

'REDUCED DIG' INSTALLATION GUIDANCE

Gravel & Grassed Surfaces

The 'Reduced Dig' method of installation for BodPave[®]40 is suitable for pedestrian and light vehicle applications where firm ground conditions already exist. It is particularly advantageous where there are budgetary limitations, restrictions on excavation due to SSSI conservation and archeological issues or TPO's (tree preservation orders).

BENEFITS

- Minimal site preparation or variation to existing levels
- Reduced installation time and costs
- Reduced import of materials and disposal of debris
- Rapid establishment and usage of site after installation
- Compliant with current guidance for Sustainable Urban Drainage Systems (SUDS)
- Suitable for grass or gravel surfaces

APPLICATIONS

- Light vehicle parking and access routes
- Pedestrian access
- Cycle routes
- Golf buggy paths and Tow paths
- Caravan and Leisure site access routes
- Wheelchair and disabled access (DDA compliant)
- Light aircraft parking and taxiways

SITE SUITABILITY

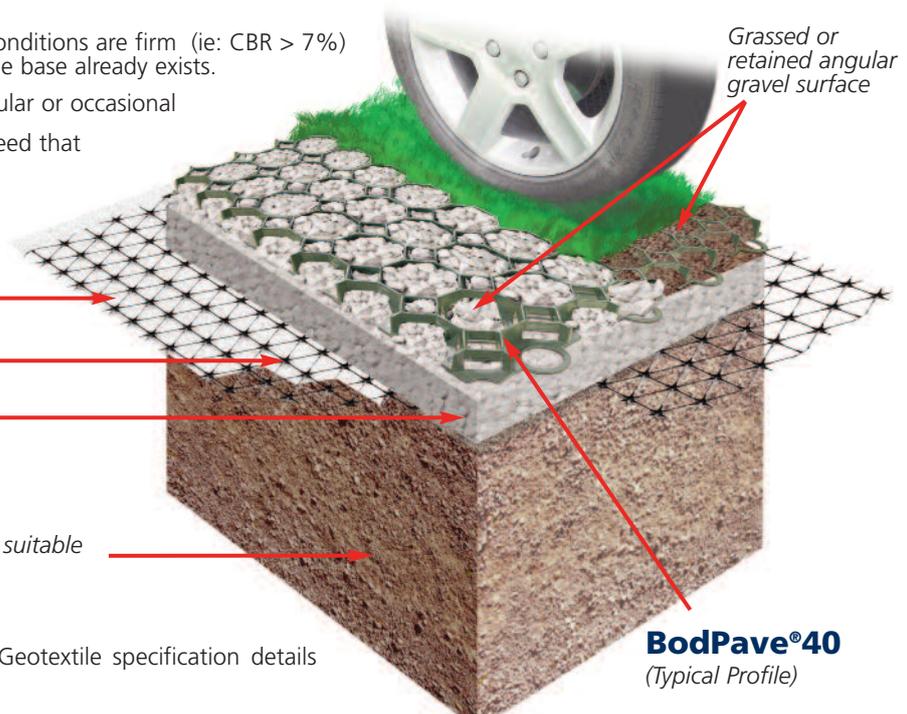
- Where existing ground conditions are firm (ie: CBR > 7%) or where a hardcore/stone base already exists.
- Where trafficking is irregular or occasional
- Where loads will not exceed that of cars and light vans

Optional geotextile layer

TX160 geogrid layer

Gravel / crushed aggregate bedding

Existing soil profile or suitable stone base



BodPave[®]40
(Typical Profile)

BodPave[®]40, Geogrid and Geotextile specification details are available on request.

INSTALLATION METHODS

After confirming that the ground conditions are suitable for this type of 'reduced dig' application, the following method of installation should be followed.

