Green Features Tour Duke Grainger Hall

Outside

Landscaping

Duke Grainger Hall's landscape and site design meets the guidelines of the Sustainable Sites Initiative, a national sustainability effort similar to the LEED rating system.

- **South side** (next to the Levine Science Research Center): An edible orchard in the courtyard is planted with native varieties of fig, plum and pear trees that will require less water.
- **North side** (main entrance, Circuit Drive): Plantings of drought-tolerant grasses and native shade trees, including longleaf pines and blight-resistant American chestnuts, on the north side of the building (main entrance, Circuit Drive) will reduce water use and runoff and provide habitat for wildlife. They will be irrigated with recycled stormwater collected from the new building's roof and site paving.

The building itself is located on the site of a former parking lot, to reduce the loss of permeable green space.

Shading

- **South façade**: Horizontal fins on the outside shield the building interior from the sun, especially in summer.
- **North façade**: Vertical frets shield the building interior from late-summer sun.

Both are designed to allow as much natural light in as possible, while minimizing seasonal heat transfer in and out of the building.

The fins and frets also reduce bird impacts (birds flying into glass) by creating shading and patterning on the windows so birds can see them. Windows also have frosted patterning in some places – specially designed to resemble window patterns at Duke Chapel – to let light in but help birds avoid collisions.

Windows

The windows are insulated, double-paned windows for higher energy efficiency, and many open automatically to allow in natural ventilation when outdoor temperatures and humidity levels are favorable.

Rooftop

Green Roof with Experimental Garden

The green roof is planted with a variety of water-wise edible plants, and irrigated with recycled rainwater. It reduces the heat effect and helps slow and filter runoff.

The varying soil depths – from six to eight inches – varying exposures and varying light levels, will allow for a wide variety of plants to be grown, some experimental.

Photovoltaic Rooftop Panels

More than 50 photovoltaic rooftop panels (left and right of the center panels) produce 45 kilowatts of electricity – enough to provide roughly 9 percent of the building's total energy needs.

Solar Water Heater

Up to eight solar thermal panels (center) provide domestic hot water for the building.

Water Conservation

Two separate water-recycling systems – one for greywater, one for rainwater – are designed to reduce runoff and provide water for toilets and irrigation.

Rainwater is collected:

- From the Duke Grainger Hall roof and stored in an underground cistern for use in irrigating the orchard and landscaping.
- From the traditional, non-green roof of the Levine Science Research Center and stored in a second underground cistern. This water is used as greywater for toilets in Duke Grainger Hall.

Inside

Thermal Corridor

On each floor along the south side of building runs an interior, thermal corridor, where the temperature can be set six degrees higher or lower than the temperature in the interior work spaces. It reduces energy use by providing a natural layer of insulation between office space and the exterior.

Chilled Beams

Heating and cooling for the work areas in the building is provided through a hydronic mechanical system in the ceilings called chilled beams. Water is heated or cooled, and then piped through the beams to heat or cool the office space, where most energy is used. This is more efficient than forced air. Each office or work area has an individual thermostat allowing the users to adjust temperatures slightly, if needed. The classrooms, art gallery and auditorium have conventional forced air systems, allowing temperatures to be adjusted more quickly.

Wood

The building's interior uses 100 percent Forest Stewardship Council-certified wood.

Carpets

Throughout the building, the use of patterned carpet tiles rather than traditional carpets reduces waste by allowing individual tiles to be laid, or replaced, in any way.

Energy Dashboard

An automated monitoring system on Level 2 (left monitor near the reading room) will continuously sense and communicate indoor and outdoor environmental conditions, as well as indoor energy use, allowing building users to make near-real-time adjustments to reduce their energy consumption.