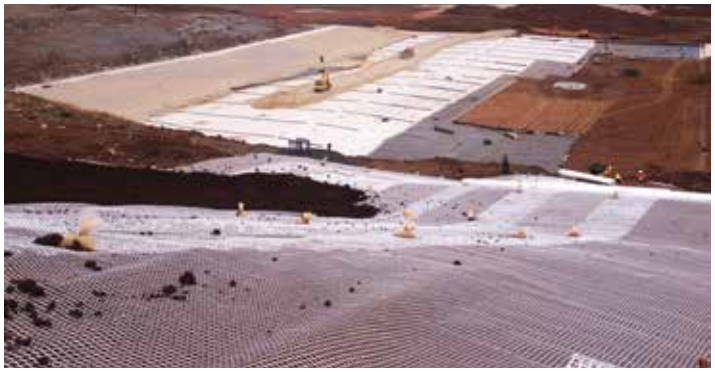
Global Synthetics

LEADERS IN GEOSYNTHETICS



Product Catalogue

Our Commitment to you

Global Synthetics Pty Ltd is a leading independent distributor and manufacturer of geosynthetics to the engineering, construction, landscape and building industries throughout Australia, New Zealand and the Pacific region. Global Synthetics Pty Ltd is wholly Australasia owned and is well represented by our offices in Brisbane, Sydney, Melbourne, Adelaide, Perth, Auckland and Christchurch.

Global Synthetics geosynthetic products incorporate the latest technology and state of the art materials. Global Synthetics is committed to delivering the highest levels of quality and service.

Global Synthetics geosynthetic products are used in the following applications:

- Pavement Stabilisation
- Ground Improvement
- Soil Reinforcement and Retaining Structures
- Water Management
- Drainage Systems & Hydraulic works
- Landfills
- Coastal Erosion Structures

Mission Statement

Global Synthetics has a commitment to provide a rewarding and safe environment for our employees, to develop mutually beneficial relationships with our customers and to become the company of choice in the geosynthetics business throughout Australasia and the Pacific Region.

Trusted Quality

Global Synthetics have partnerships with some of the largest manufacturers of geosynthetics. Our partner commitments are to use the highest quality raw materials, the latest in manufacturing techniques and to consistently monitor all aspects of quality control through all product processes.

Our manufacturing partners are committed to formal accreditation of their production, management and testing processes.

Product Guide

Geotextile

Global Synthetics geotextile products incorporate the latest technology and state of the art materials. Using a range of polymers including polypropylene, polyester, polyethylene and aramid to ensure that the most durable polymer is used for performance in a range of environmental and service conditions. You are assured of the most advanced choice of materials when selecting a product supplied by us.

Our manufacturers have a commitment to quality with accreditation to both ISO Quality and International Test Facility endorsement, with sophisticated in house laboratory testing to ensure that product manufactured, meets or exceeds, required performance criteria.

Common Applications of Geotextiles
• Drainage
• Filtration
• Separation
• Reinforcement
• Protection

*Product size and stock may differ between branch location

ProFab® Mini Rolls

ProFab® AS140 nonwoven geotextiles are comprised of polyester fibres needled together into a stable matrix that provides excellent physical and hydraulic properties. The product is manufactured to Australian standards & ISO 9002 quality procedures.

ProFab geotextiles provide economical solutions to many building, plumbing and engineering applications including a cost effective alternative to graded aggregate filters.

Applications

ProFab® geotextile Mini Rolls are ideal for subsurface drainage applications including:

- Trench drains
- Light separation
- Transpiration trenches
- Retaining wall filter systems
- Many other drainage and landscaping applications

Roll Dimensions (m)

- 0.6 x 50
- 1.0 x 50
- 1.2 x 50
- 2.0 x 50
- 2.0 x 100
- 4.0 x 100

*Product size and stock may differ between branch location

Geofirma®

Geofirma® nonwoven geotextiles are polymer based products that are manufactured from a variety of processes. Generally the engineering application for the product will determine the most suitable type of geotextile that should be selected for use by the designer or contractor.

Global Synthetics offers the Geofirma® polyester continuous filament nonwoven geotextile in a range of grades, strengths and filtration characteristics for these engineering applications.

Applications
• Drainage
• Filtration
• Protection
• Reinforcement
• Separation

Roll Dimensions (m)
• Available in roll widths to 6m

*Product size and stock may differ between branch location

ProFab® Marker Layer / Hi VIS

ProFab® AS140/Orange nonwoven geotextiles are comprised of fibres, needled together into a stable matrix, that provides excellent physical and hydraulic properties.

ProFab® Marker Layer is designed to delineate potential areas of hazard when excavating potentially contaminated ground or in the positive identification of buried services. The AS140/Orange product is laid at time of construction over the top of identified hazards.

Heavy grades are available on request.

Applications
• Warning Layer
• Filtration
• Protection
• Separation

Roll Dimensions (m)
• 2 x 50
• 2 x 100
• 4 x 100
• 6 x 100

*Product size and stock may differ between branch location

Propex®

Propex® nonwoven geotextiles are manufactured from the extrusion of fibres which are then laid down on a manufacturing "bed" and then needle punched to entangle the fibres such that a dimensionally stable product is formed.

Global Synthetics offers the Propex® polypropylene nonwoven geotxtile in a range of grades, strengths and filtration characteristics for these engineering applications.

Applications
• Drainage
• Filtration
• Protection
• Reinforcement
• Separation

Roll Dimensions (m)
• Available in roll widths to 4m

*Product size and stock may differ between branch location

Secutex®

Secutex® geotextiles are manufactured specifically for applications of extreme use such as coastal filter layers and protection of geomembranes in applications of waste and water storage.

Secutex® geotextiles are used where high strength is required to provide a high degree of protection against puncture. As a separation geotextile, Secutex® prevents individual and distinct granular layers from contaminating one another. Secutex®, when used as a protection layer acts as a cushioning barrier between a geosynthetic lining system such as in a dam or landfill cell.

Applications
• Drainage
• Filtration
• Protection
• Reinforcement
• Separation

Roll Dimensions (m)
• Available in roll widths to 4m

*Product size and stock may differ between branch location

ProFab® Woven

ProFab® woven geotextiles are manufactured from the extrusion of a polymer (polypropylene or polyester) into either a flat tape or filament product which may be then further processed by slitting or bundling and then weaving to form a fabric.

Applications

ProFab® woven geotextiles are ideally suited for applications of reinforcement or separation as the strength of the tape or filament within the fabric may be increased to suit a specific application. ProFab® woven geotextiles additionally have the ability to develop high strengths at relatively low strains which is a very important requirement in applications of reinforcement. Fabric strength is manufactured in two directions and may be varied to suit a particular reinforcement application.

In applications of reinforcement and where a load may need to be sustained by the geotextile for significant periods of time the choice of polymer used in the construction of the fabric will determine the choice of woven product. The influence of creep effects on varying polymer types is well understood and will have a marked influence on the load carrying capability of the geotextile selected.

Roll Dimensions (m)

- PP30: 5.85m x 160m
- PP80: 5.85 x 100m

*Product size and stock may differ between branch location

ProFab® Monoweave

ProFab® Monoweave geotextiles are comprised of UV stabilized polypropylene monofilament tape yarns that provide excellent physical and hydraulic properties. ProFab® Monoweave geotextile has a unique, dimensionally stable filtration weave.

ProFab® Monoweave woven geotextiles are particularly suited to soils that are poorly graded, sands, soils that are high in iron content and for applications such as in land fills where leachates may crystalise on the surface of the geotextile (such as nonwoven geotextiles) and cause potential clogging problems.

Applications

ProFab® Monoweave woven geotextiles are ideal for subsurface drainage applications, leachate drains, retention pit lining, transpiration trenches and as a filter behind retaining walls.

Roll Dimensions (m)

- 2m x 50m
- Other sizes available

*Product size and stock may differ between branch location

ProPave® Paving Fabric

ProPave® Nonwoven paving fabric is primarily used in the maintenance and repair of road surfaces, they act as a moisture barrier in your asphalt pavement. Thereby increasing the roads life and reducing reflective cracking.

Applications

It is installed in the bitumen layer of the road, providing stress minimisation and waterproofing functions that prevents pavement cracking. It improves the lifespan of the new asphalt overlay structure.

Roll Dimensions (m)

- Propave 140P: 4m x 300m
- Propave 180P: 4m x 200m
- Custom roll sizes available

*Product size and stock may differ between branch location

ACETex® Protect

ACETex® Protect is a woven geotextile made from durable high tenacity polypropylene fibres. The product has been designed with high tensile strength and at moderate strain levels. The product has been manufactured with additional additives to create a durable cover fabric.

ACETex® Protect is a woven geotextile that has been designed for specific applications requiring a well stabilised cover fabric.

Applications

Typical applications are in landfills, where a geomembrane may require the additional assistance of a sacrificial stable geotextile placed over the underlying geomembrane (primary containment layer) to assist against UV membrane deterioration until such time as the landfill waste reaches a level such that full and permanent cover is achieved.

Roll Dimensions (m)

- 4.57m x 50m

*Product size and stock may differ between branch location

ACETex® Structural Woven

ACETex® geotextiles are polymer based geotextiles that are manufactured specifically for applications of soil reinforcement. Generally the engineering application for the product will determine the most suitable type of geotextile that should be selected for use by the designer or contractor.

ACETex® woven geotextile is used where very high strength reinforcement of soil is required such as under embankments.

Applications

ACETex® woven geotextiles are ideally suited for applications of reinforcement or separation as the strength of the tape or filament within the fabric may be increased to suit a specific application. ACETex® woven geotextiles additionally have the ability to develop high strengths at relatively low strains which is a very important requirement in applications of reinforcement. ACETex® woven geotextile is used where very high strength reinforcement of soil is required such as under embankments.

Typically the strength range of this product is between 100 kN/m to 1200 kN/m.

Roll Dimensions (m)

	GT 100/50	GT 200/50	GT 300/50	GT 400/50	GT 500/50	GT 600/50	GT 800/50	GT 1000/50	GT 1200/100
Width	3.8 – 5.2	3.8 – 5.2	3.8 – 5.2	3.8 – 5.2	3.8 – 5.2	3.8 – 5.2	3.8 – 5.2	3.8 – 5.2	3.8 – 5.2
Length	100	100	100	100	100	1000	100	50	50

*Product size and stock may differ between branch location

Geogrid

Global Synthetics geogrids are manufactured from the extrusion, weaving or welding of a polymer to form open aperture products of varying strength, strain and load carrying capability for applications of soil reinforcement.

Generally geogrids have a primary strength in one direction only (uniaxial geogrids) although in certain applications the strength may be equal in both directions of the product (biaxial geogrids). Geogrids work by interlocking with the granular or soil material placed over them.

Common Applications of Geogrid
• Base and Subgrade Reinforcement
• Construction of unpaved and paved roads
• Reinforced slopes
• Embankments

*Product size and stock may differ between branch location

ACEGrid® PET

ACEGrid® is an engineered woven geogrid that has exceptionally high strength characteristics at low levels of strain. The product is additionally coated with a polymer that provides high resistance to degradation in soil environments as well as providing additional uV and mechanical damage protection to the fibres. The ACEGrid® geogrids may be constructed with tensile strengths up to 900 kN/m. strains generated at ultimate tensile strength are typically less than 10%. being composed of high tenacity polyester fibres they deliver low creep strains when subject to high tensile loads.

Applications

ACEGrid® is suitable for use in short term as well as very long term ground support applications with design life in excess of 120 years. The product may be manufactured for site specific requirements.

Roll Dimensions (m)							
	GG40	GG60	GG80	GG100	GG120	GG150	GG200
Width	4	4	4	4	4	4	4
Length	50	50	50	50	50	50	50

*Product size and stock may differ between branch location

ProGrid® UG HDPE Geogrid

ProGrid® UG HDPE Geogrids are high strength polymer grid structures that form an extremely efficient reinforcing by performing as a network of distributed anchors within a soil matrix.

ProGrid® UG HDPE Geogrids are manufactured by a process of extruding, punching, heating and longitudinal stretching. ProGrid® UG HDPE Geogrids are made of High Density Polyethylene and chemically inert, unaffected by the U.V. rays and fully resistant to aging in the soil environment.

Benefits:

- Improving bearing capacity of retaining wall or dam
- Extending the project life
- Reducing floor area
- Shortening construction period, reducing cost and maintaining expense

Applications
• Retaining Wall Reinforcement
• Steep Slope Reinforcement
• Dam Reinforcement

Roll Dimensions (m)							
	UG60	UG80	UG60	UG120	UG160	UG180	UG200
Width	1 or 2	1 or 2	1 or 2	1 or 2	1 or 2	1 or 2	1 or 2
Length	100	50	50	50	50	50	50

*Product size and stock may differ between branch location

Secugrid® Pavement Geogrid

Secugrid® is a structurally sound and stable geogrid for soil reinforcement, manufactured of extruded and drawn bars, laid and welded together.

Secugrid® which is a low strain biaxial (equal strength in both directions) geogrid with higher strengths than most other geogrids at strain levels of 1%, 2% and 5%. Stiffer geogrids pick up load more quickly and consequently operate at strain levels appropriate to pavement performance levels.

