



Global Synthetics

geonews

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Welcome

As a 100% Australian-owned company, **Global Synthetics** is proud to offer you a complete range of high-quality geosynthetic products with the added assurance of more than 100 years of combined staff experience in the industry.

Our engineers know our products and know the challenges you may have in delivering cost effective solutions to a range of geotechnical engineering applications. We have supplied products to some of the largest infrastructure works currently being undertaken in Australia:

- GATEWAY UPGRADE PROJECT – QLD
- NORTHERN ACCESS ROAD PROJECT – QLD
- SOUTH CARDUP LANDFILL – WA
- BALLINA BYPASS – NSW
- AIRPORT LINK – QLD
- CHRISTMAS CREEK MINE (FMG) – WA
- YANDI MINE (RIO TINTO) – WA
- RED HILL LANDFILL – WA
- WOODSIDE LNG PROJECT – WA
- HERON CREEK PACIFIC HWY – NSW
- NORTHERN EXPRESSWAY – SA
- PORT BOTANY EXPANSION – NSW

Global Synthetics can provide major benefits to your project. Whether your problem is one of drainage, reinforcement, retention, storage, filtration or protection, we have a product to suit your needs.

Speak to one of our engineers located throughout Australia or visit our website at www.globalsynthetics.com.au and see how we may assist in your next project.



Bentofix® again safeguards South Cardup landfill

One of the largest and most advanced landfill facilities in WA underwent its latest cell construction (cell 7) earlier this year.

Situated at the foothills of the Darling Scarp in Perth, the South Cardup Landfill exhibited some challenging design issues due to its topographic and geotechnical profile. Cell 7 is a case in point with its asymmetrical plan and elevation which necessitated a cautious design approach in terms of drainage, tie in (with adjacent cell wall), liner selection and liner cushioning.

Specialist landfill designers, Golder Associates, opted for a dual liner arrangement in order to secure high safety factors for leachate containment. Golder conducted a series of rigorous laboratory load testing, resulting in a selection of Bentofix® geosynthetic clay liner (GCL), Carbofol® HDPE liner and ProFab® heavy weight cushion nonwoven geotextiles. A specific grade of Bentofix® – BFG 5000 – was chosen due to its high quality bentonite and robust construction. The BFG 5000 also provides trouble free and cost effective installation due to its ‘self seaming’ characteristics. BGF 5000 can be cut and/or overlapped at any point throughout its area without

the need for mixing and applying adhesive paste for manual seaming.

The long steep slopes at South Cardup also demanded an HDPE liner with a high interface friction coefficient. Hence, Carbofol® 2.00mm structured (Megafriktion) HDPE liner was selected due to its unique surface texturing. The texture is extruded in the form of nipples which have a very high ‘asperity’ allowing for an excellent bond with the interface geosynthetics (GCL and cushion geotextile).

Three grades of ProFab® cushion geotextiles were selected to protect the HDPE from the sharp aggregate drainage layer above. The selections were based on their relative positions on the cell floor. ProFab® AS1200 (1200g/m²) was specified for the deepest zones to cater for the highest waste surcharge loads, whilst ProFab® AS880 (800g/m²) was chosen for the shallower sections and ProFab® AS1000 (1000g/m²) for the intermediate regions. The mixture of ProFab® grades enabled the designers and stakeholders the flexibility to economise on material costs.

For more information, contact sean@globalsynthetics.com.au

Pavement Design Software

Need some assistance with pavement design for your next project? Why not register online with our **Propex RACE Pavement Design Software**.

Download at www.geotextile.com

Follow the prompts and electronically download software for both paved and unpaved road designs.

For more information contact george@globalsynthetics.com.au

ACEGrid® soil reinforcement assists wall construction on former clay quarry

Expanding demand within Sydney for housing is creating more opportunities for innovative site restoration.

A site in South Western Sydney that was originally a quarry for the extraction of brick-making clay has recently been redeveloped.

The effective end-of-life of the quarry and its prime location within the metropolitan area of Sydney allowed for extensive filling and reshaping of the site for its rebirth as a residential housing estate.

As part of the required earthworks there was a need for some large retaining structures along one property boundary.

The wall to retain fill on the site needed to meet the aesthetic requirements of a high quality residential sub-division. It also had to fulfill the technical requirements of a major structure.

The most effective solution that satisfied the project requirements was a combination of a concrete segmental block combined with an ACEGrid® reinforcement geogrid. The combination

of block walls and geogrid allows for effective, aesthetically pleasing, front wall face stabilisation, with the geogrid imparting additional tensile capacity to the soil behind the wall.

ACEGrid® has been fully tested with most concrete segmental block systems commercially available in Australia. The ACEGrid® product is constructed from polyester (PET) yarn which maximises long term strength retention. Polyester is much less susceptible to long term creep effects than geogrids made from alternate polymers such as HDPE or PP. The weave construction also enables the geogrid to be laid flat with no tendency to 'roll back' on itself making installation very contractor-friendly.

