Living Shorelines

Lakes & Ponds
Project Profiles

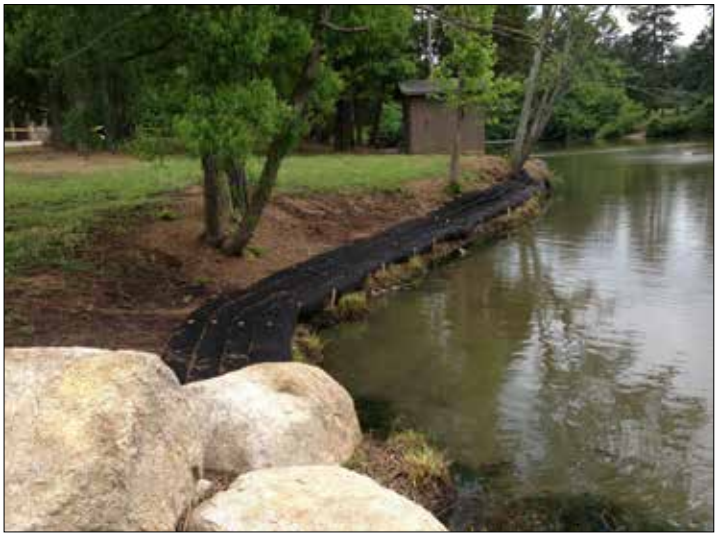
Slope Stabilization
Lakewood, OH

A residential lot on a high bluff above Lake Erie had been losing ground consistently for many years—so much that a concrete footer for a chain link fence at the top of the bluff was exposed and ready to slip. The homeowner was preparing to sell the home, and wanted the most cost-effective solution to fix the issue. He contacted Filtrexx, and the GreenLoxx® non-MSE LivingWall™ System was recommended. The job was easy to install, taking four men less than 8 hours to prepare the site and complete the installation of the roughly 450 square foot LivingWall. This included the installation of drip irrigation in the GroSoxx®, and tying it into the homeowner's existing irrigation system. "GroSoxx are a perfect solution for these types of

residential projects. They are easy to move into place and install without heavy equipment," said Nick Strazar, Inside Sales Manager for Filtrexx International. The team cleared existing brush and debris by hand, with no excavation required. The GroSoxx were pre-seeded with a mixture of perennial rye and native wild flowers.

Pond Rehabilitation
Charlotte, NC

Charlotte Latin School is a premier private school in North Carolina, serving 1400 students in grades K-12. The 122-acre campus features a large pond that had become so overgrown it was unusable by the staff and student families. The school's administration wanted to revitalize this natural asset, giving it a park-like feeling and making it accessible for fishing, picnics, and other recreational activities. Eco-FX, Inc. was hired to clear the overgrown vegetation, create mulched areas for recreation, and stabilize the banks of the pond in a manner that



was aesthetically pleasing. They chose Filtrexx Bank Stabilization application, which uses GroSoxx and/or geogrid to provide structural protection, control erosion, and establish vegetation in one simple system. The GroSoxx were vegetated with Eragrostis curvula, commonly known as Weeping Lovegrass. It produces an extensive root system that makes it useful for erosion control.

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Canal Remediation
Warrington, UK

In 2009, discussions began about how to handle the severely contaminated Woolston New Cut Canal in Warrington, UK. In 1978 the canal fell into disrepair and flows of water ceased. Water levels dropped and standing water and wet sediments were colonized by dense vegetation. Academic research trials between 2002-2006 had investigated phytoremediation at the Canal.

The research recommended stabilizing the contaminated silt and rewetting the canal. The current restoration project created a live demonstration to showcase novel wetland and contaminated land restoration techniques, demonstrate potential markets for recycled products, enhance and create habitats, and improve public access. (Rawlinson, 2012).

Concerns about handling of dredge materials brought Filtrexx® Design Services into the discussions. Based on recently published data about removal/stabilization of heavy metals, nutrients, hydrocarbons, and bacteria, using GroSoxx® to filter the sediment while contained in a Gabion system would be the best option. The original design called for rock gabions, but there were concerns about dredge flowing back through the rocks into the now open aquatic environment. Filtrexx presented research on Gabions and a test project was submitted to the community and funded through Waste & Resources Action Programme (WRAP).

GroSoxx with MetalLoxx® additives were manufactured by Forth Resource Management to fill the gabions. There are numerous options to consider, from completely filling the gabion structure with GroSoxx to only filling the fascia portion next to the soil fill, which is decided upon by the site engineer.

