



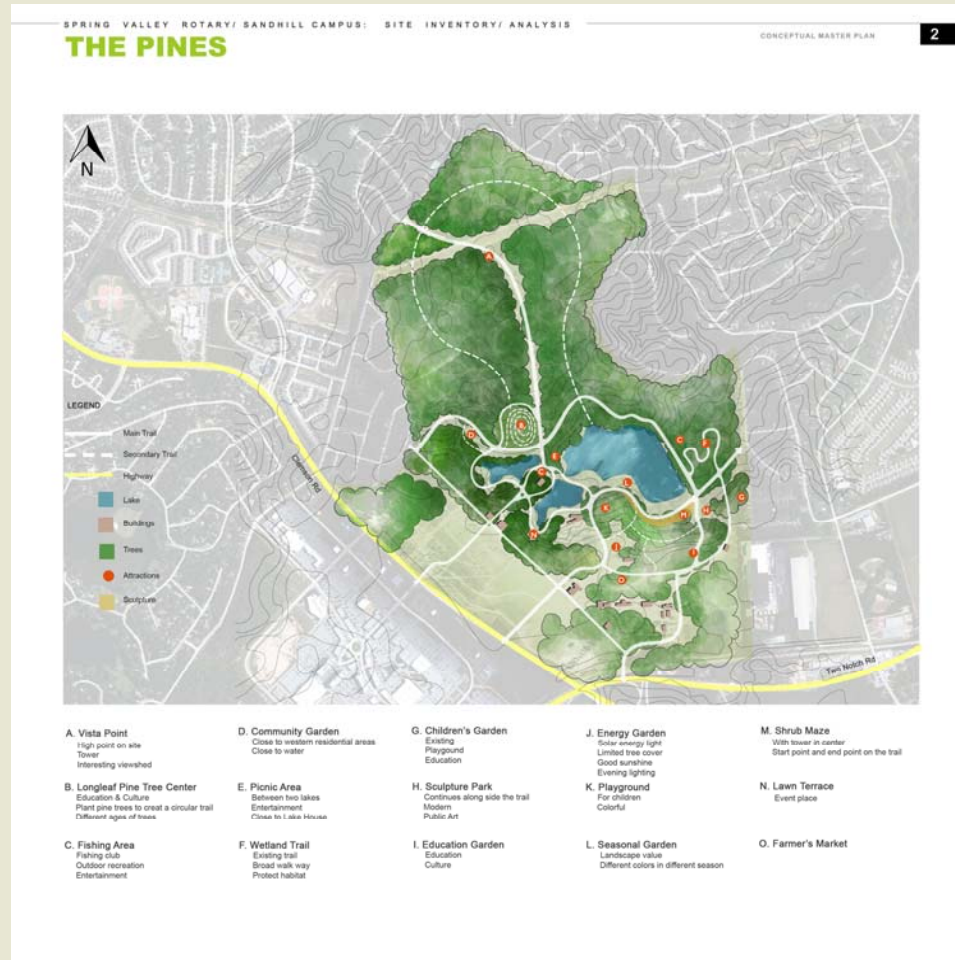
STUDENT AWARDS



AMERICAN SOCIETY OF
LANDSCAPE ARCHITECTS

North Carolina Chapter

Student Awards

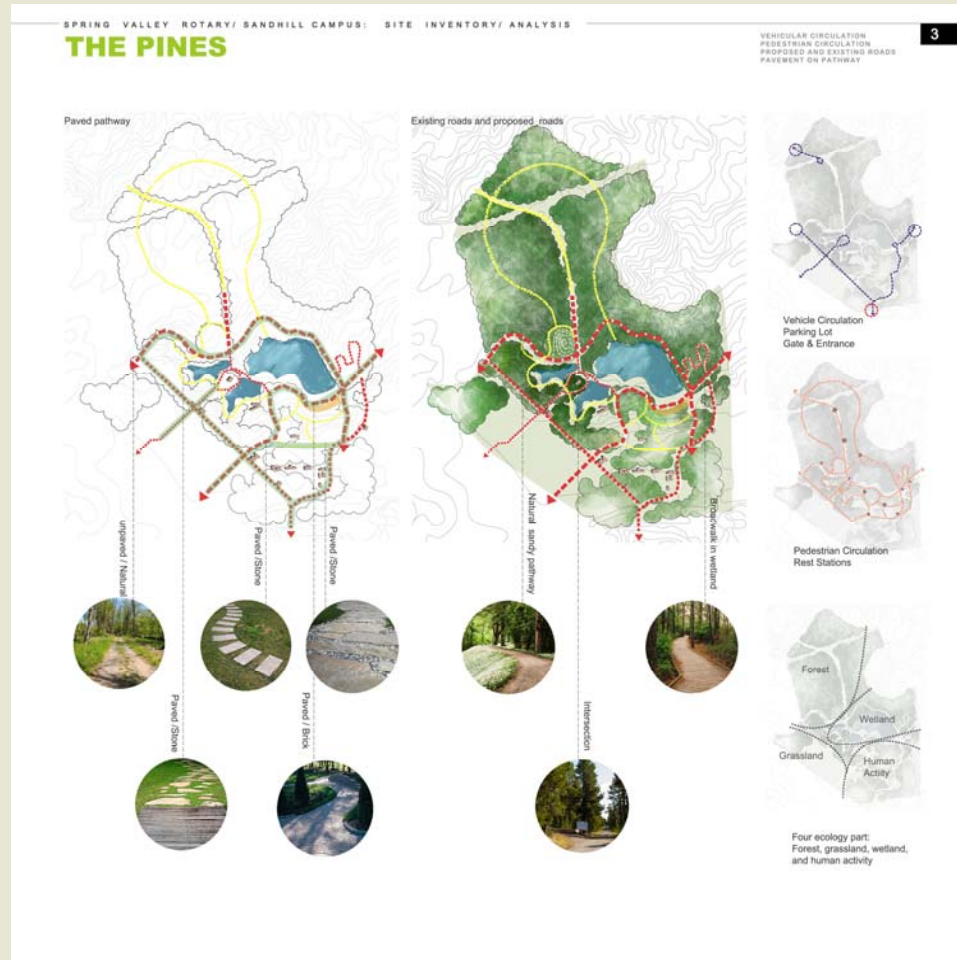


Project Name: The Pines at Sandhills, Research and Education Center

Firm Name: Clemson University

Project Location: Columbia, South Carolina

Student Awards



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SPRING VALLEY ROTARY/ SANDHILL CAMPUS: SITE INVENTORY/ ANALYSIS

FOREST AREA
LONGLEAF PINE TREE EDUCATION CENTER

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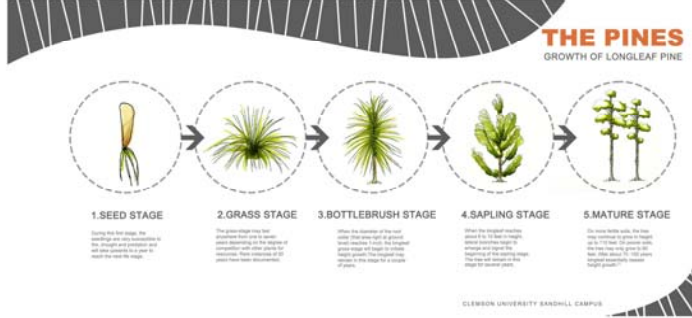
THE PINES

According to analysis, 60% of site is woodland, and almost 85% of the trees are longleaf pine trees. An informal trail will loop through the pines connecting neighborhood residents to the trail system. A tower will be built among the plantation to allow for views of the entire site—showing the relationships of a variety of ecologies and the changing landscapes. Interpretive signage would tell the story of the role the longleaf pine played in South Carolina history.



Longleaf Pine Tree Education Center

Here is a unit in the longleaf pine tree education center. Mature pine trees (dominate trees, codominant trees, intermediate trees, overtopped or suppressed trees) will be planted in the center, and then sapling, bottlebrush, and grass. From the center, the height of pine trees changes gradually.



1. SEED STAGE
During this first step, the seedling and only seedling is the stage and is planted in the ground. From this stage, it will take 10-15 years to reach maturity.