Applications

In the application of base reinforcement there is the design intention of improving the bearing capacity of an existing subgrade by including a geogrid (or layers of geogrid) over the in-situ subgrade to minimise the amount of granular material needed in the base course (or pavement) design. In some situations there may be a requirement to increase the service life of the pavement by the inclusion of a geogrid for a fixed pavement depth.

Roll Dimensions (m)					
	20/20 Q1	30/30 Q1	40/40 Q1	60/60 Q1	80/80 Q1
Width	4.75	4.75	4.75	4.75	4.75
Length	100	100	100	100	100

*Product size and stock may differ between branch location

ProGrid® PP Geogrid

ProGrid® geogrid is formed by punching holes and stretching a stiff plastic sheet to form a geogrid with uniform openings to contain and absorb lateral forces exerted on the reinforcement from implied loads. The transfer of implied loads to the geogrid is by way of a combination of friction and interlocking with the surrounding granular particles. ProGrid® geogrids provide a layer to allow the construction of roads and other amenities over weak subgrades.

Applications
• Base Reinforcement
• Raft Reinforcement Construction
• Soil Reinforcement
• Roads & Car Parks

Roll Dimensions (m)			
	30/30	40/40	60/60
Width	3.9	3.9	3.9
Length	50	50	50

*Product size and stock may differ between branch location

Combigrid® Geocomposite Geogrid

Combigrid® is a flat composite geogrid from the Secugrid® product range. Incorporated into the geogrid construction is a non woven geotextile component for specific applications where reinforcement of problematic soils is required combined with the additional functions of separation and filtration.

Combigrid® is a multifunctional geogrid and is particularly suited for use on weak subgrades (CBR < 3) where the benefit of reinforcement is provided by the geogrid whilst the non woven geotextile component provides a positive separation and filtration function.

Applications
• Access Road Construction
• Crane & Piling Improvement
• Pavement Support

Roll Dimensions (m)			
	30/30 Q1	40/40 Q1	60/60 Q1
Width	4.75	4.75	4.75
Length	100	100	100

*Product size and stock may differ between branch location

Case Study – Harvey Norman Platform

In 2011, it was planned to build granular piling rig access platforms to facilitate the installation of piles for support of the new Harvey Norman bulky goods project in Maroochydore in Australia to increase the low subgrade strength and to provide sufficient bearing capacity for the imposed loads of the cranes. Subsequent continual wet weather was not allowing the perched groundwater to drain away, leaving the platform saturated as a result of the 2010 local flooding.

The surface soil alone was not capable of supporting the required 280kPa bearing capacity required for the pile rig. A further constraint was that the platform thickness was limited to 350 mm above the existing subgrade elevation to avoid interference with the intended levels of the proposed basement car parking concrete slab on ground.

Solution

Global Synthetics were asked to provide a Geosynthetic alternative design to provide a suitable (i.e. safe and stable) working platform for the piling rig. The original design proposal was to excavate 200mm and construct a 500mm thick platform consisting of good quality unbound pavement gravel. As the subgrade was weak (minimum CBR value 1%) and the thickness of the platform was limited, the geosynthetic reinforced platform on existing subgrade was chosen as the preferred solution.

Upon final approval, some 50000m2 of Combigrid® Geocomposite was installed successfully on site beneath the crane platform. The material was placed directly on the subgrade to improve the bearing capacity and to prevent fines from migrating into the platform materials. A 350mm thick granular working platform was then constructed on top of the Combigrid®.

Product

Combigrid® consists of a Secugrid® geogrid with a high stiffness and low installation damage as the reinforcement component; combined with a needle-punched nonwoven geotextile firmly welded between the reinforcement bars offering separation and filtration in one single layer. It offers the functions of two different materials with the simplicity of installing a single product.

Results

The use of Combigrid® made the construction of a thin granular platform layer on the very soft subgrade possible, reducing construction costs and construction time for the client. Combigrid® combines reinforcement, separation and filtration into one single product thus reducing supply and installation costs considerably.

By omitting the 200mm subgrade excavation and removal procedure, and reducing the platform thickness from 500mm to 350mm substantially reduced the number of truck movements to and from site ensuring significant additional environmental benefits as a result. The contractor, client and pile rig operator were extremely happy with the results and reported that the final solution exceeded their expectations.

Product	Location
Combigrid® Geocomposite Geogrid	Maroochydore, Queensland

*Product size and stock may differ between branch location

ProGrid® Glass Fibre Geogrid

ProGrid® Glass Fibre Geogrid is a high modulus glass fibre geogrid with a modified pitch coating to provide a good bond with the asphalt layers. ProGrid® Glass Fibre Geogrid can not only increase the tensile strength of the asphalt layer and extend the service life of pavement layers, but also decrease the occurrence rate of reflective cracking under cyclic traffic load. With a high modulus, high temperature resistance and high bonding properties, ProGrid® Glass Fibre Geogrid can be used with asphalt overlays in new roads or rehabilitation works as reinforcement, stress relief or as an asphalt interlayer.

Applications
• Airport runways
• New roads and highways
• Road widening
• Road maintenance and repair
• Composite pavements

Standrd Roll Dimensions (m)		
	GB50/50	GB100/100
Width	3.9	3.9
Length	50	50

*Product size and stock may differ between branch location

ProGrid® Self Adhesive Glass Fibre Geogrid

ProGrid® Self Adhesive Glass Fibre Geogrid is a high modulus glass fibre geogrid with a modified pitch coating to provide a good bond with the asphalt layers and self-adhesive backing. ProGrid® Self Adhesive Glass Fibre Geogrid can not only increase the tensile strength of the asphalt layer and extend the service life of pavement layers, but also decrease the occurrence rate of reflective cracking under cyclic traffic load.

With a high modulus, high temperature resistance and high bonding properties, ProGrid® Self Adhesive Glass Fibre Geogrid can be used with asphalt overlays in new roads or rehabilitation works as reinforcement, stress relief or as an asphalt interlayer.

Applications
• Airport runways
• New roads and highways
• Road widening
• Road maintenance and repair
• Composite pavements

Standard Roll Dimensions (m)		
	GBS50/50	GBS100/100
Width	3.9	3.9
Length	50	50

*Product size and stock may differ between branch location

ProGrid® Polyester Geocomposite Geogrid

ProGrid® Polyester Geocomposite Geogrid is a high modulus Polyester (PET) geogrid fully bonded to a lightweight polyester nonwoven geotextile. The composite has a bituminous coating to provide a good bond with the asphalt layers.

ProGrid® Polyester Geocomposite Geogrid can not only increase the tensile strength of the asphalt layer and extend the service life of pavement layers, but also decrease the occurrence rate of reflective cracking under cyclic traffic load. With a high modulus, high temperature resistance and high bonding properties, ProGrid® Polyester Geocomposite Geogrid can be used with asphalt overlays in new roads or rehabilitation works as reinforcement, stress relief or as an asphalt interlayer.

Applications
• Airport runways
• New roads and highways
• Road widening
• Road maintenance and repair
• Composite pavements

Roll Dimensions (m)		
	CGC50/50	CGC100/100
Width	3.9	3.9
Length	50	50

*Product size and stock may differ between branch location

ProGrid® Glass Fibre Geocomposite Geogrid

ProGrid® Glass Fibre Geocomposite Geogrid is a high modulus glass fibre geogrid fully bonded to a lightweight polyester nonwoven geotextile. The composite has a bituminous coating to provide a good bond with the asphalt layers.

ProGrid® Glass Fibre Geocomposite Geogrid series can not only increase the tensile strength of the asphalt layer and extend the service life of pavement layers, but also decrease the occurrence rate of reflective cracking under cyclic traffic load. With a high modulus, high temperature resistance and high bonding properties, ProGrid® Glass Fibre Geocomposite Geogrid can be used with asphalt overlays in new roads or rehabilitation works as reinforcement, stress relief or as an asphalt interlayer.

Applications
• Airport runways
• New roads and highways
• Road widening
• Road maintenance and repair
• Composite pavements

Roll Dimensions (m)		
	CGB50/50	GCB100/100
Width	3.9	3.9
Length	50	50

*Product size and stock may differ between branch location

Geosynthetic Clay Liners (GCLs)

Global Synthetics are able to offer a wide range of liners that are compatible with the diverse range of applications and contaminants likely to be encountered.

Bentofix® Geosynthetic Clay Liner (GCL) are factory produced wide width rolls of bentonite "sandwiched" between layers of geotextile. GCL's are an engineered replacement for traditional clay lining of proposed containment structures.

Global Synthetics Geosynthetic Clay Liners offer the designer an engineered equivalency to clay without the costly import and placement and quality control costs associated with this traditional method. The volume of containment may be significantly increased with the use of a Global Synthetics Geosynthetic Clay Liner as the product offers equivalency to very thick layers of compacted clay.

*Product size and stock may differ between branch location

Bentofix® GCL Standard - NSP Series

Bentofix® GCL with nonwoven cover geotextile and woven carrier geotextile. Self-sealing side overlaps (with embedded bentonite 500mm from side edge of roll). Most common grade compliant with Best Practice Environmental Management (BPEM) policy.

Applications

Ideal for base liners, landfill caps, landscape ponds, wetlands, rain gardens, retention ponds, dams, cappings and used mainly as a replacement of thick, difficult to build, compacted clay liners.

Roll Dimensions (m)

- 5m x 40m

*Product size and stock may differ between branch location

Bentofix® GCL Coated – X Series

Bentofix® GCL with nonwoven cover geotextile and woven carrier geotextile. An additional surface polyethylene (PE) coating is applied in a liquid state and then allowed to solidify on the carrier geotextile.

The additional bonding of a PE coating to the needle punched, fibre reinforcement is permanently locked and increases the pull-out resistance as well as the internal shear strength. The mass coating is 200gsm (0.2mm thick) minimum for the smooth coating and exceeds the GRI-GCL3 (USA) minimum specification requirements for coated GCLs. Also features self-sealing side overlaps.

Applications

The coated (smooth), X-type GCL is used predominantly in the following applications:

- An immediate barrier against Radon gas
- Desiccation protection
- Small root penetration protection
- Bentonite erosion at high water heads and underlying coarse subgrades
- Secondary containment (providing extra safety factor) against hazardous liquids

Roll Dimensions (m)

- NSP4900 X2: 4.85m x 40m
- NSP4900 X5: 4.85m x 35m

*Product size and stock may differ between branch location

Bentofix® GCL - Textured Coated XF Series

Bentofix® GCL with nonwoven cover geotextile and woven carrier geotextile. An additional surface polyethylene (PE) coating is applied in a liquid state and then allowed to solidify on the carrier geotextile. The additional bonding of a PE coating to the needle-punched, fibre reinforcement is permanently locked and increases the pull-out resistance as well as the internal shear strength. The mass coating is 500gsm (0.5mm thick) minimum and up to 1000gsm (1.0mm thick) for the friction coating and exceeds the GRI-GCL3 (USA) minimum specification requirements for coated GCLs. Also features self-sealing side overlaps.

Applications

The coated (friction), XF-type GCL is used predominantly in the following applications:

- An immediate barrier against Radon gas
- Desiccation protection
- Small root penetration protection
- Bentonite erosion at high water heads and underlying coarse subgrades
- Secondary containment (providing extra safety factor) against hazardous liquids
- The other added benefit of a friction coating is the increased interface friction value, allowing for steeper side batters, but providing significant protection against internal bentonite erosion and piping for exposed multi-lined landfill cells. Shrinkage reduction from environmental/thermal changes is also an important advantage.

Roll Dimensions (m)

- NSP4900 X5: 4.85m x 35m

*Product size and stock may differ between branch location

Bentofix® GCL - Scrim Reinforced B Series

Bentofix® GCL with nonwoven cover geotextile and composite nonwoven/woven scrim carrier geotextile. Also features self-sealing side overlaps. The composite nonwoven/woven carrier geotextile provides additional interface friction, with enhanced ability to minimize internal bentonite erosion. The additional internal shear (and peel) strength and puncture resistance are also characteristics of the B-type GCL.

Applications

- Ideal for side batters of landfill cells

Roll Dimensions (m)

- NSP5600 B series: 5m x 40m

*Product size and stock may differ between branch location

Case Study - Hervey Range and Stuart Landfill Capping with Bentofix® X10F Coated GCL

Townsville City Council in the north of Queensland Australia is one of the largest regional cities in the northern part of Australia home to some 200,000 residents. The Townsville Waste Services Department issued documentation for contract in late 2014 for capping and stormwater management of its 2 largest waste facilities at Stuart landfill and Hervey Range.

Waste Facility 1: The Stuart Landfill

The Problem

The Stuart Landfill Site required a previous cap to be extended and surface water to be managed through the use of berms and channels directing stormwater runoff to sediment ponds and leachate ponds to be constructed to collect continuing leachate creation from the cell.

The Solution

Council engaged Golder Associates to design these facilities and the sealing element selected for the cap extension was the latest improvement in Geosynthetic Barrier Clay (GBC) Liner technology in Bentofix® X10F PE Coated GCL/GBC. The previous capping of the site used a more traditional Bentofix® GCL without coating. The advantages of the new Bentofix® X10F GBC were the PE coating offered a frictional surface for good interface shear on steep slopes and this coating faced upwards to provide greater safety against bentonite desiccation meaning the cover soil thickness could be reduced and further provided additional safety against possible issues of ion exchange and root penetration. The coating also provides an instant barrier layer against landfill gas, even prior to hydration. The installation occurred in late 2015 by the successful contractor and is performing exceptionally well.

