

February 10, 2017

Mr. Vishnu Gangadharan, PE
OWASA
400 Jones Ferry Road
Carrboro, NC 27510

**Re: Water Main Break Technical Memorandum
Key Take Away Points**

Dear Vishnu:

So why did the water main fail and what happened? The short answer is that it was set up to fail 44 years ago on the day of its installation. Concrete pipe can be a solid long lasting asset. Installed well and left alone it can last 40 to 100 years. The main which broke on February 3, 2017, was installed in a shallow method which allowed loads on the road above it to be carried by the pipe. In this case the pipe was sitting directly over a storm drain pipe which was not going to move. The ends of the concrete pipe flexed under the load, but the middle of the pipe could not. Concrete pipe is rigid, even brittle. After 44 years, and likely some shifting of the soil, perhaps a change in operating pressures inside the pipe, the pipe succumbed to the bending pressures and broke.

The height of the ground around the pipe in comparison to the nearby elevated storage tanks means that the pipe was typically dealing with 140 to 160 pounds per square inch of pressure. This was well within its design strength, but when it failed, it left a 12 inch diameter hole with a lot of force behind it. Water drained from the distribution system to a great degree, at one point it was flowing at 30,000 gallons per minute. In total, 1.2 million gallons drained from the water distribution system. In comparison, the nearby tanks store 6 million gallons of water.

Three of those nearby storage tanks saw water levels drop significantly. With the exception of two neighborhoods, OWASA maintained sufficient pressure in the pipe network to protect public health. One of the two neighborhoods surrounded the site of the water main break, the other is in the north eastern portion of the service area, just south and east of (but not including) East Chapel Hill High School. Both neighborhoods saw normal water pressure levels return after the water main was valved off and being repaired.

Sincerely,

AECOM Technical Services of North Carolina, Inc.



Reid Campbell, PE