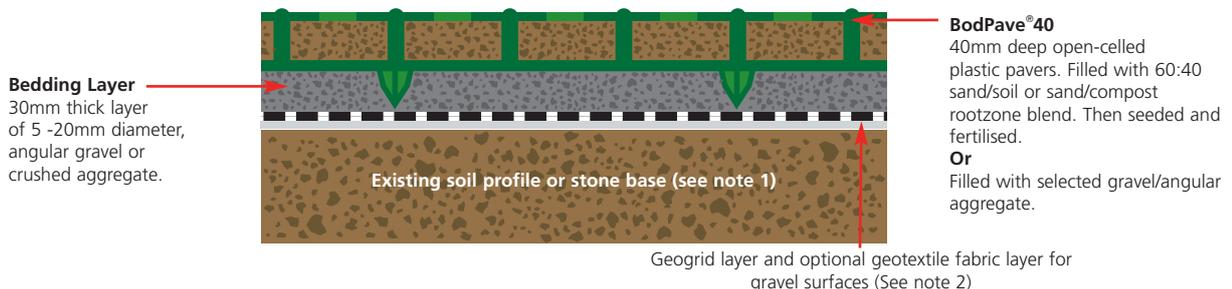
A. FOR GRASSED SURFACES

1. Cut the grass closely to the surface or where necessary remove the turf and topsoil to a depth of <70mm and dispose of all debris. Level the formation layer and lightly consolidate.
2. Install edge retaining boards or kerbs if required.
3. Place a layer of geogrid on the formation layer and ensure that it is flat to the surface by pinning as required. Advice on the specification for a geogrid layer is available from Fiberweb Geosynthetics Ltd.
4. Place a 30mm thick layer of 5-20mm diameter gravel / angular aggregate evenly over the geogrid. The geogrid must not be allowed to become exposed above the gravel / aggregate layer.
5. Place the BodPave[®]40 pavers onto the screeded gravel / aggregate layer. Connect the pavers using the ground spikes and loops, progressing over the area in rows. Use protective gloves to avoid abrasions.
6. Pavers can be cut using a hand or power saw to fit around obstructions and curves. Cut pieces which are less than half the original size should be avoided where possible. Pavers can be firmed in place using a light vibrating whacker plate if required.
7. Fill pavers with the specified propriety rootzone. Finished levels should be 5-7mm below the top of the cells after settlement. Do not overfill the paver cells. A light vibrating plate can be used to consolidate the pavers and to settle the rootzone infill if required.
8. Rootzone must be a free-draining structurally sound sand:compost or sand:soil blend. This is a nominal propriety blend of 60:40 or 70:30 ratio. Self blending is not recommended.
9. Carry out a normal seeding, fertilising and watering programme. A very light top dressing may be applied to just cover the seed and to provide adequate germination conditions. Do not overfill the paver cells. Alternately thin-cut turf can be rolled into the surface if required
10. The surface may be trafficked immediately, but it is preferable to allow the grass to fully establish prior to use.

B. FOR RETAINED GRAVEL SURFACES

After confirming that the ground conditions are suitable for this type of 'reduced dig' application, the following method of installation should be followed.

1. Follow steps 1-6 above. Note: an optional geotextile fabric layer can be placed onto the formation layer prior the geogrid installation (Step 3) to prevent migration & contamination (see note 2). Please contact Fiberweb Geosynthetics Ltd., for further advice.
2. Fill the pavers with the specified gravel or angular aggregate. Preferably a clean, well graded angular material within the range of 5 -14mm diameter. Fully rounded 'pea gravel' is not recommended.
3. Consolidate the surface using a light vibratory whacker plate if required.
4. Refill any localised low areas with gravel and repeat consolidation until satisfied with final compacted finish.
5. The surface can be trafficked immediately.



Note 1: Determination of the requirement for placement of an imported sub-base for the application, and the required thickness of that sub-base material shall be determined by the strength and condition of the existing soils, the extent of allowable excavation and also in consideration of the traffic loadings to be applied. Standard sub-base design thicknesses for access routes may then apply. Certain ground conditions may require placement of a drainage system within the design.

Note 2: Geogrid and geotextile may not be required where the construction is to be placed onto an existing stone base. Further advice from Fiberweb Geosynthetics Ltd., is available on request.

