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Since 1979

RECREATIONAL TRAILS

GEOWEB®
3D Soil Stabilization

GEOPAVE®
Gravel Porous Pavement

GEOTERRA®
Trail-Hardening Mats

Application
Resource Package

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TRAILS Innovative Solutions for Design & Build

Trails Resources

What You Will Find

Key Trail Applications

Trail Surface Stabilization

Multi-Use Trails

- GEOWEB System Benefits
- GEOWEB Application Overview
- Shoreline Trail Case Study
- GEOPAVE System Benefits
- GEOPAVE Application Overview
- Nature Reserve Case Study

Protected Areas & Tree Root Protection

- Application Overview
- Copt Hewick Case Study
- Application Overview

Wetlands & Coastal Areas

- Spectacle Pond Case Study

Trail Hardening Solution

- ATV, OHV, ORV Trails
- Application Overview

Trail Embankment Stabilization

- Slopes & Walls
- Application Overview

Free Project Planning Tools

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Create Low-Impact Trails

LONG-TERM STABILITY

Environmentally Friendly Solutions

This resource package outlines attributes and applications of the GEOWEB® 3D Soil Confinement System, GEOPAVE® Porous Pavers, and GEOTERRA® trail-hardening mats in recreational trail design for multi-use trails, wetlands & coastal area pathways, and tree root protection.

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Key Applications

Recreational Trails

Take the Tour.

See how these innovative solutions solve the most challenging site issues in trail applications at a lower cost and with higher performance than alternative solutions.

Multi-Use Trails

Protected Zones, Wetlands, Coastal Areas

ATV, OHV, ORV Trails

Embankment Stabilization

Multi-Use Trails

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The key to planning and building trails into undeveloped or protected areas is using the right reinforcement, drainage, and confinement of surface materials. These are critical components to withstand repeated traffic loading, resist degradation from water and erosion, eliminate rutting, and minimize impacts to natural resources. The overall goal is to maximize surface permeability while maintaining a stable, aesthetically pleasing, and low environmental impact trail that requires minimal maintenance. **Through confinement of aggregate infill, the GEOWEB and GEOPAVE Trail Stabilization Systems create a stable, low-maintenance trail surface.**

GEOWEB & GEOPAVE

Stability. Permeability. Low Environmental Impact.

BENEFITS

Delivered by the GEOWEB System

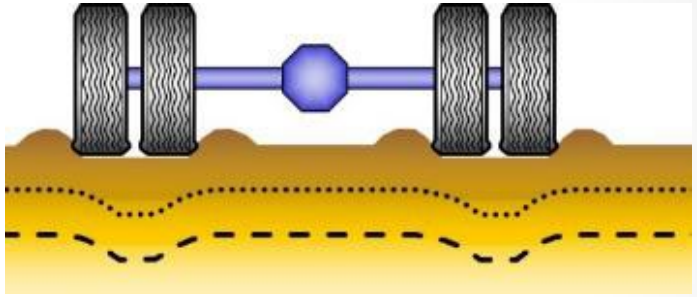
GEOWEB Geocells Flexible 3D Confinement Structure

Extends the Life of Trails

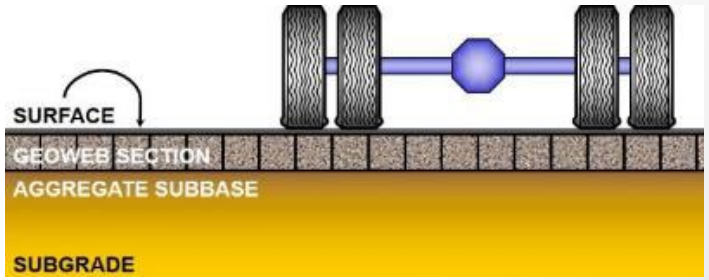
The GEOWEB system confines aggregate to prevent erosion and rutting of trails, allowing the use of clean stone infill and creating permeable trail surfaces.

