

APPENDIX E

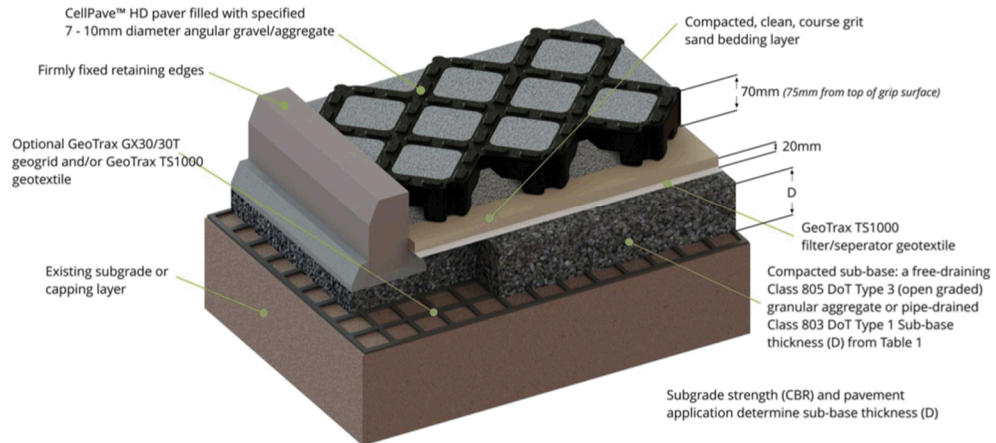
Car park permeable paving - example specification

CELLPAVE™ HD - Truck-Grade, Heavy Duty Paving System

INSTALLATION GUIDE - GRAVEL SURFACES

Design, installation and maintenance guidance for gravel surfaces

CellPave™ HD cellular paving is suitable for a wide range of trafficked applications and landscaped areas where a confined, free-draining gravel surface is required and where high vehicle loads are expected. Typical applications include: coach and truck parks, emergency access and maintenance routes.



TECHNICAL SPECIFICATION

Paving Unit Size	600mm x 400 mm x 75mm
Coverage Rate	4.17 pavers per m ²
Weight	8kg per paver (33.36kg/m ²)
Wall Thickness	35mm
Internal Cell Dimensions	104mm x 104mm

Colour	Dark Grey
Bedding Layer Material	Clean, coarse grit sand
Bedding Layer Thickness	20mm
Sub-Base Reinforcement (optional)	GeoTrax GX/30/30T
Lower Filter/Seperator Geotextile (optional)	GeoTrax TS1000

Installation Instructions

The following generic guidance must be read in conjunction with the specific project specification within the contract documents and the design notes below.

1. Install the optional geogrid, geotextile and/or geomembrane onto the prepared subgrade formation.
2. Install the specified sub-base layer and optional drainage.
3. Install any edge restraints which may be specified. Timber, plastic or concrete kerbing are all suitable.
4. Install the filter/seperator geotextile on top of the sub-base layer.
5. Install the specified sand bedding layer to a uniform thickness.
6. Ensure an accurate right-angled CellPave™ HD laying pattern by setting-out the site using string-lines. Check the lines regularly for accuracy. Start installing the CellPave™ HD pavers. Wherever possible start laying from a right angled corner and progress across the site in rows. The pavers can be installed in a width or lengthwise orientation and cross-bonded if required or appropriate to fit the site. When installing the pavers ensure that the male/female connectors are fully located together. Use protective gloves to avoid abrasions.
7. CellPave™ HD pavers can be cut to fit around obstructions & curves using a hand or power saw. Wherever possible avoid using small cut-pieces less than one-third original size.
8. When installed, fill the paver cells loosely to the finished level (top of cells) with the specified angular gravel/aggregate. Remove excess gravel from the surface of the pavers and do not overfill the cells. A single pass with a light vibrating plate machine or roller may be used to firmly bed the pavers and settle the gravel, but do not compact the gravel. It is preferable that the gravel is left just below the top of the cells to reduce its abrasion by traffic. The surface may be trafficked by slow moving plant during the cell-filling process, but care must be taken not to displace the open-celled grids with heavy-treaded or tracked machinery, nor compact the gravel during this operation.
9. A routine management and maintenance programme to keep the surface in good condition and free of debris and weed growth, will help to sustain the porosity, quality and longevity of the system.