The capping included a gabion structure to support a steepened toe area, a geogrid to relieve tension in the cover soil at steep angles reinforcing the veneer of soil and a Turf Reinforcement Matting (TRM) to protect the cover soil and reinforce vegetation.

Waste Facility 2: The Hervey Range Landfill Site

The Problem

Council engaged Golder Associates The Hervey Range Landfill Site required a cap to be installed and surface water to be managed through the use of berms and channels directing stormwater runoff to sediment ponds. The site to be capped was quite difficult due to the long slope lengths, relative steepness and adjacent waterway. The long slope lengths were divided into continuous runs that suited roll lengths to be supplied and rolls were lapped within intermediate trench berms that doubled as a means to remove runoff water from the slope surface.

The Solution

As with Stuart Landfill, the design was completed by Golders and the same Bentofix® X10F friction coated GCL was selected for the same reasons/benefits as above. The GCL was installed with the coating upwards as discussed above.

A geonet composite drain was placed on top of the coated GCL for surface water drainage. With the Bentofix® X10F PE coating facing up against the drainage composite, the GCL was protected against any potential bentonite erosion as suggested in GRI-GCL 5 and ensured the GCL did not intrude into the geonet.

Where required on steep slopes, a geogrid reinforcement was used on top of the drainage composite for veneer stabilisation.

Interface shear testing was conducted with material from site during the design and construction phase to check the stability of the capping design.

To prevent gas migration from the closed landfill being capped, the Bentofix® X10F material was installed with butyl tape sealing the joints between adjacent Bentofix® rolls. This was applied to the coated side.

Bentofix® is the original needle-punched, thermally locked GCL introduced globally by the Naue company of Germany in 1987. This robust, versatile product provides the highest safety standards and cost efficiency available. Once hydrated, Bentofix® is an effective barrier against liquids, vapors and gases.

As Bentofix® contains the highest quality natural sodium bentonite, an immediate swelling occurs following installation to ensure a water tight seal and continued protection against possible unexpected mechanical damage during installation or in the future. The sodium bentonite powder is sandwiched between two layers of encapsulating geotextiles to absorb tensile loads imparted on the GCL and provide excellent multi-axial strain behaviour. Bentofix® needle-punched GCLs retain their sealing capability under high elongation ensuring continued performance under potential differential settlement in landfill capping systems.

Bentofix® addresses the often critical issue of interface friction angle with the surrounding soil / other components and the mechanically bonded nonwoven geotextiles provide the shear resistance necessary for even the most demanding applications. This fibre reinforcement prevents lateral migration of the bentonite.

Some 100,000 m2 of Bentofix® X10F BFG5300 coated GCL was procured and successfully installed over the 2 sites through the installation partnership of the main contractor and liner subcontractor. Works were completed in 2016.

Installation of Bentofix® coated GCL is quick and easy. It is unrolled on site and overlapped at the longitudinal joints without the need for additional bentonite or additional work. Technical support and site visits were provided by Global Synthetics as the distributor of Bentofix® GCL and this led to the project being completed successfully.

If you would like to know more about our Geosynthetic Clay Liners, Geonets or any other products on offer please go to our contact us tab at www.globalsynthetics.com.au and you can speak with our experienced Global Synthetics representatives relevant to your location.

Product	Location
Bentofix® X10F Coated GCL	Townsville, Queensland

*Product size and stock may differ between branch location

Geomembranes

A geomembrane is a very low permeability synthetic membrane liner or barrier commonly used to control fluid (or gas) migration in a major project, structure, or system.

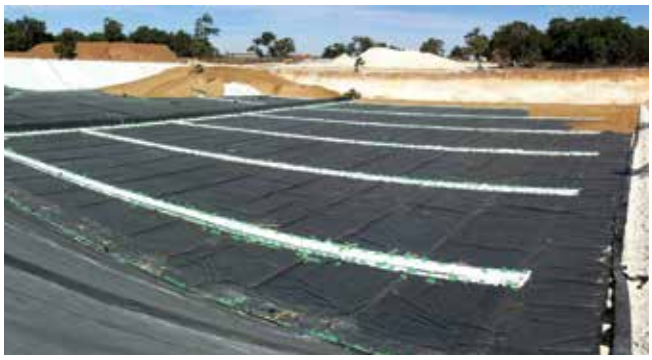
The use of membranes in civil and environmental applications is becoming more widespread as there develops a greater understanding of the effects of contaminated ground conditions on structures and the environment. Global Synthetics are able to offer a wide range of membranes that are compatible with the diverse range of applications and contaminants likely to be encountered. Global Synthetics are able to advise on the most appropriate product for each specific application.

Common Applications of Geomembranes
• Waste water treatment facilities
• Landfill caps /closures
• Potable water reservoirs
• Tank linings
• Dam/ Pond liners
• Floating covers
• Solutions ponds for mining
• Retention ponds
• Storage tanks

*Product size and stock may differ between branch location

ProLiner® HDPE

HDPE (High density Polyethylene) geomembranes have a generalised use as fundamental waterproofing materials of channels, dams and containment structures. HDPE is a non polar, semicrystalline thermoplastic material with good mechanical properties, high chemical stability and electrical insulation. ProLiner® HDPE does not absorb humidity, is odourless and physically inert. ProLiner® HDPE geomembranes are manufactured with resins which are specially formulated & certified.



Applications

- Landfill Cells
- Heap Leach Mining Pads
- Impoundment/Pond Liner
- Frac Pit Liner
- Gas Collection Systems

Dimensions

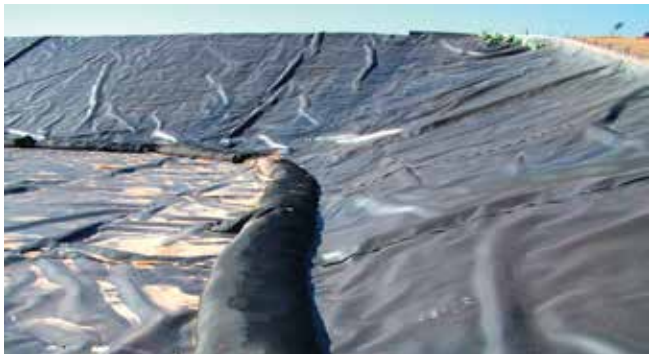
All ProLiner HDPE geomembranes are manufactured to exceed the requirements of GRI GM13 standards. Available in smooth, smooth/textured or double sided textured rolls of up to 170m long for 1-2mm thick product. All product is available in 8m width.

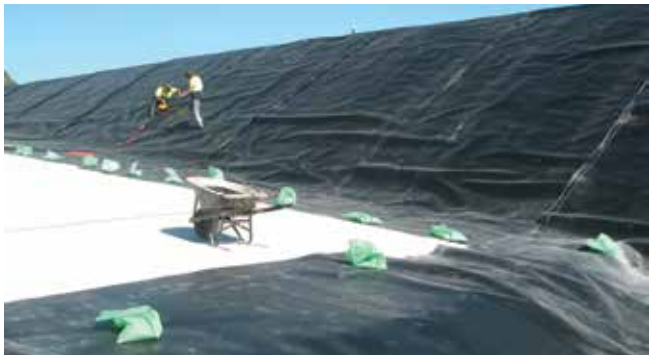
*Product size and stock may differ between branch location

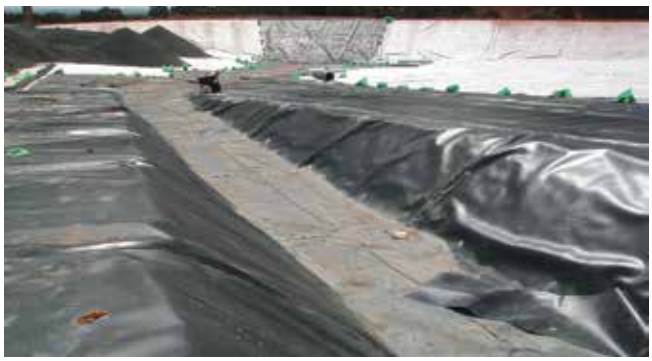
ProLiner® LLDPE

LLDPE (Linear Low-density Polyethylene) geomembranes have a generalised use as fundamental waterproofing materials for leachate pads, channels, dams and containment structures. LLDPE is a polymer with very short and uniform branches which make its melt temperature, tensile strength and cracking resistance superior to LDPE.

ProLiner® LLDPE is a non polar, semicrystalline thermoplastic with good mechanical properties, high chemical stability and electrical insulation. ProLiner® LLDPE does not absorb humidity, is odourless and is physically inert. ProLiner® geomembranes are manufactured with resins which are specially formulated and certified.







Applications

- Landfill Caps
- Secondary Containment
- AST Liner
- Fabrication Stock

Dimensions

All ProLiner® LLDPE geomembranes are manufactured to exceed the requirements of GRI GM13 standards. Available in smooth, smooth/textured or double sided textured rolls of up to 50 to 100m long for 0.5mm to 1mm thick product. All product is available in 8m width and roll length decreases with thickness increase.

*Product size and stock may differ between branch location

ProLiner® SuperFlex™

The customised SuperFlex™ resin formulation exhibits high flexibility & ductility, making it suitable for detailed & irregular surfaces such as tank lining and storm water culvert wrapping.

SuperFlex™ is also supple enough to be factory 'prefabricated' & folded/rolled onsite in large panels, enabling cost effective transport & rapid deployment without the need to mobilise excess equipment & crew to site. SuperFlex™ is easily welded & does not suffer from the high temperature 'adhesion' phenomenon which is common with poorly formulated flexible liners.

Applications

ProLiner® SuperFlex™ geomembranes have a generalised use in lining of containment structures such as dams, channels, leachate ponds, waste cells and a broad spectrum of waterproofing.

Roll Dimensions

	0.5mm	0.75mm	1.00mm
Width	8m	8m	8m
Length	100m	70m	50m

*Product size and stock may differ between branch location

Carbofol® Tunnel Membrane

To refurbish a tunnel seal requires a great deal of technical effort and massive financial investment. To prevent this occurring, it is sensible to select products and sealing systems that will ensure long-term effectiveness.

Carbofol® geomembranes for tunnel construction are geosynthetic materials manufactured from polyethylene (PE), which is highly resistant to chemicals and ecologically safe to the environment, meet highest requirements.

Carbofol® tunnel geomembranes consist of PE-VLD (polyethylene – very low density) or PELLD (polyethylene – linear low density). Due to the careful resin selection, Carbofol® tunnel geomembranes are highly flexible and free from plasticizer.

Applications

- Tunnel Lining

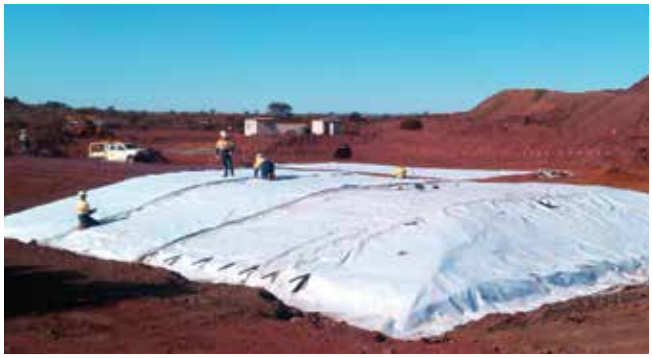
Roll Dimensions (m)

- Call us for details

*Product size and stock may differ between branch location

ProLiner® CM Composite Membrane

ProLiner® CM is a geomembrane composite, comprised of 2 layers of geotextile and a layer of geomembrane heat bonded together by extrusion laminating. This material shortens the construction time for projects and can reduce costs associated with hydraulic engineered lining/cut-off systems. The geotextile layers are securely laminated on either side of the membrane ensuring the lining can be installed with immediate protection against potential damage during installation.



Applications

The product is suitable for seepage reduction, canal lining or channel lining, protection, separation and horizontal drainage. Among these, anti-seepage and canal lining for transport of water in open channels are the primary functions. Seepage can be controlled in projects such as earthen or rock filled dams, concrete dams, sewage ponds, channels, reservoirs, and subway/tunnel basement linings.

Roll Dimensions (m)

- 5.5 x 50m

*Product size and stock may differ between branch location

Drainage Systems

Global Synthetics provides a complete range of geocomposite drainage products and systems for complete point source water management. Global Synthetics drainage products and systems manages stormwater as a resource and enhances the social and environmental amenity of the urban landscape. Global Synthetics drainage products are lightweight and efficient to install. The products are a replacement for traditional aggregate drainage treatments.

Common Applications of Drainage Systems
• Drain Soil Structures
• Subsoil Drains
• Shotcrete Applications
• Retaining Walls
• Planter Boxes
• Concrete Decks
• Retention Ponds
• Storage Tanks

*Product size and stock may differ between branch location

Prodrain® Strip Filter Drain

ProDrain® SD Series Stri p Filter Drains are prefabricated drainage composites for the efficient filtering of groundwater. All SD drainage cores are encapsulated with a high flow geotextile that prevents long term blockage of the drain core by excluding the ingress of fine soil particles. The core is made from HDPE polymer combined with a PP/PET geotextile. Both polymers are inert to a wide range of acids and alkalis likely to be found in a soil environment.

