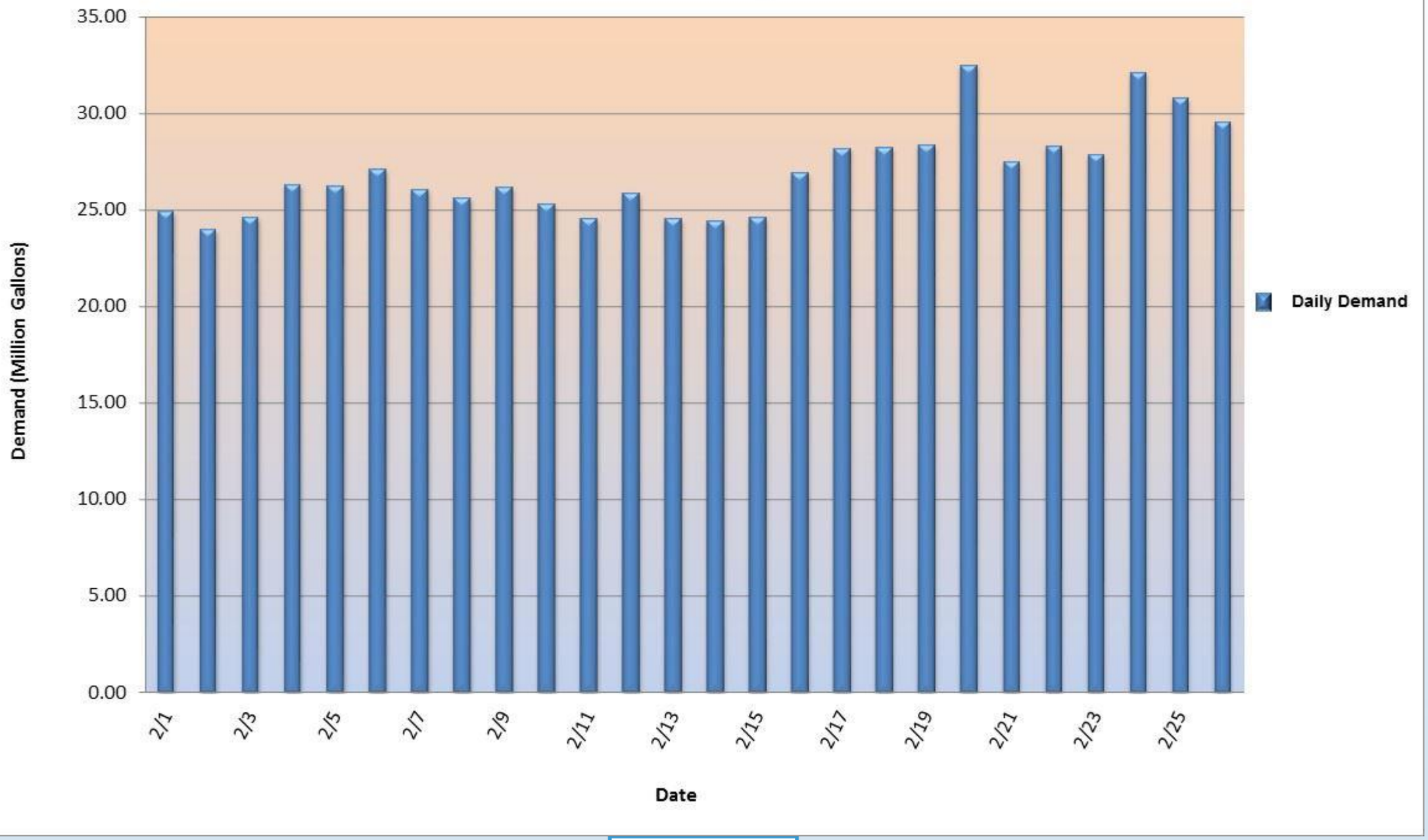
OWASA WATER EMERGENCY FEB 2017

WHY THIS MATTERS to DURHAM

MARCH 9th, 2017 / J. CHRISTOPHER SALTER

City of Durham Daily Demand
February 2017



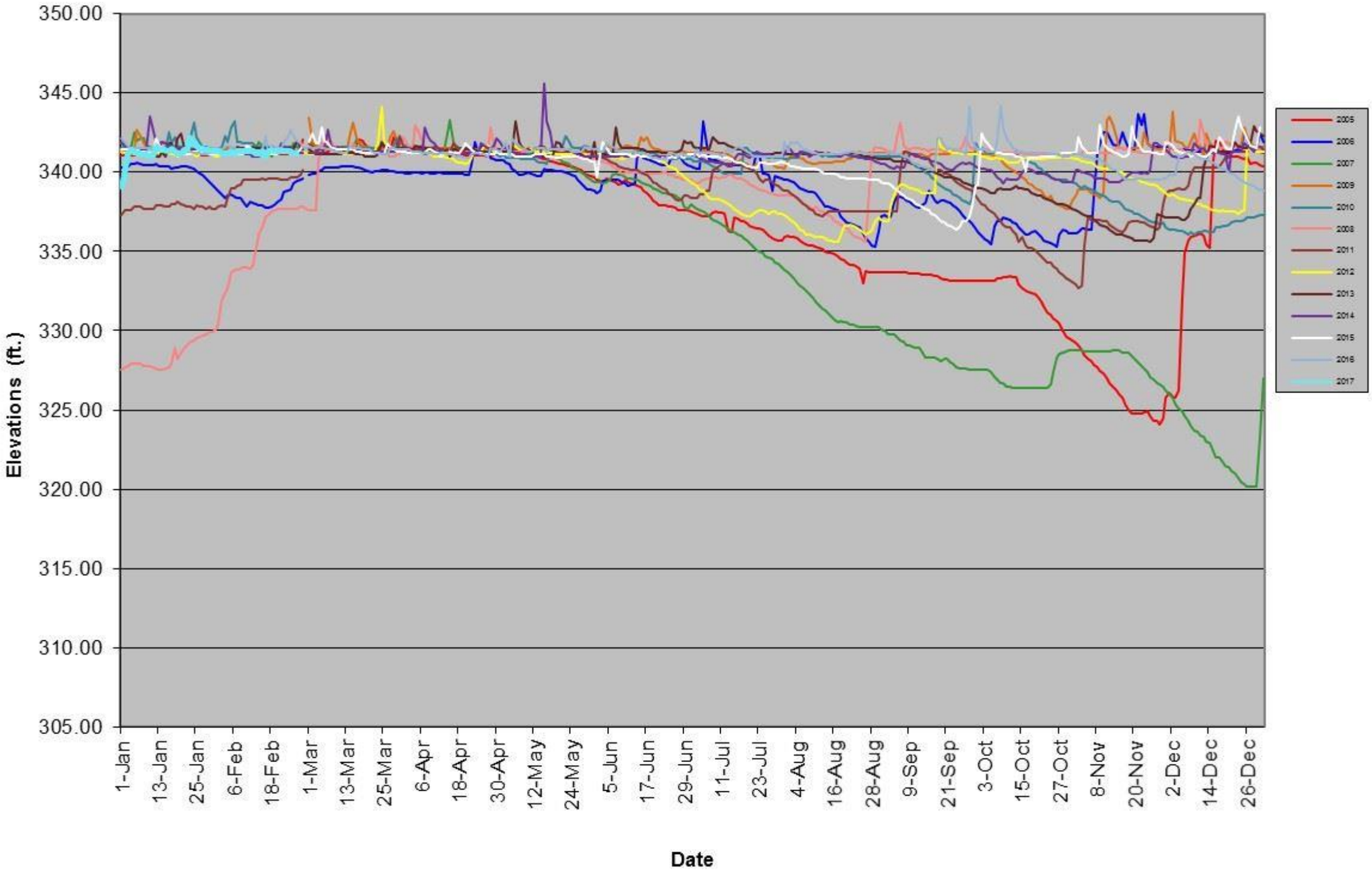
Durham WTP Source Water

- Lake Michie Elevation: 341.20 feet mean sea level

