Porous Paving Systems

An introduction to porous paving systems

abg creative geosynthetic engineering


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An Integrated Approach to Porous Paving Systems

Porous paving systems have played a key role in managing flood risk for almost 30 years and infiltration is now universally recognised as the preferred source control solution within sustainable drainage systems.

The challenge of ongoing climate change is clearly demonstrated by a recent study by the Centre for Ecology and Hydrology in collaboration with the British Hydrological Society which confirmed that in recent years, flooding during the winter has been the most extreme on record.

In addition to providing an aesthetically pleasing and cost effective solution, porous paving systems also deliver a number of significant environmental benefits including inherent water treatment, enhanced biodiversity / amenity and recharge of aquifers.

BREEAM credits are awarded where porous paving is used to limit runoff from a development and provide on-site treatment to minimise watercourse pollution. Further credits can also be gained through the use of porous paving providing beneficial impacts on local ecology. In addition, the use of rainwater harvesting for irrigation is also recognised with a credit.

Porous paving systems can also contribute to wider sustainable water management when they are used as a retrofit solution. The cost benefit of SuDS retrofit in urban areas Science Report – Environment Agency SC060024 estimates that it is possible to retrofit approximately 50% of off-road hardstanding surfaces with porous paving. This is a conservative judgement and further ongoing research is likely to indicate that this percentage could be increased.

Why ABG

- Market leading sustainable drainage system manufacturer and distributor since 1988
- Specialists in bespoke full depth pavement system solutions through supply only, supply and install and design supply and install packages, with an engineered approach to optimised designs of the underlying layers in accordance with best practice guidance
- Experts in the use of geosynthetics to minimise the overall depth of construction
- Project-specific surface and subsurface assessment reports can be provided if required
- The only supplier to offer PI insurance backed designs for the complete pavement structure
- Supporter of Susdrain, the community for sustainable drainage from CIRIA.

Truckcell™

Truckcell™ is a heavy-duty cellular paving system designed for intensive usage and high-load traffic applications. Manufactured from recycled and recyclable waste polymeric material, the cells can be filled with topsoil and seeded or with gravel to provide a robust structural surface.

Why Truckcell™

- A 30 year proven track record of use for HGV / SLW 60 vehicles (up to 60 tonne gross weight and 10 tonne wheel loads)
- Offers a significant cost advantage over precast and in-situ concrete systems
- A comprehensive range of gravel & grass infill options to suit aesthetic requirements
- Lightweight and easy to install – complies with HSE manual handling limit
- High void area and insulating properties to encourage healthy grass growth

Applications

- Truckstops & general HGV parking areas
- HGV access routes to utility facilities
- Slope & embankment stabilisation
- Loading areas
- Emergency access routes
- Verge reinforcement
- Highway widening
- Service yards
- Spillway crests
- Swale linings
- Coach parks and bus routes
- Park & Ride schemes

For ABG product datasheets, CAD details, design guidance & other technical information call +44 (0)1484 852 250 or email geo@abgltd.com

ABG Truckcell™ 80

Truckcell paver filled with porous clean angular aggregate or growing media and grass seeded