Applications

ProDrain SD Strip Filter Drains are designed for:

- Subsoil drainage as road edge drains
- Sports field broad acre drainage
- Vertical drainage components in cut face applications (behind facing systems such as shotcrete) and as a drainage collection system wat the base of retaining walls.

Roll Dimensions

	SD100	SD150	SD200	SD300
Thickness	40mm	40mm	40mm	40mm
	20mm	20mm	20mm	20mm
Length	50m	50m	50m	50m

*Product size and stock may differ between branch location

ProDrain® Strip Filter Drain Fittings

ProDrain® Strip Filter drainge systems are an efficient prefabricated drain for the collection and discharge of water in the range of engineering applications. A wide range of fittings are available to suit a variety of applications. If we do not have the fitting that you require we can quote you to manufacture such speciality fittings for you. Standard fittings are available for end connection and tee fittings to standard UPVC 100mm pipe.

End Fittings

End Fitting can be used at the outlet end of the drain to exit water to gully boxes or headwalls, preferably through an unslotted 100mm agi pipe and a pest proof flap.

Tee Fittings

Tee Fitting provide for the ability to exit water from the ProDrain® Strip Filter at specific lengths along the drain length. When this fitting is inverted, it allow for an alternate use as a flush out point along the drain length

Applications
• Conntection of ProDrain® to inlet, outlet and flush out points
• Easy connection of ProDrain® to conventional"agg" pipe
• Convenient means of joining individual ProDrain® roll lengths to each other.
• Simple means of directional change without damage to the ProDrain® product.

*Product size and stock may differ between branch location

ProDrain® Cuspated Sheet Drain

ProDrain® Cuspated Sheet Drains are cost effective dimpled plastic sheet that provides effective drainage and protects the waterproofing membrane. The integrated non-woven geotextile covering and attached to the polymer core prevents soil particles migrating into the core and blocking the drainage sheet. Wide and easy to handle roll size makes the product quick and low cost installation.

Applications

This sheet also acts as a thermal insulation barrier adjacent to the waterproofing, making the product ideal for use in:

- Retaining Walls
- Culverts
- Memebrane Protection

Roll Dimensions

	CD12	CD18
Core Thickness	12mm	18mm
Width	1m	1 or 1.2m
Length	25m	25m

*Product size and stock may differ between branch location

ProPipe Ag Pipe

ProPipe Corrugated Agriculture (Ag) Pipe is the proven, reliable, cost-effective and safe solution for long-term drainage needs.

ProPipe Ag Pipe is a flexible pipe system that performs well in both high cover and low cover applications. The ProPipe Ag Pipe is available in a range of strengths and sizes that enables this product to meet almost every product installation condition.

The ProPipe Ag Pipe may be supplied with a filter sock to minimise long term infiltration of finer materials within the pipe system. ProPipe Ag-Pipe is supplied in a variety of pipe diameters and long lengths that contributes to installation savings.

Applications
• Subsoil Drainage
• Sports Filed and Broad Acre Drainage
• Road Edge Drainage

Dimensions		
	Class 400	Class 1000
Diameter	Available in 50mm, 65mm, 100mm, 160mm	
Length	Various lengths available	

*Product size and stock may differ between branch location

ProTank® Modular Tank

ProTank® is a unique modular subsurface drainage system designed to collect water at its source.

Modules are assembled using just two components or 'plates,' both having dedicated entry ports to cater for five different pipe sizes. The smaller plate can accommodate pipes up to 300mm diameter. This makes ProTank® modules ideal for connection to domestic and commercial services. The dedicated entry ports negate the need to cut holes in the module which sacrifice structural integrity.

Applications

- Infiltration Tanks
- Detention Tanks
- Water Harvesting
- ProTank® can be installed under driveways, car parks, roads, landscaped areas and other trafficable applications.

Module Dimensions

Module (units)	Width (mm)	Length (mm)	Height (mm)	Typical Tank Volume (Litres)	Typical Storage Volume (Litres)
Single (one)	403	720	443	129	123
Double (two)	403	720	866	252	239
Triple (three)	403	720	1289	374	355
Quad (four)	403	720	1712	497	472
Penta (five)	403	720	2135	620	589

*Product size and stock may differ between branch location

CeTeau® Wick Drain

The use of Global Synthetics CeTeau® wick drain can be of significant assistance in increasing the speed of consolidation of very soft soils and ultimately increasing the shear strength of the soil such that some engineering structure may be built.

CeTeau® wick drains consist of a specially designed polypropylene core extruded into a unique configuration to transmit maximum water flow on both sides of the core. The core is fully wrapped in a non woven geotextile filter that is ultrasonically welded at the edges to maintain effective filtration.

CeTeau® wick drains are inserted into the soil by pushing the product to a predetermined depth at a design spacing distance to increase the drainage paths within the soil to be consolidated. Generally there is a surcharge load applied over the area to be consolidated such that the speed of consolidation is increased.

Applications

- Roads, Railways, Dikes and Airports
- Land Reclamation
- Harbour Construction
- Urban and industrial sites
- Stabilisation of slopes
- Degassing of landfills

Roll Dimensions

- Sold by linear meter
- Assembled Roll Length = 320m
- Assembled Drain Thickness = 3.4mm

*Product size and stock may differ between branch location

ProDrain® 30mm Drainage Cell

ProDrain® 30mm drainage cell is used in many horizontal drainage applications. The product has a high crush strength to support heavy loads. ProDrain® has been designed to provide optimal flow conditions with unique panel geometry. ProDrain® comes in a large panel size with integral clips for fast and easy installation.

The modular drainage cell system replaces traditional heavy mineral drainage layers with one lightweight, easy to install system.

Applications
• Podium/plaza drainage
• Rooftop garden drainage
• Planter box drainage
• Vertical drainage panels behind walls

Panel Dimension
• 500mm x 500mm
• Product comes preassembled into 1m x 1m sheet

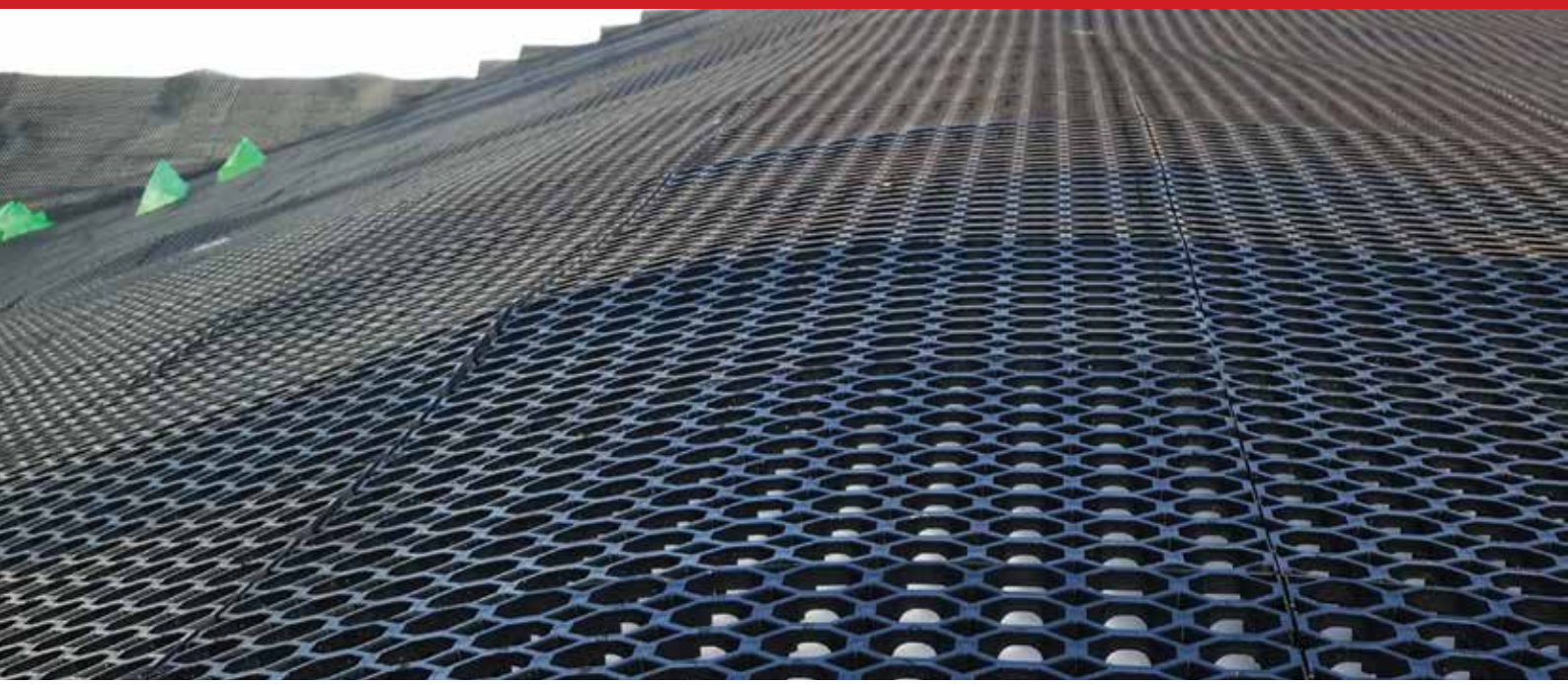
ProDrain® 50mm Drainage Cell

ProDrain® 50mm drainage cell is used in many horizontal drainage applications. The product has a high crush strength to support heavy loads. ProDrain® has been designed to provide optimal flow conditions with unique panel geometry.

Applications
• Draining Of Planter Box & Paved Areas
• Replace Traditional Aggregate Drainage

Dimensions
ProDrain® 50mm comes in a large pre-clipped panel size of 1.2m x 1m, for fast and easy installation. Individual panel size: 500mm x 600mm

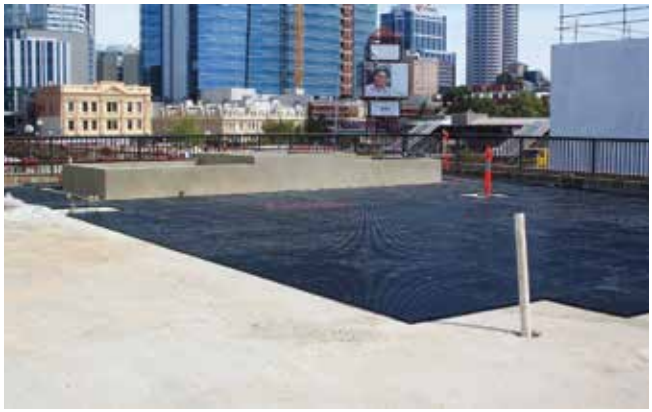
*Product size and stock may differ between branch location



Hydrocell® 30mm Drainage Cell

Hydrocell® Drainage Cell is a lightweight three dimensional geo-composite used for subsurface water management.

The Hydrocell® Drainage Cell polypropylene core is moulded into a unique profile and then wrapped in a filtration geotextile which then provides a complete void space for the water to travel horizontally without any obstruction.



Applications

Its lightweight, high compressive strength makes the product ideal for roof gardens & podium landscaping, retaining walls, under drains for slabs and subsurface drainage for permeable driveways and car parks.

Dimensions (m)

- Panel Size: 600mm x 500mm with integral clips
- Panel Depth: 30mm

*Product size and stock may differ between branch location

Case Study - Munno Para Auto Masters Store

The Problem

A new Auto Masters store to be constructed in Adelaide's north, was mandated by local authorities to include a storm water detention system to aid in mitigating flood events. Depth of existing services and limited building footprints limited the design options. The system had to meet a minimum holding capacity of 54,000 litres, later increased to 76,000 litres.

The Solution

ProTank®, a stackable high strength below-ground modular stormwater system, was installed as a detention 'gallery' below the proposed carpark. Contractors excavated a shallow rectangular zone to approx 2.0m depth. The excavated area was then lined with 'SuperFlex', an impermeable membrane, sandwiched between two layers of 'Geofirma' cushion geotextile, to provide protection to the membrane from puncture. The ProTank® units were clipped together beside the excavation in a triple module, heavy duty configuration before being placed over, and then wrapped by, the composite lining system.

During the backfilling operation, a layer of ProFab® AS140 warning geotextile (High Vis yellow/orange) was installed between the two compaction lifts, to act as a marker layer (or 'warning layer') for any future excavation works on site.

The modular construction method of the ProTank® system exhibits definitive advantages over a more traditional approach of using precast concrete tanks, due in part to the ability to configure (or even re-configure) the layout of the gallery to suit geometric constraints found on site. Just prior to delivery of materials to site, the client increased the required capacity of the system by over 20,000 litres. A quick recalculation and it was confirmed an increase in the footprint size of the gallery (from 8 x 19 to 10 x 22 modules) would allow the system to meet this new volume and still remain within the dimensional constraints of the site without any alterations to the existing construction plans.

If you would like to know more about our ProTank® system or any other products on offer, please go to our contact us tab and you can speak with our experienced Global Synthetics representatives relevant to your location.

Product	Location
ProTank® Modular Tank Detention System	Adelaide, South Australia

*Product size and stock may differ between branch location

Gabions & Mattresses

A gabion (from the Italian word gabbione) - is a cage or mesh basket predominately filled with rocks for use in civil engineering, retaining road and landscaping applications.