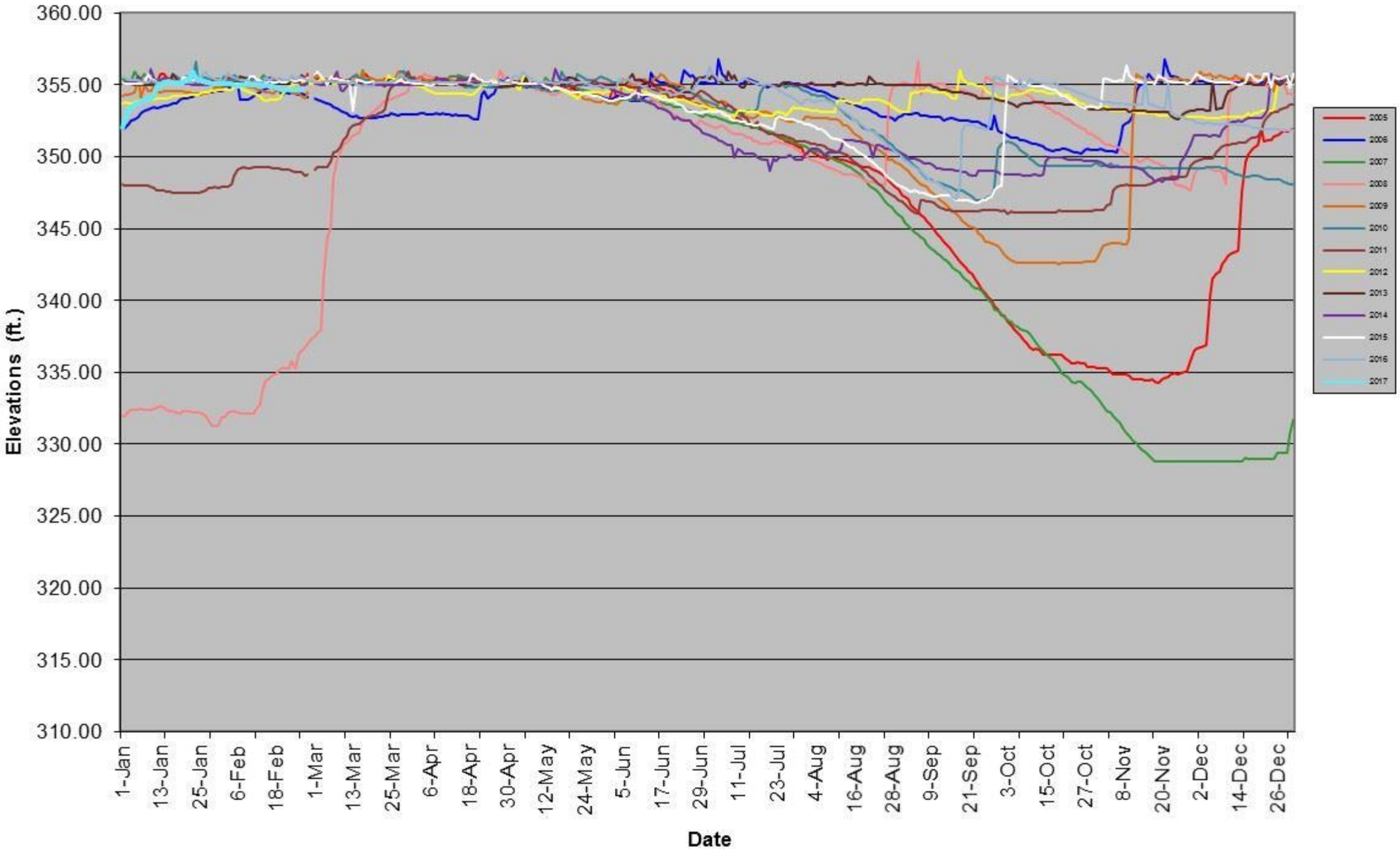
- Little River Reservoir Elevation: 354.70 feet, msl

Lake Michie & LR Reservoir are full at 341.00 & 355 msl respectively

Lake Michie Reservoir Elevations



Little River Reservoir Elevations



Terminal Reservoirs & Treatment Plants

Raw (untreated) water from Durham's 2 reservoirs/lakes is pumped into terminal reservoirs located at the city's 2 water treatment plants. The Brown Water Treatment Plant (WTP) terminal reservoir holds approximately 90 million gallons and the Williams WTP terminal reservoir holds approximately 45 million gallons. These volumes represent a 2 to 3 day supply of water for the 2 treatment plants