Dredge material was placed over the wall of the Gabion structure, and then 'encapsulated' because GroSoxx prevent the movement of silt through the Soxx™, while also enabling vegetation to grow and excess water to filter through. A 'cap' of locally made compost was placed on top. The project had the best of all worlds–filtration, stabilization, and removal of heavy metals.

This technology can be used for any linear projects with similar concerns, but especially for tidal areas where movement of dredge material has become too expensive to handle. This cost limits many projects from moving forward because it is often more expensive than the dredging itself. In addition, most dredge materials have some type of pollutant in them, limiting storage areas. Finally, we cannot overlook the benefits of local sourcing, and the concern over reports that coir logs may sometimes contain invasive species.

Project engineers tested coir/coconut logs and GroSoxx, and the results demonstrated that Filtrexx Gabions with GroSoxx clearly outperformed the coir product. "Plug planting within the compost sock was much easier than the coir rolls," states the report. "Compost socks…are a superior alternative to the use of traditional coir rolls or matting for the fast establishment and sustainable growth of aquatic plants demonstrating enhanced plant survival…a model for progressive, ecologically minded design professionals to adopt and adapt for the re-use of recycled aggregate materials in order to create new green infrastructure and diverse landscape habitats."

After, three months

Sparsley vegetated coir rolls

Fully vegetated GroSoxx

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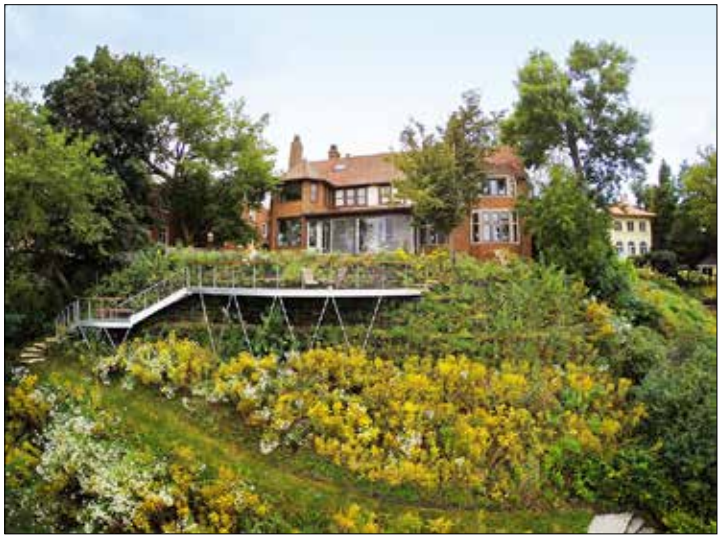
Bluff Stabilization
Shorewood, WI

The new homeowners of a historic lakefront property had slope stability concerns as well as a desire to access the sandy beach at the water's edge. The project site is located on a 115 foot 2:1 bluff overlooking Lake Michigan. From the view from the back porch windows, the home was right at the edge of the slope. It was determined by the geotechnical engineer that the site required stabilization.

Before.



After. *© Dan Bishop Photography*

Marek Landscaping, LLC (Marek), based in Milwaukee, WI, was hired to design and implement the project. Several alternatives were considered and vetted by the client. A living wall was selected for the upper portion of the bluff. This would stabilize the area directly adjacent to the home; adding eight feet of yard to the upper terrace. To provide access to the bluff and beach trail, the team determined that a cantilevered deck would provide a dramatic and functional connection between a stone stairway and the bluff trail. The living wall would be the foundation from which the deck and stairs would be anchored. It would provide the access to the beach and a sweeping view of the coast. A low impact trail with prefabricated stair sections and reinforced switchbacks created a rustic but navigable route to the base of the slope. With a goal to minimize visual and ecological impact, the trail all but disappears from sight. In order to fully flesh out the concepts discussed with the client, Marek brought a high level of technical understanding to develop solutions for the construction of the overlook.

In order to achieve this, Marek worked closely with the geotechnical engineer, carpenter/architect, and the client. Marek coordinated all of these efforts, designed custom fabrication details, selected materials, and coordinated the construction.

The bluff trail, ecological restoration, and vegetation stabilization of the site were also coordinated by Marek's landscape architect and an in-house ecologist. The end result was a native plant and seed mix created specifically for the cultural needs and stabilization properties of the plants on the site. Final installation of the design was coordinated by the landscape architect, carpenter, fabrication shop, foreman, and ecologist. Careful on-site direction was provided to ensure efficient and exact implementation of the soil stabilization, planting, trail, and overlook construction.

The integration of slope stabilization solutions into the design was crucial for the success of the project.

Continued...