Rock Mattresses are a "thin" gabion and traditionally has been used in applications such as creek and channel linings where long term scour is an issue. The confinement of appropriately sized stone within a mesh effectively increases the resistance of such rock to scour for a given flow condition.

A welded gabion incorporates a more rigid welded mesh facing panel construction. The benefits of a welded gabion are realised in land based retaining structures, feature wall cladding, sound walls, seating and other landscape features where the beauty of rock and the clean straight, architectural lines of the welded mesh panels are desirable.

Common Applications of Gabions & Mattress
• Architectural Finishes
• Freestanding Walls
• Residential Building Finishes
• Retaining Systems
• Coastal Protection Systems
• Flexible Retaining Walls
• Rockfall Prevention
• Scour Protection Systems
• Weir Structures

*Product size and stock may differ between branch location

LinkWeld® Gabions

Linkweld® welded gabions are offered in a variety of wire diameters, mesh openings, coating types and cage sizes to suit the project requirements. The ability to produce a wide range of mesh opening configurations means that a wide range of rock infill sizes can be used.

Linkweld® gabions are modular units consisting of end, base, top and side panels, bracing wires, diaphragm panels and spiral wires or "C" clips for connection. The spiral "C" clip connection method ensures rapid construction.

The panel wire will be galvanised or Galfan® (Zn/Al alloy) standard coated for corrosion protection and may be polymer coated for additional durability.

Applications

- Architectural Finishes
- Freestanding Walls
- Residential Building Finishes
- Retaining Systems

Dimensions

Length (m)	Width (m)	Height (m)	Mesh Opening (mm)	Wire Diameter (mm) & Coating Type
1	1	0.5	100 x 50mm standard Other sizes available: • 25 x 25 • 50 x 50 • 75 x 75 • 100 x 50 • 100 x 100	For mesh opening up to and including 50mm x 50mm Wire Diameter choice is: 2.0, 2.20, 2.50, 2.70, 3.00, 4.00 and 5.0mm Available with coating: • Galfan® Zn 5%Al- Coating For mesh opening 75mm x 75mm and up to and including 100mm x 100mm. Wire Diameter choice is: 2.50, 2.70, 3.00, 4.00 and 5.0mm. Available with coating: • Heavily Galvanised Coating • Galfan® Zn 5%Al- Coating • Heavily Galvanised Coating + Polymer Coated • Galfan® Zn 5%Al- Coating + Polymer Coated When product is polymer coated the final overall coated wire diameter is 3.0, 3.2, 3.5, 4.8 and 5.8mm.
1	1	1		
2	1.5	0.5		
2	1.5	1		
2	0.25	0.5		
2	0.5	0.5		
2	1	0.5		
2	1	1		
3	1	0.5		
3	1	1		
4	1	0.5		
4	1	1		

*Product size and stock may differ between branch location

Link Gabion Baskets

Gabions are rectangular woven wire mesh baskets of varying size. Typically the lengths are 2m or 4m and of height either 0.5m or 1m. The traditional use of gabion baskets was that when rock filled they could be designed to act as a monolith mass for retaining wall construction that was quite flexible in nature, was free draining and was quite suited to remote construction areas.

Gabions may be supplied as:

- Galvanised Galfan® coated
- Zinc coated
- PVC Coated

Applications
• Coastal Protection Systems
• Flexible Retaining Walls
• Prevention Of Rock Falls In Critical Areas
• Scour Protection Systems
• Weir Structures

Dimensions		
Length (m)	Width (m)	Height (m)
1	1	1
2	0.5	0.5
2	1	0.5
2	1	1
4	1	0.5
4	1	1

*Product size and stock may differ between branch location

Link Rock Mattresses

Link Mattresses provide a highly versatile solution of earth retention and erosion protection for designers and contractors in a wide variety of applications.

Rock Mattresses are a "thin" gabion and traditionally have been used in applications such as creek and channel linings where long term scour is an issue. The confinement of appropriately sized stone within a mesh effectively increases the resistance of such rock to scour for a given flow condition.

Rock Mattress products are typically supplied in plan area of 6m x 2m with varying thickness ranging between 0.23m to 0.3m.

Rock mattresses be supplied as :

- Galvanised Galfan® - Standard
- PVC Coated

Applications
• Coastal Protection Systems
• Channel Lining
• Erosion Protection
• Rockfall Prevention
• Scour Protection Systems
• Weir Structures

Dimensions		
Length (m)	**Width (m)**	**Height (m)**
6	2	0.17
6	2	0.23
6	2	0.30
6	2	0.50*

*The specification of the 6 x 2 x 0.5m unit shall be confirmed at the time of the order

*Product size and stock may differ between branch location

Linkfall Rock Netting

Linkfall Rock Netting is designed to control rockfall movement by guiding and loose debris to a collection point. The product is woven in the unique double twist weave that minimises the potential to unravel.

Additionally this Link™ rock fall netting is protected by a licensed metallic coating process known as Galfan®, which is a 95% Zn/5%Al (with rare earth mischmetal additive) alloy that has been independently tested to demonstrate a life of 2-3 times greater than traditional heavily galvanised wire of equal diameter and placed within the same operating environment.

For extended durability, the Galfan® wire coating can be additionally sheathed in an extruded UV stabilised polymer coating for superior long term life.

Link™ double twist rock fall netting mesh is traditionally supplied in a 2m wide by 50 m long roll (other roll lengths and roll widths are available)

Applications	Dimensions
Assist In The Prevention Of Rock Falls In Critical Areas	• 2m x 50m

Rings and Fasteners

The use of woven rock filled wire baskets has been in use for over a hundred years. In Australia the product is well accepted and has been used for in excess of 60 years.

Global Synthetics offers a wide array of Gabion accessories ranging from rings and fasteners to pneumatic lacing tools and manual lacing tools that the "C" rings in position.

*Product size and stock may differ between branch location

Case Study - Currumbin Creek

Construction Date

2014

Product

LINK™ Woven Gabions

Problem

Landslips that occurred during the extreme flooding in SE Qld in 2011 and 2013 caused extensive damage to the infrastructure in the area. Currumbin Creek Rd services many houses in Currumbin Valley and was majorly impacted by the downpour. The slip had failed right up to the edge of the road and had the potential to undermine the road if no action was taken to protect the road embankment. The Gold Coast Council City Council had no other option than to devise a plan of attack.

Solution

Gold Coast City Council undertook feasibility studies as to the best method to reinstate this landslip. It was determined that a mass gravity gabion wall would be the most appropriate due to the tight constraints posed by Currumbin Creek Rd and Currumbin Creek.

The proven performance of gabions in retaining unstable soils and also having to deal the hydraulics of rapidly rising and falling water levels of Currumbin creek during flash flooding, made a gabion wall the most feasible option.

The contractor selected by the Council had previously successfully completed other major gabion and rock mattress projects for council. The contractor choose Link® Galfan/PVC gabions due to their proven performance characteristics which are vital in providing a long term durability required for this design. Link® PVC Galfan Gabions carry a BBA certificate (a test of durability). This certificate is recognised throughout the world as one of the highest tests that a gabion can be subjected to and states that Link®PVC/Galfan coated product have a design life of up to 120 years.

The project proceeded with some small delays due to access issues, as it proved challenging getting material across the creek during rain events. This project commenced in August 2014 and was completed September 2014.

Product	Location
Link™ Woven Gabions	Gold Coast, Queensland

*Product size and stock may differ between branch location

Erosion Control

Global Synthetics have a wide range of products to either contain eroded materials within an area i.e. as may be found on a construction site or to provide protection to a potentially erosive surface such that erosion is minimized and that in certain applications the resistance to erosion in the longer term, vegetated state, is increased.

Erosion Control Blankets or Mats, are bio-degradable synthetic mats which provide a temporary solution as they assist in establishment of vegetation. Erosion Control Blankets or Mats are used to aid the plant's ability to control erosion where it would be unable to do so alone. They aim to protect bare soils, mainly on slopes, from the impact of rain, while they can also suppress weeds and can form a useful mulch layer, promoting seed germination.

Common Applications of Erosion Control
• Stormwater Channels
• Embankments & Steep Slopes
• Turf Reinforcement
• Sediment Control
• Silt Control

*Product size and stock may differ between branch location

Pyramat® 25 Turf Reinforcement Mat (TRM)

Pyramat® 25 TRMs are perfect geosynthetics for moderate-flow storm water channels, banks and steep slopes where both immediate and long-term erosion control is needed. Using our patented X3® fiber technology, a Pyramat turf reinforcement mat traps more seed, soil and water in place than traditional hard armor products, yielding faster and fuller vegetation. X3 also provides reinforced vegetation with twice the erosion protection of other TRMs and erosion control blankets.

Applications
• Steepened Slopes
• Stormwater Channels
• Detention Ponds
• Landfill Erosion Control

Roll Dimensions (m)
• 2.6m x 36.6m
• 4.6m x 36.6m

*Product size and stock may differ between branch location

Pyramat® 75 Turf Reinforcement Mat

Pyramat® 75 High Performance Turf Reinforcement Mats (HPTRMs) are equipped to handle the most demanding erosion control applications. Patented Pyramat® 75 three-dimensional construction makes HPTRMs ten times stronger than traditional TRMs.

Pyramat® 75's outstanding UV resistance makes it the preferred TRM in arid and semi-arid environments or other applications where soil reinforcement is needed but full vegetation is not expected.

Applications

- Steepened Slopes
- Stormwater Channels
- Detention Ponds
- Landfill Erosion Control

Roll Dimensions (m)

- 2.6m x 36.6m
- 4.6m x 36.6m
- Available in green or natural

*Product size and stock may differ between branch location

Landlok® 450

Steep slopes where both immediate and long-term erosion control is needed. Using our patented X3® fibre technology, a Landlok® turf reinforcement mat traps more seed, soil and water in place than traditional hard armour products, yielding faster and fuller vegetation. X3 also provides reinforced vegetation with twice the erosion protection of other TRMs and erosion control blankets.

Applications
• Low Flow Channel & Waterways
• Roadside Erosion Control

Roll Dimensions (m)
• 2m x 42.2m

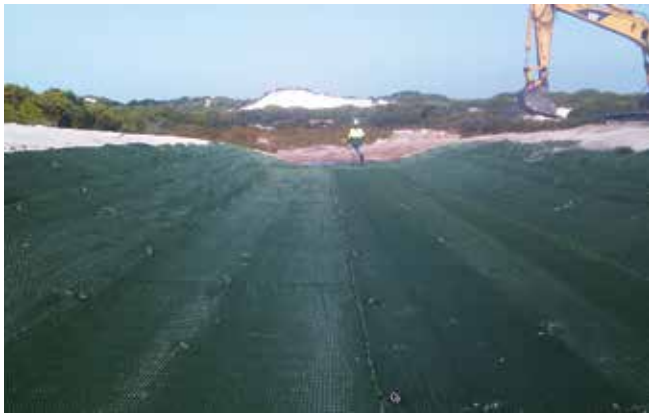
*Product size and stock may differ between branch location

Armormax® High Performance Mat

ArmorMax® Anchored Reinforced Vegetation System is the most advanced flexible armoring technology available for severe erosion challenges. Consisting of our woven three-dimensional High Performance Turf Reinforcement Mat (HPTRM) with X3® fiber technology and earth percussion anchors, you can count on the ArmorMax® system to hold its ground. Engineered to provide long-term design life, the ArmorMax® system consists of a lightweight HPTRM layer and earth percussion anchors that work together to lock soil in place to resist movement for permanent erosion protection for vegetated or unvegetated applications.

The ArmorMax® anchored reinforced vegetation system is used for Non-Structural applications such as levee armouring, protection of stream, river and canal banks and in arid/semi-arid storm water channels. The lightweight protection layer (HPTRM) is securely anchored to the subgrade typically with Type B1 (Type 2) earth percussion anchors which act as a tie-down mechanism for additional factors of safety and long-term design life.

ArmorMax® is used for Structural Applications to provide surficial slope stabilization to resist shallow plane instability. A shallow plane failure occurs when sloughing of near-surface soils descend down moderate to steep slopes. ArmorMax® is an engineered solution that provides a higher factor of safety, erosion protection and superior surficial strength.



Applications
• Flood Protection
• Shoreline Restoration
• Surficial Slopes
• Golf Courses

Roll Dimensions (m)
• 2.6m x 36.6m
• 4.6m x36.6m

*Product size and stock may differ between branch location

PYRAWALL® Engineered Wrap-Faced Vegetated Solution

PYRAWALL® is an engineered wrap-face vegetated solution for constructing reinforced-earth walls and steepened slopes. The system consists of PYRAMAT® 75 High Performance Turf Reinforcement Mat (HPTRM) and fibre-composite internal bracing. Featuring flexible setback and alignment, PYRAWALL® can be customized to unique site conditions and geometrics.