Brown WTP

City Government Office

1615 Infinity Rd

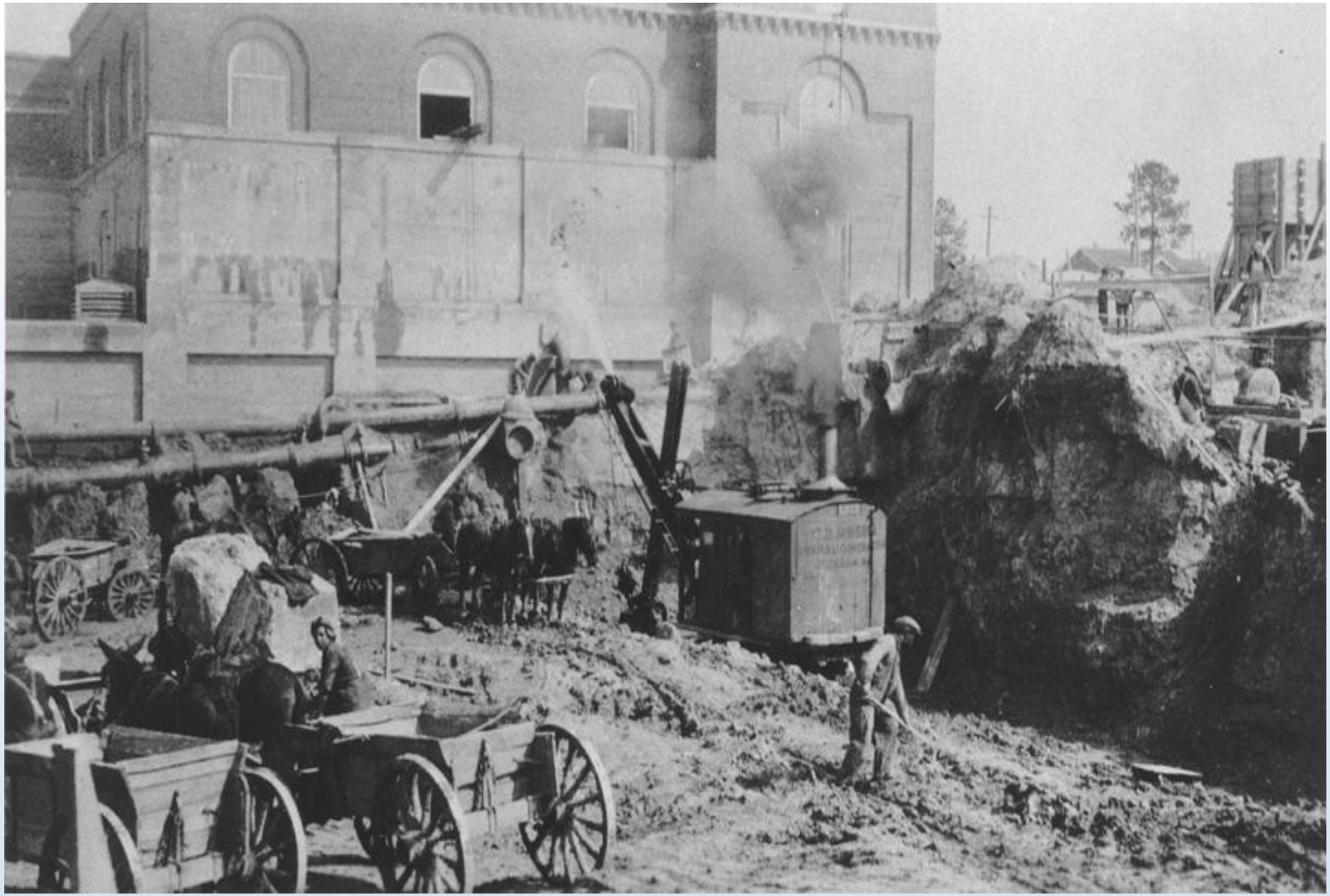
Williams WTP

1405 Hillandale Rd

Williams WTP

Under construction, 1917

Beatrice & Graham Maynard, "Romance Nuts," boating on the Durham reservoir with the clubhouse in the background.
(Courtesy Durham County Library)



Construction of the west wing, 1926.
(Courtesy Durham County Library)

William Piatt atop the completed structure, 1927.
(Courtesy Durham County Library)

Construction of the 1949-50 addition
(Courtesy Barry Norman)

Completed 1949-50 addition
(Courtesy [The Herald-Sun Newspaper]

Aerial of the water treatment plant and reservoir, 1950s
(Courtesy Durham County Library / North Carolina Collection)

1917, 1927, and 1950 portions of the treatment plant, 04.04.09 (thanks to K. Johnson for climbing on top of the sign to take this picture for me.)

