Big Savings for a Big University

Source: www.TurfMagazine.com

The University of Texas sees water savings in its huge irrigation system upgrade


Click image to enlarge.

The university system cost $2.1 million and, in addition to significant component upgrades, involved updating 280 manual zones to automatic setup of the central irrigation system and digitally mapping out locations of the controllers and zones.
PHOTOS COURTESY OF THE UNIVERSITY OF TEXAS.

What starts here changes the world," is the motto of the University of Texas in Austin. It's surprising, therefore, that Markus Hogue, program coordinator: irrigation and water conservation for UT, is endeavoring to change the way we look at water conservation in urban environments. He's also planning to share that knowledge with the Texas students, the community and beyond.

"We expect to share every aspect on our new irrigation system; we want to share with others, so they can learn from our successes and our mistakes," says Hogue.

The University of Texas, with its student population of more than 50,000, is located in the city of Austin, the Texas state capital with a population of nearly 825,000. Although water is scarce in central Texas, a situation that has grown worse as a result of a stubborn drought that settled over much of Texas several years ago, Austin keeps growing. One of the challenges to its continued growth is the availability of water.

Lakes Travis and Buchanan, the region's water supply reservoirs, depend upon rain to supply the rivers, creeks and tributaries leading into them. Because of this prolonged drought, the amount of water flowing into these lakes has been historically low for more than three years. Inflows in 2011 were the lowest in history, about 10 percent of average and inflows in 2012 were the fifth lowest in history, 32 percent of average. This year's data is no better.

Austin must get the most that it can from its limited water supply.

Further restrictions possible

Jadell Hines, program coordinator, conservation, Austin Water, explains, "Drought stages are linked, in part, to the storage levels in the lakes."

Hines says that Drought Response Stage 1 may be enacted by the city manager when lake levels drop below 1.4 million acre feet. Drought Response Stage 2 may be enacted when lake levels drop below 900,000 acre feet and Drought Response Stage 3 may be enacted when lake levels fall below 600,000 acre feet.

The lake levels as of June 3, 2013, were 791,000 acre feet, or about 39 percent full. Austin is in Drought Response Stage 2, which means that outdoor irrigation is limited to one day per week. Automatic sprinklers may operate in the early morning hours before 5 a.m. and in the evening hours after 7 p.m. on their designated outdoor water use day. Hose end sprinklers may operate before 10 a.m. and after 7 p.m. on their designated outdoor water use day.

With levels at reservoirs nearing a still lower threshold, Stage 3 restrictions may be in place by mid-summer, further limiting water usage.

The University of Texas has responded to the water crises by working with Austin Water to participate in its Alternative Water Conservation Pilot Program. This plan essentially allows 28 large water consumers, such as UT, to operate under a water budget in lieu of mandating or limiting days and hours of watering.

Working within a budget

"This more equitable program allows us the flexibility to use water judiciously, factoring in plant material requirements," says Hogue at the university. Had the campus been limited to watering only one day per week, as per Stage 2 restrictions, many landscapes would not have withstood the dramatic water reductions. The university might more nearly resemble Tucson than Austin.

Hines continues, "These commercial accounts' water-usages are calculated based on the property's irrigated area and the historical seasonal demands of the region's landscape. Through three quarters, program participants used 99 percent of the combined budget, though not all properties were able to stay within their budgets. It is too early to be definitive about savings

associated with this program, but the initial analysis points to the possibility that budgeting can achieve water savings."

Hogue adds that the budget is monitored with the help of a new central irrigation system, Calsense, installed by Water Management, Inc., which gathers live data and adjusts the irrigation based on plant needs. This information will soon be available to the UT students online in order for them to analyze the data to find more sustainable landscapes or alternative water sources that can be installed on campus.

The system cost $2.1 million and included installing 104 Calsense controllers, flow sensors, master valves, 18,000 Hunter Industry MP Rotary nozzles, a complete system audit, updating 280 manual zones to automatic, setup of the central irrigation system and digitally mapping out locations of the controllers and zones.

"We utilize flow sensors on the mainline to detect any problems within the zones and to tabulate water usage. We have two ET sensors and three rain buckets across campus that monitor live weather data and adjust the watering schedule for each zone accordingly," explains Hogue.

Overall, the project retrofitted the irrigation systems at 82 sites on the University's main campus. In addition to the digital flow sensors, wireless controllers and rotary nozzles, the school has included a solid-state weather station to provide accurate weather data to the irrigation system that updates the irrigation schedule hourly.

"The data that we have with the new system allows me to analyze landscape water usage quickly and make changes within seconds," says Hogue.