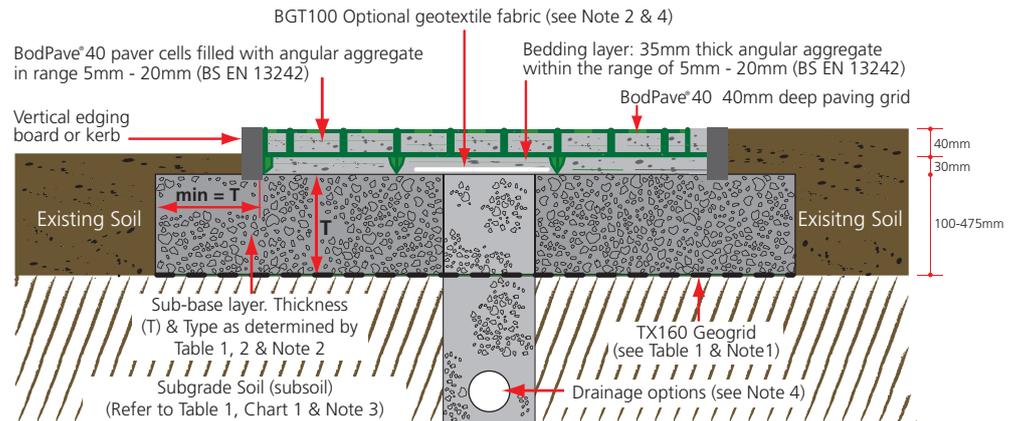
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SPECIFICATION, DESIGN & INSTALLATION GUIDANCE

For Gravel Surfaces



Typical Construction Profile



INSTALLATION METHOD

1. Place paver units with spikes downwards onto the prepared sub-base + bedding layer (see note 2). Edging boards or kerbs are recommended, to aid gravel retention.
2. Connect the pavers using the ground spikes and loops, progressing over the area in rows. Use protective gloves to avoid abrasions.
3. Pavers can be cut using a hand or power saw to fit around obstructions and curves. Cut pieces which are less than half the original size should be avoided where possible.
4. Fill the pavers to the top of the cells with the specified angular decorative aggregate. If required, use a light vibrating plate to consolidate the aggregate into the cells. Top up cells with aggregate as necessary. Fully rounded 'pea gravel' is not recommended.
5. If the area is to be used as horse paddock, it is preferable to cover the area with a 50-100mm thick layer of fine sand/mulch.
6. The surface may be trafficked immediately.

NOTES

- Note 1:** If the TX160 geogrid layer is omitted, then the total sub-base layer thickness (T) must be increased by 50%.
- Note 2:** A'DoT Type 1' sub-base may be used, provided that an adequate drainage system is installed (refer to note 4). Alternatively a porous/open-graded (reduced fines) sub-base layer may be specified, e.g as part of a Sustainable Urban Drainage System (SUDS) application. If a 'reduced fines' sub-base layer is specified, this must be covered with either a geotextile filter membrane and/or a suitable clean gravel blinding layer, to avoid fine particles entering the sub-base layer. Do not use sand for the paver bedding layer.
- Note 3:** Specific advice on ground conditions, CBR% and construction over ground with a CBR less than 1% is available from Boddingtons. CBR% = California Bearing Ratio, a measurement of subgrade soil strength.
- Note 4:** Typical drainage details; 100mm diameter perforated pipe drain laid at minimum gradient 1:100, bedded on gravel in trench backfilled with 'DoT Type A' drainage aggregate, covered or wrapped with a BGT100 geotextile fabric and leading to a suitable outfall or soakaway. Drains placed down centre or one edge of access routes up to 5m wide. Wider areas may require additional drains at 5m - 10m centres. Drainage design to be determined by the specifier based on specific conditions on site. Specific advice on Drainage and Sustainable Urban Drainage Systems (SUDS) is available from Fiberweb Geosynthetics Ltd.
- Note 5:** Maximum advised gradient for traffic applications is 12% (1:8) 7°. Pegging may be required. Specific advice for the use of BodPave[®]40 on slopes can be obtained from Fiberweb Geosynthetics Ltd.
- Note 6:** BodPave[®]40 complies with BS8300:2001 - "Design of buildings and their approaches to meet the needs of disabled people" - Code of Practice. (ISBN 0580384381)

BODPAVE[®]40 PAVING GRIDS

Table 1: Typical Sub-base Thickness (T) Requirements - refer to construction profile overleaf

APPLICATION/LOAD	CBR (%) STRENGTH OF SUBGRADE SOIL <i>(see Chart 1)</i>	(T) DoT SUB-BASE THICKNESS (mm) <i>(see Note 2)</i>	GEOGRID <i>(see Note 1)</i>
Fire truck and occasional HGV access	≥ 6	100	TX160
	= 4 < 6	120	TX160
	= 2 < 4	190	TX160
	= 1 < 2	380	TX160
Light vehicle access and overspill car parking	≥ 6	100	TX160
	= 4 < 6	100	TX160
	= 2 < 4	135	TX160
	= 1 < 2	260	TX160