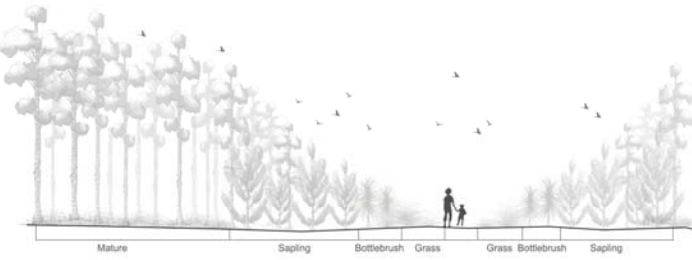

2. GRASS STAGE
The pine stage has been planted and will be in the grass stage. From this stage, it will take 10-15 years to reach maturity.

3. BOTTLEBRUSH STAGE
When the sapling has been planted, it will be in the bottlebrush stage. From this stage, it will take 10-15 years to reach maturity.


4. SAPLING STAGE
When the sapling has been planted, it will be in the sapling stage. From this stage, it will take 10-15 years to reach maturity.

5. MATURE STAGE
The tree will be in the mature stage. From this stage, it will take 10-15 years to reach maturity.

CLEMSON UNIVERSITY SANDHILL CAMPUS

Also, these forests can be home to hundreds of different plants and animals, with as many as 50 species of wildflower, grass, shrub and fern in a single square yard of the forest's open, sun-bathed floor. Some researchers estimate that the longleaf pine ecosystem is one of the most diverse outside of the Tropics.



The developing ecosystem is wonderful habitat for a variety of wildlife, including quail, turkey, deer, songbirds and gopher tortoises—the only native tortoise east of the Mississippi River. This tortoise thrives in the open understory of longleaf forests, an ecosystem in part sculpted by frequent fires that would destroy forests dominated by other tree species.

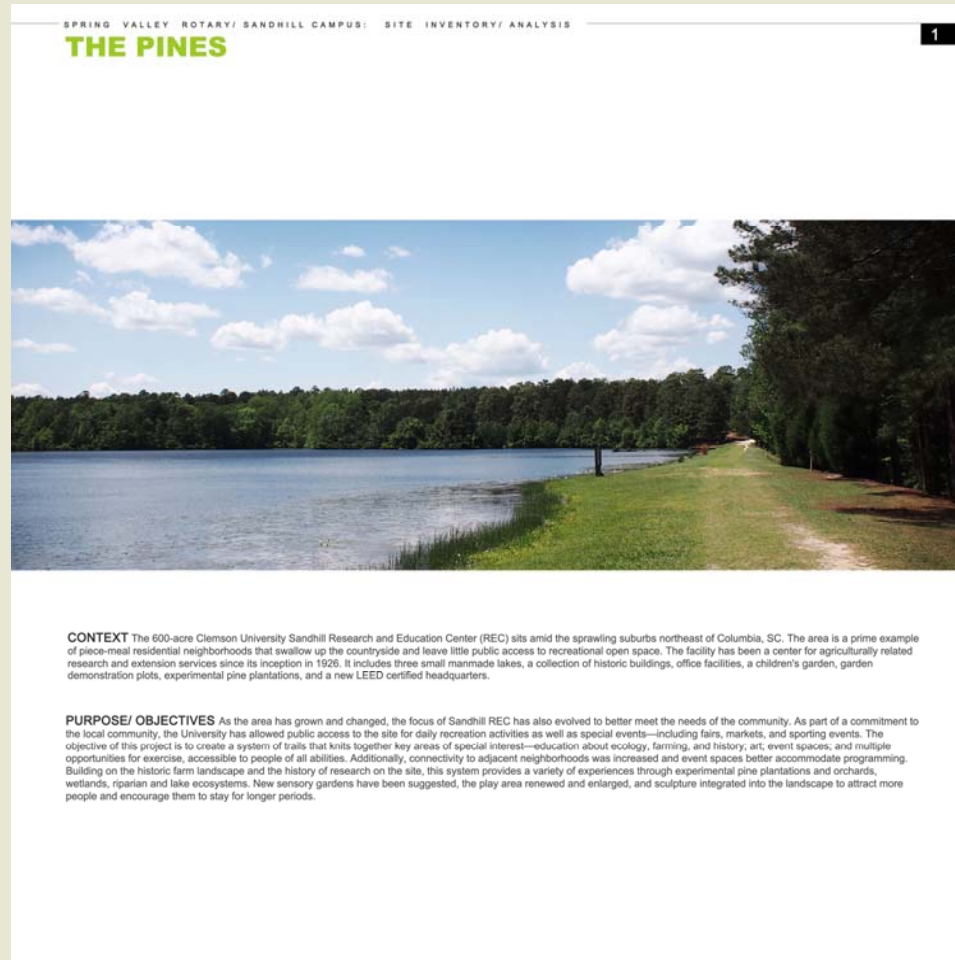
CITATION
[1] http://www.auburn.edu/academic/forestry_wildlife/longleafeducationcenter/longleafwilderness.htm
[2] <http://www.nwf.org/News-and-Magazines/National-Wildlife/Conservation/Articles/2012/Longleaf-Pine-Forest.aspx>

