



CHATHAM COUNTY NORTH

2014 JORDAN LAKE ALLOCATION REQUEST

Chatham County is requesting an allocation of water from the B. Everett Jordan Reservoir water supply pool. Chatham County is requesting a level 1 allocation of 8 percent of the available water supply and a level 2 allocation of 5 percent of the available water supply. This will enable the County to cost-effectively participate in the development of new intake, treatment, and transmission facilities located near the western side of Jordan Lake.

Chatham County
964 East Street
P.O. Box 910
Pittsboro, NC 27312

November 14, 2014

Tom Fransen
Water Planning Section Chief
Division of Water Resources
NC Department of Environment and Natural Resources
1611 Mail Service Center
Raleigh, NC 27699-1611

Dear Mr. Fransen:

This draft Jordan Lake Allocation Application being submitted by Chatham County represents a request for storage allocation required to meet Chatham North's projected needs for additional water supply capacity through 2045. This Application constitutes a request for water supply consistent with the Triangle Regional Water Supply Plan (TRWSP) that has been developed by the Jordan Lake Partnership (JLP), a collection of thirteen local governments and water systems that was created to collaboratively plan for the future of water supply in the Triangle Region, including the future use of Jordan Lake.

The JLP's TRWSP was compiled with the intention of meeting the needs of all JLP members while minimizing the impacts on other water users (including downstream systems), the environment, and rate payers. Additionally, it has been a goal of the JLP to present a set of coordinated allocation requests for Jordan Lake water supply storage that neither over-allocates the storage pool nor results in needless competition among individual water systems.

As such as, all Jordan Lake Allocation requests submitted by the Jordan Lake Partnership member entities have been made transparent to other partners, and should match the designated allocation requests that are presented in the JLPs TRWSP.

As such, Chatham County affirms that this request for an 8% Level 1 and 5% Level 2 allocation is recognized to be:

<input checked="" type="checkbox"/>	IN AGREEMENT	<input type="checkbox"/>	NOT IN AGREEMENT
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with the JLP's TRWSP.

Chatham County currently has a 6% Level 1 allocation from Jordan Lake, so this request represents an increase of 2% Level 1 and an additional 5% Level 2 allocation. As you know, Chatham County has had an allocation from Jordan Lake for an extended period of time and has always met its' financial obligations related to that allocation. As it has in the past, it is Chatham County's intention and

commitment to meet all required financial obligations associated with our present and any future Jordan Lake allocations.

Again, as you know, Chatham County initiated the first inquiries into the round 4 allocation process due to our rapidly increasing demand for water and our limited surplus capacity in the Chatham County Water Treatment Plant. This inquiry ultimately led to the formation of the Jordan Lake Partnership which Chatham County is a founding and active partner. The Jordan Lake Partnership has developed a unique Regional Water Supply Plan involving virtually all of the water utilities in the region. Chatham County is currently a partner in the Western Intake group comprised of Chatham County, the City of Durham, the Town of Pittsboro and Orange Water and Sewer Authority. This group is in the early planning stage of developing a water intake and water treatment plant on the western side of Jordan Lake.

As background, the great majority of Jordan Lake is located in Chatham County and adjacent to the area of greatest water demand. Additionally, well systems in the area are traditionally poorly performing in Chatham County with inconsistent and poor yields. For these reasons it is quite apparent that Jordan Lake has been and will be the water supply source of choice for Chatham County both based on cost and quantity. No other water supply sources are remotely comparable even with a cursory analysis.

Thank you for consideration of our allocation request.

Sincerely,

Charlie Horne
County Manager

Jordan Lake Water Supply Storage Allocation
Round Four
Chatham County North
January 9, 2015

Chatham County currently has a 6% (6 MGD) Level 1 allocation from Jordan Lake. This request represents an increase of 2% (2 MGD) Level 1 and an additional 5% (5 MGD) Level 2 allocation. As you know, Chatham County has had an allocation from Jordan Lake for an extended period of time and has always met its' financial obligations related to that allocation. As it has in the past, it is Chatham County's intention and commitment to meet all required financial obligations associated with our present and any future Jordan Lake allocations.

Chatham County initiated the first inquiries into the Round 4 allocation process due to our rapidly increasing demand for water and our limited surplus capacity in the Chatham County Water Treatment Plant. This inquiry ultimately led to the formation of the Jordan Lake Partnership which Chatham County is a founding and active partner. The Jordan Lake Partnership has developed a unique Regional Water Supply Plan involving virtually all of the water utilities in the region.

As background, the great majority of Jordan Lake is located in Chatham County and adjacent to the area of greatest water demand and where we predict the most rapid future development.

Additionally, well systems in the area are traditionally poorly performing in Chatham County with inconsistent and poor yields. For these reasons it is quite apparent that Jordan Lake has been, and will continue to be, the water supply source of choice for Chatham County both based on cost and quantity. No other water supply sources are remotely comparable even with a cursory analysis.

Granting this request will enable the County to cost-effectively participate in the development of new intake, treatment, and transmission facilities proposed near the western side of Jordan Lake and shared with one or more other utilities. In addition to Chatham County, these "Western Intake Partners" include the City of Durham, Orange Water and Sewer Authority (OWASA), and the Town of Pittsboro, have all collaborated in a recent engineering study that established the technical, economic, environmental, and institutional feasibility of the proposed joint venture. The City of Durham has taken a lead role in this process and invested approximately \$100,000 in the initial study.

The proposed regional facilities would enable Chatham County to rely on Jordan Lake in meeting projected water demands through 2045. Similarly, this proposal would allow other participating utilities to supplement their existing sources and would provide much-needed regional reliability and redundancy of the Triangle Area's water supply, treatment, and transmission infrastructure. The additional 7.0% of Jordan Lake storage allocation requested is essential to making this project cost-effective for Chatham County.

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CHATHAM COUNTY NORTH

2014 JORDAN LAKE ALLOCATION REQUEST

INTRODUCTION

The Jordan Lake Partnership (JLP) has been working collaboratively since 2009 to plan for the future of the Triangle Region's water supply. They have developed a draft Triangle Regional Water Supply Plan (TRWSP) to meet the 50-year water needs of the thirteen partners listed below:

- ***Town of Apex***
- ***Town of Cary***
- ***Chatham County (North water system)***
- ***City of Durham***
- ***Town of Hillsborough***
- ***Town of Holly Springs***
- ***Town of Morrisville***
- ***Orange Water and Sewer Authority (OWASA)***
- ***Orange County***
- ***Town of Pittsboro***
- ***City of Raleigh and Merger Partners***
- ***City of Sanford***
- ***Wake County (Research Triangle Park - South)***

The draft Triangle Regional Water Supply Plan has been provided to DWR by the JLP as an accompanying document to this Jordan Lake Allocation request. The TRWSP details the planning process used to develop the regional water supply plan, and the preferred regional alternative includes projected requests for Jordan Lake water supply allocation by several of the JLP members. This introduction briefly presents the preferred regional alternative, thus providing the regional context of Chatham County's allocation request.

As part of the regional water supply planning process, JLP members collaborated to develop demand projections, identify water source options, construct and evaluate alternatives, and present a mutually-supported plan for meeting the future water supply needs of the Triangle Region. In doing so, JLP members supported each other through a careful peer review of each other's demand projections; through shared information about conservation and water use efficiency efforts; through inter-utility infrastructure planning efforts (e.g. a regional distribution system interconnection study and hydraulic model and a feasibility study for a new intake and water treatment plant on the western side of Jordan Lake); and by expanding the pool of potential water supply source options.

The 2060 future water service areas of the JLP members are shown in Figure 1.