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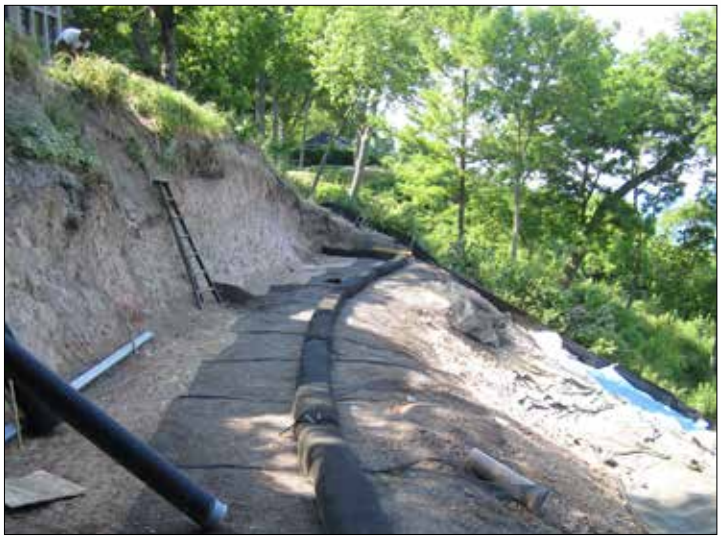


Installation of the GreenLoxx LivingWall

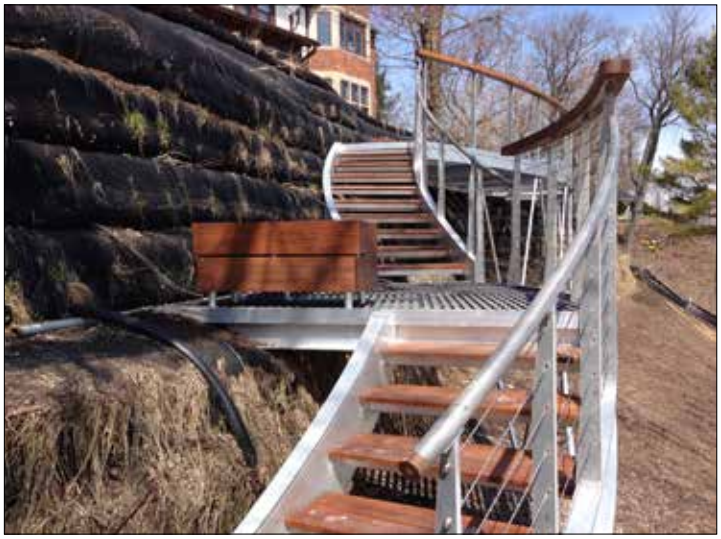
Due to the risk of erosion and for safety reasons, the client sought to stabilize and terrace the east or front yard and provide access to the beach. This led to the decision to utilize a living wall. This low impact solution promotes the growth of native plants for both a natural aesthetic as well as stabilization properties.

The 90-foot long by 15-foot high GreenLoxx® LivingWall™ consisted of lightweight geo-foam block backfill material, soil anchors, and 3" galvanized pipe tied to layers of geogrid wrapped around every two layers of the GroSoxx® at the face of the wall.

With Lake Michigan at the foot of the slope, the site offered the perfect context for pursuing improvement of access down the entire backyard property. This connection was established through a low impact trail that terminates with a pre-existing stone revetment wall that armors the toe of the slope from wave erosion.

With only five feet of space between the historic neighboring house and that of the clients, many materials were hand carried. Weight and size of assemblies were critical design criteria. Fabrication and assembly were test fitted and fully assembled at an off-site location to ensure accuracy and fit before delivery to the project site. The stairs and landing that connect the overlook deck and bluff trail were custom fabricated using aluminum, wood, and stainless steel assemblies that curve and flow with the sinuous shape of the living wall. The project recently received the 2015 Wisconsin American Association of Landscape Architects Award of Merit in the Residential Category.

Construction of the upper wall is complete.



The GreenLoxx LivingWall (dormant here) is the foundation to which the deck and stairs are anchored.

