

Slopetame²





Above: Clift's Cove, Huntsville, AL — Swales are lined with coconut blankets and Slopetame² mats. The rings collected sediment and prevented rill erosion during housing construction, then completed with topdressing and hydroseeding.

Front Cover: Total System Services, Inc., Chattahoochee River, Columbus, GA — Slopetame² and Bermuda grasses protect this slope from floods several times per year.

Introduction

Invisible Structures, Inc. has created a permanent slope stabilization mat that is positioned for difficult erosion control problems that are frequently solved by more expensive gabion, concrete block, and geo cell products. Slopetame² is a three-dimensional structure of 1" high rings, connecting bars, and geogrid, attached to vegetation locking filter fabric. The main purpose is to completely cover steep slopes or swales with the Slopetame² interlocking structure, fill it with soil, and plant with grasses or other suitable vegetation. The Slopetame² reinforced root system will form a deep, knitted, and unified protection layer for soils.

Water must take a slower route over and through the Slopetame² system of structure, fabric, and knitted roots.

Full depth cross bars connect each row of rings, forming containment and preventing surface soil from moving laterally. Water penetrating into soils must also drain through the polyester filter fabric, which slows it down while keeping soils in place above. The dense root growth knitting through the fabric layer, enables slow and deep water percolation.

Water passing over submerged Slopetame² surfaces, such as in swales or channels, will most often find a multiple layer of grass blades overlaying each other like shingles, with water passing in a smooth laminar flow fashion. This lack of turbulence reduces suction forces and loss of soil particles in the upper root zone.



Swale from flag area down to golf course was vegetated with seed mix of 27 different plants that took two years to mature.

Slopetame2 Benefits

- True 3-dimensional containment of fill for increased stability.
- Small-scale confinement with rings and bars prohibiting soil movement.
- Shallow depth of fill material to reduce costs.
- Strong diagonal grid to disperse loads across slopes.
- Interlocked continuous structure across slopes for greater strength.
- Strong root matrix in geotextile fabric for additional support.
- Fabric backing to reduce chance of undercutting and slow water infiltration.
- Lightweight product for easy assembly and installation on difficult surfaces.
- UV-resistant, 100% recycled plastics for environmental benefit and longer life.
- No product damage from normal chemicals used in horticulture for durability.



Invisible Structures — Standard Product Roll Sizes

Model	Width		Length		Diameter		Area		Weight	
	m	ft	m	ft	m	ft	m ²	ft ²	kg	lbs
1010 ¹	1	3.3	10	32.8	0.5	1.7	10	108	19	41
1020	1	3.3	20	65.6	0.8	2.7	20	215	37	82
1050	1	3.3	50	164	1.2	4	50	538	93	205
1520	1.5	4.9	20	65.6	0.8	2.7	30	323	56	123
1550*	1.5	4.9	50	164	1.2	4	75	807	139	308
2020 ¹	2	6.6	20	65.6	0.8	2.7	40	430	75	164
2050*	2	6.6	50	164	1.2	4	100	1,076	186	410
2520	2.5	8.2	20	65.6	0.8	2.7	50	538	93	205
2550*	2.5	8.2	50	164	1.2	4	125	1,346	233	513

¹Most popular roll sizes, usually in stock.

*Roll sizes marked with asterisks should be installed by lifting machines only. All other rolls can be installed manually (2 people advised). Rolls apply to Grasspave², Gravelpave², Draincore², and Slopetame². Custom roll sizes available by request.

Crossbars and Filter Fabric

The crossbars between rows of rings, perpendicular to water flow, prevent rill erosion from forming. The polyester filter fabric prevents water from rapidly moving below the structure, and gives grasses and other vegetation a foothold for micro scale confinement. The fabric also assists new vegetative covers by allowing them time to get established and protecting the root zone from soil removal due to water runoff.