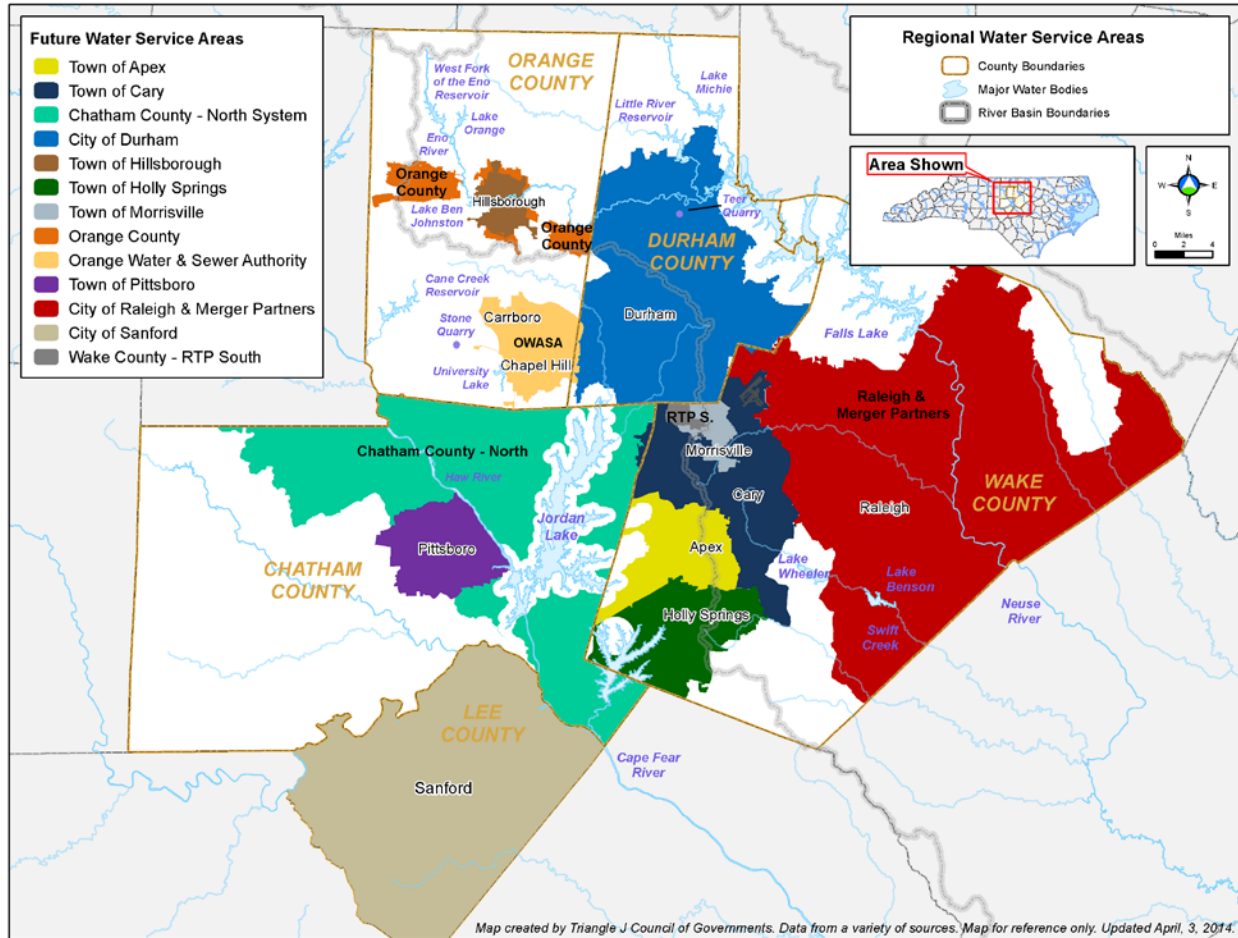


Figure 1 – Future (2060) water service areas of the Jordan Lake Partners

Developing the Regional Water Supply Plan

The TRWSP has two basic components: 1) identification of regional waters need through 2060, and 2) a plan for meeting those needs. The *Triangle Regional Water Supply Plan: Volume I – Water Needs Assessment* (May 2, 2012) presented the demand projections and initial estimates of water supply needs for all of the JLP members. The *Triangle Regional Water Supply Plan: Volume II – Regional Water Supply Alternatives Analysis* (Draft, April 18, 2014) presented the methodology used to create and evaluate regional water supply alternatives and the details of the preferred alternative and regional water supply plan. These documents should be consulted for more information. The following information summarizes the regional needs, recommended regional water supply alternative, and proposed Jordan Lake allocations requests.

Water Demand Projections and Projected Need

Figure 2 illustrates the total regional water demand projections as compared to the current available water supply (horizontal line) of 199 MGD for the thirteen JLP members. Each of the partners developed its own initial projections, which were then reviewed and scrutinized by the

other partners, and subsequently revised. The revised, peer-reviewed demand projections were approximately 10-15% lower than the initial projections, as shown by the red shaded boxes in the figure below, and represent an historic consensus among local water system professionals about the present status and long-term needs of the Triangle Region’s water supply resources.

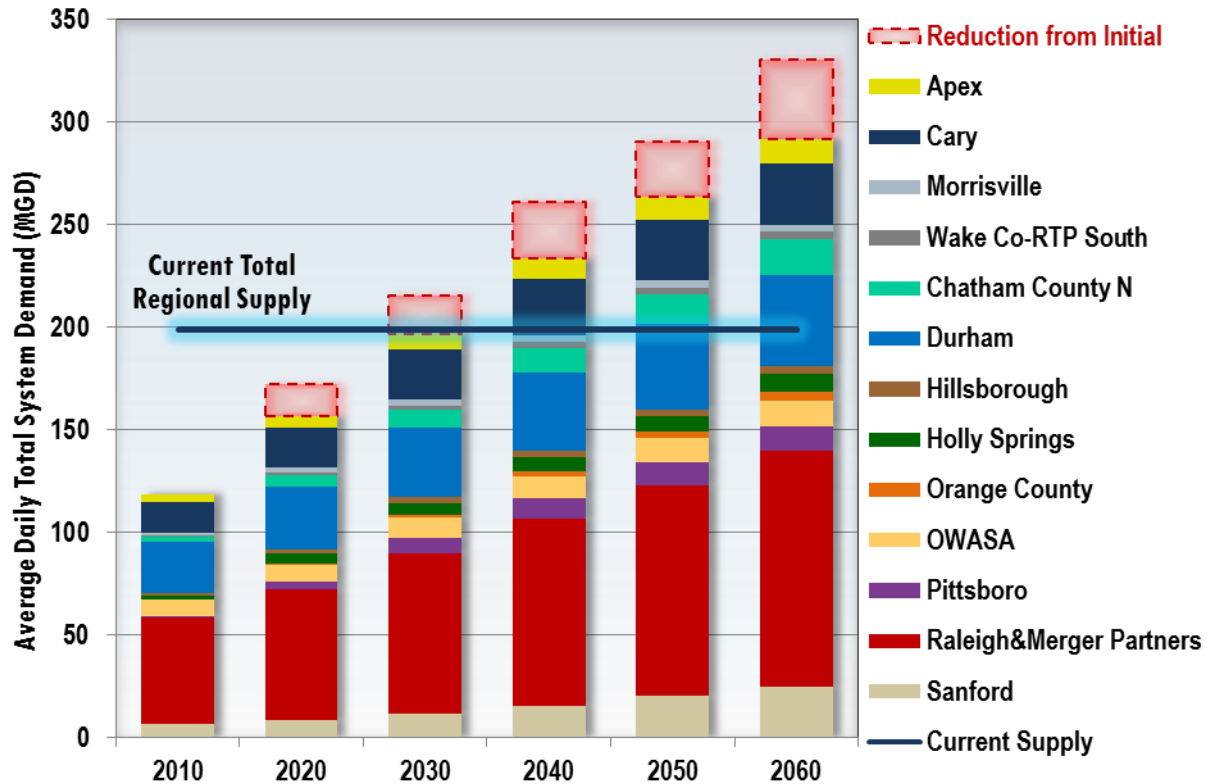


Figure 2 – Regional demand projections, current supply, and reductions due to peer review.

Each water system’s need is presented as the average day demand minus the operational yield of its existing water supply sources (including existing Level I Jordan Lake allocations). Based on demand projections and existing supply, the need for each partner was computed for the 2010 -2060 planning period at five year intervals as shown in Table 1. The italicized columns for 2045 and 2060 highlight the key planning years for the Round 4 Jordan Lake Allocation process and the 50-year TRWSP, respectively.

Table 1 – Projected Water Supply Need (MGD) by Partner

Partner	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Apex *	0.0	0.0	0.0	0.0	0.0	0.3	1.4	2.1	2.5	2.8	3.1
Cary *	0.0	0.0	0.0	0.0	0.8	2.5	3.9	5.1	6.3	6.3	6.3
Morrisville *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Wake Co. (RTP S.) *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chatham County N *	0.0	0.0	0.0	0.8	2.3	4.1	5.9	7.0	8.2	10.1	12.1
Durham *	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.1	4.0	5.2	6.5
Hillsborough	0.0	0.0	0.0	0.0	0.1	0.3	0.4	0.6	0.8	0.9	1.1
Holly Springs	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	1.1	1.6	2.1
Orange County	0.0	0.1	0.5	0.9	1.3	1.8	2.2	2.6	3.0	3.3	3.7
OWASA *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pittsboro	0.0	0.0	1.3	3.6	5.8	6.9	8.1	8.4	8.8	9.3	9.8
Raleigh & Merger	0.0	0.0	0.0	0.0	0.9	7.5	14.0	19.7	25.4	31.6	37.7
Sanford	0.0	0.0	0.0	0.0	0.0	1.3	3.2	5.8	8.4	10.6	12.8
Total	0.0	0.1	1.8	5.3	11.2	24.7	39.4	54.0	68.4	81.8	95.2

* “Need” assumes that existing Level I Jordan Lake allocations are fully utilized

Recommended Regional Alternative

The JLP evaluated a multitude of regional water supply alternatives that could meet the Region’s needs as presented in Table 1. The *Triangle Regional Water Supply Plan: Volume II – Regional Alternatives Analysis* presents the methodology and analyses used to create and evaluate those alternatives. A preferred regional alternative for meeting the future needs of all partners through 2060 emerged from this effort and is referred to hereinafter as the “JLP Recommended Alternative.”

Table 2 presents new water supply sources that would be brought online as part of the JLP Recommended Alternative. The Projected New Supply column lists the estimated yield of supply sources in addition to existing yields currently available. These sources may include either new supply sources or the expansion of existing sources.

The City of Raleigh’s preferred source options remain uncertain with regard to timing and order of implementation, but include four priority sources, any of which could provide approximately 13.7 MGD of additional yield. These include 1) a new Little River Reservoir in eastern Wake County, 2) a reallocation of Falls Lake storage to increase the available water supply pool, 3) a direct withdrawal from the Neuse River upstream of Raleigh’s Neuse River Wastewater Treatment Plant, and 4) a quarry reservoir adjacent to the Neuse River near Richland Creek. Under the JLP Recommended Alternative, Raleigh would meet its future demands from a combination of these Neuse Basin sources and would not require a Jordan Lake allocation.

Table 2 – JLP Recommended Alternative sources to be constructed.

Partner	Source Name	Basin	Type	Year Online	Projected New Supply [MGD]
Multiple	Jordan Lake – Round 4	Haw	Storage Allocation	2015	28.2
Multiple	Jordan Lake – Future Rounds	Haw	Storage Allocation	2025 – 2045	8.2
Sanford	Cape Fear River Withdrawal	Cape Fear	River Withdrawal	2025, 2045	12.8
Pittsboro	Haw River Withdrawal	Haw	River Withdrawal	2015, 2020	4.0
Hillsborough	W. Fork Eno Reservoir Expansion	Neuse	Reservoir Expansion	2015	1.2
OWASA	Stone Quarry Expansion	Haw	Quarry Reservoir	2035	2.1
Orange County	Town of Mebane Purchase	Haw	Purchase	2015-2020	2 (0.5 – 2.5)
Raleigh	Neuse Basin Option 1	Neuse	TBD	2025	13.7 (9-15)
Raleigh	Neuse Basin Option 2	Neuse	TBD	2035-2045	13.7 (9-15)
Raleigh	Neuse Basin Option 3	Neuse	TBD	2050-2055	13.7 (9-15)
TOTAL	All New Sources				96.2-100

In total, the JLP Recommended Alternative provides approximately 100 MGD of additional supply by 2060, which would meet the Region’s projected cumulative need of 95.2 MGD. The timing and sequence of bringing the new sources online would reduce the risk of a supply deficit for any partner during the planning period.

