Living Shorelines

Rivers & Streams
Project Profiles

Streambank Stabilization
Jefferson County, PA

Filtrexx often partners with engineers for custom installations, especially when working with engineers who are still familiarizing themselves with the product and all its potential variations. Kevin Weaver, CPESC, and VP of Business Development for Filtrexx International, conducted a Lunch & Learn with an engineering firm in Jefferson County, PA, who were engaged in a streambank restoration project in the Punxsutawney area. Wanting to move away from the use of concrete and rip rap, the engineers saw Filtrexx vegetated GroSoxx® technology as a path toward a more bioengineered solution. Weaver assisted the engineer during the planning phase to create a sustainable and eco-friendly solution to restore the streambank. The plans incorporated Filtrexx GreenLoxx® with a mini-gabion foundation. "Blending the two systems worked very well," said Weaver. "There was no need to use a vegetated GroSoxx under the water, and the gabion lends additional strength to the whole system." The team also installed drip irrigation in the GroSoxx to ensure good germination and long term plant health—a hallmark of Filtrexx LivingWalls.

Streambank Stabilization
Cleveland, OH

A homeowner contacted Filtrexx because a stream in their side yard, which usually runs at a trickle, had begun swelling to a three to four foot river after each rain event. Each event washed away a significant amount of land–initially just a foot or so per year. When one month's rain took five or more feet of land and brought the eroded bank within 15 feet of the home's foundation, the homeowners decided it was time to do something.

A local Filtrexx Installer engineered a solution to accommodate the stream's highest flow, yet was still attractive during dryer months. The team used 12" Soxx™ to create stepped "flood zones" to minimize erosion, stepping up two feet and back three feet for each level. Above the flood zones they created a LivingWall™ pre-seeded with a deep root grass mix and a wildflower erosion control mix. The solution restored what had been lost to erosion over the previous 20 years.

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River Bank Stabilization

Brentwood, TN

The City of Brentwood is an affluent suburb of Nashville. In May 2010 the entire region experienced a "1000-year flood". The two day rainfall at Nashville International Airport shattered the monthly rainfall record for May. According to the NOAA, the equivalent to 420 billion gallons of water fell in just two days.

The City of Brentwood received an unprecedented 14-17 inches of rain. Flooding caused water damage to several hundred homes, mud slides, damage to roads and bridges, and even generated several fires in flooding homes. It turned the normally trickling Little Harpeth River into a raging river. Several homes along an unnamed tributary to the River had lost several feet of land in their back yards. Erosion of these parcels has continued unabated, and with a median property value of $450,000, this means huge financial losses for the homeowners.

The City's stormwater regulations require a natural, undisturbed buffer along existing streams to improve water quality. City engineers originally proposed to mitigate further erosion using coconut matting with rip rap.However, Tennessee Department of Environment and Conservation (TDEC) rejected the proposal, preferring something "greener". The tributary is a Designated Blue Line Stream, and thus is governed by the TDEC, with strict rules on what you can and cannot do.

Brentwood's Public Works Department turned to Mid-TN Erosion Control for a solution. "We had worked with Mid-TN in the past and knew that they always stood behind their work," said Rich Richardson, Public Works Operations Superintendent for the City of Brentwood.

Continued...

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Continued... Mid-TN showed them several installations that use Filtrexx® Bank Stabilization technology and they were very impressed with the rapid and sustained vegetation and their overall stability under the constant flow of water.

"We conducted a cost analysis and found that the labor was not drastically different from what we had used in the past, but this system lasts a lot longer," said Richardson. TDEC approved the City's proposal to use Filtrexx® Bank Stabilization technology to mitigate the loss of land. This technology uses GroSoxx® filled with engineered Filtrexx® GrowingMedia™. GroSoxx® are typically pre-seeded with native species for successful establishment. On this project, the GroSoxx® were seeded with switchgrass, hairy vetch, fescue, and bermudagrass.

Mid-TN Erosion stabilized a 530-foot section of bank, at an average height of four feet. "It took six men about a day and half to build the product and a day and a half to install it," said Chris Richey, of Mid-TN.

GroSoxx® are installed in successive courses along with geogrid to provide structural protection, control erosion, and establish and reinforce vegetation all in one simple system. The application has been specifically developed to withstand high flow velocities and shear stresses that conventional products cannot withstand. Over time the vegetation creates a natural anchor between the bank and the stabilization system. We call this "nature's velcro". Eight weeks later, the GroSoxx® have indeed proven to be effective. "I was out there last week and it was unbelievable! You can't see the mesh–it's completely vegetated," said Richardson. "And the homeowners are tickled to death, it looks like their lawn extends right up to the bank."