Bedding layer

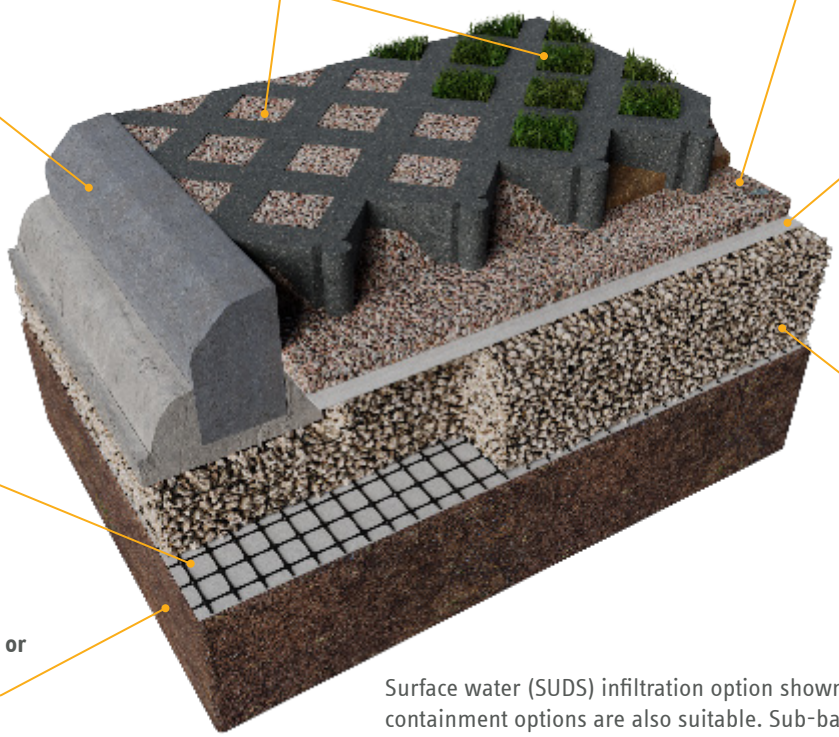
Compacted angular aggregate

Edging

Firmly-fixed retaining edges ensure lateral movement is minimal

ABG Geotextile

Terrex non-woven filter/separator geotextile (optional)



Sub-base

Compacted free draining sub-base

ABG Geogrid and Geotextile

Geogrid and geotextile layers

Existing subgrade or capping layer

Surface water (SUDS) infiltration option shown, but attenuation and containment options are also suitable. Sub-base depth may be reduced by use of ABG Abweb. Graphic for illustration purposes only. Refer to ABG Design Guidance Notes for detailed design information or contact ABG Ltd

Case Studies

Cannock Truck Stop

This heavily used truck stop used Truckcell™ to provide a porous surface that is robust enough for in the region of 500 vehicles per day.

Wadlow Windfarm Lifting Pads

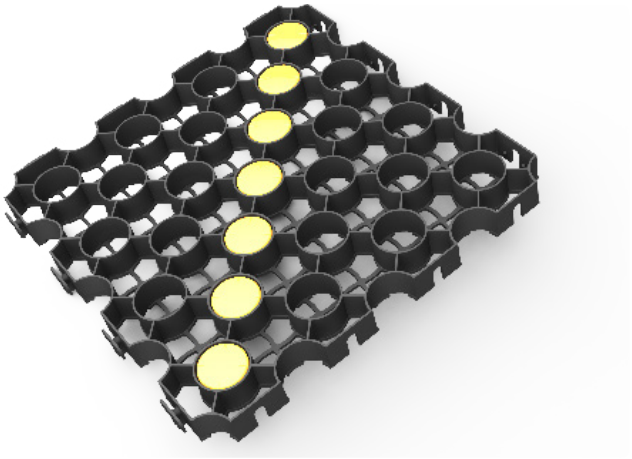
Truckcell™ utilised to create lifting pads and porous access routes for the construction and operational phases of this windfarm.

Cody Technology Park

Truckcell™ was used to create porous access and manoeuvring areas across the site for HGV and forklift traffic.

Sudspave®

Sudspave® is a system of interlocking cellular plastic paving units designed for the stabilisation of trafficked grass or gravel surfaces. Suitable applications include car parks, emergency and maintenance vehicle access roads, cycle paths and pedestrian areas.



Why Sudspave®

- Sudspave® is a cellular porous paving system designed to create a range of natural reinforced gravel and grass surface options to suit project-specific loadings from pedestrian up to occasional HGV traffic.
- Sudspave® benefits from an integrated approach to the structural and hydraulic design of the overall pavement structure leading to reduced construction depths and installation times.
- Sudspave® is manufactured from a unique combination of LDPE / HDPE material providing inherent flexibility to accommodate a wide range of climatic conditions and long term freeze thaw durability.
- Sudspave® is supplied in pre-connected 1m2 panels to facilitate ease of installation and rapid project completion. Pinning of the system is not generally required.

Applications

- Primary car parks including park & ride facilities
- General vehicular access including domestic driveways
- Overflow/overspill car parks
- Event parking
- Emergency access routes
- Tree root protection
- Pedestrian & cycle paths
- Golf course buggy routes
- Holiday park hardstandings
- Verge reinforcement
- Slope reinforcement
- Swale reinforcement
- Equestrian facilities
- Infiltration trenches
- Taxiways, rural airfields, helipads & tramways
- Laybys