Table 2: Paving Grid Specification

DESCRIPTION	DATA
Product	BodPave [®] 40
Material	Rigid 100% recycled polyethylene
Colour	Green
Paver dimensions	500mm x 500mm x 40mm
Paver size laid	500mm x 500mm (4 grids per m ²)
Nominal cell size	60mm Octagonal
Cell wall thickness	2.7mm - 3.2mm
Weight	1.2kg/paver - (4.8kg/m ²)
Load bearing capacity	150 tonnes/m ² (Crush resistance)
Central base support	25mm long pegs on underside (4 per paver)
Open cell %	Top 95% / Base 75%
Connection type	Spike and loop edge connection
Chemical resistance	Excellent
UV resistance	High
Toxicity	Non Toxic
Bedding Layer	30mm thick of 5-20mm angular aggregate (BS EN 13242)
Paver fill	To top of pavers using 5-20mm crushed aggregate (BS EN 13242)
Sub-base type	DoT Type 3 or a modified porous sub-base (Table 1 & Note 2). DoT Type 1 with drains
Base reinforcement	TX160 Triaxial Geogrid (Table 1 & Note 1) - Specifications available on request.

Chart 1: Field guidance for estimating sub-grade strengths

Consistency	Indicator			Strength	
	Tactile (feel)	Visual (observation)	Mechanical (test)	CBR	CU
			SPT	%	kN/sqm
Very Soft	Hand sample squeezes through fingers	Man standing will sink >75mm	<2	<1	<25
Soft	Easily moulded by finger pressure	Man walking sinks 50-70mm	2-4	Around 1	Around 25
Medium	Moulded by moderate finger pressure	Man walking sinks 25mm	4-8	1-2	25-40
Firm	Moulded by strong finger pressure	Utility truck ruts 10-25mm	8-15	2-4	40-75
Stiff	Cannot be moulded but can be indented by thumb	Loaded construction vehicle ruts by 25mm	15-30	4-6	75-150

This field guide is provided as an aid to assessing the mechanical stabilisation requirements in commonly encountered site conditions. Fiberweb Geosynthetics Ltd., accepts no responsibility for any loss or damage resulting from the use of this guide.

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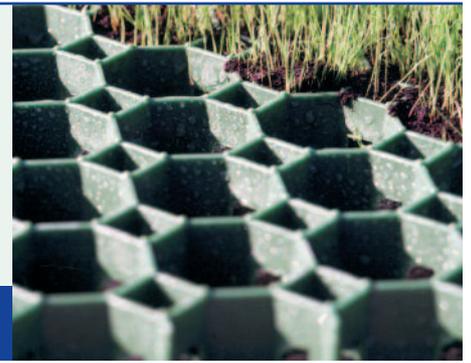
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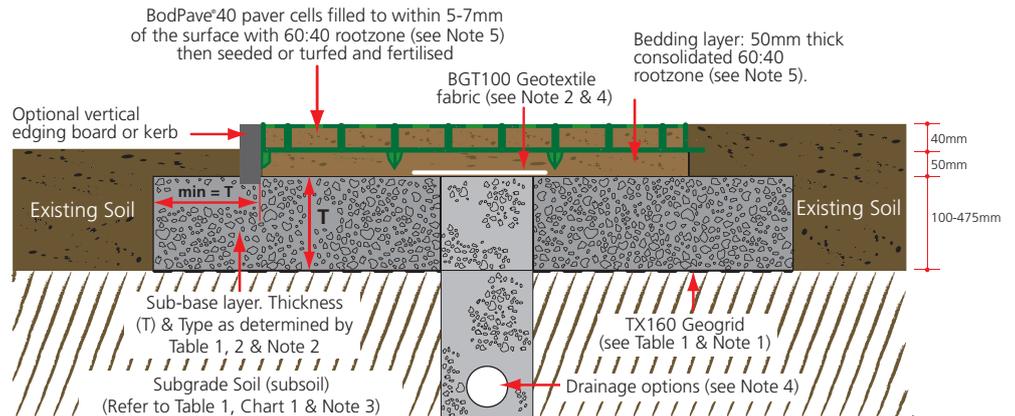
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SPECIFICATION, DESIGN & INSTALLATION GUIDANCE