Jordan Lake Allocations proposed in JLP Recommended Alternative

The JLP Recommended Alternative includes new or expanded Jordan Lake Allocations for multiple partners, both in this current Round 4 and in future allocation cycles, to meet needs through 2060. Currently, 63% of Jordan Lake’s water supply pool has been allocated, and a 1% storage allocation is assumed to yield approximately 1 MGD of average day supply. All existing allocations are currently held by Jordan Lake Partnership members, and the JLP Recommended Alternative proposes that all of these either be maintained or increased.

Table 3 presents current allocations, the proposed Round 4 allocation requests, and future proposed allocation requests through 2060. Round 4 requests would meet water supply needs through 2045; future allocations would meet 2060 needs. Table 3 indicates the total allocation amounts for each partner, who are expected to distinguish between Level I and Level II requests in their respective Round 4 allocation applications.

Table 3 includes all thirteen JLP members, even though Raleigh and Sanford are not expected to request Jordan Lake Allocations. The Towns of Apex and Cary currently hold a combined allocation that meets the needs of both communities. The Town of Cary also has finalized long-term agreements to serve the Town of Morrisville and the Wake County – RTP South service areas and is expected to make a joint allocation request. Table 3, therefore, includes the combined amount of the proposed allocation request, but it also shows the individual partners’ amounts.

Table 3 – JLP Recommended Alternative proposed Jordan Lake Allocations by Partner (MGD).

Partner	Current	Round 4 Requests	Future Rounds (2060 Need)
Apex	8.5	10.6	11.6
Cary	23.5	28.6	29.8
Morrisville	3.5	3.5	3.6
Wake County (RTP South)	3.5	3.5	3.5
Chatham County - N	6	13.1	18.2
Durham	10	16.5	16.5
OWASA	5	5	5
Orange County	1	1.5	2
Holly Springs	2	2	2.2
Hillsborough	0	1	1
Pittsboro	0	6	6
Raleigh & Merger Partners	0	0	0
Sanford	0	0	0
TOTAL JLP	63	91.3	99.4

Moving toward implementation

The JLP Recommended Alternative is the result of more than four years of collaborative planning by the Partnership. The water supply needs of the thirteen partners have been vetted through multiple rounds of peer review and represent the most complete long-term picture of the Region’s demands compiled to date. A thorough regional water supply alternatives analysis determined that the JLP Recommended Alternative would be most acceptable in terms of implementability, environmental and community impacts, customer costs, and overall acceptance by local governments and the general public.

The JLP efforts constituted the successful collaboration – including an unprecedented level of mutual trust and respect – among local entities planning, coordinating, and moving toward implementation of a water supply plan that will meet the long-term needs of the entire Triangle Region. Individual partners will continue to operate their own systems, but the success of this regional water supply plan will depend on each partner being able to implement its respective additional water supply sources as recommended.

The partners investigated the various impacts of the JLP Recommended Alternative – including effects on the environment, downstream water users, and the general public – and found these impacts to be acceptable and preferable to those of the other options. Hydrologic effects of

the JLP Recommended Alternative were modeled with the recently updated Cape Fear-Neuse Basin OASIS model. Preliminary results indicate the proposed alternative will meet long term demands without creating downstream shortages; is considered to be the most implementable from a regulatory and political perspective; and provides for coordinated allocation requests among JLP members.

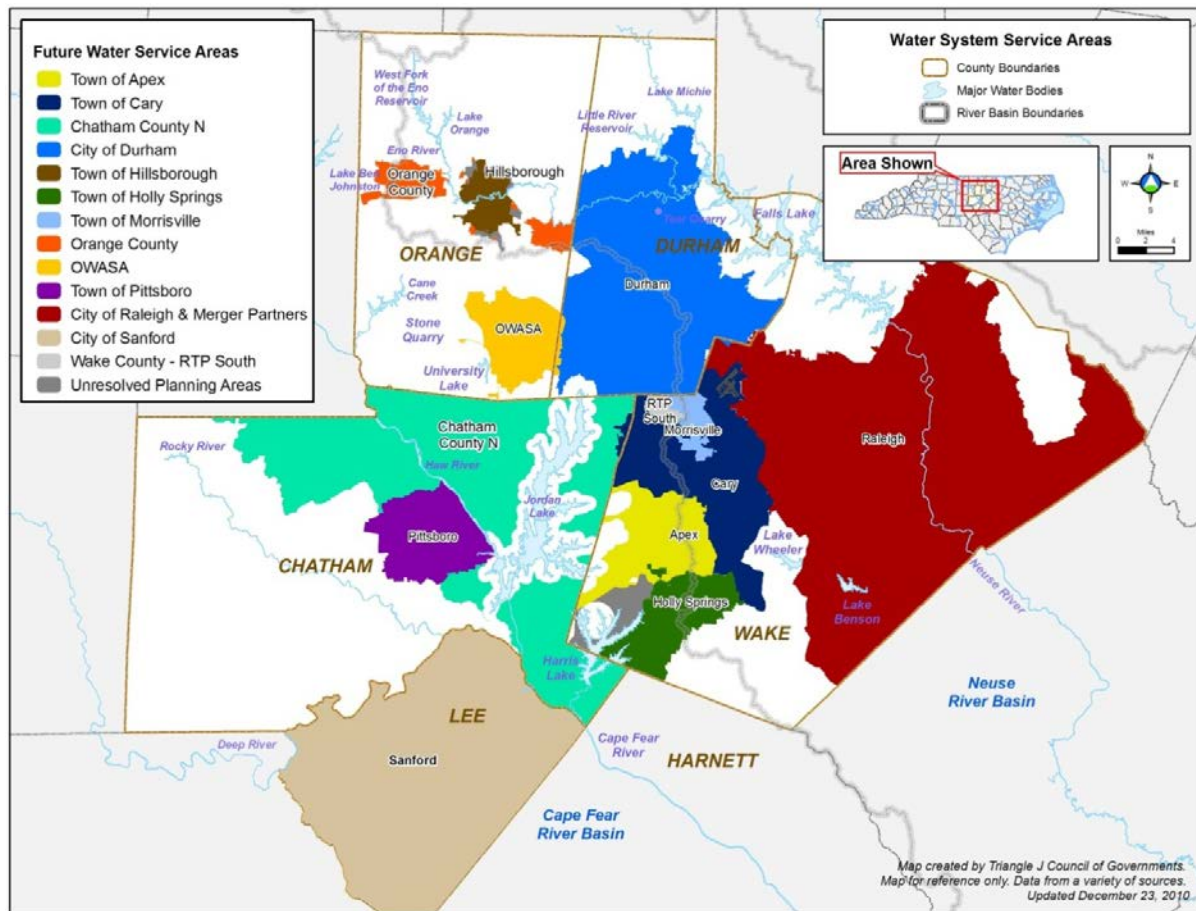
The remainder of this document presents the allocation request for Chatham County.

SECTION I. WATER DEMAND FORECAST

Chatham County initiated the first inquiries into the round 4 allocation process due to our rapidly increasing demand for water and our limited surplus capacity in the Chatham County Water Treatment Plant. This inquiry ultimately led to the formation of the Jordan Lake Partnership which Chatham County is a founding and active partner. The Jordan Lake Partnership has developed a unique Regional Water Supply Plan involving virtually all of the water utilities in the region. Chatham County is currently a partner in the Western Intake group comprised of Chatham County, the City of Durham, the Town of Pittsboro and Orange Water and Sewer Authority. This group is in the early planning stage of developing a water intake and water treatment plant on the western side of Jordan Lake.

As background, the great majority of Jordan Lake is located in Chatham County and adjacent to the area of greatest water demand. Additionally, well systems in the area are traditionally poorly performing in Chatham County with inconsistent and poor yields. For these reasons it is quite apparent that Jordan Lake has been and will be the water supply source of choice for Chatham County both based on cost and quantity. No other water supply sources are remotely comparable even with a cursory analysis.

Figure I.1 – Map of Service Area



User Sectors

Table I.1. Water Use Sectors

Use Sector	Use Sub-sector	Description
Residential		Single family homes, duplexes, apartments — including apartments with a master meter, and irrigation to these buildings.
Non-Residential		Commercial businesses, industrial & institutional customers are all included in this sector. Examples include; county facilities, schools, nursing homes, and daycares as well as irrigation to these buildings.
Industrial		Included in Non-Residential.
Institutional		Included in Non-Residential.
Non-Revenue	Distribution System Process	Flushing water
	Water Treatment Process	Raw water used at WTP & returned to Jordan Lake. Not sent into the distribution system.
	Other Non-Revenue	Firefighting, leakage.

Chatham County - North includes commercial businesses, industrial and institutional customers under the “non-residential” category. Examples of users under this category include county facilities, schools, nursing homes, daycares, and commercial customers as well as irrigation uses at those facilities.

In general, non-revenue water falls into unbilled water use for system management, maintenance and operations purposes, and all other non-revenue water use. The JLP members agreed in principle to separate the “System Process” usage according to where it was used, namely, at the water treatment plant or in the distribution system. This distinction is important as the “Distribution System Process” water is by definition “finished water” and is most easily calculated as a function of total consumed or total finished water entering the distribution. “WTP Process Water” is generally calculated as the portion of the “raw water” that is pulled from the source that does not become “finished” water. The “Other Non-Revenue” category is a flexible category for many other types of unbilled use, but primarily should represent loss through leakage. The JLP members have been working towards completing water audits, and better measuring flows to be able to better categorize system process uses, reduce apparent losses, and more accurately define true losses in the “Other Non-Revenue” category.

Breaking down what was once “Unaccounted-for Water” into these three components allows a more complete representation of non-revenue water uses that is still flexible enough to be used by multiple JLP members. While the definitions of the sectors are largely similar, differences in system operation lead to differences in the specific components within the sectors. Furthermore, each partner used slightly different methodologies to compute the actual demand in each of these subsectors. Thus, the single percentage factor in the “Population & Demand Projections” tab of the JLA4 Excel Workbook (DWR, 2012) is not

sufficient to represent these sectors, and the projections are instead entered as the projected values in units of million gallons per day (MGD).