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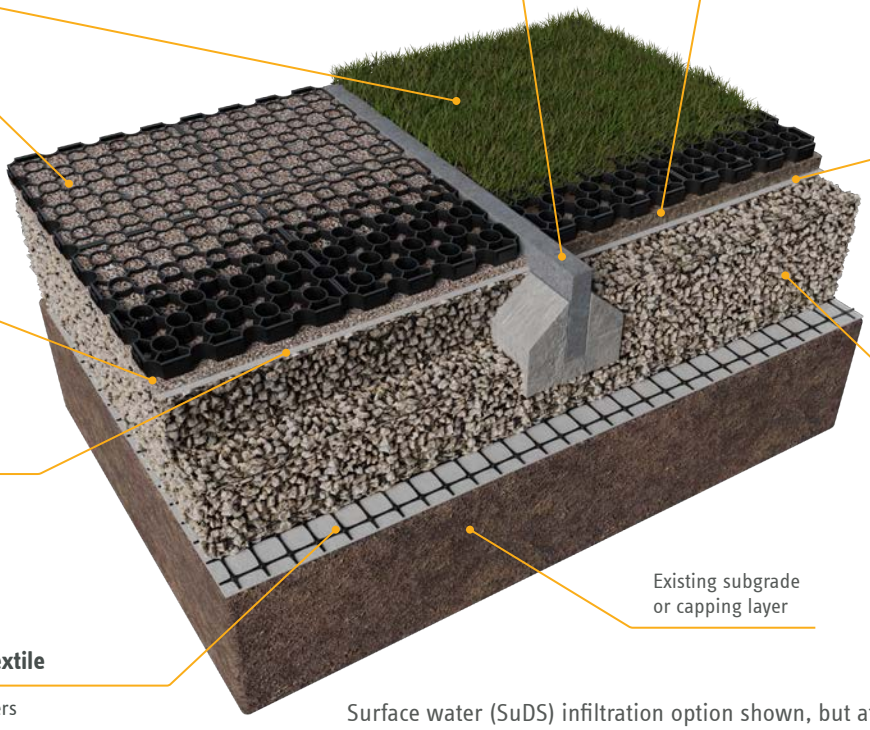

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Case Studies

Truro Park and Ride

Parking bays for 1,800 vehicles built using Sudspave® to allow infiltration and avoid the need for underground storage tanks.

Devour Restaurant, Thongsbridge

Subbase attenuation for the Holme Valley restaurant's car park, coloured especially to match the selected infill gravel and create a natural look.

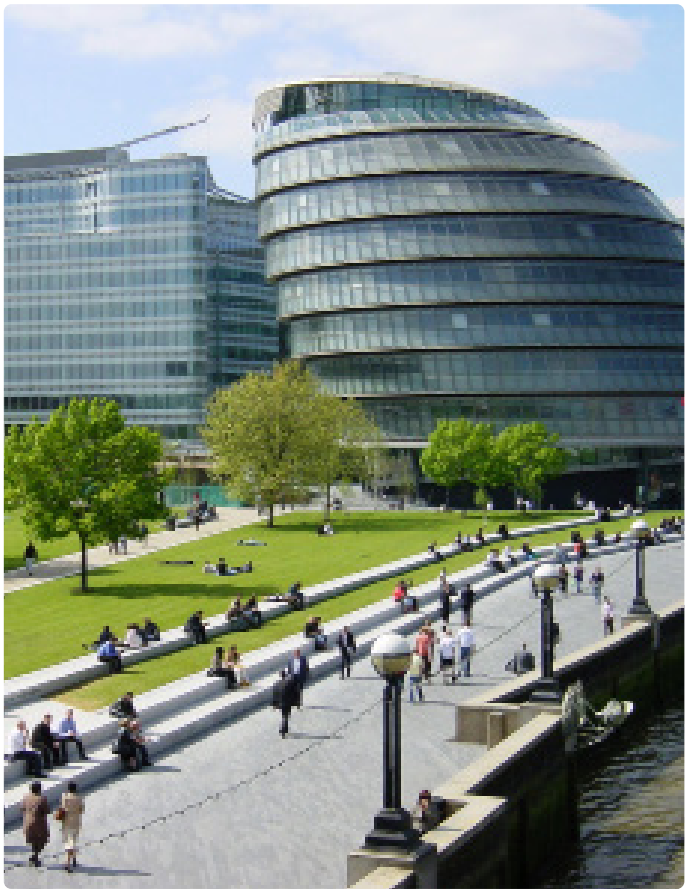
Yorkshire Sculpture Park

4,500m² of gravel filled cellular permeable paving system at the popular Bretton Country Park attraction, replacing grassed overflow areas prone to localised flooding.

www.abg-geosynthetics.com/case-studies

Advanced Turf®

Advanced Turf® is a patented rootzone reinforcement system which brings unrivalled resilience, durability and health to natural grass surfaces.



The Advanced Turf® system comprises a sand: soil rootzone into which thousands of small interlocking polypropylene mesh elements have been pre-blended. When installed it is supplied with a selected turf finish. As the grass roots develop they penetrate through the mesh to form a deep-anchored root system and a very stable rootzone. The result is a free-draining natural grass surface with high load-bearing capabilities and no visible surface structures.

