

## CASE STUDY :



# UNC-CHAPEL HILL

Location:	Chapel Hill, N.C. (Orange County)
Industry:	Public University (SIC Code 8221)
Pollution Prevention Application:	Water Conservation
Waste Reduction:	Total not calculated
Annual Savings:	Total not calculated
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## BACKGROUND

In fall 1998, Gov. Jim Hunt issued a challenge to state government to set an example of environmental stewardship. The University of North Carolina at Chapel Hill (UNC) was one of the first universities in the state to respond to this challenge, and in April 1999 the university created its Sustainability Coalition in response to the governor's challenge and student initiatives. Gov. Hunt also created a statewide sustainability initiative, directing North Carolina's 16 UNC-system campuses to become more environmentally sustainable, and named a sustainability officer at each campus.

The UNC Sustainability Coalition, led by an executive committee and eight task force groups, has made tremendous progress over the past four years, analyzing opportunities and implementing change to make the entire campus more sustainable in thought and in action. In 2001, the Chapel Hill campus hired the first full-time sustainability coordinator in the UNC system.

As part of its sustainability efforts, and in response to the severe drought of 2002, UNC has completed commendable water efficiency initiatives in several different campus facilities.

## WATER CONSERVATION MEASURES

### "Every Drop Counts" Public Information Campaign

In response to the severe drought of 2002, UNC initiated a public information campaign aimed at reducing campus water use by 25 percent. The campaign, dubbed "Every Drop Counts," heightened water conservation awareness on campus

in a number of ways. A Web site with water-saving suggestions and practices was created and linked to the campus homepage. Posters, stickers and bus placards encouraging water conservation in daily activities were placed throughout the UNC campus, and numerous articles on water conservation were printed in employee and student newsletters. The university also sponsored a drought forum to convey the severity of the drought, UNC's actions to date, and plans for future water conservation. To engage students in water conservation efforts, the university hosted a 'Water Wars' competition between residence halls to reward communities that were most successful in reducing their water consumption.

### Water-free Urinal Installation

In response to the severe drought of 2002, the university allocated \$307,000 from its emergency budget to speed up planned improvement of the university's water infrastructure. Three hundred water-free urinals were purchased at a cost of \$150 each, and were installed in new buildings and retrofitted for older buildings. University maintenance staff handled all of the installations, which averaged three hours for removal of each traditional unit and replacement with the water-free fixture. Joe Emory, maintenance supervisor for the project, notes that the water-free urinals "do install easily if everything is where it should be." Some delays occurred in installation when the units were installed in older buildings with plumbing several decades old.

In high-use areas, water-free urinals save at least 40,000 gallons per unit per year. The installation of these 300 units is expected to save the university 12 million gallons of water annually.

For more information, please visit: <http://gazette.unc.edu/archives/02oct23/everydrop.html>.



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## Closed-Loop Cooling Systems

The systems that produce distilled water from steam in the university's research labs were cooled by "once-through" systems. In a once-through or open-loop cooling system, incoming water circulates through the refrigeration compressor to dissipate heat, and then is discharged into the sewer system. Non-contact, distilled water is not contaminated in the process, and can be used for laboratory experiments or reclaimed for reuse in the cooling system. These inefficient systems in campus laboratories are currently being replaced with more efficient closed-loop systems. The closed-loop systems circulate the hot water through a cooling tower, and then back through the system to reabsorb heat.

The five largest water-consuming buildings on campus were the first to be upgraded, a task that was completed in 2003.

## Green or 'Vegetated' Roofs

UNC is in the process of incorporating green roof systems into several of its new construction projects. Vegetated roofs efficiently utilize rainwater, mitigate stormwater runoff, and improve the campus environment. An extensive green roof will be installed at the Carrington Nursing School, where it will be visible and semi-accessible to staff and students. Once the Rams Head Project (currently underway) is complete, a green roof there will capture rainwater and store it beneath the vegetation for irrigation use. Here, the project will also provide an accessible gathering space adjacent to the new dining hall. A smaller green roof is also planned for the Botanical Gardens' new Visitor Education Center.

## Underground Cistern Project

As part of UNC's investment in increasing campus water efficiency for the long-term, a 70,000-gallon underground cistern and gravel storage field has been installed at Carmichael Field. The cistern system captures rainwater from the roofs of the School of Government and the indoor track. Water is then stored and used to irrigate Carmichael Field.

A similar rainwater-capture and re-use system is planned for the Ehringhaus baseball field.

## Porous Pavement

Despite plans for UNC to construct 5.9 million square feet of new buildings over the next 10 years, the university has pledged not to increase the volume, rate or pollutant load of stormwater leaving its campus. Along with its vegetated roofing projects and installation of underground cisterns, the university is accommodating this pledge by paving new roads, parking lots and sidewalks with special porous pavement designed to allow and assist the absorption of water into the soil.

The new porous pavement consists of a top layer of permeable asphalt, which prevents surface run-off that floods ditches and storm drains, and washes nonpoint source pollution from the roads into the water system. Below the permeable asphalt, a deep stone bed holds the water and allows it to slowly seep into the rich clay soil predominant in the North Carolina Piedmont. Thus, the porous pavement both minimizes the pollutant load in the water system and helps to recharge groundwater aquifers.

UNC constructed an 800-car park-and-ride lot, and expanded an existing remote student lot by 600 spaces using porous pavement. Further, because detention basins or complex drainage systems were unnecessary, the university saved approximately \$500 per space in the construction of these new lots.

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## FUTURE PROJECTS

UNC also has several other projects planned for the future or under consideration and study. Highly water-efficient infrared sink faucets with short timers will be installed in public access areas in new residence halls on campus. (This has already been completed in some locations.) The university is considering the possibility of using nonpotable or untreated rainwater in some campus functions. A study is currently underway to examine the prospects for using reclaimed wastewater from the local treatment facility in the chillers at the campus cooling plant. UNC is also evaluating the feasibility of using captured rainwater to flush toilets in some new construction projects.



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