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Merit Award



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Project Name: The Green Room

Firm Name: Clemson University

Project Location: Pickens County, South Carolina

Student Awards

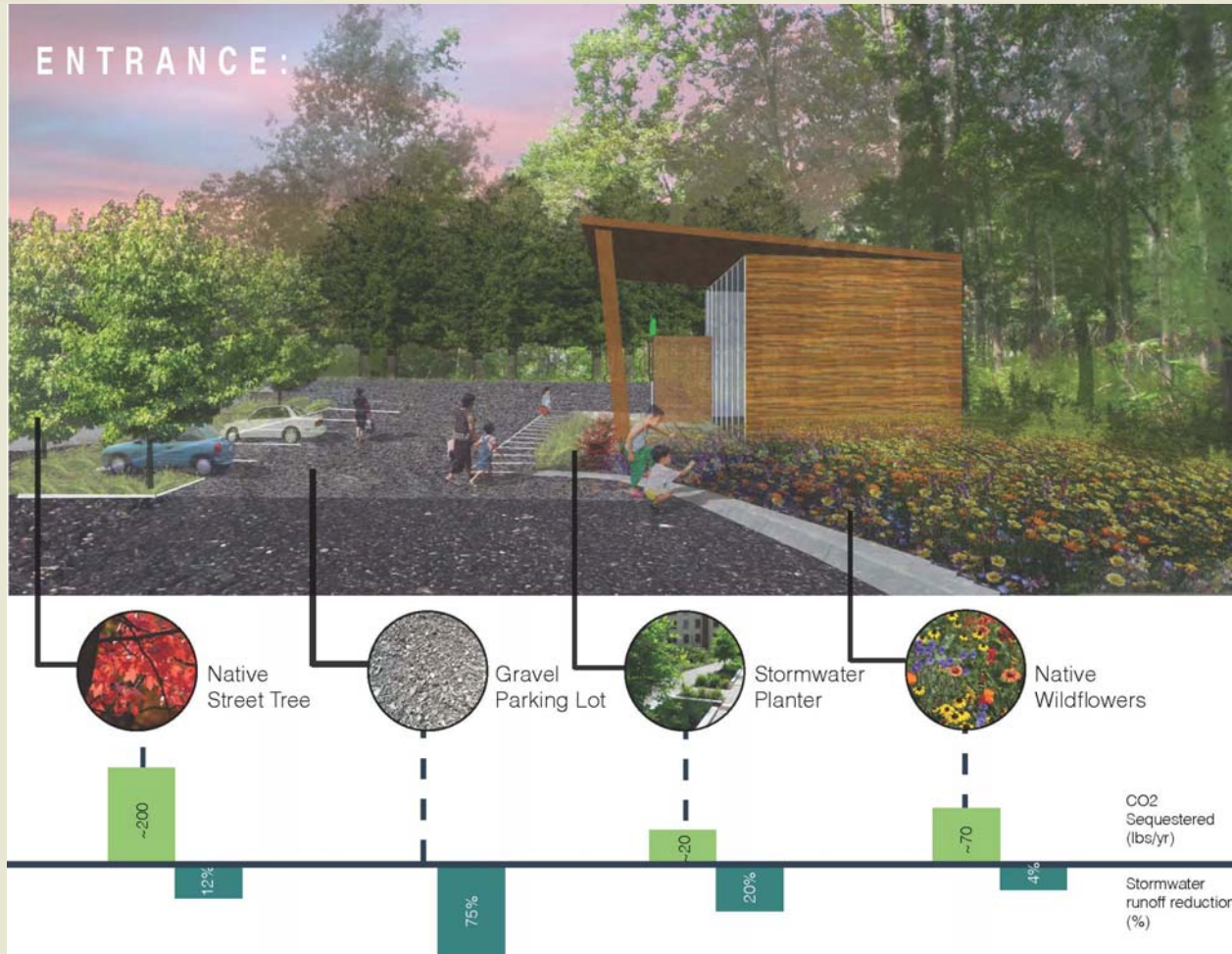


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Student Awards



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Merit Award

SEASONAL COLOR WALK:

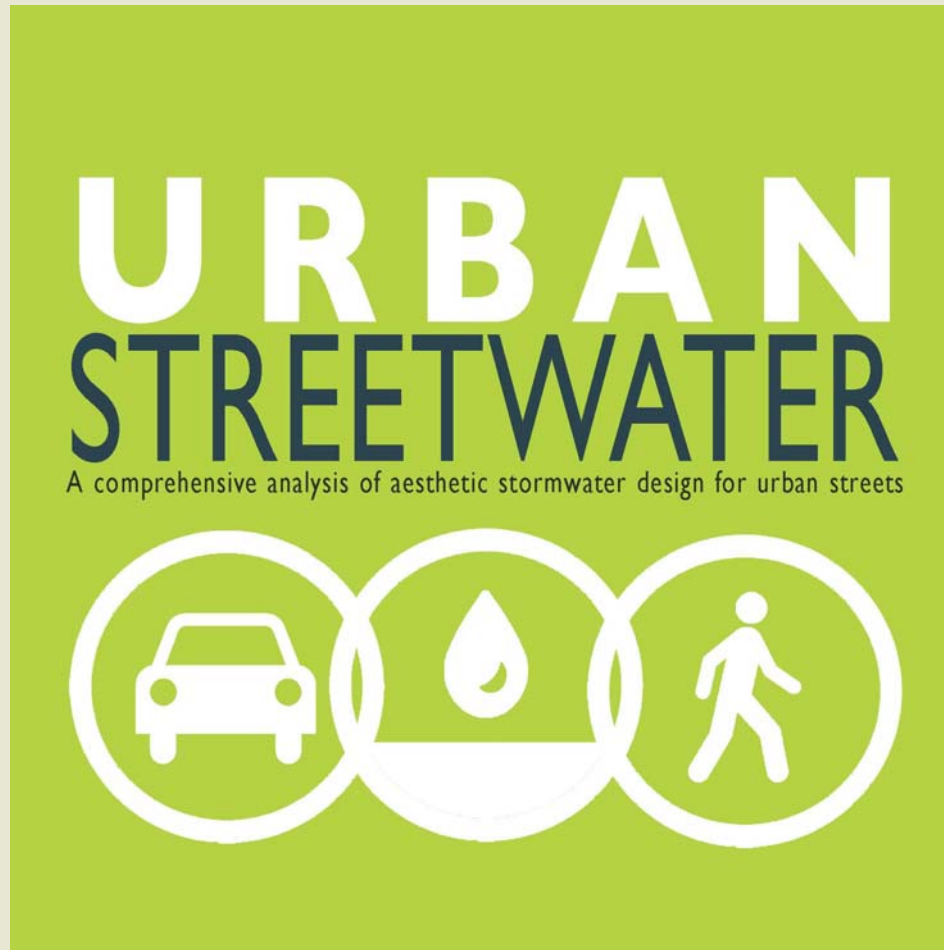


Project Name: The Green Room

Firm Name: Clemson University

Project Location: Pickens County, South Carolina

Student Awards



Project Name: Urban StreetWater

Firm Name: Clemson University

Student Awards

METHODOLOGY



Urban Center Plaza, Havana Nigun Associates

In order to analyze the potential of urban streets for stormwater management solutions, I looked at three separate aspects of urban stormwater designs (urban ecology, urban public space, aesthetic design) and how they interacted with each other. First I researched the tenets of urban ecology and how factors like soils, water flow, and weather patterns affect and are affected by the urban landscape. Second I tried to determine the qualities of effective urban public spaces. I asked questions such as "what do people value most in urban public space?" and "how do you

make the most of limited space?". Third I went back to the basics of aesthetics and tried to define specific characteristics of successful designs. Using these characteristics as guiding principles, I am more likely to create functional spaces that are considered amenities. Each of these areas urban ecology, urban public space, and aesthetic design contribute to the creation of a successful, artful stormwater management solution.