It has many applications including permanent emergency and maintenance vehicle and occasionally-used HGV routes, helipads, sculptured slopes, walkways and occasionally but intensively trafficked multi-use event areas.

Advanced Turf® is supported by over a decade of civil engineering and turfgrass research. There are in excess of 40 published research papers available about the system.*

Advanced Turf® and Netlon®are registered trademarks of Conwed Plastics nv.

*There are more than 44 published research papers for Advanced Turf®. A summary list and specific copies are available on request.

Applications

- Fire service and emergency access routes
- Overspill parking
- Helipads/airfields
- Slope stabilisation < 55°
- SuDS source control
- Multi-purpose sports/events areas
- Pedestrian amenity areas
- Walkways and verges
- Cherry picker and MEWP access routes

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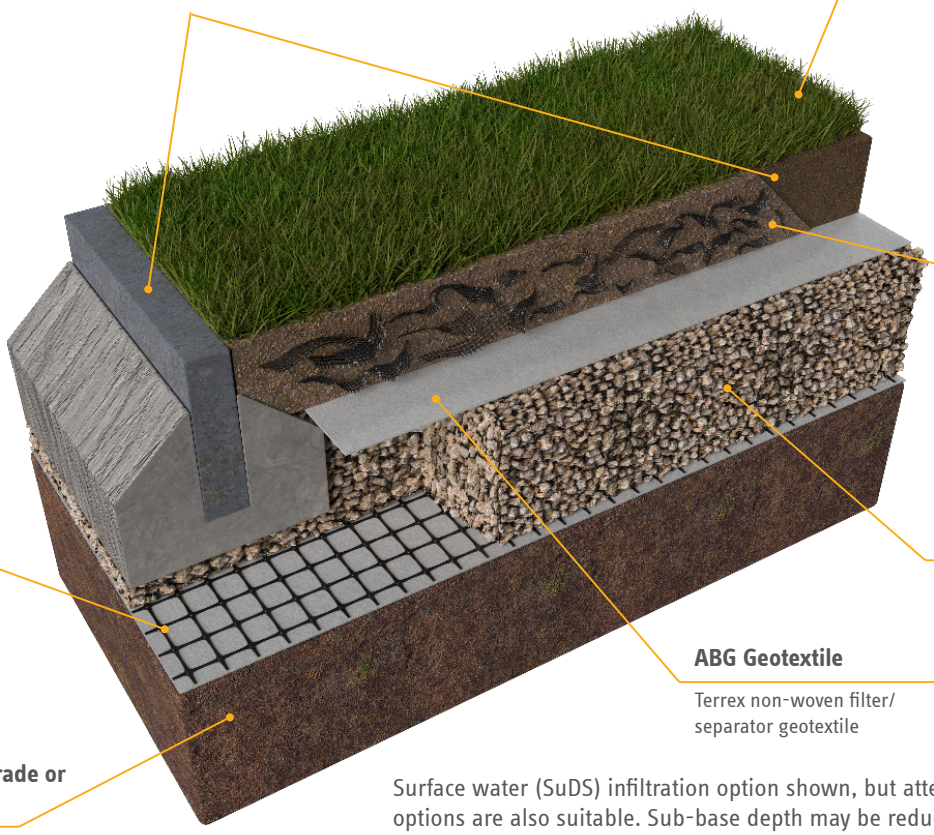

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Case Studies

York University Access Routes

Advanced Turf was used to create grassed landscaped areas that are robust enough to allow maintenance and emergency access.

Edinburgh Quartermile Cherry Picker Routes

Advanced Turf in Cherry-picker routes providing natural reinforced grass maintenance access to the prestigious Foster & Partners designed building

Cheltenham Racecourse Viewing Area

Advanced Turf provides a robust, free-draining grassed surface to the finish-line viewing area at the front of the new £45m Princess Royal Grandstand.

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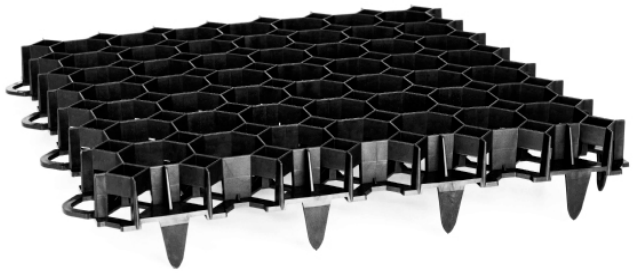
Complementary Products

Sudsgrid 40

Sudsgrid 40 is an economy version of our cellular porous paving systems for applications where costs may be restrictive, but performance of the surface remains an important factor. Sudsgrid is suitable for daily-use vehicle and pedestrian applications with a gravel or grassed finish.