For Grassed Surfaces



Typical Construction Profile



INSTALLATION METHOD

1. Place paver units with spikes downward onto the prepared well consolidated bedding layer. Edging boards or kerbs can be used where required, according to existing soil conditions.
2. Connect the pavers using the ground spikes and loops, progressing over the area in rows. Use protective gloves to avoid abrasions.
3. Pavers can be cut using a hand or power saw to fit around obstructions and curves. Cut pieces which are less than half the original size should be avoided where possible.
4. Fill pavers with the specified propriety rootzone. Finished levels should be 5-7mm below the top of the cells after settlement. Do not overfill the paver cells. A light vibrating plate can be used to consolidate the pavers and to settle the rootzone infill if required.
5. Rootzone must be a free-draining structurally sound sand:compost or sand:soil blend. This is a nominal propriety blend of 60:40 or 70:30 ratio. Self blending of paver fill and bedding material is not recommended.
6. Carry out a normal seeding, fertilising and watering programme. A very light top dressing may be applied to just cover the seed and to provide adequate germination conditions. Do not overfill the paver cells.
7. The surface may be trafficked immediately, but it is preferable to allow the grass to fully establish prior to use.

NOTES

- Note 1:** If the geogrid layer is omitted, then the total sub-base layer thickness (T) must be increased by 50%.
- Note 2:** A 'DoT Type 1' sub-base may be used, provided that an adequate drainage system is installed (refer to note 4). Alternatively a porous/open-graded (reduced fines) sub-base layer may be specified, e.g as part of a Sustainable Urban Drainage System (SUDS) application. If a 'reduced fines' sub-base layer is specified, this must be covered with either a geotextile filter membrane and/or a suitable clean gravel blinding layer, to avoid fine particles entering the sub-base layer.
- Note 3:** Specific advice on ground conditions, CBR% and construction over ground with a CBR less than 1% is available from Fiberweb Geosynthetics Ltd. CBR% = California Bearing Ratio, a measurement of subgrade soil strength.
- Note 4:** Typical drainage details; 100mm diameter perforated pipe drain laid at minimum gradient 1:100, bedded on gravel in trench backfilled with 'DoT Type A' drainage aggregate, covered or wrapped with BGT100 geotextile fabric and leading to a suitable outfall or soakaway. Drains placed down centre or one edge of access routes up to 5m wide. Wider areas may require additional drains at 5m - 10m centres. Drainage design to be determined by the specifier based on specific conditions on site. Specific advice on Drainage and Sustainable Urban Drainage Systems (SUDS) is available from Fiberweb Geosynthetics Ltd.
- Note 5:** Rootzone bedding and paver fill must be a free-draining, structurally sound propriety blend of sand:soil or sand:compost such as that used in sports/golf construction. This is normally identified as a 60:40 or 70:30 ratio blend and in-situ self-blending is NOT recommended.
- Note 6:** Maximum advised gradient for traffic applications is 12% (1:8) 7°. Pegging may be required. Specific advice for the use of BodPave[®]40 on slopes can be obtained from Fiberweb Geosynthetics Ltd.
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Cell wall thickness	2.7mm - 3.2mm
Weight	1.2kg/paver - (4.80kg/m ²)
Load bearing capacity	150 tonnes/m ² (Crush resistance)
Central base support	25mm long pegs on underside (4 per paver)
Open cell %	Top 95% / Base 75%
Connection type	Spike and loop edge connection
Chemical resistance	Excellent
UV resistance	High
Toxicity	Non Toxic
Bedding Layer	60:40 rootzone (see Note 5) : 50-70mm thick
Paver fill (seed bed)	60:40 rootzone (see Note 5) : 33-35mm thick
Grass seed or turf	35g/m ² amenity blend low maintenance seed or turf as required.
Fertiliser	Pre-seed fertiliser followed up with appropriate seasonal fertiliser.
Sub-base type	DoT Type 3 or a modified porous sub-base (Table 1 & Note 2). DoT Type 1 with drains
Sub-base reinforcement	TX160 Triaxial Geogrid (Table 1 & Note 1) - Specifications available on request.

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Firm	Moulded by strong finger pressure	Utility truck ruts 10-25mm	8-15	2-4	40-75
Stiff	Cannot be moulded but can be indented by thumb	Loaded construction vehicle ruts by 25mm	15-30	4-6	75-150

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