Demand Projections

Sector Projections

The basic methodology for projecting development coincides with methodology used by Triangle Region MPOs in their Transportation Demand Model. The projection methodology is a parcel-based land use analysis supported by water usage rates from planning figures, water use data and economic development data.

Determining the developable land area was the first task. The future service area was determined by the IBT basin boundary (which divides the Chatham County – North system from other Chatham County water systems) and the Chatham County boundary. Additionally, the areas in the Pittsboro ETJ were removed. The remaining area was intersected with the parcel information in the 2005 Chatham County GIS data.

In the GIS parcel data, there were 33 prototype parcel classifications, which were divided among the following categories:

- Natural and Undeveloped Land Prototypes
- Residential Density Prototypes
- Non-Residential and Mixed Use Land Use Prototypes
- Government Infrastructure Project Types That Can Be Assigned To Parcels

Development was then assigned to the parcels based on several criteria. If there were existing plans for development on the parcels, those were assumed to be completed. For other parcels, development was assigned based on the prototypes and according to parcel size, zoning, and presence of existing structures. Undeveloped parcels were then classified as residential, non-residential, untraditional (open space, parks, etc.), and vacant.

The residential parcels were then used to develop residential build-out estimates and population estimates. First, 5% of the land area was set as undevelopable to account for non-suitable terrain, rights of way, etc. Then, existing residential development was analyzed to determine densities and occupancy rates. The number of base-year residential units was calculated from TAZ data for the service area. Using census data and TAZ data, the vacancy/occupancy rates were computed as 6.6%/93.4%. Census data (2010) were used to get a pph figure of 2.35. Future housing density was assumed to follow current conditions, and using this density, and the total number of developable parcels, build-out conditions were computed for housing units. Build-out population was calculated using pph and occupancy rates. The development conditions were assumed to reach ~95% of build-out by 2060. Development rates through 2040 were estimated to follow recent average trends on a linear basis (~6,690 units per decade), and after 2040, growth was projected to continue at 2.5% per year. Population for each projection year was calculated by multiplying housing units by 2.35

pph. Finally, residential demand was calculated by multiplying the number of households by the household water use rate, currently 200 gallons per household per day (gphd). New development being considerably larger and more landscaped than existing stock, the rate is projected to increase to 205 gphd in 2020 and 210 gphd in 2030-2060.

Non-residential demand was computed relative to residential demand. Over time, Chatham County's ratio of non-residential to residential demand has been growing at a relatively constant rate. This change occurs as Chatham County grows and attracts more commercial development to support its residential population and the area becomes more attractive for businesses and industry. This trend is expected to continue. Currently the ratio is 0.27, which is projected to grow to 0.3 by 2020, and reach 0.35 in 2030. By 2040, it is projected to reach 0.4 and cease changing thereafter. In each projection year, residential demand is multiplied by these factors to estimate non-residential demand.

Chatham County – North's Jordan Lake Treatment Plant uses a considerable amount of raw water in the treatment process to treat Jordan Lake water to drinking water standards. WTP Process water accounts for 14% of total demand, which is expected to continue into the future. Chatham County – North's large distribution system and currently low demand (relative to miles of pipe) results in a large need for distribution system flushing and maintenance. Currently, this amounts to 25% of total demand. As development fills in and the water system makes upgrades to the distribution system, it is expected this percentage will be reduced considerably. See Table 27 for the projected declines in percentage terms. Finally, other non-revenue usage is currently 7% of total demand, which is expected to remain constant.

Chatham County's primary avenue for water efficiency gains is in reducing its non-revenue water as a percentage of total production. Chatham County – North relies on Jordan Lake water for its raw water supply, which is difficult to treat to the Safe Drinking Water Act requirements, and requires a significant amount of water treatment process water. As Chatham's water demand increases, this WTP process water should decline as a percentage of total water use because a certain amount of the WTP use is relatively fixed regardless of the amount of production. Chatham County – North also uses a significant amount of finished water on flushing because of the layout of its distribution system and the need to manage disinfection by-products. The current high distribution process water usage should decline as Chatham County's user base expands and evens out consumption. Combined with careful management of the treatment process, distribution system, and system improvements, Chatham County should be able to reduce its non-revenue water use in the future.

Population Estimate

Chatham County – North's population estimates are derived from a TAZ-based land use and build-out analysis and census data on population characteristics. The methodology for estimating population was based on estimates of residential development and planning and census data. The Water Demand Projection subsection below explains how residential development (and other development) was computed.

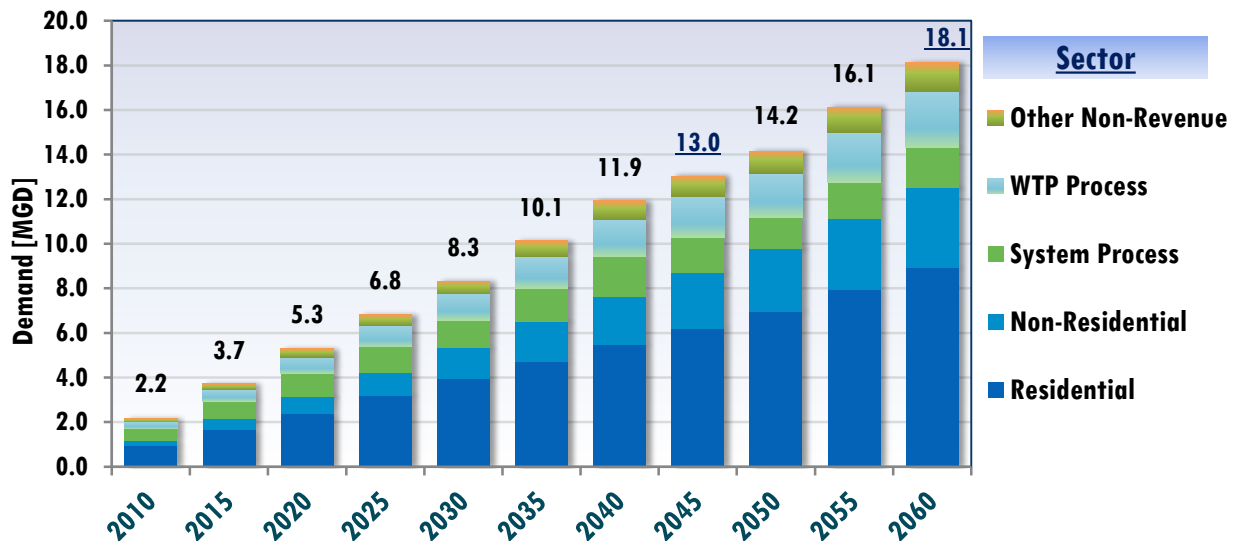
Table I.2 - Population projections for service area

2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
10,200	18,100	25,900	33,800	41,600	49,500	57,300	65,400	73,400	83,700	94,000

Table I.3 – Water Demand Projections by sector table.

Sector	Subsector	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Residential	Residential	0.92	1.66	2.40	3.18	3.95	4.70	5.45	6.21	6.97	7.95	8.93
Non-Residential	Commercial, Industrial, Institutional.	0.25	0.49	0.72	1.05	1.38	1.78	2.18	2.49	2.79	3.18	3.57
System Process	System Process	0.54	0.80	1.06	1.16	1.25	1.52	1.79	1.61	1.42	1.62	1.81
System Process	WTP Process	0.30	0.52	0.74	0.96	1.17	1.42	1.67	1.83	1.98	2.26	2.54
Non-Revenue	Other Non-Revenue	0.15	0.26	0.37	0.48	0.58	0.71	0.83	0.91	0.99	1.13	1.27
TOTAL		2.16	3.73	5.29	6.81	8.33	10.13	11.92	13.04	14.15	16.14	18.12

Figure I.2 – Demand Projections by Sector



References

Triangle Regional Water Supply Plan

Section II. Conservation and Demand Management

Attached is the Chatham County water conservation ordinance (Attachment 1) including amendments. The ordinance is very similar to the majority of the other jurisdictions in the area in most respects. The main difference being Chatham has one of the most restrictive year round water use provisions in place. Irrigation is restricted to two days per week with 1 inch of water use per week maximum. The allowable hours of irrigation are also fairly restrictive, being between the hours of midnight and 7:00 a.m.

The primary purpose for these restrictions is to reduce the peak demand during the hot weather months. Chatham has been pushing up against the capacity of the water treatment plant for several years. These restrictions were put in place to keep the demand below the plant capacity while plans are being made to build a new intake and water treatment plant on the western side of Jordan Lake. It is very likely without putting in place these restrictions the peak demand for water would be higher than it has been the last several years.

Chatham's water pricing has also likely resulted in somewhat reduced demand. Chatham's residential rate at \$7.00/1000 gallons for the first 5000 gallons is one of the highest in the area with increasing block rates of \$8.50/1000 gallons for 5000-8000 gallons and \$10.50/1000 gallons for any use over 8000 gallons. Again, this appears to be one of the most aggressive conservation pricing policies in the area and the state.

Chatham County has a stated goal of repairing 100% of minor system leaks within 24-48 hours. Chatham County has typically been able to make repairs in this time frame 90 - 95% of the time. Again, the goal is to make these repairs within 24 – 48 hours 100% of the time.

Chatham completes a water audit report monthly and aggregates those reports for the year. According to the data for the calendar years 2012 and 2013, Chatham County has made substantial progress in reducing plant process water from approximately 14% to a little over 7%. Likewise, the distribution process water has been reduced from 25% to 7%. These percentages are not likely to go much lower until a new plant is constructed and additional density is achieved in the distribution system. Nonetheless, remarkable reductions have been realized in a relatively short time by plant process improvements, plant repairs in the backwash piping, improved flushing protocols, reduced disinfection by-products formation and improved chlorine residual management.

Chatham County's public education program consists primarily of electronic communications usually in the early spring of each year to remind customers of the water conservation ordinance and specifically the irrigation schedules and restrictions. This information is also posted to the County webpage. These actions are supplemented with press releases and print notices inserted with the monthly bills.