Approximately 1200m² face area of ACEGrid® soil reinforced wall was constructed on the site with the wall contractor delighted with the ease of placement of the 5000m² of ACEGrid® reinforcement geogrid supplied.

For more information contact
martin@globalsynthetics.com.au



Combigrid® provides heavy-weight support for Cooperbrook-Pacific Highway



How to develop a cost effective pavement to carry a 300kPa piling rig load over a soft clay subgrade?

Thiess Contractors solved this challenge after approaching Global Synthetics for design assistance for the Stewarts River bridge section of works, part of the Pacific Highway upgrade between Sydney and Brisbane.

A Bauer BG28 piling rig has a loading pressure of approximately 167kPa while travelling and 317kPa when extracting piles. The design adopted a conservative sub-base CBR of 1%. As an economic solution to improve the subgrade strength, the preliminary design considered the installation of a Combigrid® pavement geogrid.

The critical considerations in geosynthetic-pavement design are:

- **Modulus** – the ability of the geosynthetic to deliver high load capacity within the working strain of the pavement. That is, the strength at 2% strain.
- **Interaction** – the bond between the geogrid and the base aggregate increases the shear strength and thus the load distribution capacity of the base course.

Combigrid® is a composite geosynthetic that combines the reinforcement function of a geogrid together with the filtration and separation benefits of a geotextile fabric. The geotextile is bonded within the welded geogrid bars during the manufacturing process.

For further details, copy of design calculations, installation guides or design assistance please contact george@globalsynthetics.com.au

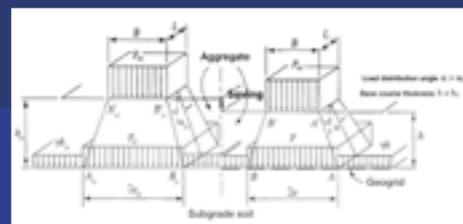
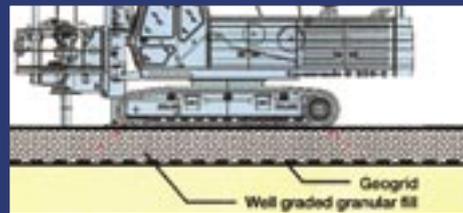


Fig 1. Load distribution angle with Combigrid®

The ultimate bearing capacity q_{ult} underneath a rectangular plate (truck) may be calculated as follows: $q_{ult} = s_c \times N_c \times c_u$

where s_c = shape factor 1.2 for rectangular track
 N_c = Bearing capacity factor
 c_u = Undrained shear strength, here 30 kN/m²

A well graded granular base course was recommended over the Combigrid®. To satisfy a factor of safety, FoS > 2.5 for all loading conditions, the following concept design was proposed and ultimately installed:

- 500mm well graded gravel base course placed over Combigrid® 40/40:
 - 40kN/m strength @ 8% peak strain
 - 16kN/m @ 2% working strain.



Three-way solution for ground improvement on Gateway Upgrade Project

Rapid growth in South East Queensland over recent years has created stress on the city roads and connecting arterial roads. One of which is the major North South connecting Gateway Motorway.

The Queensland Department of Main Roads contracted the Leighton Abigroup Joint Venture to construct the Gateway Upgrade Project.

Work commenced in 2006 on the 20km upgrade including lane additions, widenings and a duplication of the existing Gateway Bridge river crossing.

Many of the realignments selected and the widenings to be created were to be constructed on the flood plain areas of the Brisbane River. This flood plain comprises many soft soil deposits that are in low lying areas with the presence of a high water table.

To traverse the soft and saturated soils, many ground improvement techniques were employed to provide a stable construction platform for the roadway embankments.

One technique to overcome these problems was the combination of Global Synthetics CeTeau® CT-D811 wick drains, ACETex® GT PET woven polyester reinforcement geotextile and ProfFab® nonwoven separation geotextiles.

The ground improvement commenced with the placement of ProfFab® AS440 nonwoven geotextile over the existing soft subgrade. ProfFab® AS440 functions as a separation and filtration layer to separate the soft subgrade soil particles from the imported granular working platform/drainage layer.

The imported granular material layer provides an initial function of a working platform for the ensuing wick drain installation, and over time provides a lateral drainage path for escaping subgrade water during the consolidation phase.

To accelerate the consolidation process and reduce lead time for safe embankment construction, Global Synthetics CeTeau® wick drains were then installed vertically through the

soft subgrade layers at regular intervals. Generally a triangular pattern of 1.2m spacings was adopted to optimise the consolidation process where excess ground water could be removed quickly and efficiently by the vertical CeTeau® wick drains. The wick drain depths varied between 5m and 22m.

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. The CeTeau® drains are inserted into the soil by pushing the product to the desired depth to increase the drainage paths within the soil to be consolidated.

