

Appendix 4

2019 MS4 Stormwater Annual Report

New Haven independent Article on Bioswales

New Haven Tops 200 Bioswales

by **ALLAN APPEL** | Dec 9, 2019 4:38 pm

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ALLAN APPEL PHOTO

Dawn Henning signs in an Elm Street bioswale.

The bioswales have landed — New Haven has now passed the 200 mark, and on course to lay down another 75 of the rainwater-runoff gardens to reduce floods and buttress the city's storm-sewer system.

City Engineering Department Program Manager Dawn Henning set out Friday to start posting informational signs at 25 of the latest “green infrastructure” additions. She was joined by Matt Viens and William Tisdale, a crew from the [Urban Resources Initiative \(URI\)](#), the Yale School of Forestry-based nonprofit that has installed many of the city's 210 bioswales, the most of any city in the state.

URI and the city have just finished a federally funded two-year 100-bioswale installation project for the center of the city, from Long Wharf through downtown to the eastern edge of Dwight.



The sign-planting group's first stop Friday was the 15-by-five foot bioswale immediately in front of the library's new Orchid Cafe so the public can better understand the science behind the simple but effective green infrastructure.

"For a city our size the density of bioswales is very high," Denning said as Viens and Tisdale screwed on the informational sign to one of the bioswale's vertical posts.

The signs report that each bioswale can receive and infiltrate down into the soil up to 75,000 gallons of stormwater annually, diverting it from the city's sewer system.

Henning and the city engineer staffers adapted the design of New Haven's bioswales to fit New Haven's needs and soils.



Viens and Tisdale with the signage.

For example the new bioswales have granite curbs, unlike New York's concrete one. Black chain fencing aesthetically echoes the historic iron fencing across the street from the Green.

Another key point: "What's unique in New Haven is that we developed the design so it could be built with low-skilled labor," Henning said.

The hand-digging of the enclosure prevents damage to unmarked utilities in the soil beneath, especially in busy downtown areas. Manual labor means that there are no backhoes and other heavy equipment clogging traffic on the adjacent thoroughfares, she added.

URI won the contract to do the installation. Many of its crews come through [Emerge Connecticut](#), which helps train formerly incarcerated people to join the job force and reintegrate to society.

The same guys who plant the many trees that URI is responsible for citywide are also involved in creating these low cost green infrastructures.

Bioswale Basics



You can't put a bioswale on a hill. And bioswales must leave at least five feet of sidewalk for pedestrian passage. That posed a bit of challenge, in front of the library, with its steps and walls pushing out towards the curb.

Once you have a good spot, over a two-and-a-half day period crews dig down five feet below grade and lay in the 15-by-foot trench two and half feet of stone and two feet of mulchy graveled soil. The entryway from the road is the inlet; that lets in the stormwater — so that it doesn't wash into the nearby catch basins. That water enters, circulates among the plants, swirls and infiltrates down through the soil, then the stone layer where, cleaned up by now, it joins the ground water.