Slopetame² reinforcement matrix has small cellular three-dimensional containment for soils and plant material. Filter fabric backing provides excellent penetration for roots and allows mats to be pre-vegetated and pinned onto slopes.

Replaces Rip-Rap

The old technology of unsightly rip-rap often can be replaced with Slopetame². A vegetated, grass swale, is much nicer looking, is easier to maintain, and improves property values in developments. In most cases, vegetation will act as a bio-filter to clean pollutants from stormwater in swale applications. Slopetame² can also be used during site construction to capture displaced soils, thus satisfying EPA water quality regulations.

Anchors and Pins

Duckbill anchors are provided with

Slopetame² — one with each ten square meters. Insert a reinforcing rod between a row of rings at the top of the slope. Slip the loop end of the anchor around the

rod and drive the anchor into the

ground until secure. This will tie the top of

Slopetame² mat to the top of the hill, bank, or channel. Some installations may require another reinforcing rod and Duckbill anchor to be used halfway down the slope and at the bottom. Further fasten the mat with standard landscaping U-shaped pins 6"–8" in length — use as many as necessary for good contact to ground. Curving the mat and cutting out some rings to fit channels, may necessitate additional pins. Types of anchors and pins used may vary with substrata conditions.

Cut-off Drains

Cut-off drains should be installed to intercept surface water generated from above slopes. The new slope will contend with water actually falling on the Slopetame², minimizing storm water volume build-up. At the toe of long slopes, or at terrace levels, additional cut-off drains may be installed for similar purposes downstream. Cut-off drains may be as simple as shallow, reverse sloped surfaces covered with Slopetame² mats oriented with cross bars opposing water flow.

Price Range

Slopetame² cost is in the mid-range of erosion control methods, which is appropriate to its capabilities for channel reinforcement, riverbank stabilization, and steep slope surface containment. Slopetame² can replace typical concrete block revetments at a price one-third the typical installation cost.



Vegetation

Compatible forms of vegetation include grasses, ground covers, vines, and wildflower mixes. The selected form(s) should be matched with slope, soil types, moisture, maintenance and aesthetic requirements of the site. Ground covers other than grasses will usually be planted from pots ranging in size from 2" to 1 gallon. Small plants may have the root system split to grow over and between rings, while larger plants may require some ring removal. Hydroseeding with a cellulose mulch is the best method for installing grasses, forbs, and most wildflowers, because the mulch helps retain moisture necessary for seed germination. As root systems develop, roots will penetrate and integrate with the fabric layer to establish a very strong surface.

Slopetame² mats can also be prevegetated, with plant materials grown into the mat at a nursery, or with established "sod" rammed into the mat with a vibrating plate or roller on site. Prevegetated mats or panels can be rolled or lifted into place for immediate slope, swale or channel protection.



Slopetame² is used to keep small embankment in place during heavy hurricane flooding.

Installation Steps

1. Soil preparation should include tilling to a depth of 10 cm to 15 cm (if possible), incorporating fertilizers, and Hydrogrow spread over the surface at a rate of 0.5 kg per 10 m². Hydrogrow will be included with each order.
2. Preassemble, on flat firm ground, the Slopetame² mats, using the built-in snap-fit fastener to shorten or lengthen standard rolls, for sizes to fit the full length of each slope segment. Orientation of each roll dictates that the crossbars oppose the primary direction of moving water. Be sure to overlap the fabric of adjoining sections.
3. Start at the highest elevation and place the Slopetame² mat with rings up, fabric down, place and secure the rebar/Duckbill anchor between the 3rd and 4th rows at the top, tucking rows 1 and 2 into the soil, and unroll down the slope. Slopetame² should extend from "top to toe" of a slope in one continuous piece, 1 meter wide, or wider depending upon length.