The GEOWEB Confinement System:

- Allows use of local, inexpensive fill with low fines.
- Offers design flexibility: several material sizes and depths meet loading and stormwater needs.
- Conforms to landscape curves and contours due to its flexible nature.
- Is easy to deploy and install.
- Offers the lowest environmental impact solution with its 98% surface open area structure.



Unconfined Soil.
Surface is prone to rutting.



GEOWEB-Confined Soil.
Surface is extremely stable.

Application Overview

Multi-Use Trails: GEOWEB Geocells

Biking, Walking, Equestrian, Vehicles

Multi-use trails are designed to accommodate a variety of traffic from walkers, bicyclists, equestrians, and vehicles. The GEOWEB trail system is ideally suited for these applications because of the following attributes:

- **It is fast to install without heavy equipment—even in difficult or remote terrain.**
- Immediately after infill placement, the surface may be driven on by construction vehicles, thereby accelerating construction.
- Tendons can be installed to prevent uplift in flood-prone areas.

Several available GEOWEB cell sizes/depths provide the most economical solution for the intended trail use, subgrade conditions, planned loading/frequency, and stormwater requirements.

CASE STUDY

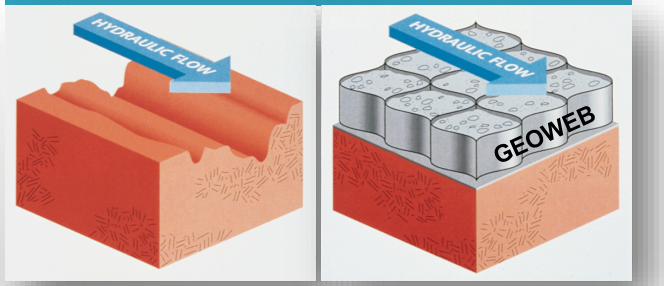
Shoreline Trail Flood Mitigation

Trails Through Flood-Prone Area

Restored recreational trail washout from flooding.

- The client wanted to follow the natural contours of the shoreline, making the flexible GEOWEB system the perfect solution.
- Tendons and anchors were used with the GEOWEB system to prevent potential uplift due to the high-water table.
- GEOWEB system cells were filled with decomposed granite infill to allow good drainage.
- After install, over 7 inches of heavy rain occurred in a 3-hour period, flooding portions of the Shoreline Trail.
- The GEOWEB-reinforced trail withstood the storm event, and no repair was needed.
- The GEOWEB Soil Stabilization System performed as expected and helped to minimize trail damage.

Water flows over the confined infill, limiting movement and controlling sheet flow erosion.



Flexible GEOWEB System conforms to curves & contours.

Trail may be driven on by construction vehicles once filled.

BENEFITS

Delivered by the GEOPAVE Gravel Pavers

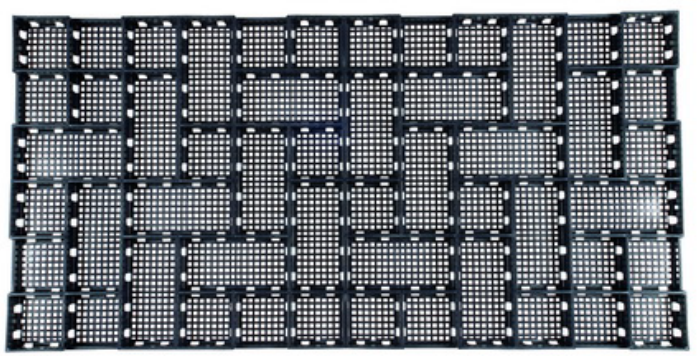
GEOPAVE Rigid Gravel Pavers

Aggregate Pavers for Everyday Traffic

GEOPAVE Gravel Pavers stabilize aggregate surface materials for lower maintenance and protection from surface wear and scour.

The GEOPAVE porous pavement system:

- Supports open-graded base course (OGBC) for fast infiltration & natural drainage.
- Herringbone surface offers aesthetic appeal.
- Monolithic mesh bottom keeps aggregate confined and resistant to movement.
- Green construction with product made from recycled HDPE.
- Two color options for the GEOPAVE Units—black or tan.
- Three color options for the SNAP Delineators—yellow, blue, or white.