There is a significant amount of reclaimed water that is presently being used in Chatham County but those efforts are generally associated with privately operated, non-discharge wastewater systems. The developments that currently fall into this category are The

Governor's Club, The Preserve, Chapel Ridge, The Legacy, The Parks at Meadowview, and Briar Chapel. Since Chatham County does not operate a wastewater plant of any consequence, there really isn't an opportunity for the County to provide reclaimed water. Currently, there are no plans for the County to develop a significant wastewater system.

References

Chatham County Water Conservation Ordinance

SECTION III. CURRENT WATER SUPPLY

Available Supply

The Chatham County North System currently has only one source of water, which is Jordan Lake. The great majority of the lake is located in Chatham County and is contiguous to the North System service area. Chatham County does not operate its own intake, and raw water from Jordan Lake is provided through the Cary - Apex intake and raw water force main, which is located relatively close to the Chatham County Water Treatment Plant. Chatham County's current allocation from Jordan Lake is 6 MGD.

Chatham County is currently constructing a transmission line from the City of Durham to the Governor's Club water storage tank in Chatham County. This project should be completed by July 2014. When complete, Chatham County will be able to purchase a maximum of 3 MGD from Durham. This supply will be available through 2028. The purpose of this supply is to provide water during the interim period while Chatham County and other jurisdictions move forward with constructing an intake and water treatment plant on the western side of Jordan Lake.

Another possible source of water is from the Town of Pittsboro. Chatham County participated financially in the expansion of the Pittsboro Water Treatment Plant in the mid 1990's. That contribution gave Chatham County the right to .5 MGD of water from the Pittsboro plant. However, due to large differences in the two systems hydraulic grades (Chatham being much higher) and the relatively small diameter piping connecting the two systems, it is not currently feasible to transfer any appreciable amount of water from Pittsboro to Chatham County.

Chatham County currently has an interconnection with the City of Sanford which is the primary water supply for the Chatham County Asbury System. With some system reconfiguration, water from the City of Sanford could be supplied to the Chatham County North System. Due to the recent addition of two new pump stations, available supply to the Chatham County North System is approximately 0.5 MGD. Due to the differences in the hydraulic grades between the North System and the Asbury System, water can most readily be provided to the southern portion of the North system.

Figure III.1 – Map of Water Supply Sources and Treatment Plants

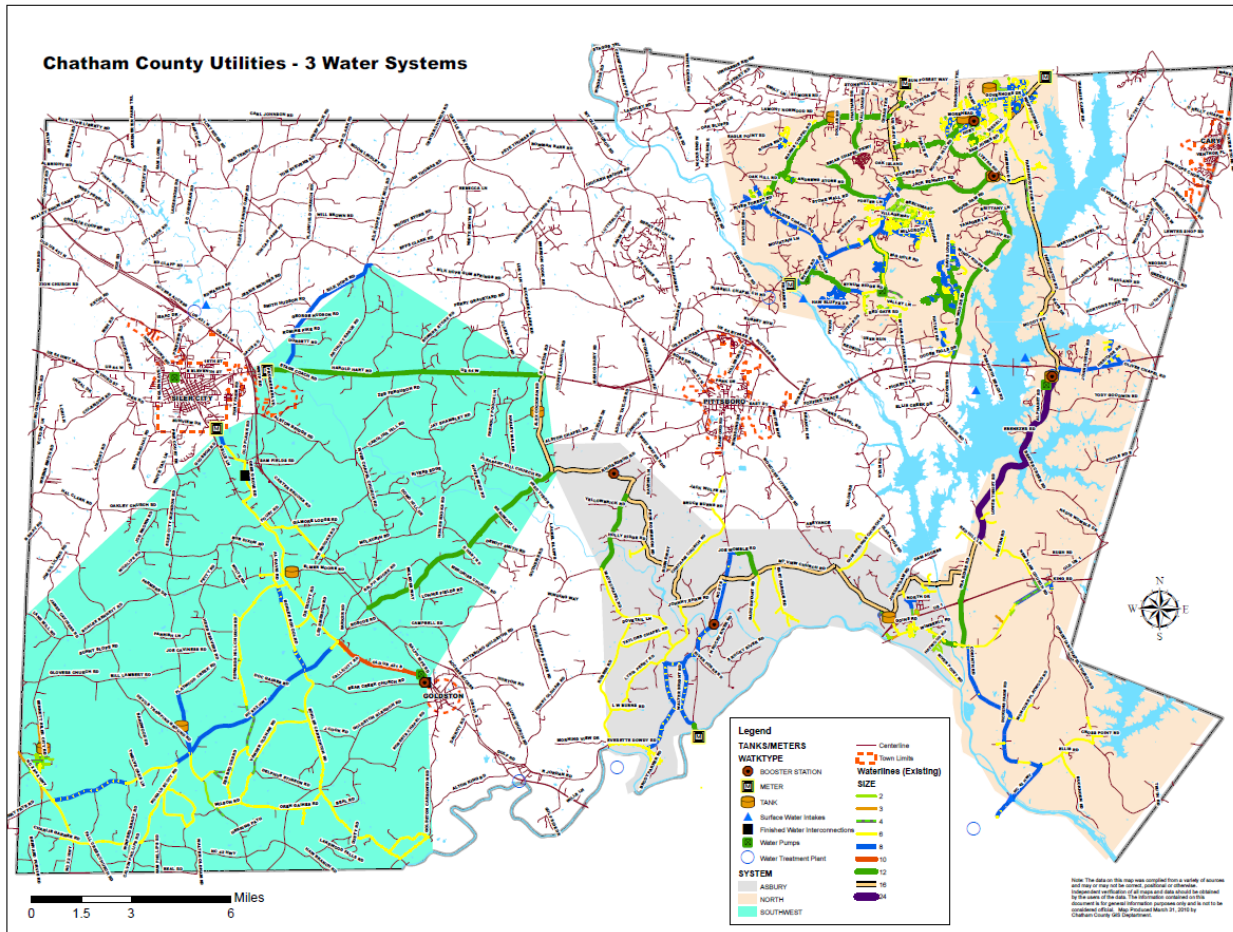


Table III.1 – Existing Source Summary, Available Supply

Source	PWSID	SW or GW	Basin	WQ Classification	Available Supply (MGD)
Jordan Lake Reservoir	03-19-126	SW	Haw (2-1)	WS IV B NSW CA	6.0
TOTAL					6.0

SECTION IV. FUTURE WATER SUPPLY NEEDS

The Demand Projections presented in Section II have been peer-reviewed by the Jordan Lake Partnership, and represent the best available estimate of the future demand for Chatham County - North for average day demand over the planning horizon.

The Jordan Lake Partnership, of which Chatham County is a member, developed a Triangle Regional Water Supply Plan. During the development of this plan each participant formulated a water demand forecast that met the requirements for an allocation request. The following is basically a restatement of the methodology contained in the Regional Water Supply Plan.

Historical Finished Water Use

In 2010, the Chatham County – North Water system produced an average of 1.72 MGD of finished water. Chatham County- North’s SFR customers used an average of 199.9 gpd per connection.

Table 25. Chatham County – North Historical Finished Water Production.

Year	Production (MGD)
1995	-
1996	-
1997	0.62
1998	0.70
1999	0.65
2000	0.69
2001	0.88
2002	0.94
2003	1.04
2004	1.17
2005	1.19
2006	1.33
2007	1.55
2008	1.51
2009	1.72
2010	1.72

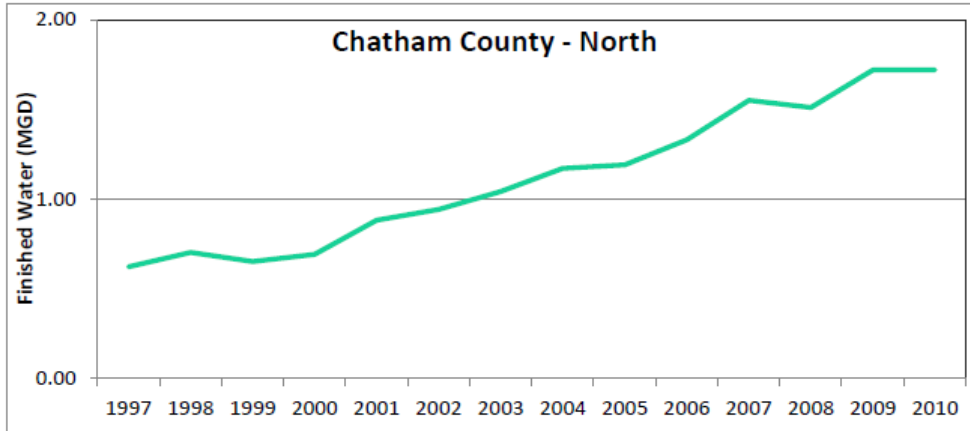


Figure 14. Chatham County – North Historical Finished Water Use (MGD).

Future Demand

Table 26. Chatham County - North Future Projected Demand (MGD).

Sector	2010	2020	2030	2040	2050	2060
Residential	0.92	2.40	3.95	5.45	6.97	8.93
Non-Residential	0.25	0.72	1.38	2.18	2.79	3.57
WTP Process	0.30	0.74	1.17	1.67	1.98	2.54
Distribution Process	0.54	1.06	1.25	1.79	1.42	1.81
Other Non-Revenue	0.15	0.37	0.58	0.83	0.99	1.27
Total	2.16	5.29	8.34	11.92	14.15	18.11

Table 27. Chatham County- North Future Projected Demand (percent of total demand).

Sector	2010	2020	2030	2040	2050	2060
Residential	43.0%	45.0%	47.0%	46.0%	49.0%	49.0%
Non-Residential	11.0%	14.0%	17.0%	18.0%	20.0%	20.0%
WTP Process	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%
Distribution Process	25.0%	20.0%	15.0%	15.0%	10.0%	10.0%
Other Non-Revenue	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Total	100%	100%	100%	100%	100%	100%

Chatham County – North projected its future demand in only the residential/non-residential sectors listed in the tables above.