Coagulation, Flocculation, Sedimentation

Currently, both treatment plants use a chemical called ferric sulfate (Fe^{3+}) as a coagulant

Filtration

After water has gone through the flocculation and sedimentation process to remove the sediment/particulate matter, it flows through filters composed of layers of crushed anthracite coal, sand and gravel. The filtration process removes additional minute particles which are not removed by the flocculation and sedimentation process.

Disinfection & Chemical Addition

Several chemicals are added to the water throughout the different processes to facilitate water treatment. They include chemicals for disinfection (chloramines), corrosion inhibition (orthophosphate), pH balance (sodium hydroxide) and dental health (fluoride). The concentrations of each of the majority of these chemicals must meet **EPA standards**.

Chlorine is a highly effective disinfectant. However, it produces small amounts of chemicals (called "disinfection by-products")

These disinfection by-products can cause illness after drinking them for a long time

Chloramine (NH_2Cl) can last longer in the water pipes and produces fewer disinfection by-products [1]. To meet the EPA standards intended to reduce disinfection byproducts, many water utilities have switched to chloramine.

Chlorine levels up to 4 milligrams per liter (mg/L or 4 parts per million (ppm) are considered safe in drinking water. At this level, no harmful health effects are likely to occur [2].

Chloramine levels up to 4 milligrams per liter (mg/L) or 4 parts per million (ppm) are considered safe in drinking water. At these levels, no harmful health effects are likely to occur [5]

However, our concern is not from their toxicity, but to assure adequate control of the disinfection byproducts.

Trihalomethanes (THM),
Haloacetic acids (HAA),

Interest in THM and HAA stems from their carcinogenic activity in laboratory animals.

Chloramines to Chlorine
Periodic Changing

When used together, ammonia and chlorine form a chemical called chloramine, which safely and effectively disinfects water while also reducing the formation of disinfection byproducts in the water distribution system.

Federal and state regulators require water providers that rely on chloramination to temporarily change this method of disinfection once a year.

The temporary switch to chlorine-only disinfection serves as a precautionary measure to ensure the entire water distribution system is clean (disinfected).

Fluoride in the form of hydrofluorosilicic acid has been added to Durham's drinking water since the late 1950s in order to prevent tooth decay.

It has been cited by the Centers for Disease Control as one of 10 great public health achievements of the 20th century

Studies show that fluoridation can prevent between 15% - 40% of decay. The ADA cites over 60 years of studies supporting this conclusion

The city maintains a fluoride concentration that ranges from 0.47 to 1.0 mg/L (ppm) in our drinking water.

Storage & Distribution

Once treated and disinfected, drinking water is stored in covered tanks called clear wells. The city stores several millions of gallons of treated water in clear wells on the treatment plant sites ready for distribution.

Treated water is also stored in elevated and ground level water storage tanks located throughout the city.

Sampling

If any routine or repeat sample is total coliform positive, the system (i.e. the lab) must further analyze that sample to determine if E. coli are present.

The presence of coliform bacteria in tap water suggests that there could be a problem with existing equipment or treatment systems, contamination of the source water, or a breach in the distribution system that could introduce E. coli contamination.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Actual sampling in Durham, NC

What if you don’t have enough stations?

Backflow Prevention

Positive/BAD *Negative/GOOD*

When a water system receives an unsafe or total coliform positive sample result, within 24 hours, the owner or operator of the system must collect a set of repeat samples in the distribution system

Breaks/breaches *Backflow*

Pressure Drops

Drops in water pressure can cause contamination to be drawn back into the system. The area of concern must be isolated quickly to prevent spread/distribution

Hydraulic Isolation

Orange Water and Sewer Authority

NEWS RELEASE **Thursday, February 2, 2017**

OWASA temporarily receiving drinking water from City of Durham; water continues to be safe to drink

Due to an accidental overfeed of fluoride within the water treatment process, OWASA began receiving drinking water from the City of Durham late Thursday afternoon.

