



South Summit Avenue Plan of Action

Charlotte Water is submitting this Plan of Action in response to the Notice of Deficiency (NOD) issued by NC Department of Environmental Quality on May 17, 2016. As directed by the NOD, this plan addresses control of iron in the water distribution system. The NOD also directs Charlotte Water to submit quarterly written status reports listing actions to monitor and resolve the water quality issues in and around South Summit Avenue.

Charlotte Water manages a comprehensive Community Investment Plan that includes substantial funding for ongoing replacement and rehabilitation of aging infrastructure. The water distribution system in Charlotte-Mecklenburg consists of approximately 4,200 miles of pipe installed between the late 1800s and today through which water service is provided to nearly a million people each day. Specific to controlling iron concentrations, Charlotte Water has targeted replacement of small diameter galvanized steel pipes along with cleaning and lining the unlined cast iron pipes that were the industry standard material in the early to mid-1900s. In fact, just this year, more than 32,000 feet of galvanized steel pipe has been removed and replaced with PVC pipe at a cost of approximately \$3,200,000. Also this year, more than 24,000 feet of cast iron water mains have been either replaced or cleaned and lined at a cost of approximately \$3,000,000. This on-going capital program has been in place for at least 24 years in Charlotte and much progress has already been made to protect water quality and to ensure sustainable water service for many years into the future.

Higher than normal iron concentrations generally occur in water systems as a result of changes in flow rates in tuberculated galvanized steel and/or unlined cast iron pipes. These incidents are commonly referred to as “red water” complaints and are common in water systems all across the world. Red Water complaints are often triggered by flow disruptions or disturbances caused by operation of hydrants, water main breaks or construction activity.

Charlotte Water, like all other water systems, routinely receives red water complaints. We have trained water technicians who respond promptly to each complaint to determine the best course of action in each case. Frequently, flushing the local water mains through fire hydrants resolves the problem. The locations, causes, and frequency of red water complaints helps identify and prioritize areas where water line replacement or rehabilitation is scheduled.

Action Item: Control of Iron in Distribution System

Charlotte Water will control iron concentrations by continuation of efforts to reduce the amount of galvanized steel and unlined cast iron pipe in the system, by educating water system users such as fire



departments and contractors about how they can help avoid activities that could trigger high iron incidents, and by responding to red water complaints from customers.

To control iron in the distribution system, Charlotte Water will:

- Continue a proactive water distribution **rehabilitation program** that prioritizes water quality and structural integrity.
- Continue capital programs to identify and **replace galvanized steel** pipe.
- Continue a water main rehabilitation program to **clean and line unlined cast iron** pipe.
- Continue to promptly **investigate water quality complaints** by communicating with customers, dispatching water quality technicians, sampling as appropriate and flushing water mains as needed.
- Complete a **Water Distribution System Master Plan** currently underway to analyze system hydraulics.
- Continue operation of the distribution system by controlling tank levels and flushing to **reduce water age**.
- Continue to evaluate the water distribution system to determine need and location for additional automatic **flushing** equipment.
- Continue to use proper methods, best management practices and modern technologies to manage the water distribution system including replacement and rehabilitation of water pipe with **more corrosion resistant materials** such as cement lining, epoxy and the use of PVC pipe.

Action Item: Control of Iron in South Summit Avenue Area

To further control iron concentrations in the drinking water in the South Summit Avenue area, Charlotte Water will:

- Determine the boundaries of the area referred to in the NOD as the South Summit Avenue area.
- Evaluate additional rehabilitation needs in the South Summit Avenue area. This may include collecting pipe coupons, reviewing any customer complaints and analyzing water quality and water system operation.
- Exercise each water distribution valve in the South Summit Avenue area to confirm operability.

Action Item: Weekly Analytical Results for Iron

Charlotte Water operates a state-of-the-art water quality laboratory that is independently certified. In addition, Charlotte Water laboratory and field operations staff is routinely trained to collect samples and analyze drinking water.



To ensure the continued delivery of high quality drinking water to customers in the South Summit Avenue area, Charlotte Water will frequently monitor water quality at strategic locations in the target area.

- On a weekly basis, Charlotte Water staff will perform field tests for iron on drinking water samples collected from three distribution system locations.
- The sites are:
 1. South Summit Avenue
 2. Grandin Road
 3. Calvert Street
- If any site has a field test iron concentration of greater than 0.30 mg/L, an additional sample will be collected at that site and a certified analysis for iron concentration will be performed. Moreover, Charlotte Water Operations staff will be contacted for immediate consultation and water quality remedial actions.

Action Item: Reporting

As required in the NOD, quarterly status reports will be submitted to the North Carolina Public Water Supply Section (PWS) to provide updates on this Action Plan with a growing list of activities such as:

- Date and results of water quality monitoring,
- Efforts to monitor and resolve customer complaints,
- Distribution system operations and maintenance.

Weekly test results from the three listed sites, including date and time of analysis, will be compiled and submitted weekly to the North Carolina Public Water Supply Section (PWS) by Charlotte Water.

Measuring Success

Charlotte Water suggests that at the conclusion of a full quarter (3 months) where all weekly monitoring results of samples taken from the target area are of iron concentrations equal to or less than 0.3 mg/L, success is achieved and the Action Plan activities specifically targeting the South Summit Street area can cease following PWS agreement.