Data Sheets, Installation & Design Guidances and Case Studies can be downloaded from www.groundtrax.com/downloads

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Design Notes

Note 1: If the optional geogrid is omitted, the total sub-base layer thickness is typically increased by a minimum of 50%. Selecting an alternative geogrid will require a redesign of the sub-base thickness.

Note 2: Use of GeoTrax GX30/30T geogrid. If construction traffic axle loads will be greater than 60kN (approximately 6 tonnes), minimum sub-base thickness over the geogrid shall be 150mm. Maximum sub-base particle size should match minimum sub-base thickness but must not exceed 75mm diameter. For sub-base thicknesses of around 100mm, a minimum 37.5mm particle size should be adopted to allow effective installation of the geogrid.

Note 3: Sub-base attenuation utilising a geomembrane and optional geotextile protection, is typically necessary to create a water storage facility and/or a groundwater protection function.

Note 4: A permeable open-graded (reduced-fines) Sustainable Drainage System (SuDS) sub-base layer such as Dot Type 1x, Type 3 or Type 4/40, is preferred. However, where a conventional DoT Type 1 sub-base is to be installed, it is essential that a drainage system is incorporated to assist in the mitigation of issues associated with saturation. This drainage system would typically comprise of a network of perforated pipes or drainage geocomposite.

Note 5: CBR% = California Bearing Ratio: an indicative measurement of subgrade soil strength. Specialist advice should be sought from a suitably qualified person for high load or critical applications.

Note 6: The SuDS permeable sub-base must be overlaid with a GeoTrax TS1000 geotextile to provide separation, enhanced water treatment function and prevent migration of the sand bedding layer. The sand bedding must be a clean, coarse-grained sand free from silts & clays: it must not be soft building sand or silver sand.

Note 7: The paver fill material should be good quality, free-draining friable top-soil suitable for grass growth and with no contaminants or oversized debris. Amenity grass seed mixture should contain hard wearing, low fertility and/or drought tolerant species with option of a low percentage of clover content if acceptable.

Note 8: The maximum advised gradient for vehicular trafficked applications is 8% (1:12) 5°.

Note 9: When designed in accordance with the recommendations, CellPave™ HD complies with BS8300:2009 : "Design of buildings and their approaches to meet the needs of disabled people" – Code of Practice (ISBN 9780 580 57419) & Building Regulations Document 'M' Sec. 6.

The following table is for general guidance only. Please contact us for scheme specific advice.

APPLICATION/LOAD	CBR % OF SUBGRADE	SUB-BASE THICKNESS	GEOTEXTILE (A)	GEOGRID (B)
LIGHT DUTY (CARS)	OVER 6 %	150 mm	TS1000	
	4 - 6 %	200 mm	TS1000	
	2 - 4 %	230 mm	TS1000	GX20/20
	1 - 2 %	350 mm	TS1000	GX20/20
	BELOW 1 %	CONTACT US		
MEDIUM DUTY (7.5T)	OVER 6 %	150 mm	TS1000	
	4 - 6 %	200 mm	TS1000	GX20/20
	2 - 4 %	300 mm	TS1000	GX30/30
	1 - 2 %	430 mm	TS1000	GX30/30
	BELOW 1 %	CONTACT US		
HEAVY DUTY (HGV)	OVER 6 %	230 mm	TS1000	GX20/20
	4 - 6 %	310 mm	TS1000	GX30/30
	2 - 4 %	470 mm	TS1000	GX30/30
	1 - 2 %	CONTACT US		
	BELOW 1 %	CONTACT US		



For more information, contact us
or visit the dedicated website:

www.cellpave.com

GROUNDTRAX

Ground Protection and Reinforcement

Telephone: 03456 800008 | Fax: 03456 800208

E-Mail: info@groundtrax.com | Website: www.groundtrax.com

APPENDIX F

Example Acoustic Fence Specification



Noise Barrier - Acoustic Fencing

Tried, Tested, Trusted



Gramm Barrier Systems SoundBlok Range

NATURAL SoundBlok® REFLECTIVE CE

Gramm Barrier Systems NATURAL SoundBlok barrier range has a classic look most suited to rural environments. Gramm have spent a great deal of time developing our Timber Noise Barrier Range to provide high decibel reductions whilst maintain a 30 year maintenance free design life.