OWASA said “*the water continues to be safe for customers to drink because the overfeed of fluoride was contained within the Jones Ferry Road Water Treatment Plant. No water with higher than normal fluoride reached the water pipe system supplying OWASA customers*”.

But in the meantime……

While OWASA was receiving water from Durham, a pipe burst occurred resulting in a pressure drop and possible contamination in the Chapel Hill/Carrboro area.

Hi all,

Just in case you get questions, I wanted you to have this info. Share with others as you think necessary. Kirk is our Sr. Public Affairs Specialist. http://durhamnc.gov/DocumentCenter/View/13851

Kirk's contact info for your future reference:

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City of Durham - Water Management
https://durhamnc.gov/

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Have a great weekend.

Vicki (Assistant Director, Water Management)

Friday, Feb 3rd, 2017 @ 4:19 PM

Good afternoon,

By now we're all likely aware of the current water emergency affecting OWASA and its customers in Chapel Hill and Carrboro. Durham One Call and Water Management's phones have been ringing frequently, with our own water customers confused and worried about Durham's water. ***Our drinking water is safe to use for all drinking water purposes***.

Kirk Butts
Senior Public Affairs Specialist
City of Durham - Water Management
https://durhamnc.gov/

Durham Drinking Water is Safe
Feb 3rd, 2017 Press Release

Durham's Water Supply Unaffected by OWASA Water Emergency

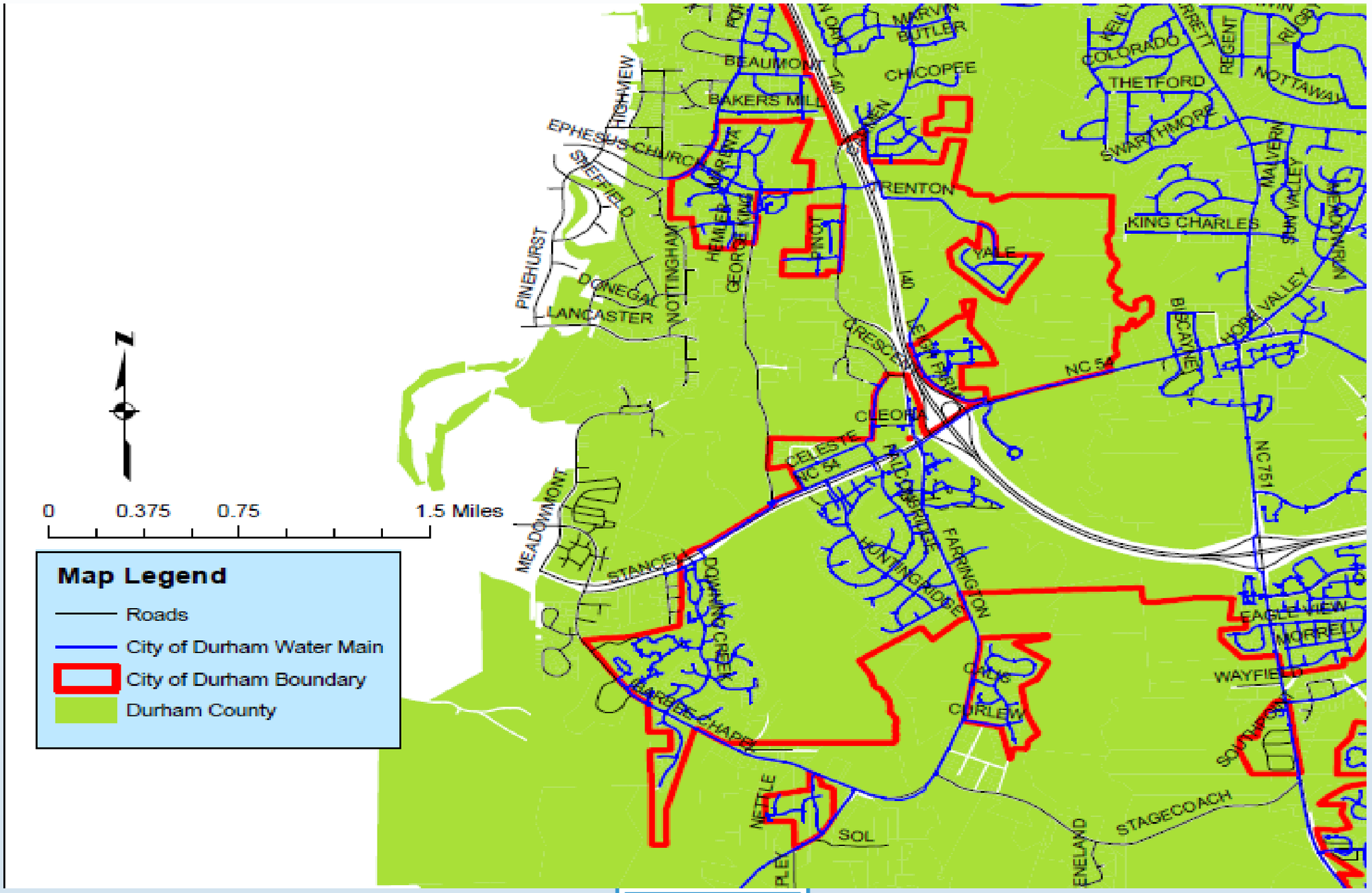
DURHAM, N.C. — While the City of Durham Department of Water Management continues to assist its neighbors in Orange County with their ongoing water emergency, the department wants to remind Durham water customers that our drinking water is completely safe.

