SOLMAX

RESILIENT FLOOD MITIGATION

Supporting state/local governments and tribes/territories in building resilient infrastructure and communities through nature-based flood mitigation solutions.

Nature-based solutions

Solmax is a global leader in developing and manufacturing innovative flood mitigation & erosion protection systems. Our low carbon solutions stabilize the earth and improve the performance of levees, dams, channels and other key infrastructure.

Resilient solutions that meet FEMA's nature-based criterion

- Promotes vegetation and helps restore rivers, floodplains, wetlands, living shorelines and soil stabilization.
- First and only manufacturer of High Performance Turf Reinforcement Mat (HPTRM) to have our carbon footprint verified by an independent, third-party organization.
- The carbon footprint of our HPTRM is up to thirty times smaller than traditional solutions such as rock riprap and concrete.
- HPTRMs have been recognized by the Environmental Protection Agency (EPA) as a Best Management Practice (BMP) to improve water quality.
- Reinforced vegetative solutions support living shorelines, whereas rock riprap and concrete can decrease streamside vegetation and adversely impact fish populations.

Benefits

- Half the installed cost of rock and concrete
- **Tested and approved by the U.S. Army Corps of Engineers (USACE)**
- Made in the USA

Technical support

Solmax's team of professional engineers offer full service support throughout the design process including site analysis, product selection, design support, construction details, and installation assistance.

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SANTA ROSA, FLORIDA

Oyster Lake outfall improvement

Industry:	Water
Sub-industry:	Flood mitigation, Coastal protection and reclamation
Location:	Santa Rosa, Florida
Product:	**PROPEX**® Armormax®

Overview

Oyster Lake is a coastal dune lake that creates a unique interchange between a natural stormwater lake and the Gulf of Mexico. When a coastal dune lake reaches a high water level, flow breaks through the dune system forming a channel between the lake and the Gulf. The outfall is critical for regulating water levels and mitigating flooding.

Oyster Lake's outfall had become severely degraded and the overall health was strained due to major storms and urban growth.

Walton County and other state agencies wanted to reinforce the outfall while preserving the natural vegetation.

FEMA included this project in its Mitigation Action Portfolio (MAP) as a successful nature-bases solutions for flood mitigation.

Solution

More than 2,000 square yards of **PROPEX** Armormax, consisting of High Performance Turf Reinforcement Mat (HPTRM) and Engineered Earth Anchors (EEA), were installed along the channel. This system was selected because it provides slope stabilization and erosion control while promoting vegetation. During installation, 2,000 sea oats were planted within the HPTRM, which is designed to promote vegetation.

After installation, Hurricane Michael (category 4) made landfall 60 miles east of Oyster Lake causing winds up to

80 mph, storm surge, and significant rainfall and flooding at the project location. The vegetated slopes of the outfall withstood the extreme conditions, protecting beachfront homes, nearby businesses, underground utilities, a section of Highway 30A, and a bridge that crosses the channel.

TEMECULA, CALIFORNIA

Murrieta Creek stabilization

Industry:	Water
Sub-industry:	Flood mitigation
Location:	Temecula, California
Product:	**PROPEX**® Armormax®

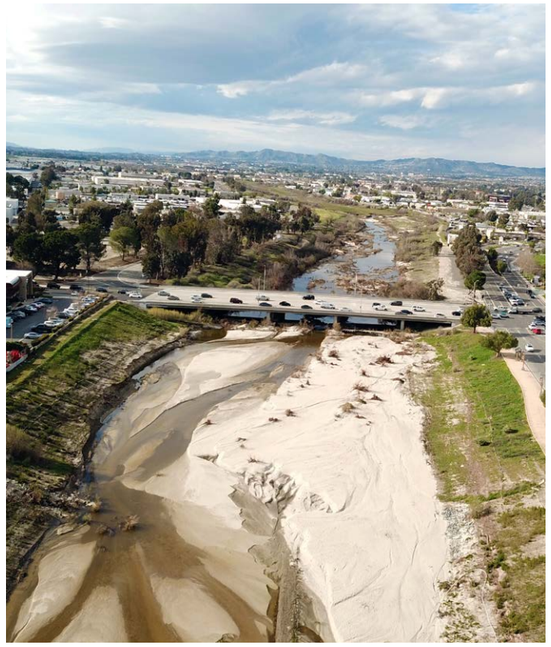
The purpose of this project was to mitigate flooding by conveying the 100-year flow within Murrieta Creek.