A biologist by training, Richardson understands the long term benefits. "The vegetation does the work. The product alone is not going to do it," he said. "But once the vegetation is established, I can't see it failing–ever."

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Streambank Stabilization

Columbia, SC

A Richland County stream had heavily eroded banks, and residents had begun complaining to the County about the loss of land. Richland County took on the project in order to restore the lost real estate. The engineer originally proposed using turf reinforcement mats, but that would have meant taking away even more land to create the necessary slope angle. "The County was looking for a design that would allow for the stream banks to be built back up quickly, almost vertically

in some locations, and a design that would also look very natural," said Allison Steele, Stormwater Engineer for Richland County. "The whole point of the project was to give them their yards back." Engineering firm CDM Smith decided to use Filtrexx GreenLoxx LivingWall, not only for its verticality, but also for its ease of installation in a forested environment. The GroSoxx used in the GreenLoxx LivingWall mold to fit around trees, eliminating the need to clear cut. Filtrexx® Certified℠ Installers Eco-FX, Inc. (Charlotte, NC) and Coogler Construction, Inc. (Ballentine, SC) teamed up for the custom installation. Together they installed approximately 600 feet of streambank, and the work was completed in about two weeks. GreenLoxx can be installed with or without mechanical reinforcement. This project used both. The Soxx were pre-seeded with an annual cover crop. The team returned this spring to plant several hundred native plants for permanent stabilization

Creek Bank Stabilization

Clemson, SC

The Clemson University campus is bisected by Hunnicutt Creek. A small but steep bank along this creek had been steadily eroding. Land Planning Associates, Inc. in Easley, SC provided a plan to stabilize the bank using GroSoxx®. Company engineers saw this as a good opportunity to try the product on a small scale. McJunkin Grading installed 12" GroSoxx in a pyramid stack at the top of the slope to divert water to an inlet, while using 8" GroSoxx on the slope itself. "We had used Filtrexx for sediment control in the past, but we had never used the GroSoxx. They were very easy to install," said Kevin Ross, Civil Engineer for McJunkin Grading. LPA Project Manager Allan Fortner was extremely pleased too. "They work fantastic. They did everything we expected and more. We installed the GroSoxx last fall and they are still holding up great after winter.

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Creek Bank Stabilization
Albemarle County, Virginia

The Avon municipal landfill operated between the mid-1950s and early 1970s. Moore's Creek, a tributary to the Rivanna River, flows along the base of the closed landfill and for many years has eroded portions of the landfill slope. During periods of heavy precipitation and high stream flow, exposed wastes and soils have entered the stream.

The property was acquired by a developer to provide access to an adjacent shopping center. To obtain local approval to construct a road over the landfill, the developer voluntarily agreed to implement corrective measures stipulated by the Virginia Department of Environmental Quality that would reduce landfill impacts on the stream. The corrective measures included stabilizing an approximately 300-feet long section of 20 to 40-feet high landfill slope being eroded by Moore's Creek.

The slope is very steep (approximately 70% to near vertical), sparsely vegetated and contains layers of exposed landfill wastes. During normal rainfall soils from the barren slope wash into the creek. During periods of high flow the landfill toe is eroded, resulting in local slides of soil and waste into the creek. The additional stream sediment impacts the Rivanna River (a sediment TMDL stream) several miles downstream.

After reviewing hard armor and green alternatives for stabilizing the slope, the Filtrexx® LivingWall™ concept was selected. Filtrexx provided the design with assistance from The Earthworks Group (Murrells Inlet, SC) and Koth Consulting, P.C. (Powhatan, VA). The design consists of 180 feet of riprap filled gabions founded in the stream bed, extending approximately six feet above the normal stream flow elevation. Above the gabions are four rows of 18-inch diameter seeded GroSoxx® at the base, followed by 12-inch diameter GroSoxx® placed up to the 100 year flood stage elevation.

Access to the work area was very difficult across extremely steep, heavily vegetated slopes. Brent Scarbrough & Company, Inc. (Fayetteville, GA) was the general contractor and Yard Works, LLC (Moseley, VA) was the Filtrexx® Certified℠ Installer. Construction oversight was provided by Draper Aden Associates (Richmond, VA).