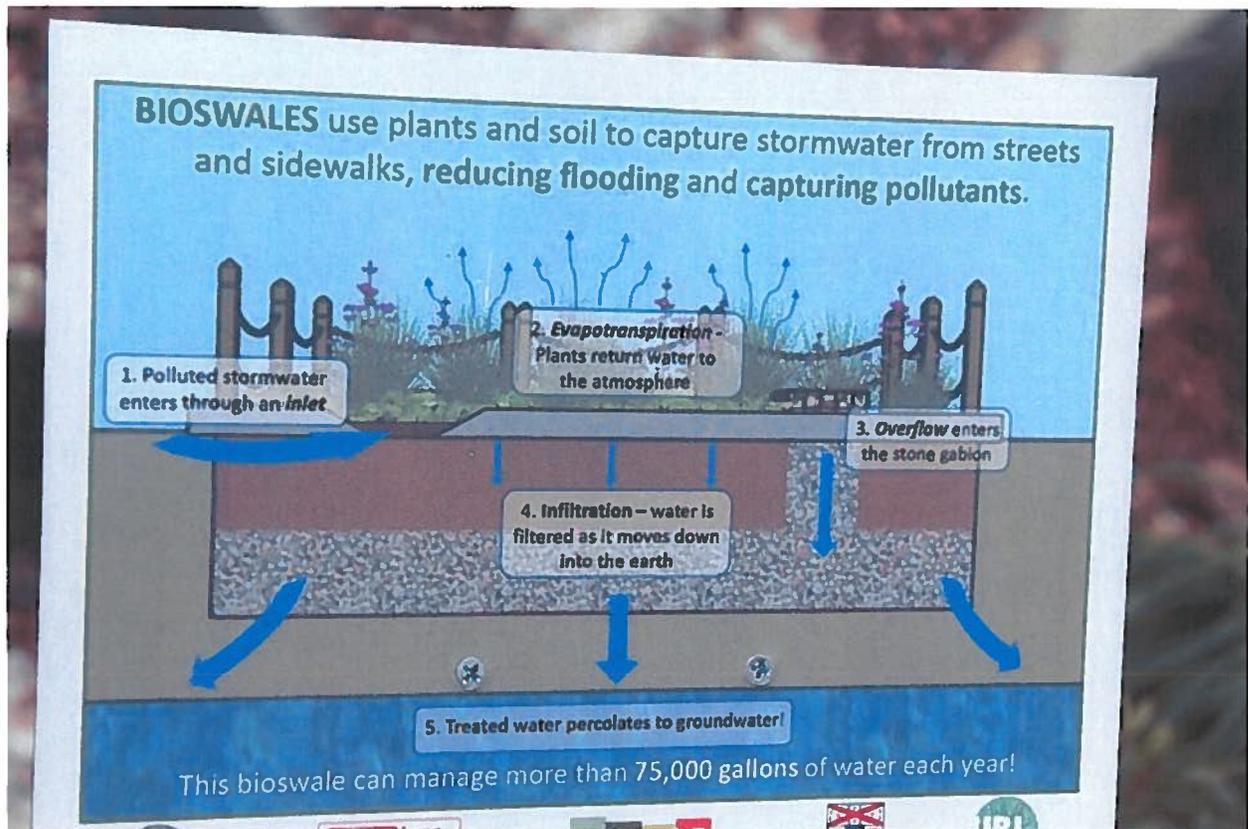
Each bioswale features toward a cage or [gabion](#) filled with rocks. Henning explained that the gabion is a shortcut to the rock level to expedite rapid infiltration during heavy stormwater events.

If you see a white tube descending in the middle of the gabion, that's not part of the structure. Rather it's for a study being undertaken by another partner in the city's growing bioswale enterprise, Dr. Gabe Benoit of the Yale School of Forestry and Environmental Studies. "He's doing research in the bioswales to measure precisely how much is being taken out of our storm sewer system" through the bioswales, said Henning.

Henning said preliminary soundings suggest that a "capture of 75 percent of the water inflows into the bioswale."

She speculated that the soils under the city are incredibly sandy and have huge absorptive ability. New Haven soils absorb 40 inches per hour, she said, while normal towns register closer to five.

It's Not A Gravel Pit



Each bioswale has generally the same mixture of evergreen and deciduous shrubs and plants, explained Viens, who is URI's green skills manager.

They all need to have roughly similar characteristics; They need to be able to withstand high salt—from the washed off de-icing compounds. They also need to survive well in both wet and very dry conditions, and so the the plants you're passing in the bioswales are generally those that would live in what Viens described as an ephemeral wetland environment.



MARKESHIA RICKS PHOTO

[A Chapel Street bioswale.](#)

So, botanists, get ready. These would be [ninebark](#), inkberry shrubs, and an ornamental evergreen grass called a liriop. The bioswales also contain a variety of day lilies that are nearly indestructible and, when they emerge, provide vibrant color. All this is so that people walking by won't think a bioswale is a gravel pit, Viens said, with irony.

Henning's office gets many calls from regular citizens requesting bioswales, along with professional calls from cities including Bridgeport and those in Rhode Island and Massachusetts. Since New Haven has the highest density of bioswales in the state, other cities are inquiring to borrow New Haven designs and to pick its engineering brain for best practices and approaches for installing — which include efficient pre-cast elements such as the granite edging and the fence posts.

Would Henning one day like to see New Haven monikered "The Bioswale City?"

She thought for a moment and then suggested a more general title: the City of Green Infrastructure.

URI plans to start building another 75 bioswales in the Hill once warm weather returns in 2020.



Project EMERGE participants at work on a Westville bioswale.

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