"The goal is to apply only the amount of water needed. Also, I observe rain chance percentages and will shut down the system if a high enough chance is in the forecast. The new system allows me to shut down all the controllers in seconds, versus the old system that would take two days."

In addition, the system informs the staff of any spray heads that are not working at optimal efficiency, allowing immediate repairs to save what would have been wasted water.

Even Droughts are Bigger in Texas

The drought affecting Texas has lingered now for more than two years. Water tables are at record lows with little relief in immediate sight.

"It would take a huge weather event for us to feel any sudden positive effects, like the residue of a slow-moving hurricane dumping a lot of water in a short time," says Jill Mayfield, Austin Water. This spring, 99 percent of Texas is in some form of drought conditions, and the state's reservoirs are only 66 percent full. Nearly 11 percent of the state is in "exceptional" drought, the worst stage, according to http://www.waterdatafortexas.org.

The drought has affected a wide-range of industries in Texas. Economists

estimate that the drought has cost farmers and ranchers upwards of $8 billion. Rice, corn and peanut crops are suffering; 40 percent of the corn crop was lost in 2011. Many ranchers are selling their cattle herds as feed prices rise and water becomes scarcer. Severe dust storms are forming in west Texas.

Officials from the Electric Reliability Council of Texas, ERCOT, are also concerned. Nuclear, coal and natural gas energy production all require large amounts of fresh water to cool equipment. Because “summer rains are unpredictable,” as State Climatologist John Nielsen-Gammon attested, it is hard to tell what this year will bring. But if the La Nina weather pattern returns in the fall of 2013, it could result in dire conditions. The latest National Oceanic and Atmospheric Administration outlook predicts the drought will “persist or intensify” in Texas in the coming months, and drought-free areas of the state are likely to see drought development.

The problem hasn’t gone unnoticed by politicos who are being pressured on many fronts to take action. On May 28, Texas Governor Rick Perry signed into law a bill creating a fund to finance water infrastructure projects in the state. The bill, approved by the Texas legislature, sets up a system for the state to provide loans for projects such as reservoirs, wells and conservation efforts.

“The Calsense central irrigation system uses flow sensors to monitor the irrigation. We have a set flow rate for each zone that was determined by the flow sensor when the zone was in perfect condition. If a zone has a higher flow rate, then it will flag that zone for a possible break. So instead of a zone running for 30 minutes and wasting water due to a break, the system detects the higher flow rate and shuts the zone down within a minute or two.

Click image to enlarge.

The irrigation upgrade involved the installation of flow sensors, master valves, 104 Calsense controllers and 18,000 Hunter MP Rotator nozzles.

“This feature has saved almost 10 million gallons, between March 2012 and November 2012, when compared to the old system. Some of our systems are 20 to 30 years old and some of the valves are the original ones. We found several valves that would stick on for 15 minutes and continue running for up to two hours at night, but were not caught during the monthly walkthroughs. This was wasted water that may never have been caught. Our irrigation techs are going through jasmine beds and tabulating nozzle rates to find the correct flow rate at the zones pressure. We have found several breaks that were hidden in the beds due to plant material and again may not have been found for a long time.”

But this state-of-the-art irrigation system is not all of UT’s doing. In conjunction with Austin Water, it is also pursuing the purchase of reclaimed/gray water from the city for use in utility operations and campus irrigation. Reclaimed water is highly treated wastewater that would otherwise

be returned to the (Texas) Colorado River and is safe for irrigation, toilet flushing and cooling. The effort will reduce the demand for potable water by approximately 400 million gallons per year and provide a substantial benefit to the city regarding water usage, and to the university in terms of cost savings.

Students urged to participate

The campus has long had a program to recover condensed water from buildings cooling coils for recycling into cooling towers. A continued investment in this approach has allowed the campus to recover 64 million gallons of this condensate water, thereby avoiding the purchase of a like amount from Austin.

The university is also training students to help continue the effort for water conservation.

“We have several classes that require students to find ways to conserve on campus, either by saving energy or conserving water. The new system allows me to provide those students with water-use information so they can work on projects to either provide that water from another source (AC condensation or rain water) or to change the landscape to a more native plant material,” says Hogue.

By the end of the year he hopes to have all this information up on the UT website for quick easy access to irrigation usage per building, and how that compares to the other benchmarks.

“It’s one thing to claim water conservation, but we want to show the hard numbers and be as transparent as possible to our community,” says Hogue.

Cooperation between the city of Austin and the university should be a model for other urban areas that have large universities and corporations that rely on city-services. What has started here might change the world.

Mike Ingles is a freelancer writer living in Columbus, Ohio, who writes articles about business and the green industry. Contact him at duckrun22@gmail.com.