Overview

Murrieta Creek has a history of devastating flooding. Notably, the flood of 1993 that claimed the lives of five people and damaged 70 aircraft and two bridges at Pendleton Marine Corps Base. The flood also inundated pumps at the Eastern Municipal Water District, causing 5 million gallons of raw sewage to flow into the creek. Multiple major flood events have occurred since the 1993 flood. Today, more than 600 homes and commercial structures are vulnerable to flooding.

Solution

In 2000, the U.S. Army Corps of Engineers initiated the Murrieta Creek Flood Control, Environmental Restoration and Recreation Project to mitigate flooding. In phase two of the project, **PROPEX** Armormax was selected to provide erosion and scour protection on the creek banks. The system consists of High Performance Turf Reinforcement Mat (HPTRM) and earth anchors that provide resilient flood control for up to 75 years.



Maintaining water quality was a main concern because Murrieta Creek is recognized as one of the last high-quality, minimally disturbed riverine environments in Southern California. **PROPEX** Armormax helps to decrease sedimentation and pollutants and encourages infiltration of water back into the groundwater table. The system also promotes rapid root development for long-term vegetation, whereas rock riprap, can decrease streamside vegetation and adversely impact fish populations.

Vegetation was quickly established, and **PROPEX** Armormax has effectively protected the channel from erosion and flooding.

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WALLER COUNTY, TEXAS

Harvey Ditch stabilization

Industry: Water
Sub-industry: Channel stabilization
Location: Waller Country, Texas
Product: **PROPEX**® Armormax®
PROPEX Scourlok®

Overview

Brookshire-Katy Drainage District (BKDD) maintains a drainage channel that runs along Stalknecht Road in Waller County, Texas. Extreme storm water flows caused by Hurricane Harvey caused the roadside drainage ditch to experience erosion and slope instability, reducing the channel's capacity.

The severe erosion and reduction in channel capacity prompted BKDD to pursue permanent erosion protection.

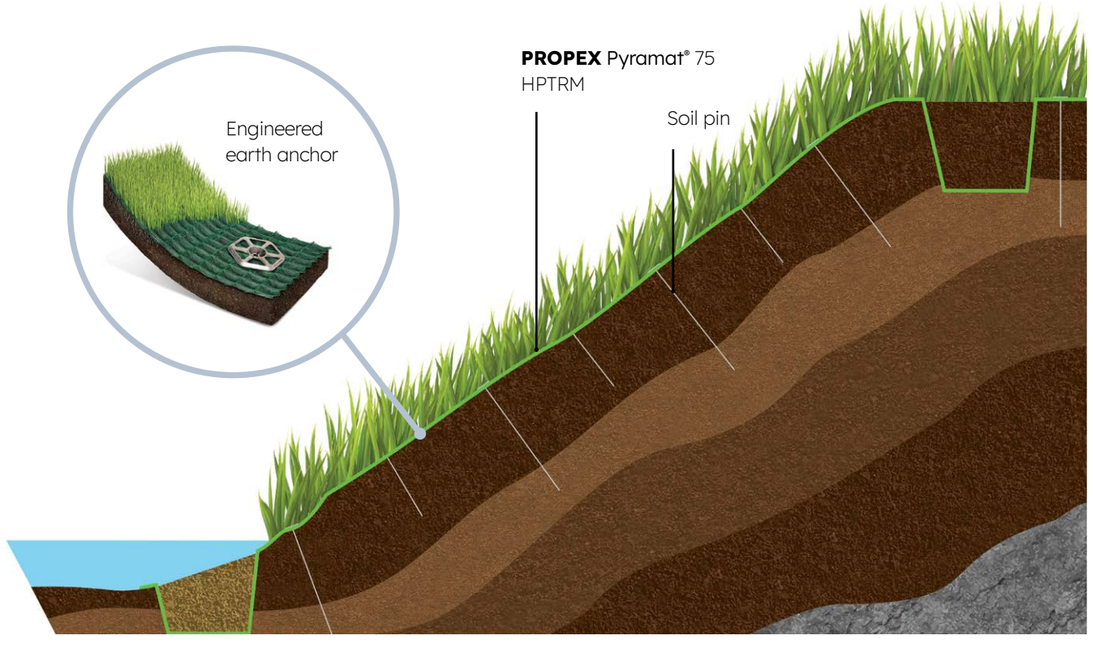
PROPEX Scourlok can be filled with on-site soil, reducing the number of trucks transporting materials to the site, thus reducing carbon emissions.

