



*creating
sustainable
environments™*



THE VEGETATED GEOWEB® CHANNEL PROTECTION SYSTEM

As communities expand, engineers explore better ways to manage increases in stormwater runoff. Maintaining a natural, green environment with vegetated solutions is often an important criteria in channel protection designs.

The multi-layered Geoweb® channel protection system provides a natural environment for vegetation in its terraced facia. The system is structurally stable, withstands high flows and associated hydraulic stresses for extended periods, and offers an aesthetically pleasing, cost-effective alternative to traditional channel protection methods.

Examples where the versatile Geoweb system solved unique channel protection problems are illustrated in this case study summary.



GEOWEB®
channel protection system

VEGETATED-STACKED CASE STUDY SUMMARY 2

providing sustainable channel protection solutions



case study 1

GRAVITY WALL • CIRBY CREEK, ROSEVILLE, CALIFORNIA • OCTOBER 1992
AWARDED 1997 INDUSTRIAL FABRICS ASSN INT'L AWARD OF EXCELLENCE

THE CHALLENGE

Project Engineer, Spink Corporation, was charged with increasing the flow capacity and installing a new sewer line in a flood-prone creek while maintaining the natural appearance of the adjacent neighborhood. The Geoweb® system was specified for channel embankment



protection, vehicle access ramps, service roads and scour aprons along 11.3 km (7 miles) of the creek. The system was chosen for its ability to provide a vegetated facia, perform with right-of-way constraints, accommodate saturated foundation soils and potentially high flow velocities, and be installed quickly.

THE INSTALLATION

Construction involved widening the channel and placing a 46-cm (18-in) sewer line in the invert of the creek. The original side slopes varied from 4h:1v to greater than 1h:1v with channel water-flow velocities as high as 2.7 mps (9 fps). Near vertical cuts were required to widen the channel and place the sewer line in the invert of the creek.



Project photos courtesy Soil Stabilization Products Co.



THE RESULTS

Chosen as an alternative to gabion baskets, the Geoweb system resulted in a 7% savings to the city and provided a natural vegetated bank system. The project utilized the Geoweb system for all four of its traditional applications: load support, channel protection, slope protection, and earth retention. Even after weathering extreme flooding of several winter storms, the Geoweb channel system remains in stable condition.

case study 2

GRAVITY WALL • RUISSEAU LEAMY, HULL, QUEBEC, CANADA • FALL 1995

THE CHALLENGE

Storm water runoff had substantially increased due to a new subdivision in Hull causing significant stream bank erosion to an area downstream. Storm flows had increased to 7 m³ sec (246 ft³ sec) for normal flows, to 10.5 m³/sec (369 ft³ sec) for peak flows with velocities of 3.5 m/sec (11.5 ft/sec).

Project photo courtesy Amtec Limited



Compounding the problem were predominantly soft, weak clay soils, extremely

prone to frost heave and differential settlements. A solution that blended naturally with the native woodlands was deemed mandatory by the City and residents. The Geoweb® channel protection system was selected for its inherent flexibility in soft soil conditions and ability to provide a visually-attractive, vegetated solution with a minimum of site preparation.

THE RESULTS

Constructed in 55 man-days, this Geoweb channel protection system has been exposed to extremely harsh winters and high runoff springs. The channel continues to perform as expected, both visually and structurally.

case study 3

REINFORCED EARTH • W. BOULDIN CREEK, CITY OF AUSTIN, TEXAS • SUMMER 1999
AWARDED 2000 INDUSTRIAL FABRICS ASSN INT'L OUTSTANDING ACHIEVEMENT AWARD

THE CHALLENGE



The City of Austin's W. Bouldin Creek experienced significant erosion of a 46-m (150-ft) long, 6.7-m

(22-ft) high section of bluff. A near 90-degree turn in the creek created concentrated flows and erosive forces that severely undercut the outside bank, undermining the embankment to the point where emergency repair was critical before impacting an adjacent roadway. Erosive shale foundation soils and a significant overburden of limestone complicated the problem. Engineers sought a long-term solution that would resist further erosion of the bluff while maintaining the natural appearance of the stream bank.