Work began in late August 2013, after receiving required permits from the Virginia Marine Resources Commission and Albemarle County, VA. To create a dry work area, stream flow was diverted using an Aqua-Barrier® inflatable dam immediately upstream and pumps were used to discharge the impounded water downstream. Trackhoe and loader equipment were used to shape the slope as necessary before placing a geotextile blanket on the slope surface. After preparing the gabion subgrade, riprap was poured from above the slope into a chute connected to a "rock box" at the toe of slope. A loader removed the riprap and placed it into individual in-place gabion baskets. Once the gabions were completed, Yard Works used a blower truck located above the slope to fill the Soxx™ with compost. Filtrexx® Lockdown™ Netting and duckbill anchors installed on 8-foot centers were used to secure every two rows of Soxx. Once the Soxx were installed, live stakes and plantings were set on 2-foot centers into theLivingWall. The wall was completed to approximately two feet above the 100-year stage. Since the slope was essentially vertical the final two feet, it was finished with either 8-inch Soxx or live stakes.

The LivingWall was completed in March 2014. During construction and since completion of the LivingWall there have been six 1.5 to 4-inch rainfall events. The LivingWall has performed as intended during the six high stream flow events.

For additional information contact Stephen G. Werner, P.G., Consultant, Draper Aden Associates; 804-869-2246 or swerner@daa.com.

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Creek Basin Stabilization

Sarasota, FL

As part of a $2.5 million sediment management project, Sarasota County has implemented the Phillippi Creek water quality improvement program. The Phillippi Creek Basin drains 57 square miles of Sarasota County. GroSoxx® Gabions were identified and selected as a critical component for the project. The gabions are used to both stabilize the banks of Phillippi Creek and to remove particulate matter and nutrients from surface runoff and filter lateral movement of water in the soil that drains into the creek. EPA acting assistant administrator Nancy Stoner visited Sarasota County to determine which projects could be replicated in other areas of the country. Overall improvement to Sarasota Bay attracted Stoner to the area however, her focus was on Phillippi Creek, a tributary that, despite its 60 percent reduction in nitrogen pollution since 1988, is still in need of much help. Said Stoner, "There will be a lot of interest in what people have done here and how it worked to restore these water bodies."

Riverbank Stabilization

Nashville, TN

The scenic South Harpeth River near Nashville is one of the major tributaries of the Cumberland River. A private landowner needed to build a bridge over the river in order to improve access to his land. It was very important to him to preserve the natural beauty of his mountain hideaway–he didn't want to see rip-rap or boulders along the streambank when it was finished.

Gresham, Smith and Partners worked with Filtrexx to design a vegetated solution using Filtrexx® GroSoxx®–3' sections of Soxx™ pre-seeded for rapid and sustained vegetation that stop the loss of sediment and prevent erosion post-construction. Mid-TN Erosion Control installed the GroSoxx®, which were pre-seeded with turf seed. It took five men only one and one-half days to install the GroSoxx® along a 150-foot stretch of streambank. The seed germinated within five days of installation, and was fully vegetated within two weeks.

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Creek Bank Stabilization

St. Peters, MO

The city of St. Peters, Missouri has some 150 miles of streams and creeks that flow through it. The trees that line the Margaret Brown Creek had grown large and been encroached on by wild honeysuckle. A 16" culvert pipe that runs under a utility easement had been plugged causing the creek to overflow and cut an expanded channel.

ECO Constructors of Lake St. Louis was asked to help design a green solution to stabilize the creek. They corrected the overflow issues with a plug safe inlet extension and the creek stayed in its channel through the fall 2011 rainy season. The banks of the creek were then cleared of problem vegetation and reshaped using a mini-excavator. The sides of the creek were then repaired using the Filtrexx Bank Stabilization design and practices. During the installation, the Soxx™ were seeded with Virginia Wild Rye and plugged with live willow stakes.

Streambank Restoration

Charlotte, NC

This streambank behind a residence in Charlotte, NC had been subject to increasing flows and velocities of water due to upstream construction over a period of several years. The owners had begun to lose their fence at the top of the streambank, and were at risk of losing part of their yard and turned to Eco-FX Environmental in an effort to save their land. Eco-FX installed the Filtrexx® LivingWall™ with minimal excavation, and all site preparation was completed without heavy equipment. Sections of 12" Soxx™ were filled with rock and used as the foundation of the Filtrexx® structure. After several major rain events, the structural integrity of the LivingWall™ is still intact and germination is occurring at an excellent rate.

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