Table IV.1 - Projected Water Needs (5-year increments)

	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Demand	2.2	3.7	5.3	6.8	8.3	10.1	11.9	13.0	14.2	16.1	18.1
Existing Supply	6	6	6	6	6	6	6	6	6	6	6
Demand as % of Supply	36%	62%	88%	114%	139%	169%	199%	217%	236%	269%	302%
Need	0.0	0.0	0.0	0.8	2.3	4.1	5.9	7.0	8.2	10.1	12.1

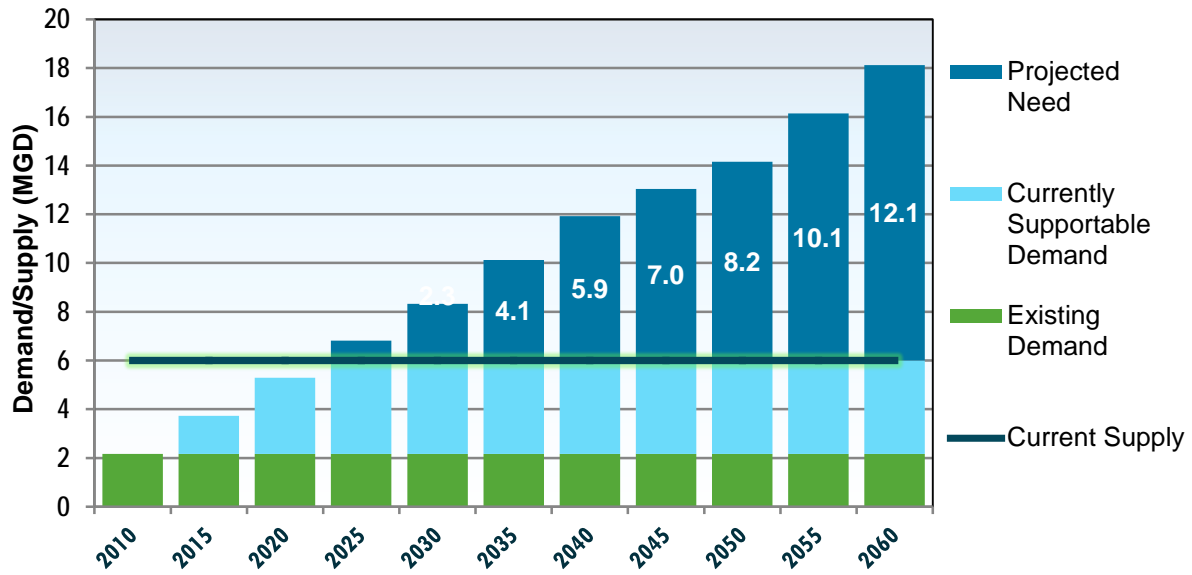


Figure IV.1 – Projected Demand and Need relative to Current Supply

References

Triangle Regional Water Supply Plan

SECTION V. ALTERNATIVE WATER SUPPLY OPTIONS

Source Options

Alternative 1 (Preferred) – Jordan Lake Allocation in Conjunction with New Regional Intake, Treatment, and Transmission Facilities Constructed Near the Western Side of Jordan Lake and Shared with Other Utility Providers

Description

Four members of the 13-member Jordan Lake Partnership (Chatham County, the City of Durham, OWASA, and the Town of Pittsboro) are jointly evaluating options for a new regional intake and treatment plant located on the western side of Jordan Lake to supplement their existing supply sources and to provide more regional reliability and redundancy. The initial concept, for which the technical, economic, institutional, and environmental feasibility were recently estimated, includes a new intake structure, pumping facilities, and water treatment plant located south of U.S. Highway 64 near the western shore of Jordan Lake, as well as major finished water transmission lines to serve the four participating entities. Raw water intake and pumping facilities would be constructed within the lake and/or on land leased from the Army Corps of Engineers. The treatment plant would be constructed on property currently owned by OWASA adjacent to Corps land. Additional concept-level configurations are being developed and will be evaluated, but the participating Partners have agreed that the scenario outlined in this narrative provides a consistent technical and economic basis for developing their respective Jordan Lake allocation requests. Additional scenarios remain under investigation. A concept-level map of the potential regional facilities is presented in Figure V.1.

Facilities would be initially sized to meet maximum day demands of 44 MGD anticipated through 2040, and then expanded to meet ultimate (2060) maximum day demands of 60 MGD. Capital costs for this scenario include a new raw water intake, raw water transmission facilities, a water treatment plant (WTP), plus shared as well as separate finished water pumping facilities and transmission lines. Where applicable, costs include the purchase of land/easements, environmental mitigation, and Jordan Lake water supply storage allocations. For the concept-level planning purposes of this analysis, capital funding for the initial facilities is assumed to occur in 2015, with construction completed in 2020. The new intake facilities and all pipelines would be sized to meet ultimate (2060) maximum day demands. Each Partner's share of the capital costs of those facilities was calculated as the ratio of that Partner's ultimate demand to the total ultimate facility capacity. The WTP and shared pumping facilities are assumed to be constructed in two phases, with initial sizing to meet interim (2040) demands of 44 MGD. Each Partner's share of the capital costs for those initial facilities was calculated as a direct ratio of that Partner's interim demand to the total interim capacity of the WTP and shared pumping facilities. Facility expansion is based on ultimate capacity of 60 MGD in 2060, with financing for the expansion assumed to occur in 2035 and construction completed in 2040. Each Partner's share of the capital cost for the expansion was calculated as a direct ratio of that Partner's incremental increase in demand (from 2040 to 2060) to the total increase in facility capacity.

As noted, initial and ultimate facility capacities of 44 and 60 MGD are based on projected maximum day demands in 2040 and 2060, respectively.

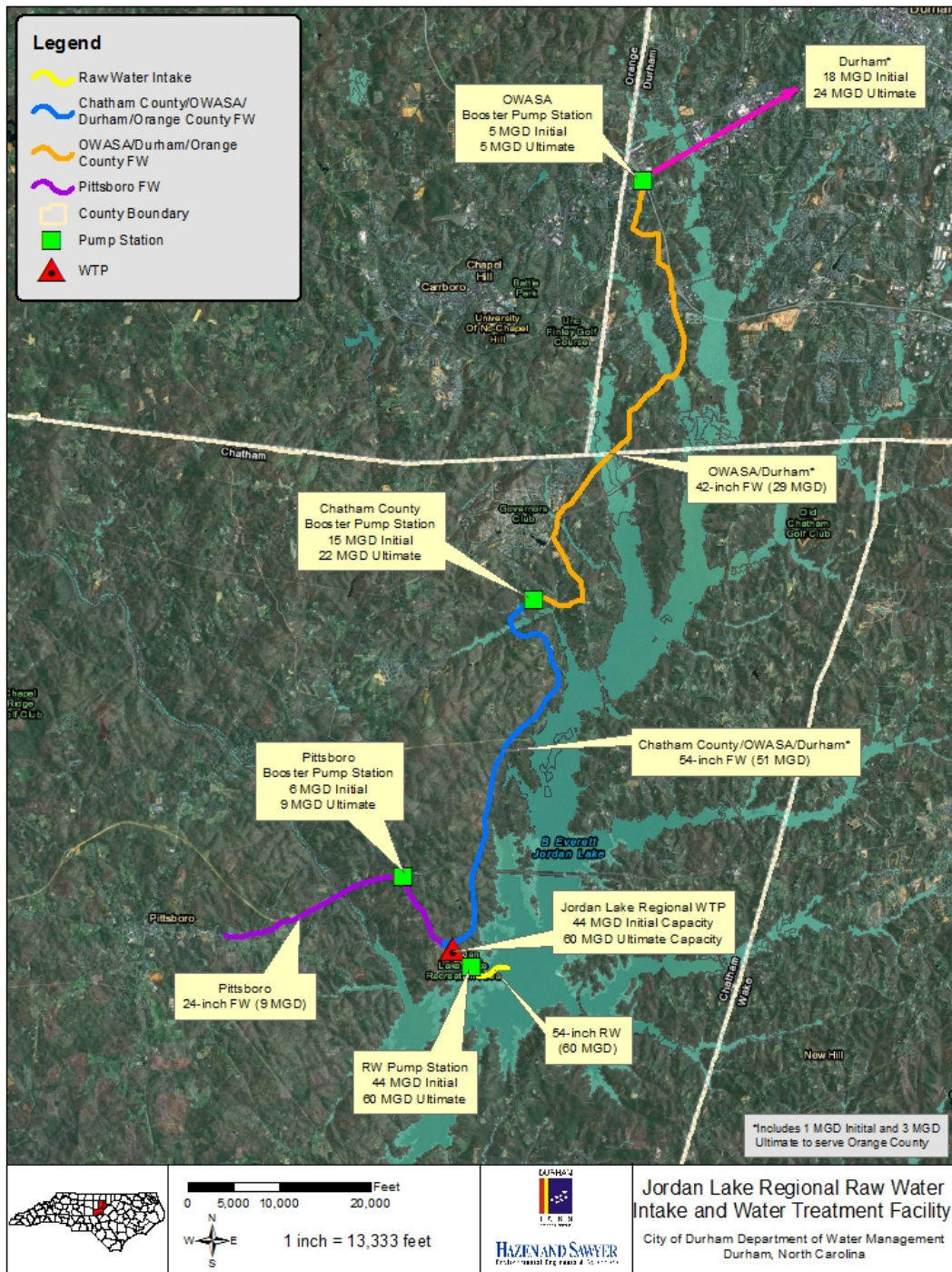


Figure V.1. Concept-level map of proposed regional facilities at Jordan Lake.