Solution

An early phase in the design process used rock filled gabion baskets to armor the channel, however, the design engineer wanted a more economical and environmentally-friendly solution. Gabion baskets require the removal and transportation of excavated material from the site, but **PROPEX** Scourlok allows the reuse of on-site soil to fill the units.

Stakeholders selected **PROPEX** Scourlok for the remaining phases of the project because it was a more cost-effective solution. **PROPEX** Scourlok is a stabilization system that features rigid and interlocking cells armored with erosion protection from a highly UV stabilized High Performance Turf Reinforcement Mat (HPTRM). The system is engineered to provide a vegetated, gravity wall system that resists sliding and overturning for up to 75 years.

The design included an eight-foot wall, comprised of two tiers of **PROPEX** Scourlok that spans 500 feet along the eastern side of the channel. The design also included 300 square yards of **PROPEX** Armormax along the top of the channel.



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OAHU, HAWAII

Kaneohe Stream bank restoration

Industry:	Water
Sub-industry:	Rivers, streams and estuaries
Location:	Oahu, Hawaii
Product:	**PROPEX**® Pyrawall®

Overview

As part of Hawaii's National Pollutant Discharge Elimination System (NPDES) and Erosion Prone Area Improvements Program, a streambank stabilization project was completed along Kaneohe Stream in Kaneohe, Oahu.

Over the past 30 years, high-flow events eroded higher portions of the channel, causing encroachment of several private properties. To prevent additional property loss and mitigate future flooding, the City and County of Honolulu wanted to find a solution that would provide long-term channel stabilization. Historically, a concrete solution has been used, but the City and County wanted a more natural system that encouraged the growth of native vegetation.

Due to limited site accessibility, the geotechnical investigation and sampling relied on the use of hand tools. A system was needed that was lightweight and could easily be carried on site and installed without heavy equipment.

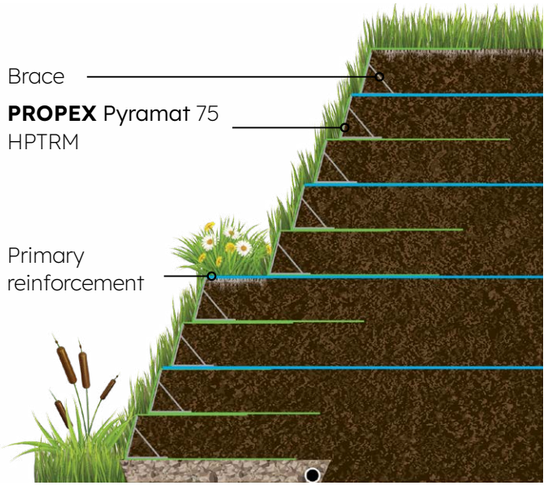
Solution

PROPEX Pyrawall engineered wrap-faced vegetated solution, was selected to reinforce 330 feet of Kaneohe Stream.

The installation ranged from six to eight feet high and was designed based on geotechnical information available at the site. This included steep 1H:4V slope segments with a mid-slope planting bench.

PROPEX Pyrawall combines High Performance Turf Reinforcement Mat (HPTRM) with internal braces to reinforce soil mass and resist lateral earth pressures. It is also designed to encourage vegetation and is a vegetated Best Management Practice Solution for NPDES Storm Water Compliance. This wall system is comprised entirely of three engineered geosynthetic components with no metal, concrete or short-lived biodegradable materials.

The vegetated wrap-face wall system provided a resilient bank reconstruction and stabilization along a residential section of the Kaneohe Stream that will provided a flood mitigation for up to 75 years.



About Solmax

Solmax is a world leader in sustainable construction solutions, for civil and environmental infrastructure. Its pioneering products separate, contain, filter, drain and reinforce essential applications in a more sustainable way – making the world a better place. The company was founded in 1981, and has grown through the acquisition of GSE, TenCate Geosynthetics and Propex. It is now the largest geosynthetics company in the world, empowered by more than 2,000 talented people. Solmax is headquartered in the province of Quebec, Canada, with subsidiaries and operations across the globe.

Uncompromised quality

Our products are manufactured to strict international quality standards. All our products are tested and verified at our dedicated and comprehensive laboratories which maintain numerous accreditations. We offer our partners a wide scope of testing according to published standards to ensure products delivered to sites meet specified quality requirements.

Let's build infrastructure better

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