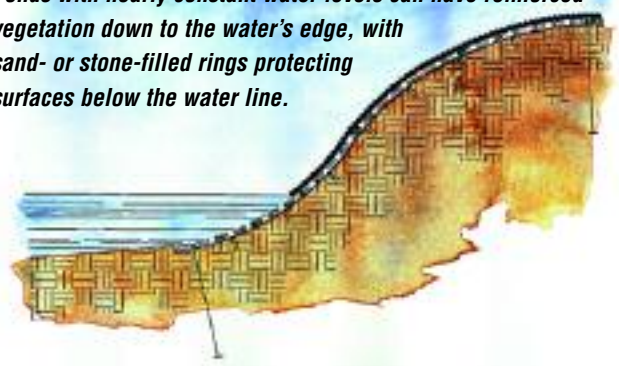
Swale Reinforcement

Slopetame² reinforced vegetated swales replace old fashioned and expensive rip-rap swales, and offer bio-filtration and sediment capture capabilities.



Pond Edge

Ponds with nearly constant water levels can have reinforced vegetation down to the water's edge, with sand- or stone-filled rings protecting surfaces below the water line.



4. Anchor the mat every 40" on center, or closer as may be needed by local conditions. Place standard erosion pins (15–20 cm long × 25 mm wide × 2 mm gauge wire) 40" on center down and across each mat. Each roll can be connected to each other with the snap-fit connectors, or placed side by side, with erosion pins placed along the edge on each side of each mat (equals more pins).

5. Fill the Slopetame² units with 1" of topsoil in preparation for seeding.

6. Hydroseed and mulch the area for grasses and ground covers. Mulching with cellulose (preferred type) is necessary to assist germination and protect delicate seedlings until the roots have grown through the fabric layer.

7. Provide supplemental irrigation, as determined by local environmental conditions, to assure germination and plant root development.

Design and Technical Support

Invisible Structures welcomes the opportunity to review project designs and answer technical questions. Project Profiles and standard Slopetame² AutoCAD design details may be reviewed and downloaded from our website. ISI staff or representatives are available for telephone or on-site construction guidance.



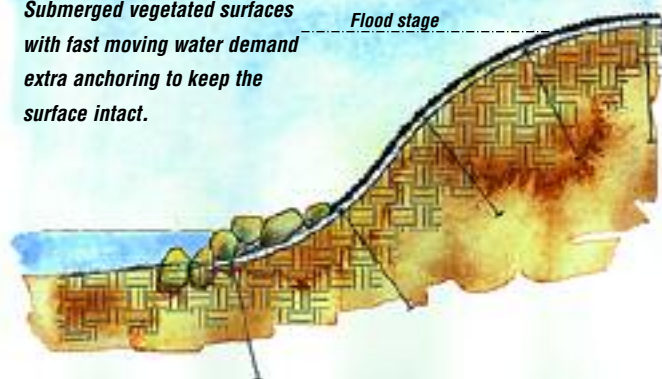
Quick, complete coverage on any slope is easy with large, lightweight rolls in variable widths and lengths to fit site dimensions.

Contact Information

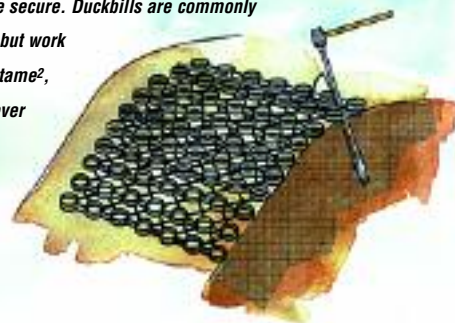
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Channel Reinforcement

Submerged vegetated surfaces with fast moving water demand extra anchoring to keep the surface intact.



Duckbill anchors are looped around rebar laid between rows of rings to ensure that the top, middle, and bottom of Slopetame² mats are secure. Duckbills are commonly used to stake trees, but work beautifully for Slopetame², because they will never come out. Further anchoring is done with common U-shaped pins.



Total System Services, Inc., Columbus, GA — Client chose Slopetame² over concrete block revetments for improved appearance



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