A summary of ultimate estimated capital costs (in 2010 dollars) is presented below (It is assumed that Orange County’s share of the costs would ultimately be reflected in an agreement with the City of Durham, which would provide Orange County’s Jordan Lake water through Durham’s finished water interconnection with the Town of Hillsborough):

Summary of Conceptual-Level Capital Cost Estimates of Proposed Jordan Lake Regional Facilities			
Partner	Total Allocation Request (MGD)	Cost Share (\$M 2010)	Cost Per MGD of Allocation (\$M 2010)
Chatham County	18	\$102.1	\$5.67
Durham	16.5	\$115.0	\$6.97
OWASA	5	\$30.5	\$6.10
Orange County *	2	\$18.1	\$9.05
Pittsboro	6	\$46.5	\$7.75
Total	47.5	\$312.2	\$6.57

**** Orange County to be served via Durham-Hillsborough finished water interconnection; costs to be recovered through interlocal agreement.***

Unlike the other water supply alternatives considered in Chatham County’s application package, *this Jordan Lake scenario and associated capital costs comprise new finished water (treatment and transmission) as well as raw water facilities.* Unit cost comparisons to the other supply alternatives, which do not include finished water treatment and transmission facilities, may therefore be misleading; that is, the unit costs for Jordan Lake may appear to be disproportionately high, as they do not represent a leveled or “apples to apples” cost comparison to the other Alternatives. However, to disaggregate treatment and finished water transmission costs from the raw water components of this Jordan Lake scenario would not be meaningful, due to the locations and distances from Chatham County’s and Pittsboro’s existing treatment plants and service areas. Raw-water-only scenarios are not feasible for Chatham County, Orange County, or Pittsboro, but might be viable for OWASA and/or Durham. Such raw-water-only scenarios are still being evaluated.

The estimated total capital cost of \$312 million represents an average unit cost of \$6.57 million per MGD of Jordan Lake water supply allocation; however, as noted above, this includes finished water treatment and transmission facility as well as “water-supply-only” costs.

No specific agreements are in place among the Partners regarding possible financing, ownership, governance, or operation of a regional venture, but potential institutional arrangements could include single-entity ownership and operation (e.g., Durham, OWASA, Chatham County, or Pittsboro); shared or joint ownership, such as the present Cary-Apex water

treatment or Western Wake (Cary-Apex-Morrisville) wastewater partnerships; interlocal agreements among individual utilities; or the creation of a new entity, such as a Jordan Lake water supply authority. The actual institutional setting for any new regional enterprise would be established by the appropriate local policy-making bodies.

Jordan Lake Allocation Request

Chatham County currently holds a 6% Level I allocation and is requesting an increase of 2% Level I and 5% Level II for a **total of 8% Level I and 5% Level II allocation (13% total allocation including Level I and Level II)** to meet its projected needs as presented in Table IV.1 and Figure IV.1.

Available Supply

The requested **7 MGD** of additional Jordan Lake allocation would increase Chatham County's total available supply from its present capacity of **6 MGD** to **13 MGD**, which will be needed to meet projected demands of 13.0 MGD in 2045.

Environmental Impacts

Because this alternative does not require the development of a new water supply source, it represents none of the major environmental and social costs of a new reservoir, such as private land (and home) acquisition, road relocation, significant habitat destruction, and so forth. The direct environmental impacts of the proposed Jordan Lake regional facilities will be largely limited to the temporary and localized construction activities required for new raw water intake, pumping, treatment, and finished water transmission facilities. Virtually all of these will occur on property already owned by public entities or located within public rights of way. It is clear that this option represents the least environmental impacts of any of Chatham County's water supply alternatives.

Water Quality Classification

The water quality classification of Jordan Lake in the vicinity of the proposed intake is **WS-IV, NSW** and would remain unchanged with this alternative.

Timeliness

The timeliness of this alternative is **Acceptable**. Although the 2020 startup date for the proposed regional facilities may not be achievable, Chatham County's needs will be adequately addressed if the new facilities are in service by the late 2020s.

Interbasin Transfer

Neither Chatham County, Durham, Orange County, OWASA, nor Pittsboro currently transfer water out of the Haw River Basin (2-1). Implementation of the proposed Jordan Lake regional alternative would eventually involve an interbasin transfer (IBT) of up to 1.5 MGD from the Haw

to the Neuse River Basin (10-2) by Orange County, but no transfers would occur by the other four entities. Orange County would access its Jordan Lake allocation via a finished water interconnection between the Durham and Hillsborough systems, but would not require IBT certification because its transfer would not exceed the 2 MGD statutory threshold.

Water obtained and treated from Chatham County's Jordan Lake allocation would be used only within the Cape Fear (Haw) portion of Chatham County's service area and therefore would not require IBT certification.

Regional Partnerships

This alternative was developed in coordination with the Jordan Lake Partnership and is fully consistent with the Triangle Regional Water Supply Plan as adopted by the Partnership.

Technical Complexity

This alternative is considered to be **Technically Complex**, but is well within the practical range of existing utility engineering practices and procedures.

Institutional Complexity

This alternative would be **Institutionally Complex** due to the involvement of multiple units of local government who must collaborate and reach agreement on issues of financing, governance, operation, maintenance, etc. of the new facilities. The existing Cary-Apex agreement regarding the construction, ownership, and operation of the Cary-Apex Water Treatment Facility; the Cary-Apex-Morrisville partnership in developing the new Western Wake Wastewater Facility; and the utility merger agreements among Raleigh and other Wake County municipalities have all demonstrated the economic and operational benefits of shared facilities. It is also believed that the successful and ongoing staff level collaboration demonstrated by the Jordan Lake Partnership and the recent focus of the Western Intake Partners represent a solid foundation on which the respective local policy boards can develop formal institutional agreements.

Political Complexity

This alternative would be **Politically Complex** due to the institutional factors described above.

Public Benefits

This alternative will provide **Substantial Public Benefits** through the economies and efficiencies of scale available through shared facilities. Such a regional approach also simplifies or streamlines regulatory oversight and is better able to respond to the evolving regulatory environment. Similarly, such an approach is better able to incorporate new and emerging technologies than may be feasible or cost-effective with more traditional individual local projects. Most importantly, additional intake and treatment facilities on the western side of Jordan Lake would provide much-needed regional reliability and redundancy in the event of

unplanned/emergency conditions or other operational contingencies at the existing Cary-Apex facilities or elsewhere in the Triangle. Also, as noted above, this alternative requires the development of no new water supply sources; ensures a reliable and sustainable water supply for the participating entities; and reduces the volume of Durham's existing and future interbasin transfers out of the Neuse River Basin.

Consistency with local plans

This alternative is **Consistent** with local growth management and development plans. The proposed capacities of new intake, treatment, and transmission facilities have all been scaled to meet the future water demand projections of each participating entity.

Total Cost

Per the revised February 2014 guidance from DWR, estimates have been developed in 2010 dollars for the *total capital costs* and *unit capital cost per MGD of additional supply (yield)* for this alternative. As noted above, Chatham County's share of the total capital cost is estimated as **\$102.1 million**, which represents a unit capital cost of **\$5.67 million per MGD** of additional supply. It is important to emphasize that these costs include Chatham County's portion of new water treatment plant and finished water transmission facilities in addition to the "water-supply-only" elements of the other alternatives evaluated in this application.

References

Hazen and Sawyer, *Jordan Lake Joint Development – Western Intake, WTP, and Related Facilities, April 24, 2014 (analysis in progress as of November 14, 2014)*

Alternative 2 – New Intake on the Cape Fear River in Harnett County

Raw water would be pumped from the Cape Fear River in the reach between Jordan Lake Dam and the Town of Lillington. Water would be withdrawn using either a reservoir intake within the Buckhorn Dam impoundment or a run-of-river intake. Based on an initial evaluation of this reach, a range of approximately 11 mgd to 31 mgd of average day water supply should be available in the summer peak demand months. Water would be treated either at a new WTP, between the intake location and the connection to the County's current distribution systems, or at the existing WTP. To transmit water from the Cape Fear River to the County's current distribution facilities would require approximately 21 miles of pipeline, depending on the point of interconnection. Alternatively, Chatham County could partner with other entities in lieu of building a new intake. The City of Sanford and Harnett County have existing raw water facilities on this reach of the Cape Fear River and present partnership opportunities for facility expansions. In that case, new finished water transmission capacity would be needed. Progress Energy has expressed its intent to construct a new intake and raw water pipeline from the Cape Fear River at Buckhorn Dam to Harris Lake; the water would be used to supplement cooling water supply for a new nuclear reactor unit. This would present a partnership opportunity for building an intake, raw water pipeline, and perhaps a treatment plant.

Environmental Impacts

The Environmental Impacts are the more than the Preferred Alternative. It is important to note that if the cumulative withdrawals along this reach of the Cape Fear River exceed 20 percent of 7Q10 flows (7-day, consecutive low flow with a 10-year recurrence interval), an instream flow study may be required by the NC DWR. An environmental document meeting SEPA requirements would be necessary for the new water supply and infrastructure development. One of the key issues associated with receiving the appropriate approvals will be how to address potential direct impacts of the water withdrawal, including maintaining minimum instream flows to meet habitat and water quality requirements.

Water Quality Classification

The water quality classification of the Cape Fear River in the vicinity of the proposed intake is **WS-IV, CA** and would remain unchanged with this alternative.

Timeliness

The timeliness of this alternative is rated as **Problematic**. As indicated in Figure V.2, the fact that this alternative would not be available until 2035 would leave a gap between supply and demand from approximately 2025 until the new source is on-line in 2035.

Interbasin Transfer

This option would require a new Interbasin Transfer certificate, because the new transfer would be from the Cape Fear River Basin, rather than the Haw River Basin. The impacts would need to be studied at projected future demands.

Regional Partnerships

This Alternative is not the preferred option and is not supported by the Regional Water Supply Plan on the Jordan Lake Partnership.

Technical Complexity

The Technical Complexity is rated as **Complex** for this alternative. Building a new treatment plant would add to the technical complexity. If the water were treated at the existing Sanford or Harnett County plants, a method for transferring sufficient finished water would be needed.

Institutional Complexity

The Institutional Complexity is rated as **Complex** for this alternative. Developing a new raw water intake could be done alone, or in partnership with others. One possibility is partnering with Progress Energy to construct a new intake and raw water pipeline from the Cape Fear River at Buckhorn Dam to Harris Lake (Progress Energy, 2007). But several institutional issues may make it difficult to partner with Progress Energy. Nuclear Regulatory Commission (NRC) licensing guidelines may prevent or limit the ability of Progress Energy to partner with the Towns for the shared development of a raw water intake and/or transmission pipelines. Additional levels of federal review may be triggered as well. If Cary instead partnered with Sanford or Harnett County to expand a treatment plant, contracts and cost-sharing agreements would be needed for the construction, and for the provision of finished water to Cary system customers. In any situation, some permits and studies would be required to actually construct the withdrawal and other infrastructure. As discussed in the Environmental Impacts section, an environmental document meeting SEPA requirements would need to be developed for the new infrastructure, and impacts on the in-stream flow would likely need to be studied to receive the necessary permits.