Features & Benefits

- Interlaced bracing provides superior material connection and system performance
- Produces reinforced soil mass to resist lateral earth pressures and provides immediate erosion protection upon installation
- Is a Vegetated Best Management Practice Solution for NPDES Storm Water Compliance
- Superior UV resistance for up to 75 years of design life
- Eliminates the need for temporary metal bracing or removable forms to improve installation efficiency
- Flexibility of product allows for curves to be incorporated along the wall or slope alignment
- Provides durable, permeable and vegetated wall face for long-term performance and aesthetics
- Ideal for coastal climates because the components are environmentally inert and not susceptible to corrosion
- On-site soil can be used for infill eliminating the cost and carbon footprint of importing soil
- System is easily transported making it ideal for sites that are difficult to access
- If walls/slope are higher than 2 mertres requiring geogrid extensions, then PYRAWALL serves as secondary reinforcement to redistribute potential high facing loads
- Patented triolobal X3® Fiber Technology helps lock in seeds and promote rapid root mass development

Applications

- Wrapped-face Mechanically Stabilized Earth (MSE) structures
- Reinforced Soil Slopes (RSS)
- Streambank stabilization
- Landslide remediation
- Vegetated facing for soil-nail or ground-anchored slope
- Landscaping enhancements for residential and commercial properties
- Wing walls for Geosynthetic Reinforced Soil – Integrated Bridge Systems

Roll Dimensions (m)

- 2.6m x 36.6m
- Available in Green or Tan

*Product size and stock may differ between branch location

Jute Mesh Soil Saver Blanket

Jute Mesh is a biodegradable open weave erosion control blanket suitable for short to medium term erosion protection to batters and open drains where light water flows are expected. Jute Mesh helps retain moisture and allows water and light infiltration to encourage vegetation growth.

Installation is easy. Jute Mesh shall be pinned in place using Global Synthetics Retaining Pins available separately. Generally, two pins should be applied per square metre to fix the blanket to soil surface.

Applications

Jute Mesh is suitable for batter protection, lining of swale drains and many applications of economical erosion protection prior to establishment of vegetation.

Bale Dimensions (m)

- 1.22m x 548m

*Product size and stock may differ between branch location

JUTELOK™ Organic Geotextile

JUTELOK™ is a 100% biodegradable jute fibre erosion control blanket. JUTELOK™ has been developed to promote growth and add to the enhancement of long term stability of steep slopes and indeed those areas which could be affected by erosion in time. It allows water filtration while protecting precious topsoil. JUTELOK™ contains no synthetic materials and will not entangle wildlife or machinery. JUTELOK™ is manufactured from AQIS certified material with no added chemicals or binders.

Applications

JUTELOK™ Light is engineered to allow the transmission of natural light making it ideal as a germination blanket for seeded areas. Light also reduces the effect of wind and water erosion, protect both top soil and seed and assisting grass establishment.

JUTELOK™ Heavy acts as an excellent weed and erosion control geotextile and is designed to extend the period that it takes to biodegrade.

JUTELOK™ Heavy is also available in preslit rolls for rapid installation of tube stock plantings.

- Promote Growth & Stability for Vegetation in Steep Slopes
- Germination Blanket For Seeded Area

Dimensions (m)	
Light	**Heavy**
2 x 50m (250gsm)	1.83 x 25m (750gsm)

*Product size and stock may differ between branch location

ProCoir™ Matting

ProCoir™ Matting is a 100% coir fibre erosion control mat. They are an effective way of preventing erosion on slopes while promoting healthy for re-vegatation. It is 100% biodegradable made from coconut fibres that lasts up to 3 years after installation.

ProCoir™ Matting comes in a 300gsm and 450gsm grade. The 300gsm matting features a 9mmx9mm PP net side stitched with brown PP thread. The 450gsm matting is a 100% coir fibre blanket and features a jute net top and bottom with cotton threads.

Applications
• Erosion Control
• Re-Vegetation
• Stream Bank Stabilisation
• River Embankments
• Landscaping

Dimensions (m)	
Light	**Standard**
2.4 x 50m (300gsm)	2.4 x 50m (450gsm)

Coir Geologs

GeoLog coconut fibre logs are comprised of 100% biodegradable coir fibre tightly bound by a coir yarn netting which maintains its density & shields the structure against mechanical & hydraulic stresses.

Applications
GeoLogs are deal for riverbank scour protection, silt entrapment, wave dissipation, runoff & stream diversion, spill containment as well as aquatic/wetland plant protection & buttressing on revegetation projects

Dimensions (m)	
Length	**Diameter**
3.0m	0.2m, 0.3m

*Product size and stock may differ between branch location

Coir Mesh

Coir Mesh is a 100% biodegradable natural coconut fibre product with an open weave. It is spun and woven for extra strength and will last longer than equivalent jute matting products.

When used with vegetation it is mechanically strong enough to hold slopes together even after heavy rain. Also promotes the growth of new plants and stops the topsoil from drying out and damaging new growth.

Coir matting resists temperature and wind extremes while retaining humidity and reducing soil erosion.

Benefits:

- Promotes growth of new plants
- Reduces soil erosion
- Retains moisture
- 100% Biodegradable
- Lasts up to five years with optimum seasonal conditions

Applications
• Slopes
• Roadsides
• Natural regeneration sites
• Mining
• Coastal areas with high winds
• Wetlands and riparian slopes
• Can be fastened with a "U" shaped pin

Dimensions	
Length	**Weight**
2 x 25m	400gsm, 700gsm, 900gsm

*Product size and stock may differ between branch location

Premium Silt Bags

ProFab® Premium Silt Bags are factory fabricated from high quality geotextile. Profab Silt Bags may be purchased as a single item of short fixed length.

Applications

ProFab® Premium Silt Bags are filled with sand or gravel and laid around various site storm water inlets or across open drains to slow the velocity of runoff flow and retain suspended sediment. The aim is to minimise this silt or sediment loss from sites and the entry of these particles into storm water systems and ultimately protecting the natural waterways.

ProFab® Premium Silt Bags are used to compliment the requirements of local, state and federal government authorities for erosion and sediment control on construction sites.

Dimensions (m)

Length	Round Flat Diameter / Lay Flat Width
1m	0.15 / 0.25m

Premium Silt Fence

ProFab® Silt Fence is designed with high tensile capacity to allow damming' to its full height. It provides a permeable barrier, allowing water transmission whilst trapping sediment, reducing turbidity at downstream water-bodies.

ProFab Silt Fence is used to complement the requirements local, state & federal government bodies for erosion & sedi control on construction sites. It is extremely easy & quick t install. Timber stakes or star posts are driven adjacent to th fabric at nominal centres to enable upright positioning.

Applications

To prevent contamination by flanking exposed soils or bordering entire construction sites

Roll Dimensions (m)

- 0.86m x 100m

*Product size and stock may differ between branch location

Silt Socks

ProFab® Silt Socks are factory fabricated from high quality geotextile into a tube of various lengths. ProFab Silt Socks can be purchased in roll form and cut to length on site to suit the application or may be purchased as a single item of short fixed length.

Applications

- Silt Socks are filled with sand or gravel and laid around various site storm water inlets or across open drains to slow the velocity of runoff flow and retain suspended sediment.
- The aim is to minimise this silt or sediment loss from sites and the entry of these particles into storm water systems and ultimately protecting the natural waterways.
- Silt Socks are used to compliment the requirements of local, state and federal government authorities for erosion and sediment control on construction sites.

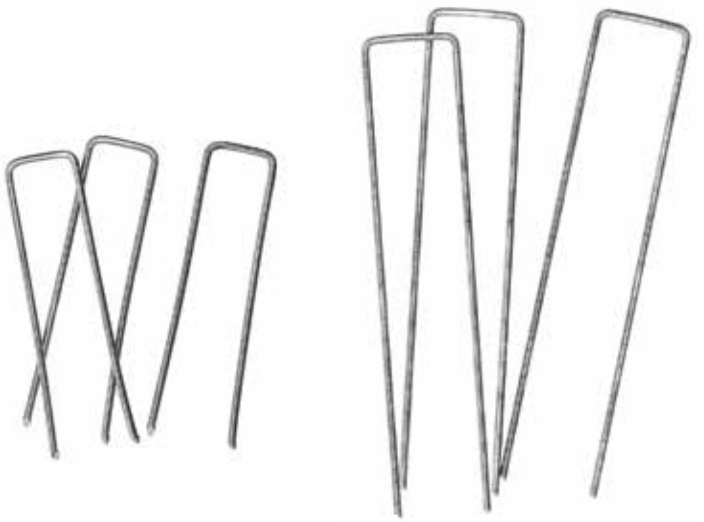
Dimensions (m)

Length	Round Flat Diameter / Lay Flat Width
1m, 2m, 4m	0.15 / 0.25m

U Shapes Retaining Pins

Global Synthetics Retaining Pins are made of mild steel and are used in the landscape and construction industries for pinning erosion blanket or geotextile fabric for either long term or temporary applications. All pins have sharpened points for easy installation.

Biodegradable 200mm pins now available.



Applications

- Erosion Control Blankets
- Erosion Control Netting
- Geotextile
- Irrigation line fixing It is generally suggested that a 150mm U Pin is used for relatively firm compacted soils and the longer 300mm U Pin is used for pinning through loose topsoil.

Dimensions

	PIN150	PIN200	PIN300
Size (mm)	150 x 150 (30mm leg separation)	200 x 200 (35mm leg separation)	300 x 300 (50mm leg separation)
Quantity	500 per box	150 per box	150 per box
Wire (mm)	4mm mild steel	4mm mild steel	5mm mild steel

*Product size and stock may differ between branch location

LINKLOK®

LINKLOK® is a combination off the proven turf reineforcement mat (TRM) Landlok®. 450 and the unique features of double twiste mesh provided by the Link rock fall netting product. Each component is supplied as separate items to ensure that the highly flexible nature of the Landlok® product can be laid and pinned, such that immediate and long term intimate soil contact is achieved to provide positive soil erosion benefits.

Overlying the Landlok® 450 TRM is an anchored Link rock fall netting product to provide good mechanical strength against superficial surface failures and potential rock movement. LINKLOK® may be supplied using the Pyramat® High performance Turf Reinforcement Mats (HPTRM) when required.

Applications

- Erosion Control For Rocky Slopes
- Steel Mesh Structure Allows For Greater Strength

Dimensions

Link double twist mesh is traditionally supplied in a 2m wide by 50 m long roll (other roll lengths and roll widths are available).

*Product size and stock may differ between branch location

Safety Fence

Global Synthetics have two safety fence styles available dependant on the application. Both products are designed to be robust for construction applications and to provide good visibility as a visual warning system.

Applications
The budget safety is a knitted product with limited re-use applications. The product does provide high visibility.
The premium safety fence is an extruded plastic and provides a higher re-use cycle with good tensile strength and good visibility.

Dimensions (m)	
Budget Safety Fence	Premium Safety Fence
0.9m x 50m	1m x 50m

*Product size and stock may differ between branch location

Case Study - Pyramat® Albury, NSW

Due to continued development upstream, the potential for flooding was greatly increased by reduced opportunity for natural groundwater recharge by natural channels. The City of Albury were concerned this flood protection bank would fail and erode away during a significant storm event. Therefore the client's engineer deemed it necessary to design this levee bank for a 1 in 1000 year storm event to ensure adequate protection downstream.

In addition there was a very short window of opportunity to undertake these works and achieve the desired result.

Solution

After careful evaluation the City of Albury's nominated consulting engineer, GHD selected a High Performance Turf Reinforcement Mat (HPTRM) solution for the following reasons: Environmentally friendly solution, Speed of installation, Cost effective solution. The City of Albury selected Pyramat®75 supplied by Global Synthetics and installed by BTL Australia.

TRM Information

Pyramat® 75 has a three-dimensional matrix with no loose fibres (See Figure 2) and is made using UV stabilised polypropylene. The three-dimensional structure increases the surface area by 40%, thus reducing water velocities. A fully vegetated TRM structure can resist velocities of up to 7.6 m/sec.

TRMs promote revegetation by slowing water velocities and trapping sediment. After the area is vegetated the mat then provides a stable and durable reinforcement for the roots of the vegetation. As HPTRMs are synthetic, they don't break down over time, thus continuing to reinforce the vegetation, for up to 50 years or more.

Benefits

In this application the Pyramat® 75 provided a environmentally friendly solution to a rock armoured alternative. The Pyramat® 75 is positioned within the critical root zone reinforcing the vegetation should a significant storm event occur. Further benefits to the client on this project included low danger to wildlife by entanglement due to the close weave of the Pyramat® 75 and reduced site maintenance stresses as the vegetation can easily be cut by standard mowing equipment with no damage to the TRM.

Pyramat® 75 uses patented X3® fibres – these fibres have a tri-lobe cross section (see fig 4) which traps more soil particles and moisture within the structure compared to standard fibres. Both these components are critical for establishing vegetation.

