

An Education in Rainwater

Educational facilities conserve with rainwater harvesting systems

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vangelism on behalf of rainwater harvesting is increasing nationwide. An indication of this are five new rainwater harvesting systems that have been designed and installed for educational facilities in South Carolina and Kentucky in less than three years.

The most recent of these was for the Charleston County School District's new Career & Technology Academy, situated on 5.2 acres of the Wando High School campus in Mount Pleasant, S.C. Completed in 2013, the 126,000-sq-ft facility serves approximately 600 students, including some who are studying horticulture. The site receives an average of 51.53 in. of rain annually.

A rainwater harvesting system, designed by Rainwater Resources, collects, stores and manages rainwater from a 1,700-sq-ft rooftop section, delivering irrigation water for horticulture projects. The system reduces water costs and decreases the environmental impact of undesired of storm water runoff.

The Career & Technology Academy system collects 49,118 gal of water per year-an average monthly yield of 4,093 gal, smaller than that of some commercial designs. However modest its capacity, the system design is rigorous, using components often found on much larger installations. The storage and management system has a Wisy vortex flow separator/filter/aerator that removes the first surface wash water from the system at the outset of a new rain event (first flush). The filtered water then is discharged to a CorGal corrugated galvanized steel storage tank, which has a geotextile pre-liner and a 25-mil flexible membrane main liner for water containment. Once in the tank, stored water is kept odor and slime free without chemicals by a proprietary Rainwater Resources design. A wireless level indicator provides constant storage data.

Because irrigation is sprayed into the air on occasion, an ultraviolet (UV) disinfection system also was installed. In the event of a UV lamp outage, an automatic shutoff is built into the design.



Charleston County School District's Career & Technology Academy collects 49,118 gal per year from a 1,700-sq-ft rooftop section. The water is used to irrigate horticulture projects.

The other four educational projects recently completed by Rainwater Resources are installed in the metropolitan area of Knoxville, Tenn., the company's home base.

Halls High School, Knoxville

For the Knox County Public School System's

Halls High School, Rainwater Resources designed and installed a 34,000-gal-per-year rainwater harvesting system to irrigate an agricultural classroom greenhouse. The system is a project of the Beaver Creek Watershed Assn., an alliance of 21 agencies, institutions and utilities now in its 15th year of cooperation



to improve and protect the creek's 86-sq-mile drainage area. Halls High School, located on the banks of Beaver Creek, was lauded by state Sen. Becky Duncan Massey for its support of conservation and public education regarding the watershed.

"This is an opportunity for our students to operate a demonstration system as a part of their scientific horticultural investigations," said Mike Blankenship, agricultural instructor for Halls High School. "The Wisy four-step sustainable system provides odor-free, slime-free water taken from our greenhouse roof with very [few] maintenance requirements and puts that water back into the greenhouse as controlled irrigation."

The system allows for crossover to municipal water in the event of drought conditions.

Ijams Nature Center, Knoxville, Tenn.

ljams Nature Center includes 300 acres of protected wildlife habitat and natural areas, located 3 miles from downtown Knoxville. The area contains 10 miles of trails, rock formations, ponds, lakes and scenic overlooks.

Hosting more than 300,000 visitors annually, Ijams has dozens of outdoor educational exhibits, now including a trailside rainwater harvesting system designed and installed by Rainwater Resources. Ijams Nature Center is a longtime educator and advocate for water quality and conservation in Knoxville. It hosts Water Fest annually and, according to Assistant Park Manager Ben Nanny, "We are constantly seeking ways to safeguard and conserve water here."

ljams had an existing solar array, which collects and sells power to the Tennessee Valley Authority—an attractive surface from which to capture rainfall. Immediately adjacent to the solar array is the center's greenhouse and plant recovery area, both somewhat underutilized for public display. Partnering with ljams, the Rainwater Resources team suggested integrating existing elements into an educational display with functional benefits for operations.

Today, "The Barrel's Big Brother," a colorful and attractive exhibit, is in place, collecting water from 1,700 sq ft of solar array and transporting it into 1,500 gal of aboveground storage. A solarpowered pump provides spray irrigation inside the adjacent greenhouse and powers a UV sanitization system. The cistern directs excess capacity to onsite groundwater recharge with a Rainwater Resources automatic capacity regulator. Ijams expects to capture and use 40,000 gal per year of pure, natural, chlorine-free water.



Halls High School in Knoxville collects approximately 34,000 gal of rainwater per year for use in its agricultural classroom greenhouse.

Mead Montessori School, Knoxville

Located on the grounds of Ijams Nature Center, the Miller Building houses tenant Mead Montessori School. A catchment system on the tenant building offered Nanny and Ijams Executive Director Paul James an opportunity to control and direct rooftop rainwater to useful and environmentally friendly best practices.

The system is capable of capturing 35,000 gal of rainwater annually. The collected water services a renovated pond and newly constructed waterfall. These improvements are part of an Alcoa Foundation sustainability grant and reflect Ijams' commitment to sustainable park management.

Rainwater Resources engineered and specified the system to provide years of low-cost water supply. The key piece of equipment is the Germandesigned gravity flow Wisy vortex filter between the roof and the 1,550-gal tank, which stops debris or sediment from reaching the storage reservoir.

Outdoor Classroom, Farragut

The Farragut Outdoor Classroom is a storm water control demonstration project for the rapidly growing town just west of Knoxville. The new classroom features rainwater catchment, permeable pavers, bioswales and rain gardens. There are picnic tables under the catchment roof.

For the Outdoor Classroom, Rainwater Resources designed a 2,500-gal system to harvest rainwater from the pavilion roof for irrigation and a splash pad for kids. Design features include:

- A Wisy vortex inlet filtration, smoothing inlet, submersible pump and skimming/ overflow device;
- · 2,500 gal of aboveground water storage;
- A UV disinfection system for protection against inhaled bacteria from irrigation spray;
- Automatic crossover to municipal water as a drought backup;
- Installation as a "wet" conveyance system, with all piping and electrical underground;
- Overflows easily diverted to a soil infiltration system;
- A double backflow prevention device installed on municipal water line;
- Accommodation for quick and easy winterization; and
- A filtration and purification system that are contained in an attractive outdoor enclosure. Back to back in these matching weather-proof steel cabinets are pump controls and humidity/temperature controls for the electronics. CW

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