DESIGN CONSIDERATIONS

A composite wall design integrating the Geoweb® system and geogrid reinforcement every 0.6 m (2 ft) was chosen

over conventional methods due to aesthetics and labor savings. Interior perforated

cell walls were specified to allow lateral drainage from any naturally-occurring groundwater. Drainage ports were included to prevent the build-up of hydrostatic pressures behind the Geoweb fascia. The flexible wall structure conforms to the creek's landscape contours and prominent rock outcroppings, and can tolerate potential settlement without loss of structural integrity.

THE RESULTS

The City of Austin found the Geoweb channel much less labor-intensive than conventional methods, and estimated the four-month construction was performed at one-half the cost of other options (poured concrete or gabions).



Project photos courtesy Soil Stabilization Products Co.



case study 4

GRAVITY WALL • MOLLY ANNE'S BROOK, HALEDON/PATERSON, NEW JERSEY • SUMMER 1999



THE DESIGN

Due to increased storm water runoff from surrounding areas, the US Army Corps of Engineers – Philadelphia District needed to increase the flow capacity of an existing channel in an area with limited right-of-way, rock outcroppings, and high stream

velocities. At a section with varied rock elevations, a 122-m (400-ft) long gravity wall with 2.7-4.3 m (9-14 ft) heights was designed with the layered Geoweb channel protection system rather than reinforced concrete retaining walls. The design included a 100 mm (4 in) concrete-filled Geoweb® layer along its base for scour protection as the channel would be subjected to flash flooding and high velocities during its 50-year design life.

THE INSTALLATION

The Geoweb layers extended from the wall face into the bank 0.9-2.3 m (3-7.5 ft). Each layer was setback 50 mm (2 in) from the underlying layer, allowing for vegetative growth in the

exposed front cells. The bottom five sections were filled with 3/4-inch stone to protect against long-term flows. The upper sections were filled with native silty sand and gravel. The setback of subsequent layers allowed for planting of a hardy perennial vine.

THE RESULTS

The Corps estimated that the Geoweb system was constructed for less than half the cost of an equal length of reinforced concrete retaining wall. Employing the layered Geoweb system at this 122 m (400 ft) location and as a concrete channel liner at another 91 m (300 ft)

location provided an overall project savings close to \$400,000. The channel embankments protected by the Geoweb systems have performed as expected.



Project photos courtesy ACF Environmental

case study 5

CULVERT HEADWALL • CITY OF HULL, QUEBEC, CANADA • FALL 1997

THE CHALLENGE

To complete a retail mall project, developer Deschenes Construction required the following solutions:

- Stream re-alignment paralleling property limits to create space for new buildings
- Stream relocation to meet rigid environmental and aesthetic requirements
- Three stream crossings to provide mall access.

The Geoweb® system was selected for culvert headwalls at the stream crossings for its adaptability to the channel's natural curves, ease of installation, and vegetated facia. The system can withstand changes in soil caused by seasonal variations and traffic vibrations as well as anticipated differential settlement due to the native soil's poor bearing capacity.



THE INSTALLATION

The Geoweb sections were placed with high-strength geogrid integrated at appropriate elevations to provide soil reinforcement. A non-woven geotextile separator was placed over the native soil on the banks and in the streambed, and covered with river rock. Once constructed, a variety of flora was planted in the wall's open facia cells.

THE RESULTS

All project participants and area residents approved the appearance of the vegetated solution. As a result, two years after construction, the City of Hull constructed a second phase utilizing the same vegetated channel solution.



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At Presto, we're committed to helping you apply the most cost-efficient solution to your channel protection problems. Contact Presto Geosystems or our worldwide network of knowledgeable distributors/representatives for assistance with your project needs.

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