Product	Location
Pyramat® 75 Turf Reinforcement Mat	Albury, New South Wales

*Product size and stock may differ between branch location

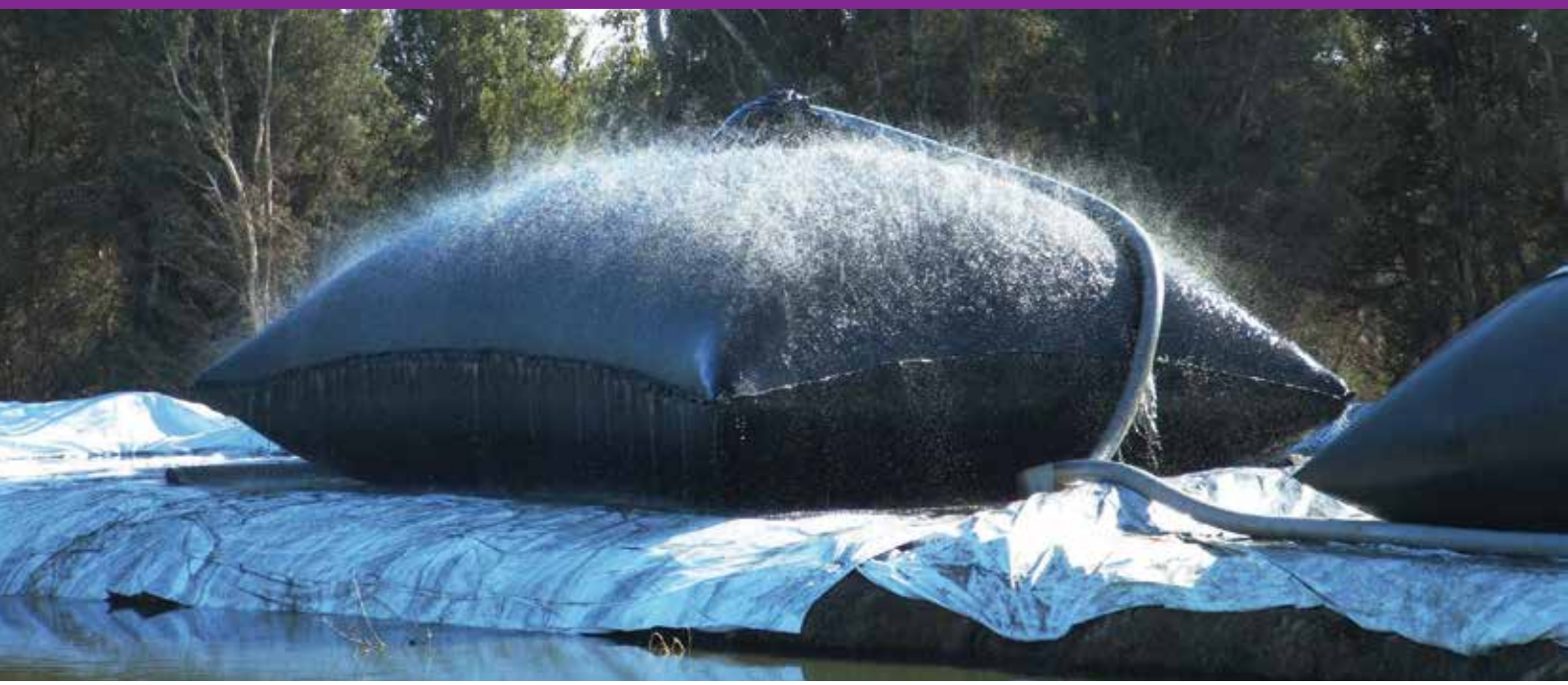
Dewatering Solutions

Specialty textiles fabricated into large bags or tubes for the containment of materials (generally sand) to form engineering structures in marine environments. They were developed in the USA in the late 1980's. The technology has developed such that these systems are a well accepted engineering methodology that provides a unique and cost-effective solution to engineering problems in a marine environment.

In more recent times the use of such products has been extended to include the effective dewatering of sludge from a range of industrial processes. The use of such products provides a very innovative, efficient and economical alternative to the dewatering of sludge over more traditional methods.

Common Applications of Dewatering Solutions
• Sludge Dewatering Bags
• Shoreline protection
• Solids and waste containment
• Agricultural applications
• Municipal applications
• Aquaculture and horticulture
• Wastewater lagoon liners
• Water and wastewater treatment and containment
• Industrial applications
• Environmental containment
• Soil remediation

*Product size and stock may differ between branch location



ProTube® Dewatering Tubes

The Global Synthetics ProTube® is made from a specially constructed geotextile that has excellent tensile strengths and filtration characteristics suitable for the manufacture of dewatering tubes and for the dewatering of a range of sludge materials.

Dewatering of sludge material using the ProTube® product works by:

- Containing the fine grained sludge material within the unique weave of the Global Synthetics ProTube geotextile.
- Dewatering of the excess water through the specially constructed pores of the Global Synthetics ProTube geotextile.

There is significant volume reduction of the sludge material which allows for repeated filling of the ProTube® product in many cases. Consolidation occurs after the final cycle of filling and dewatering. The fine grained solids contained within the ProTube® product continue to consolidate through desiccation with residual water vapour continuing to escape through the geotextile pores. This results in the most effective residue state for final disposal of the waste.

ProTube® allows for effective high volume containment with efficient dewatering and volume reduction. The ProTube® product offers users cost savings in disposal costs and the ability to on-site manage waste generated with no special equipment requirements

Applications

- Sludge Dewatering Bags
- Shoreline protection
- Solids and waste containment
- Agricultural applications
- Municipal applications
- Aquaculture and horticulture
- Wastewater lagoon liners
- Water and wastewater treatment and containment
- Industrial applications
- Environmental containment
- Soil remediation

Dimensions

- Available in various sizes

*Product size and stock may differ between branch location

Case Study - Winmalee Dewatering

Winmalee Sewage Treatment Plant is a waste water treatment facility located on the western outskirts of Sydney, NSW, Australia. The plant is located in an environmentally sensitive area and is located on an escarpment, near the town of Winmalee, NSW. Site conditions are very constrained with limited space and difficult terrain. The plant is operated by Sydney Water who proposed some extensive modifications within their secondary biosludge reactor basin with additional pump capacity and pipe upgrades required. Prior to such works being undertaken the reactor basin needed to be emptied and sludge removed and transported to disposal.

The Design

A specialist contractor in waste management from Australia was engaged to provide a suitably economic solution to the problems presented by the site location, terrain conditions and environmental restraints. The chosen solution involved the use of ProTube® geotextile dewatering tubes, vacuum truck technology, small amphibious dredging methods and the use of dewatering accelerants.

Two geotextile dewatering tubes were involved in this section of works with a third tube used on the Winmalee site for a different area of work. The tubes supplied were each 13.5 m theoretical circumference and 20m in length. Each geotextile tube has a calculated volume capacity of some 200m3 based on the recommended fill heights for the size of geotextile tube. The geotextile fabric used in the construction of the geotextile tubes was a high strength, high permeability woven geotextile, ACETex GT70/105. The tensile strengths of 105kN/m in the geotextile tube circumference direction and 70kN/m in the axial direction of the geotextile tube. All geotextile tubes were constructed with necessary seams running in the direction of geotextile tube axial direction. Two filling ports were installed in each tube.

Construction

High capacity pumps, for direct delivery of sludge from the basin were used, in combination with a system of vacuum truck tankers discharging into skip bins and then being pumped into the geotextile tubes. Pumps were capable of delivering some 175 litres of sludge per second via 150 mm pipe systems at a potential delivery pressure of some 300 kPa. It took less than 30 minutes to fill one tube using these pumps. The second geotextile tube did use a cationic polymer to assist in dewatering rates. The polymer was supplied in a concentrate liquid form. A preparation mix of polymer was made by diluting 1 part concentrate to 1000 parts of water. This preparation mix was then introduced to the waste stream at a further reduced dilution rate of 10ppm.

In total some 420m3 of sludge in a transportable state was recovered through the use of the geotextile tube process. An additional 250 m3 of sludge was captured in polymer treated settling tanks. A result of a very rigorous maintenance program of daily cleaning of the outer geotextile tube surfaces to limit algal and slime growth which can reduces fabric flow rate.

Performance

The initial geotextile tube supplied did not use polymer accelerants in the dewatering process. Excellent dewatering rates were achieved with full geotextile tube completion obtained within an eight week period. The rate of dewatering was doubled when using the polymer accelerant. The final condition of the material in the second geotextile tube, after four weeks total fill and consolidation time, with a fifteen fill and dewater cycle, achieved similar densities to the first geotextile tube. A feature of this project was the ability of this contractor to fill the geotextile tubes some 40% greater than a theoretically calculated maximum fill height. Actual fill heights of some 2.2m were achieved compared with a theoretical calculated maximum fill height of 1.6m. A traditional alternate treatment of pumping and cleaning, with transfer of total liquid waste to a suitable waste facility, has been estimated to be in excess of $500,000 cost. The geotextile tube process was less than half of these costs.

Product	Location
ProTube® Detawatering Tubes	Winmalee, New South Wales

*Product size and stock may differ between branch location

Site Containment & Ancillary Products

Global Synthetics offers a number of products to prepare your site, control sediment and encourage vegetation.

Sediment control products are used on building sites to prevent sand, soil, cement and other building materials from reaching waterways.

*Product size and stock may differ between branch location

ProTac® Stress Absorbing Membrane

ProTac® is a self adhering waterproofing membrane used in conjunction with resurfacing and overlaying operations and in pipe/culvert bandage operations to seal joints. It is comprised of a stress absorbing geotextile fabric that is combined with a rubberised bitumen to produce a composite membrane that bonds tenaciously to clean and dry surfaces.

Applications

Applications include crack sealing of many surfaces prior to surface overlaying or backfilling in applications such as:

- Road surfaces
- Lane widening joints
- Other paved surfaces such as runways and car parks
- Bridge decks and pipe / culvert joint sealing
- Sealing of bridge girder joins prior to surfacing

Roll Dimensions (m)

- 0.3m x 15.24m
- Other sizes available

*Product size and stock may differ between branch location

Silt Curtain

Profab® floating silt curtains are used to contain mobilised soil particles from propagating into waterways from adjacent construction sites. During construction activities, any turbidity created will be contained within the silt curtain boundaries limiting the extent of the silt movement.

Profab® floating silt curtains are manufactured from self buoyant, durable polypropylene non woven geotextile. A 100mm float is pre-installed into the top high visibility pocket, and a ballast chain for weighting purposes maintaining taughtness is pre–installed in the bottom pocket.

Individual sections are easily and firmly joined end to end through eyelets and industrial velcro is used to strengthen and tightly seal the joins.

Profab® floating silt curtains are complete ready to install, saving you valuable time during deployment.

Applications

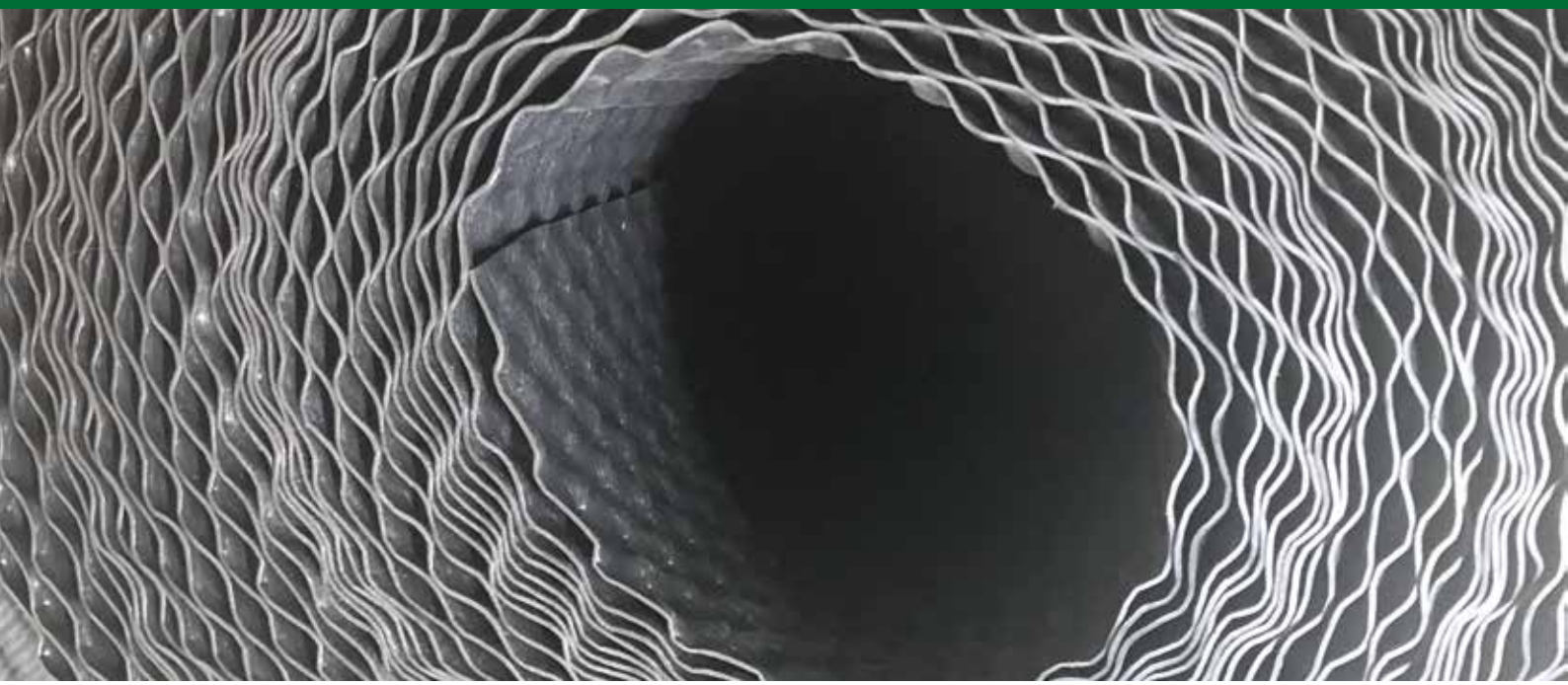
- Bank works in creeks, streams
- Canal works
- Shore based works only in exposed waters

Dimensions

Curtains are available in 10, 15 or 20m sections.