Unlike other systems, Gramm do NOT use a tongue and groove system, as timber naturally wants to expand and contract in the varying weather conditions which causes gaps to open along the joints allowing noise to pass through.

Gramm Barrier systems NATURAL SoundBlok timber noise barrier range uses a unique double acoustic board design on structural supports which allow the timber to move whilst maintaining an acoustic seal for the full life span.

Our range of timber barriers can be manufactured to suit the requirements of each individual site, ensuring the barrier system provides the highest level of sound reduction available.

Gramm Barrier systems NATURAL SoundBlok® Reflective barrier are constructed off site under strict quality controls providing the highest level of construction which conforms to all the latest standards required for all sectors. Alternatively, our Timber Reflective range can be installed piece meal on site, to allow for varying ground conditions and obstacles.



NATURAL SoundBlok® Reflective panels are constructed using incised, Tanalith E pressure treated timber which is sourced from an FSC approved supplier.

The panels consist of horizontal structural rails and structural gravel boards. The face side is then clad with vertical acoustic boards and cover boards and surmounted by a weathered calling. All elements are fixed using stainless steel annular ring shanked nails and fixings.

Applications



Road



Rail



Airport



Commercial



Industrial



Utilities



Ports



Defence



Residential



Housing

NATURAL SoundBlok®

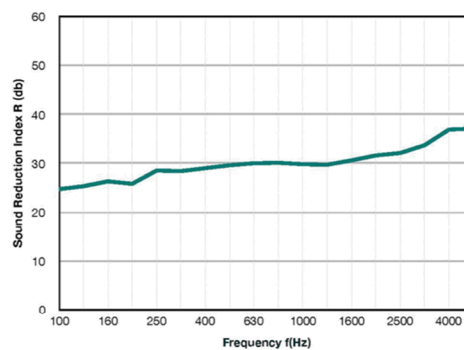
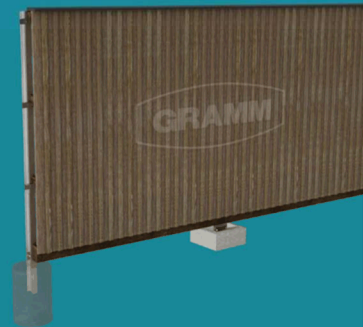
REFLECTIVE

Tried, Tested, Trusted



Technical Information

- Barrier Rating: A0, B3
- Absorption: 0 D_{la}
- Reflection: 30 D_{Lr}
- Height: From 0.5m - 10m (Bespoke Heights available on request)
- Lengths: 1.0m - 3.0m (Bespoke Lengths available on request)
- Material: Timber
- Weight: 26.4kg/m²
- Finish: Tanalith E Treatment in Green or Brown
- Design Life: 30 years



Head Office

Gramm Barrier Systems Ltd
18 Clinton Place
Seaford
East Sussex
BN25 1NP

South East Office

Gramm Barrier Systems Ltd
Mildave
Station Road
Felsted, Essex
CM6 3D

Wales & West Office

Gramm Barrier Systems Ltd
Venture Wales Offices
Merthyr Tydfil Industrial Park
Pentrebach, Merthyr Tydfil
CF48 4DR

North Office

Gramm Barrier Systems Ltd
No 2 Wellington Place
Leeds
West Yorkshire
LS1 4AP

Scotland Office

Gramm Barrier Systems Ltd
20 - 23 Woodside Place
Glasgow
Strathclyde Region
G3 7QL



Call now for a free quote - 08442 259002 / 01323 872243 info@grammbarriers.com grammbarriers.com