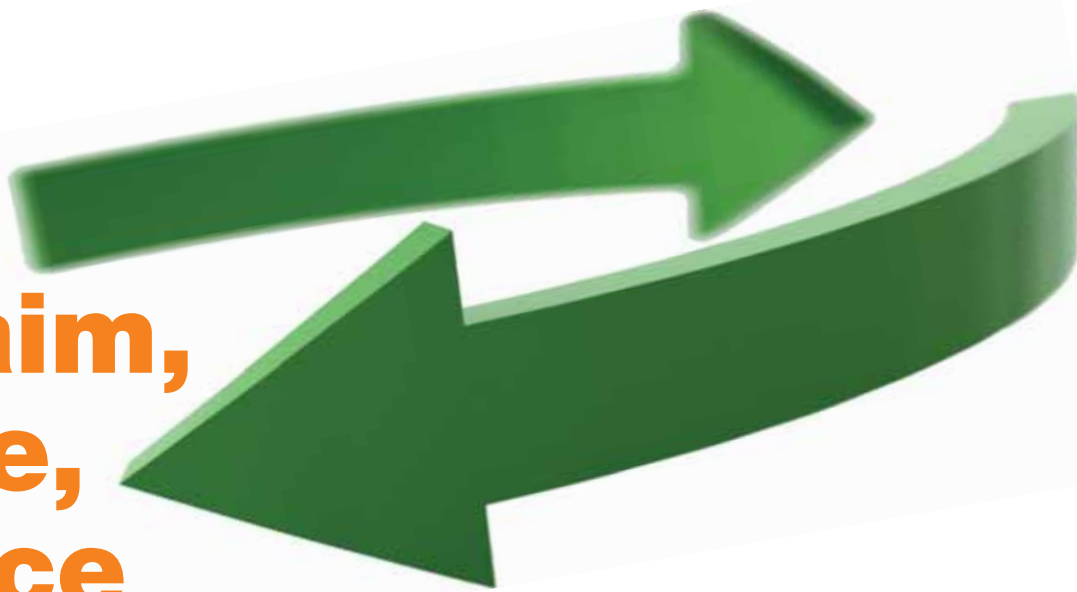




# Reclaim, Reuse, Reduce



By Joe Sgroi

Water reclamation  
system saves energy  
& water costs

**G**ateway Village, a 15-acre mixed-use development complex in North Carolina—designed to bring businesses, retailers, restaurants, new residents and visitors to the area—was developed through a joint venture between Bank of America and Cousins Properties. The complex is home to three office towers totaling more than 1 million sq ft of class A office space. In late 2007, North Carolina and a large portion of the southeastern U.S. endured an exceptional drought that prompted water restrictions across the region.

## The Concept

During this period, a meeting took place between Cousins Properties, property manager for Gateway Village, and its HVAC water management consultant, Aqualine Water Treatment Products of Davidson, N.C. The drought conditions and subsequent water restrictions had heightened awareness of the availability and access to clean water. At the meeting, the idea of using reclaimed non-potable groundwater from the site for cooling tower makeup was addressed.

Shortly thereafter, Cousins Properties began pursuing Leadership in Energy and Environmental Design (LEED) Gold certification for Existing Buildings: Operations and Maintenance through the U.S. Green Building Council. A major element in the pursuit of this certification was potable water demand reduction. Cousins Properties turned to Aqualine for a solution to manage the quality of reclaimed water removed from the building's foundation for the cooling tower system.

## The Challenge

Designing a treatment system for the reclaimed foundation water presented several unique challenges. The composition of the water was determined to be

significantly different from the potable water that was currently supplying makeup water to the cooling towers. Understanding the quality of makeup water is extremely important when designing a water management program for heat exchange equipment. A properly designed HVAC water management program decreases water and energy use while maximizing heat transfer efficiency.

Preconditioning the reclaimed water was the first step. Cousins Properties selected water reuse solutions provider Aquanomix LLC to coordinate the pretreatment train, which was designed to clean the water of organics and suspended solids before delivery to the cooling tower. Pretreatment included dual carbon filtration beds for removal of trace organics, dual filter housings for removal of suspended solids and, ultimately, ultraviolet disinfection for microbial control. Analytical sensors were installed to measure and report pH, conductivity and ORP back to the building management team.

Following the pretreatment operations, the groundwater needed to be transferred nine stories from the basement to the roof, which required an additional pumping apparatus. In addition to the pretreatment equipment, Aquanomix was tasked with providing the control logic to manage

delivery of the groundwater to the cooling tower through booster pumps and level controls. Once delivered to the roof, the project was turned over to the Aqualine team for the cooling tower water management program enhancements.

The cooling tower treatment program was chemically engineered to meet the more aggressive water quality demands of the groundwater. Most notably, the treatment program was designed to address the groundwater's high silica and hardness content. In order to maintain the same heat transfer efficiency and cycles of concentration as previously designed utilizing city water, Aqualine developed proprietary treatment chemistry exclusively for this application.

## The Reward

Since the system was commissioned in early July, the cooling tower has used more than 1 million gal of groundwater. As a result, the process has provided a redundant water source, reduced the energy demand to deliver potable water, assisted in achieving the building's LEED Gold certification and reduced the makeup water costs to the owner. Robert O'Donnell, partner at Aquanomix, said, "As a provider of integrated water reclamation solutions, I'm excited to have delivered such a bold return on the social, environmental and economic initiatives to Cousins Properties in our hometown of Charlotte, N.C." *wqp*

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**Top:** Gateway Village earned LEED Gold with the help of its groundwater reclamation system. **Bottom:** The treatment system is carefully designed to maintain the same heat transfer efficiency as with potable water.