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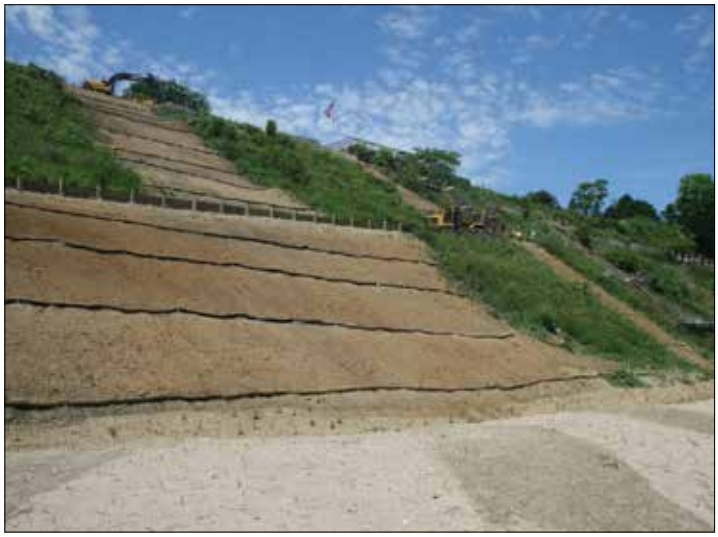
Shoreline Slope Stabilization

Milwaukee, WI

The Village of Shorewood, WI experienced a 7-inch/24 hour rain event that left a 100- foot, 2:1 shoreline bluff badly battered. Milwaukee based Marek Landscaping, was hired for design and consulting services for the road reconstruction, beach restoration, and slope stabilization,



as well as for construction services. They used a multi-BMP approach that included Filtrexx slope interruption and a biodegradable turf reinforcement mat. Marek installed 8" degradable SiltSoxx™ secured by hardwood stakes every six feet. They used laser levels to place them horizontally along the contours of the site every eight vertical feet. The media was a blend of FilterMedia™ and GrowingMedia designed to both slow the pass through rate and increase infiltration to the soil, thereby reducing runoff and encouraging plant growth. The entire slope was then seeded with a mix of mesic prairie plants, specifically selected for the site's slope aspect and soils. Marek has long been using Filtrexx products. "Filtrexx holds back sediment, increases infiltration, and doesn't fall down," said Vice President and Project Manager Mike Marek. We had the right flow-through rate and sock longevity for the site because of their rigorous testing and research."

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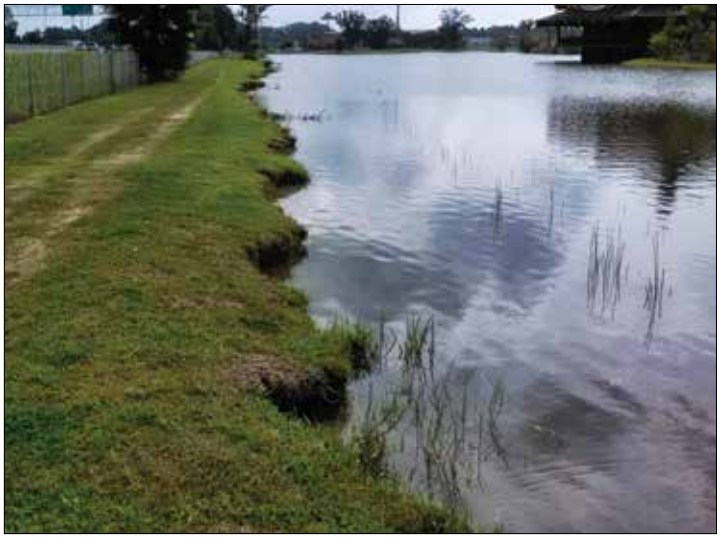
Edge Protection
Denham Springs, LA

High volumes of boating activity in ponds or lakes often cause severe undercutting along the shallow shores, as there is not enough deep rooted vegetation to dissipate the wave action.



This lake bank was rebuilt with GroSoxx because they are aesthetically pleasing and offer proven performance—at a fraction of the cost of hardscape. GroSoxx, filled with Filtrexx GrowingMedia™, provide a stable and fertile environment for optimum vegetation establishment.

GroSoxx are typically pre-seeded during production using species appropriate for the application and climate. Nurse crops, such as annual rye, may be used to establish a quick vegetative cover and root anchor until perennial grasses and/or live stakes can be established.

GroSoxx can be installed on site using pneumatic blower equipment, or pre-manufactured in two-foot sections and installed manually. At this lake, a nearby interstate made it logistically difficult to access the lake's perimeter with a blower truck. In addition, the lake featured a small island, so the GroSoxx had to be carried to the island using a barge and ropes. Therefore, the GroSoxx were manufactured on site using a Filtrexx Mini-FX machine. They were pre-seeded with a 4-way turf grass. The banks were dug to create a smooth edge prior to placing 6600 square feet of GroSoxx along the bank. After installation the GroSoxx were planted with Louisiana iris, dwarf calla lilies, horsetail reed, broadleaf arrowhead, bulrush, and other native species to create a natural look.

GroSoxx began to germinate within days of installation and soon established an extensive root system that anchored them to the existing bank. Eventually the Soxx become obsolete, as mature vegetation provides permanent vegetative reinforcement.

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