Sudsgrid 40 cellular paving

Abweb and Abweb TRP

Abweb is a three dimensional cellular matrix designed to strengthen weak soils in horizontal applications such as access roads, car parking areas and site compounds. It strengthens and reinforces granular stone layers such as sub-base by confining the aggregate within a three dimensional tensile matrix.

Abweb TRP is geocell mattress which is expanded on site and then filled with a clean no-fines stone. The strength of the system comes from the containment of the stone within the structure, although unlike traditional construction, this is achieved without compacting the stone and the subsequent loss of permeability.

The porous surface ensures water and air can carry essential nutrients to the tree roots.

Abweb TRP can be used in both permanent and temporary pavement constructions. In temporary constructions the system can be removed without damaging the roots once operations on site are complete.

Many pavement finishes are suitable for use over Abweb TRP including porous asphalt and porous block paving. In temporary applications there is usually no requirement for a pavement finish, the fill of the Abweb TRP acting as the surface.

Abweb and TRP

SuDS Blue/Green Roofs

ABG green and blue roofs (constructions that have the ability to attenuate collected water within the roof/podium deck build up) have been used extensively on many leading sustainable developments across the UK. Offered as a full turnkey solution including PI covered design through to installation and on-going maintenance, they provide an integral element of any holistic SuDS solution.

The final design of the system is dependent on the project specific requirements with a number of final surface finishes available including extensive, intensive and biodiverse vegetation along with paved finishes. The drainage/storage capacity is also project specific to meet the requirements of the SuDS design. A blue roof is often more cost effective than a SuDS tank.

ABG Green Roof installation as part of a SuDS scheme

Geogrids & Geotextiles

ABG have a complete range of geotextiles suitable for a wide range of filtration, separation and protection applications in civil engineering projects. The range comprises both woven (Abtex) and non-woven (Terrex) geotextiles, each with a wide range of grades and performance.

The use of geogrids is common practice to both strengthen weak sub-bases or reduce the depth of imported fill required. ABG has a range of sub-base reinforcement products including the high performance Trigrid and Abgrid ranges.

Geogrids & Geotextiles

SuDS Ponds and Basins

Geosynthetic lining systems such as GCL and HDPE are useful and long-lasting methods of forming ponds. Liners can be pre-fabricated to size before delivery or welded on site to the required profile.

The Webwall system offers a solution in many SuDS applications with its primary use being in the construction of steep embankments on SuDS structures such as swales, channels and attenuation basins and ponds. Constructing steeper embankments minimises the land take of the structure freeing up more land for development allowing developers to maximise return whilst meeting statutory SuDS requirements.

Webwall around SuDS attenuation pond

Drainage Geocomposites

ABG drainage geocomposites offer high performance, cost effective alternatives to traditional stone groundwater drainage solutions and have been used extensively in a wide range of civil engineering, environmental and building drainage applications. Drainage geocomposites offer very high flow capacity, many times that of traditional crushed stone (specific data is available). This is achieved through the unique open structure created by the cuspated profile which allows unhindered water flow through the core. The geotextile ensures that adjacent soil does not enter the core void, thereby providing performance for the whole life of the installation.

Drainage Geocomposites

About ABG

ABG is a market leader in the design, development, manufacture and technical support of high performance geosynthetic systems for use in a wide range of applications within the built environment.

Formed in 1988, based in Meltham, in the heart of the Pennines, ABG have developed an excellent reputation for developing quality products and delivering outstanding service. The ability for rapid product development ensures that the most innovative, up to date and cost effective solution can be found for many sustainable construction requirements.

ABG's involvement in sustainable drainage systems goes back over twenty five years with the development of innovative drainage products that directly replace the requirement for stone. We have wide engineering expertise coupled with a complete range of geosynthetic products developed specifically for use in this technically demanding application.

Technical support is provided by our trained and experienced staff, many of whom are Chartered Civil Engineers. This comprehensive support extends to design, design validation, feasibility studies, cost advice and advice on meeting regulatory requirements.

ABG is active in developing and driving knowledge within the industry, including working with both international and local regulatory bodies on developing guidance and best practice in the use of innovative geosynthetics to solve complex engineering issues.

To discuss your project specific requirements contact:

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For the latest information and developments in SuDS visit www.susdrain.org

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