After compiling some base knowledge, I explored the relationships between the three areas. A web of connectedness began to form as I found ways that the three areas affected and influenced one another. A concise diagram of my analysis can be found with my research conclusions on page 7 and 8.

My process continued forward as I began to draw up diagrams and details for implementation strategies based on the information gathered in the research phase. I organized the information by filing the strategies under the categories of slow, spread, or soak. The strategies are not site specific or finalized but instead aim to create framework for urban stormwater management that could be applied on a project by project basis.

As a culmination of my work, I plan to produce a site-specific project that uses my research and implementation strategies as guiding principles for its design.

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URBAN ECOLOGY



Urban ecology is a relatively new field that examines the relationships of ecological functions, such as soil quality, wind, water, and wildlife patterns, in an urban environment. These natural systems are often manipulated in an urban setting in order to attain specific design or planning goals. Ignorance of the effects of these natural systems has led to some of our biggest issues in urban areas today, such as the urban heat island effect, species endangerment, and water pollution. For the purposes of this study, I focused on the issues of water in an urban setting and how these issues can be diffused using stormwater management techniques. I found successful stormwater systems needed to address five key hydrological objectives; flow rate, volume, frequency, duration, and quality. Properly implemented, green stormwater infrastructure can absorb containments, reduce runoff, and decrease amount of pollutants entering neighboring water bodies.

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Project Name: Urban StreetWater

Firm Name: Clemson University

SPREAD *it out*

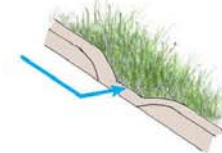


Strategies:

- Flow-through planters
Water can be cleaned by a series of flow through planters if stormwater infrastructure is needed in an area with a lot of impervious surfaces
- Filtration beds
Filtration beds are a good alternative if water can not be directly introduced into the water table; water can be cleaned by filtration beds before entering the stormwater pipes
- Curb details
Subtle curb details can change what was a concrete wall into a stormwater planter entrance for water flow

EXAMPLE:

Curb Details



Curb cut

The simplest option, a series of curb cuts allows water to move off the road and into the stormwater planter.



Perforated curb

In order to utilize a stormwater planter but still give the illusion of an interrupted curb, a perforated curb may be used.



Flush curb

A flush curb utilizes road slope to send runoff into the planting bed. This type of curb should not be used on high-speed roads.

Project Name: Urban StreetWater

Firm Name: Clemson University

Honor Award

2) CASE STUDIES

NE Siskiyou Green Street

City of Portland, Bureau of Environmental Services / Portland, OR / 2003



Landscaped curb extensions

Client: City of Portland
Size: 590 sq ft
Project Type: Streetscape
Existing site retrofit
Design Features: Landscaped curb extensions
Cost: \$20,000

Description:
Portland's first residential green street. Provides an example of how curb extensions can be used to manage stormwater. Curb cuts allow water to enter beds and if the water gets high enough, excess water enters the sewer system through a drain in the back of the curb extension.

Conclusion:
Relatively inexpensive option for effectively managing stormwater. Attention should be paid to blending plant material as NE Siskiyou residents appreciated that effort.



Blending of materials was appreciated by the residents

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Sand River Headwaters Green Infrastructure

Woolpert, Inc & Clemson Center for Watershed Excellence / Aiken, SC / 2009

Client: City of Aiken
Size: Over 5 acres
Project Type: Streetscapes
Existing site retrofit
Design Features: Bioretention facility, bioswale, cistern, porous pavers, curb cuts
Cost: \$3.34 mil

Description:
Aiming to reduce downtown Aiken's stormwater runoff impact on the Sand River, the green infrastructure included multiple different design features to try to contain and treat stormwater. The relatively large project aims to be low maintenance as well.

Conclusion:
While it may not be the most eye-catching stormwater project looked at, the project does set a good precedent for using South Carolina natives for low-maintenance.



Use of natives on the bioswales



Closer view of the swale and how it directs water

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Project Name: Urban StreetWater

Firm Name: Clemson University