Friday afternoon

Saturday Morning

Gayle gets call from concerned resident
Gayle emails Chris & Eric
Eric calls Chris
Chris contacts Kirk
Chris contacts Marc
Marc contacts Orange ENV HLTH
Chris attempts to contact Vicki, leaves voicemail
Chris calls Rizzo Conf Center & Debose House
Chris calls the Cedars Clubhouse & Cedars Nursing Home
etc……

Why does this affect Durham?



Thursday, February 2, 2017

3:00 pm	Fluoride overfeed discovered and confirmed by OWASA Water Treatment Plant (WTP) staff
3:28 pm	NC Department of Environmental Quality, Public Water Supply (PWS) notified
5:09 pm	First Durham interconnection activated to maintain system pressure and meet system demands
6:00 pm	News release issued by OWASA advising of the event and requesting conservation
11:00 pm	Second OWASA news release with additional information regarding event

Friday, February 3, 2017

8:00 am	Third OWASA news release with additional call for conservation
9:30 am	Began activation measures for second interconnection with Durham on Highway 54
10:13 am	OWASA water main broke in northeast Chapel Hill
11:00 am	OWASA requested activation of the Orange County Emergency Operations Center (EOC) and Water Emergency Team Partners
11:30 am	OWASA issued "DO NOT USE" directive to customers to prevent contamination and protect emergency supply
11:30 am	Water main break isolated by locating and closing control valves
2:00 pm	Orange County Health Department (OCHD) issued "DO NOT USE" and "DO NOT DRINK" directives
2:00 pm	Second Durham interconnection activated to maintain pressure and storage
5:15 pm	Chatham County interconnection activated
10:24 pm	Backup pump delivered to primary Durham interconnect and prepared for service

Saturday, February 4, 2017

9:00 am	Began re-filling clearwell with non-fluoridated filtered water
10:30 am	Water main repaired; flushing began to ensure water quality
12:34 pm	All distribution samples found to be clear and absent of bacteriological indicators
2:24 pm	"DO NOT USE" and "DO NOT DRINK" directives lifted by OCHD and OWASA
3:30 pm	Boil water advisory issued for customers near line break
6:37 pm	OWASA Water Treatment Plant back in full operation
7:47 pm	Second interconnection with Durham deactivated
9:04 pm	Primary interconnection with Durham deactivated

IMPACTS

- Anxiety (public health)
- Cost and repairs (municipal)
- Lost confidence & inconvenience
- Lost revenues (business disrupted)
- **UNC Fans Upset**
- **Business Owner Outrage**

Carolina vs Notre Dame…..game moved to Greensboro

Saturday 4th

vs

Super Bowl

Sunday 5th

Close your eyes and picture this……

It’s 4:00 PM on Friday, May 12th

It’s Mother’s Day weekend

It’s commencement weekend for both UNC Chapel Hill and Duke

We get notification that several water samples have come back positive……

Public Health

DCo Public Health/Environmental Health response to Contaminated Municipal Water Notice (boil water notification)