A joining system has been developed to provide simple but effective removal and attachment of sections both on land or in the water. The system uses ASTM 962 pattern connectors to join the floats, tension members and D rings use galvanized shackles and skirts are joined using marine zippers or eyelets and ties. Long length curtains are factory pre-joined to provide easily deployable bundles minimizing the on site installation time.

*Product size and stock may differ between branch location



Root Barrier

Root barrier is a rigid plastic sheet made from high density polyethylene. The Root barrier is simply placed vertically into a trench of varying depth to provide a barrier impenetrable by tree roots.

The Root barrier should be installed adjacent to building footings or directly under the "drip line" of the tree to ensure that roots cannot propagate and potentially damage hardscapes such as concrete and paved pathways. Root barrier is available in depths of 600mm, 900mm and 1200mm.

Applications
• Around individual trees
• Adjacent to structure footings
• Adjacent to pathways
• Around golf course greens and paths

Dimensions		
	Unit	Typical Value
Size (mm)	mm	1
Width (mm)	mm	600, 900, 1200
Length (m)	m	30

*Product size and stock may differ between branch location

turfpro™ Grass Paving System

turfpro™ is a uniquely designed grass paving system to distribute and support vehicle loads, whilst maintaining a visually pleasing turf surface. Vehicular access roads, paths and parking areas can be integrated into the landscape of the project, avoiding the use of concrete or asphalt pavements, which can cause consequent additional discharge issues on the site. turfpro™ can provide for the recharge of groundwater and can limit the amount of discharge that the site might normally produce using conventional pavement treatments.

- Easy installation
- High compressive strength
- Lightweight with a very high strength to weight ratio
- Reduces rainfall run-off with a large open surface and high internal void ratio
- Durable with all turfpro™ made from polypropylene that is highly resistant to naturally occurring micro-organisms, acids and alkalis likely to be found in soils
- Environmentally friendly with the product able to be recycled if necessary

Applications

Turfpro™ is ideal for all vehicular traffic access including:

- Parking Areas
- Golf Course Paths
- Emergency Access Points for service vehicles
- Residential Courtyards and many more

Dimensions

- Cell : 500mm x 500mm with integral clips

*Product size and stock may differ between branch location

Geosynthetic Sand Containers

Global Synthetics has several products that can be successfully used in the stabilisation of coastal foreshores. Due to the unpredictability of the physical environment along all coastal locations and the increasing incidence of urban encroachment into this environment, there are increasing consequences of major damage to infrastructure. Global Synthetics has several products that include geotextile tubes (sand filled on site) and smaller geotextile bags (sand filled on site) that can significantly reduce the economic costs of damage from wave attack.

Geosynthetic sand containers are geotextile sand-filled bags, containers, or tubes that are manufactured from needle-punched nonwoven geotextiles. For coastal structures, dune security and scour protection, geosynthetic sand containers provides an alternative to conventional rock materials such as riprap, gravel filters and other hard armour and aggregate solutions.

Common Applications of Geosynthetic Sand Containers
• Sea walls, beach and dune revetments
• Submerged breakwaters and jetties
• Scour protection for waterfront structures, walls, bridge piles and offshore wind turbines
• Offshore cable protection
• Erosion control in flowing waters
• Filling of washed out material in dams
• Soil stabilisation in dams
• Environmental containment
• Soil remediation
• Groynes

*Product size and stock may differ between branch location

GeoRock™ Geosynthetic Sand Containers

GeoRock™ GSCs are made of very robust staple fibre geotextile layer sewn together with a UV stable polyester/ polypropylene yarn. In Vandal Resistant format, the outer geotextile features a heavy, coarse Polypropylene geotextile which traps sands particles within its structure to provide a vandal resistant and durable outer layer.

Global Synthetics has the ability to provide unique solutions for coastal protection using geotextile tubes, geotextile bags or geotextile containers. The product is fabricated to suit the specific coastal problem. Fabric selection is based upon project specific requirements.

The use of such products may allow the use of sand materials as the filling media such that the structure is dimensionally stable over long periods of time.

Dimensions (m^3)
• 0.75m3
• 1.00m3
• 2.50m3

*Product size and stock may differ between branch location

Case Study - Cocos Islands

Just 2750 kilometres North West of Perth within the pristine blue waters of the Indian Ocean lies Australia's last true untouched paradise, the Cocos (Keeling) Islands. Home to some 600 people, comprised mostly of the local Cocos-Malay residents, this remote island destination attracts thousands of visitors each year, with its kite and windsurfing, exceptional fishing and diving.

The Problem

This tranquil paradise is under relentless attack from the forces of the open seas, with severe foreshore erosion resulting in the destruction of important infrastructure, such as main roads, air strip and housing. With the highest points on the Islands being 2-3m above sea level, the islanders have their heads just above water.

Federal Government funding was granted to Cocos Island to address the issue of foreshore erosion. Conventional method of armouring with large stone is impractical & cost prohibitive. Unfortunately there is no rock on Cocos Island, only sand and coral, which meant a different approach was needed to defend the foreshore.

The Solution

The Shire of Cocos (Keeling) Islands chose to use GeoRock™ GSCs (geotextile sand containers)to remediate a severely eroded section of William Keeling Cres. GeoRock™ provides an aesthetically pleasing, soft armour solution comprising a staple fibre geotextile with exceptional UV resistance, superior tensile strength and high levels of abrasion resistant.

The following were installed on this project;

- GeoRock™ 1.0m^3 Anti Vandal (AVL) Geotextile Sand Containers: +5,350 units
- ProFab® ULTRA AS1200X Nonwoven Revetment Filter Geotextile: +5,500m^2

The GeoRock™ 1.0m^3 units were the preferred option by the Shire as it meant they were benefiting from 25% greater mass than traditional 0.75m^3 units. The higher mass results in greater unit stability with a negligible increase in unit cost and improved installation efficiencies. This is critical on islands with a narrow tidal window for works access.

The Shire of Cocos (Keeling) Islands achieved all structural design objectives within their financial and timing allowances. Feedback from the local island community also suggests they are happy with the 'soft armour' approach taken by the Shire whilst comforted by reduced storm threat levels.

For further information please contact sean@globalsynthetics.com.au

Product	Location
• GeoRock™ Geosynthetic Sand Containers	Cocos (Keeling) Islands, Australian External Territory

*Product size and stock may differ between branch location

Geonets

A geonet is a geosynthetic material consisting of integrally connected parallel sets of ribs overlying similar sets at various angles for in-plane drainage of liquids or gases.

Transnet® geonets are an extruded three dimensional bi-planar core made from virgin high density polyethylene (HDPE) for flow under high loading.

The geonet may have, heat laminated to this core, a nonwoven polypropylene geotextile for situations when the geonet has to provide a filtered drainage path. This product is called a Transnet® Geocomposite. Dependent upon the application the geotextile may be affixed to either one or two sides of the geonet core.

*Product size and stock may differ between branch location

Transnet® Geonet

Transnet® geonets are an extruded bi-planar core made from virgin HDPE

Features

Transnet® products have the following features:

- Virgin polymer HDPE core allowing reduced creep and higher compressive strengths (up to 2800 kPa)

Applications
• Transets® Geonets may be used as either liquid or gas collectors.
• The typical applications for these products are in all applications that require drainage /collection of gas and leachates (mining and landfill) and filtration of sediments contained within these liquids.
• Transnet® is specially formulated to allow for use in high load applications such as landfill cells and where compression resistance is critical.

Thickness (mm)
• 3.81mm (TN 160)
• 5.08mm (TN 220)
• 6.35mm (TN 270)
• 6.98mm (TN 300)
• 7.62mm (TN 330)

*Product size and stock may differ between branch location

Transnet® Geocomposite Single & Double Sided

Transnet ® Geocomposites Single Sides Geonets are drainage products manufactured with three dimensional bi-planar Geonet which are laminated on one side with non-woven geotextiles. They offer light weight, factory controlled, easy installation and environmental friendly solution to traditional drainage materials such as granular stones, gravel and sand.

Applications

- Drainage
- Leak Detection

Thickness (mm)

Transnet ® Geocomposite Geonets are manufactured with varied widths depending upon customer's need and come in the following thickness:

- 3.81mm (TN 160)
- 5.08mm (TN 220)
- 5.84mm (TN 250)
- 6.35mm (TN 270)
- 6.98mm (TN 300)

*Product size and stock may differ between branch location

Case Study - Melbourne Regional Landfill (MRL)

TRANSNET Drainage Geocomposite & GEOFIRMA Cushion and Filter Geotextiles

The Problem

Melbourne is one of the fastest growing Australian cities. Upgrading infrastructure to support this rapid growth is essential. The MRL meets a critical infrastructure need, to deal with the city's ever-increasing residual waste today, and for the long term. There is a need for residual waste to be managed safely and effectively through Best Practice Environmental Management (BPEM) design guidelines set up by the local EPA regulatory authority. Global Synthetics were able to supply geosynthetics that complied to design specifications and met critical quality assurance hold points including MQC & CQC testing.

The Solution

80,000 m2 of GEOFIRMA® AS540E cushion and protection fabric and GEOFIRMA® AS200B filter geotextile were supplied. A TRANSNET® TN350-1-200 drainage geocomposite was used as part of the leachate collection system on the side walls of the new landfill cell. An appropriately designed geonet drainage geocomposite was used as an alternative to the gravel drainage layer the landfill sidewall leachate drainage systems. Geocomposite drains are permitted to also be used in secondary leachate collection systems (leak detection systems) and groundwater drainage systems.

The TN350-1-200 is a geocomposite with a 8.3mm thick HDPE heavy duty geonet core with a 200g/m2 geotextile thermally bonded to it.

The geonet drainage geocomposite should:

- have an internal geonet drainage core manufactured from virgin high-density polyethylene (HDPE)
- have a geotextile fabric heat bonded to the upper surface of the geonet to prevent fines from entering the drainage channels, and a geotextile fabric heat bonded to the lower surface to prevent damage to adjacent geosynthetic layers
- be able to resist degradation caused by factors such as chemical attack, temperature, hydrolysis and stress cracking over the entire life of the landfill. Polypropylene geotextiles are chemically more resistant and preferred for this reason.
- have high ply adhesion and interface friction with adjacent layers. For this reason the geocomposite geotextile must be thermally laminated to the geonet core. Gluing is not recommended due to poor strength and durability concerns.
- have adequate long-term flow capacity for the calculated leachate flow rate at the site. The allowable flow rate should be determined from a long term 100-hour test simulating field conditions (adjacent layers, waste loads and hydraulic gradient). This test will account for decreases in flow capacity due to intrusion of the geotextile into the geonet core.

The designer should then allow for factors that will further reduce the thickness and capacity of the drainage core under long-term field conditions. These factors include long-term creep deformation of the geonet, and chemical and biological clogging caused by leachate. In addition to these specific reduction factors, adequate general safety factors should be applied to account for overall design uncertainties.

If you would like to know more about our Transnet® or any other products on offer please visit our homepage globalsynthetics.com.au or you can speak with our experienced Global Synthetics engineers by contacting the numbers below.

Product	Location
Transnet® TN350-1-200 Geocomposite	Melbourne, Victoria

*Product size and stock may differ between branch location

Cellular Confinement

Cellular confinement systems (CCS - also known as geocells -are widely used in construction for erosion control, soil stabilization on flat ground and steep slopes, channel protection, and structural reinforcement for load support and earth retention.

A Cellular Confinement System when infilled with compacted soil creates a new composite entity that possesses enhanced mechanical and geotechnical properties. When the soil contained within a CCS is subjected to pressure, as in the case of a load support application, it causes lateral stresses on perimeter cell walls. The 3D zone of confinement reduces the lateral movement of soil particles while vertical loading on the contained infill results in high lateral stress and resistance on the cell-soil interface. These increase the shear strength of the confined soil, which:

- Creates a stiff mattress or slab to distribute the load over a wider area
- Reduces punching of soft soil
- Increases shear resistance and bearing capacity
- Decreases deformation

Common Applications of Cellular Confinement
• Slope Protection
• Earth Protection
• Load Support
• Channel Protection.

*Product size and stock may differ between branch location

Miracell® Geocell

MiraCell® is a perforated cellular confinement system engineered from HDPE sections for maximum performance. MiraCell® is available in several depth and cell opening combinations. MiraCell® is supplied in a olded configuration that minimises transport costs to site yet can be readily expanded on site for very quick installation. MiraCell® has been perforated to ensure that each cell does not become water saturated during use.

The advantages of MiraCell system include:

- Low handling costs
- Low wastage rate
- Minimum maintenance required
- Easy installation

Applications
Main applications of MiraCell cellular confinement system:
• Slope Protection
• Earth Protection
• Load Support
• Channel Protection.

Panel Depth (mm)
Available in Small, Medium or Large cell size.

*Product size and stock may differ between branch location

Global Synthetics
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