GEOPAVE Units

(20 in. x 40 in. / 2 in. Wall Height.)

SNAP Delineators

(Yellow, Blue, & White Colors Available)

Application Overview

Walking Trails: GEOPAVE

Biking, Walking, Vehicles

Trails designed for foot traffic may also require ADA compliance or occasional access by maintenance vehicles. GEOPAVE trails are designed with highly permeable, open-graded aggregate for fast infiltration. The small particle size of the infill material and the rigid nature of the GEOPAVE units meet ADA requirements, as well as enable infiltration and filtering, preventing runoff pollutants from entering waterways.

- A deeper base may be incorporated to accommodate loading or stormwater requirements.
- The stable surface virtually eliminates erosion caused by runoff.

CASE STUDY

Permeable Aggregate Pathway

Walkway Through Nature Reserve

The nature observation trail at Rookery Bay is a barrier-free pathway through one of Florida's most scenic and environmentally sensitive areas.

- Maintaining a stable walkway as well as minimizing the environmental disturbance through the nature reserve in a soft-soil area was challenging.
- The engineer chose the GEOPAVE system for its structural stability, permeability, and ADA wheelchair accessibility.
- Over 15,000 sf of material was installed along the winding pathways, directly over the sand subgrade.
- GEOPAVE units were installed in an offset pattern, changing the orientation of the units with each row.
- Complete system created a flat, stable surface to support pedestrian traffic, along with occasional traffic from maintenance vehicles.

Protected Areas & Tree Root Protection

The majority of a tree's root system is located within the top three feet of the ground's surface. Construction excavation, maintenance vehicle traffic, and compaction can damage or even destroy roots to the point where trees cannot survive.

Trails designed through nature preserves or protected areas may require a low environmental impact solution to prevent environmental damage to grasses, plants and trees.

GEOPAVE & GEOWEB trails are ideal in these environments.

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Application Overview

Trails Through Protected Areas & Tree Root Protection

GEOPAVE & GEOWEB Systems

GEOPAVE and GEOWEB trails are ideal in these environments.

Their load-spreading ability minimizes construction and traffic-related damage to a tree's critical root zone by reducing soil compaction and damage to near-surface roots that ultimately endanger the tree's structural integrity.

- Open-graded aggregate surface is highly permeable, allowing moisture to get to the roots and limiting runoff from the trail surface.
- High load distribution characteristics spread vehicle and equipment loads on the upper surface, protecting the root zone.
- Quick to deploy and easy to install.

GEOPAVE Rigid Pavers

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GEOWEB Geocells

CASE STUDY

Copt Hewick Hall Service Road

Low-Impact Service Roads

Offers Access Over Soft Subgrades & Protection of Tree Roots

Project Scope:

When construction equipment and vehicles intrude on a tree's Critical Root Zone, they can negatively affect the soil environment, causing compaction of the soil and damage to near-surface roots—ultimately endangering a tree's structural integrity and survivability.

The GEOWEB 3D Soil Stabilization System proved to be the ideal solution for England's Copt Hewick Hall service road. **The objective: provide permanent access over poor soils and long-term protection of numerous mature trees.**

Project Results:

- Only 8 inches of subgrade needed to be excavated compared to the 20 inches required for conventional road construction and subgrades of similar CBR value.
- A needle punched geotextile was installed to provide a suitable separation layer between the subgrade and the specified aggregate fill.
- ATRA® Key connectors were used to join GEOWEB panels together end-to-end rather than traditional staples.
- Once secured in position, the GEOWEB panels were infilled with aggregate.
- The road was finished with decorative concrete edging.