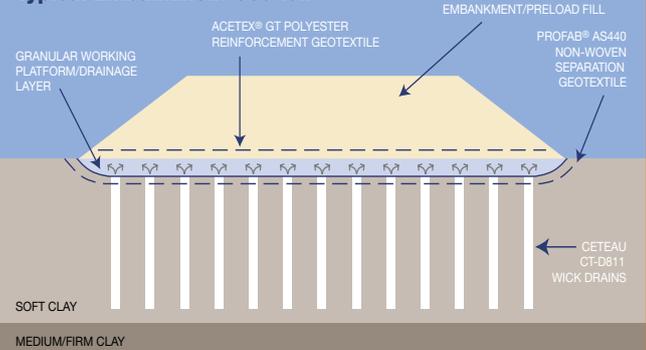
Once the CeTeau® wick drain installation was complete, the Global Synthetics ACETex® GT PET woven range of high strength polyester geotextile was installed over the granular working platform/drainage layer. The reinforcement geotextile controls stability during construction and provides a reinforcement function during the consolidation phase and throughout the structure life. The ACETex® GT PET (polyester) range of products is used for primary applications of reinforcement over extended periods of time. Typically the strength range of this product is between 100 kN/m to 1000 kN/m.

To enhance the consolidation process, the embankment fill/preload fill is placed over the ACETex® GT reinforcement geotextile to the desired vertical height. This fill provided a normal load/surcharge to 'squeeze' the free water from the ground through the vertical CeTeau® wick drains.

By using CeTeau® wick drains and ACETex® GT PET reinforcement geotextile, road construction was able to commence within a matter of months rather than years.

The use of such Ground Improvement technologies available from Global Synthetics is becoming widely accepted as a beneficial, effective and economic means of improving the land available to developers and public projects.

Typical Embankment Section



For more information contact
jason@globalsynthetics.com.au

Erosion Control

Have you ever wondered how to effectively design your next drainage channel in an environmentally-friendly manner?

Using **Propex High Performance Erosion Control Mats** you may be able to replace hard armour solutions such as concrete or rip rap with an engineered "green solution" using state of the art software.

Download the **Propex EC-DESIGN software** at www.geotextile.com

For more information contact
martin@globalsynthetics.com.au



On-site water detention: problem solved

A Global Synthetics solution assisted a residential apartment development in Eastern Sydney to comply with local government requirements for on-site detention of rainfall.

The Rainsmart® modular below-ground storage/detention tank system, with an approximate 80,000 litre capacity, was installed within a few days.

With little space for an above ground detention solution, the Rainsmart® tank gave the developer a cost effective solution as well as providing a pleasant living environment for residents.

Global Synthetics suggested the use of an extremely high compressive strength modular tank that was able to be site-assembled to suit the development conditions. The tank location was excavated to suit both the storage volume requirements and the proposed drainage discharge points. A bedding layer of sand was placed on the floor of the excavation,

an impermeable liner was placed to contain collected water; a ProFab® nonwoven geotextile was then placed over the liner for protection against puncture and the modules placed to the design plans and elevation.

Once all modules were placed and all drainage connections made, the tank was backfilled and compacted.

On completion, an attractive garden was constructed above the tank and tank water can be re-used to maintain landscaped areas on site.

The Rainsmart® tank can be constructed in both pedestrian and trafficable areas. The load capacity of the modules can be changed by the simple addition of internal strengthening plates. Tanks can be constructed with load capacities in excess of 33 tonnes/m². Possible storage volumes are almost infinite.

For more information contact chris@globalsynthetics.com.au

Propex Geosynthetics Returns to Australia

Global Synthetics has been appointed exclusive Australian distributors for Propex geotextiles and erosion control products. Propex is one of the world's leading suppliers of geosynthetics through the amalgamation of well known producers such as Synthetics Industries, Amoco and Propex.

Propex are based in the USA with an extensive worldwide distribution network.

Global Synthetics now delivers well recognised erosion control products, Landlok®, the Pyramat® range of high performance turf reinforcement mats and the Propex range of Geotex® geotextiles.

All products are well supported technically by Global Synthetics engineers with full product performance data for local Australian applications.

For more information contact martin@globalsynthetics.com.au

Product Listing

PRODUCT TYPE	PRODUCT
Geotextiles - Nonwoven	ProFab®
Geotextiles - Woven	ProFab®
Geotextiles - Reinforcement	ACETex®
Geogrids - Pavement	Secugrid®
Geogrids - Reinforcement	ACEGrid®
Rock Mattress	RhinoMesh
Gabions	RhinoMesh
Geosynthetic Clay Liners	Bentofix®
Geocells	Miracell®
HDPE Membranes	Carbofol®
Sheet Drains	ProDrain
Drainage Cells	Nerocell®
Water Tanks Modular	Ellipse®
Erosion Blankets	Landlok®
Erosion Blankets - High Performance	Pyramat®
Erosion Blankets - Biodegradable	Jutemaster®
Silt Fences	Global
Floating Silt Curtains	Global
Dewatering Tubes	ProTube®
Wick Drains	CeTeau®

www.globalsynthetics.com.au

For a comprehensive product catalogue, please email info@globalsynthetics.com.au

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