Political Complexity

The Political Complexity is rated as **Complex** for this alternative. Concerns about the cumulative withdrawal from this reach of the Cape Fear could lead to opposition from downstream water users on the Cape Fear. This alternative would require new, interlocal agreements with multiple local governments. Approvals would be needed from other local/county governments to acquire land and easements for new infrastructure.

Public Benefits

This alternative will generate **No** public benefits. This would be a river withdrawal and would therefore not provide any secondary recreational or other public benefit.

Consistency with local plans

This Alternative is not consistent with the Regional Water Supply Plan on the Jordan Lake Partnership.

Total Cost (\$ millions)

Total costs were not fully developed for this alternative but are estimated at \$221.43 M for a unit cost of \$18.3 M /MGD.

Other Alternatives

In the case of Chatham County, there does not appear to be any, even remotely feasible, alternatives to Jordan Lake. Chatham County is unique in respect to Jordan Lake in that the great majority of the lake is located in Chatham County and contiguous to the Chatham County North Water System. There are no other readily accessible water sources in the sub-basin that could provide the quantities that will be required in the future by Chatham County. The geology of the area, along with the known unavailability of ground water, eliminates the possibility of ground water as a viable source.

Alternate sources such as Kerr Lake or the Cape Fear River would involve issuance of an inter-basin transfer certificate along with many, many miles of pipeline and tremendous pumping expenses. Even a cursory review reveals that the only reasonable water source for Chatham County is Jordan Lake.

Table V.1 – Source Options descriptions

Source	Type	Basin	WQ Classification	Year Online (earliest)	Available Supply (MGD)	Supply Range (MGD)
Jordan Lake Allocation Round 4	Jordan Lake	Haw (2-1)	WS IV B NSW CA	2015	7.1	0.0
Jordan Lake Allocation Future Rounds	Jordan Lake	Haw (2-1)	WS IV B NSW CA	2046	5.1	0.0
Cape Fear River in Harnett Co.	Cape Fear River	Cape Fear (2-3)	WS IV CA	2031	12.2	0.0

Supply Alternatives Summary

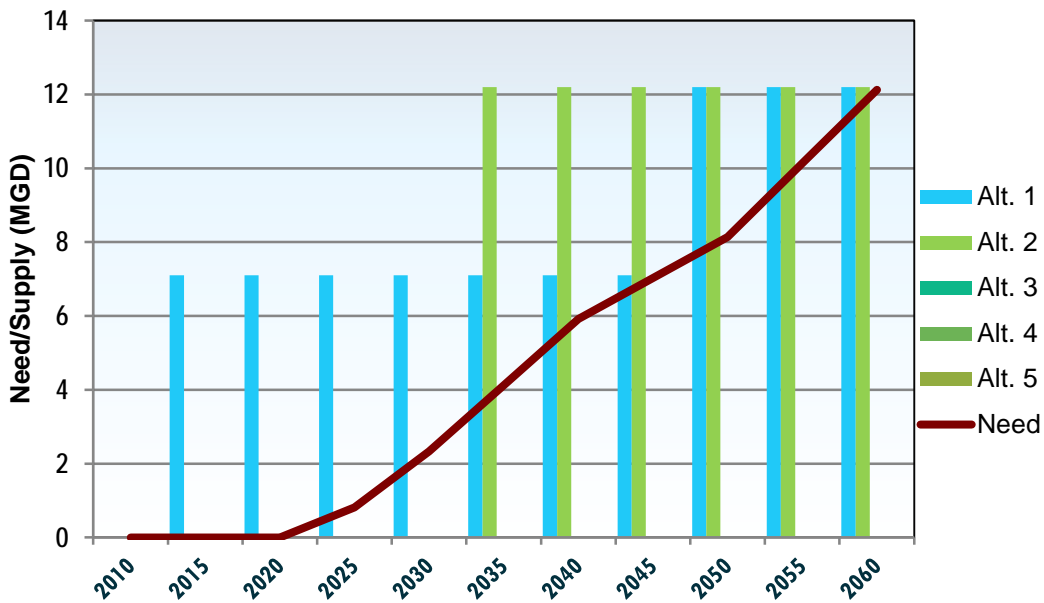
Table V.2 – Alternatives Description Table

Alternative	Alternative Description
Alternative 1	This alternative is the preferred alternative and was developed in collaboration with, and is supported by the Jordan Lake Partnership. Cape Fear River at Harnett County
Alternative 2	

Table V.3 – Source Composition of Supply Alternatives (MGD)


Need and Source Options	Alternative 1	Alternative 2
Total Projected Need (2045)	7.0	7.0
Total Projected Need (2060)	12.1	12.1
Sources:		
Jordan Lake Allocation - Rd 4	7.1	0.0
Jordan Lake Allocation Future Rounds	5.1	0.0
Cape Fear River in Harnett Co.	0.0	12.2
Total New Supply (MGD)	12.2	12.2

Figure V.2 – Alternatives - Timeline of need versus new water supply



Alternatives Analysis

Table V.4 – Water Supply Alternative Ratings –

Classification	Alternative 1	Alternative 2
Rd. 4 Allocation Request (% of storage)	13.0	0.0
Total Supply (MGD)	13.0	12.2
Environmental Impacts	Less Than	More Than
Water Quality Classification	WS IV B NSW CA	WS IV CA
Timeliness	Good	Problematic
Interbasin Transfer (MGD)	0	12.1
Regional Partnerships	Yes, JLP	None
Technical Complexity	Not Complex	Very Complex
Institutional Complexity	Not Complex	Not Complex
Political Complexity	Not Complex	Very Complex
Public Benefits	None	None
Consistency with local plans	Yes	No
Total Cost (\$ millions)	\$102.1*	\$221.43
Unit Cost (\$ millions/MGD)	\$5.7*	\$18.3
Selected Alternative		

*Includes costs of new WTP (Chatham North's 18.0 MGD share) and finished water transmission facilities

Selected Alternative

Chatham County's selected alternative is to receive an **additional 2% Level I and 5% Level II Jordan Lake allocation, which will enable it to participate in the development of new intake, treatment, and transmission facilities to be constructed near the western side of Jordan Lake and shared with one or more other utilities.** This alternative would represent a total Chatham County allocation of 13.0% estimated to yield 13.0 MGD and enable the County to cost-effectively rely on Jordan Lake to meet projected demands through 2045. This approach offers the following additional benefits:

- The Jordan Lake water supply already exists, and therefore represents none of the major environmental and social impacts of developing a new source. The direct environmental effects of this alternative will be limited largely to the temporary and localized construction of new raw water intake, pumping, treatment, and finished water transmission facilities. Virtually all of these will occur on property already owned by public entities or located within public rights of way.
- The Selected Alternative provides sufficient economies and efficiencies of scale to support Chatham County's participation in the development of major new intake,

treatment, and transmission facilities on the western side of Jordan Lake. In addition to supplementing existing supply systems, these new facilities will provide much-needed regional reliability and redundancy in the event of unplanned/emergency conditions or other operational contingencies at the existing Cary-Apex Jordan Lake facilities or elsewhere in the Triangle.

- The capital costs per MGD of this alternative are less than the other alternative evaluated by Chatham County.
- The Selected Alternative is consistent with and supports the water supply plans of other local entities of the 13-Member Jordan Lake Partnership and is fully consistent with the Triangle Regional Water Supply Plan as developed and adopted by the Partnership.

This alternative is in agreement with the JLP's RWSP. As such, any changes to the allocation request in this alternative could have an impact on the ability of other partners to meet their needs. This alternative represents a regional alternative for which allocation requests have been coordinated, and to the best knowledge of the partners, will not have a substantial negative impact on either the ability of Jordan Lake to meet all applicants' requests for water, or downstream users and the environment.

SECTION VI. PLANS TO USE JORDAN LAKE

Based on the need demonstrated in Section IV, and the alternatives analysis presented in Section V, Chatham County is planning to implement Alternative 1. Accordingly, this application includes a request for Jordan Lake Water Supply Storage in the amount of an **8.0 % Level I Allocation and a 5.0% Level II Allocation**. This represents an increase of 7.0 MGD from the existing 6 MGD Allocation. The future projected 2060 need is for an 18.2% total allocation.

Chatham County's only access to its existing 6 MGD Level I Jordan Lake allocation is through the raw water intake with the Town of Cary. The County's plan to access to the existing and requested Jordan Lake allocation would be provided via new intake, treatment, and transmission facilities to be constructed near the western shore of the lake. Details of a proposed implementation plan, including a tentative timeline, are presented in the Description portion of Alternative 1 in Section V – Alternative Supply Options, of this application. It should be noted that this Alternative is only one of several regional scenarios still being evaluated jointly by Durham, OWASA, Pittsboro, and Chatham County. All options under review would employ the same new intake and raw water pumping facilities to be shared by the participating entities, but each scenario includes a different configuration of water treatment options. It is Chatham County's intent to implement one of the scenarios still under evaluation.

Raw and Finished Water Quality Monitoring Plan

It is anticipated that specifications of locational and parametric coverage, sampling frequency, etc. for raw water will be coordinated with existing Jordan Lake monitoring programs, such as NCDWR's ambient water quality monitoring network and the Triangle Area Water Supply Monitoring Project managed by the Triangle J Council of Governments in cooperation with USGS. A detailed in-plant monitoring program will be developed as specific processes and their operational monitoring requirements are defined for the new Jordan Lake regional water treatment facility. Finished water quality will generally be monitored per Chatham County's existing Water System Management Plan on file with NC DENR's Public Water Supply Section.

Estimate of Costs

(Please see the Costs section under Alternative 1 in Section V of this application for information regarding the estimated capital costs of Chatham County's Jordan Lake alternative.)

APPENDICES

APPENDIX A. DENR JORDAN LAKE WATER SUPPLY WORKBOOK

See attached excel workbook.