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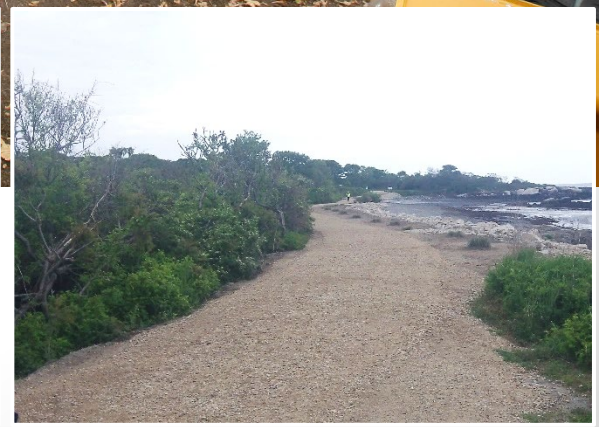
Wetlands & Coastal Areas

GEOWEB & GEOPAVE

Economical & Low-Maintenance Options

Nature trails built near or through wetlands or across streambeds contend with soft, wet subgrade soils that are often under water in spring and rainy months of the year. These trails may also require occasional access by maintenance vehicles, so building the trail with a stable, drainable surface and with materials not impacted by water is paramount. GEOWEB and GEOPAVE trails have been successfully constructed in wetlands and environmentally sensitive areas. Their HDPE material is highly resistant to degradation and does not harm the environment in any way. The HDPE material is also resistant to corrosion, making it an ideal solution in coastal environments.



CASE STUDY

Spectacle Pond Shoreline

Permeable Pavers

Offer Low-Impact Beach Access

Access to Brighton State Park Day Use Area precipitated the need for a pathway along a stretch of Spectacle Pond shoreline—a 102-acre recreational area in Northeast Vermont.

With a requirement to be ADA compliant, as well as porous to allow stormwater infiltration as required by the Vermont DEC, the GEOPAVE Porous Pavement System was proposed.

Other products were considered, but GEOPAVE pavers with aggregate infill were chosen as the most stable and sustainable solution for supporting everyday traffic and meeting the stormwater permeability requirements.

The GEOPAVE Porous Pavement System confines open-graded aggregate, allowing a high rate of infiltration to minimize stormwater runoff. The system's molded mesh bottom keeps aggregate from moving under pedestrian—and vehicle traffic.

No-Fill, Trail-Hardening Solution

Build “floating” trails across wetlands and streambeds to bridge wet areas and reduce trail degradation and braiding. Build low-impact trails in areas where infill resources are limited. This is possible without fill using GEOTERRA rigid mats.

GEOTERRA

Rigid No-Fill Mats

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Application Overview

GEOTERRA Mats Attributes & Benefits

GEOTERRA rigid mats are strong enough to support light medium traffic from ATVs or light vehicles without infill. Indigenous grasses regenerate through the permeable, open-celled GEOTERRA mats, ultimately camouflaging the product with the natural environment and protecting the vegetation from damage. The mats can also provide temporary protection during rainy seasons and are easily removed when no longer needed.

- Rigid mats are ‘locked’ together with PADLOC® connections to form any trail configuration, including grade changes.
- Open surface infiltrates water, allows natural revegetation.
- Temporary or long-term access.
- Fast, easy installation without heavy equipment—ideal for remote areas.

Open Structure Promotes Revegetation

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Trail Embankment Stabilization

GEOWEB 3D System

Slope Protection & Vegetated Walls

As part of trail design, ensuring embankments stability along trails can present challenges. The embankments may be part of existing natural terrain or result from cuts made to accommodate the building of new trails.

Creating stable, natural environments may also be a key factor in trail design. Depending on embankment steepness, the GEOWEB 3D system is utilized to stabilize slopes with single-layer protection or to build near-vertical, tiered retaining walls with a vegetated fascia. GEOWEB slopes and walls can accommodate existing structures or be built with new structures incorporated such as stairs and ramps.

Application Overview

Erosion Protection & Stormwater Control

GEOWEB slope and wall structures minimize the potential for erosion, reduce stormwater runoff, and offer natural blending with the environment. Specific grasses and flowering vegetation provide additional aesthetic appeal.

Trail Resources

Presto Geosystems offers FREE Project Evaluations for GEOWEB Trail Surface Stabilization, Slopes, and Retaining Walls.

Customized Design Support

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