



Permeable by design

Paving the way for SuDS v1.3



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What is SuDS?

From the Ancient Romans' innovative drainage systems to the extensive network of sewers, pumping stations and treatment facilities developed during the Industrial Revolution, managing rainfall and surface water has been a challenge for centuries.

Across the UK and Ireland, climate change and rapid urban growth are now placing unprecedented pressure on ageing drainage infrastructure. Increased rainfall, more frequent flooding events and tighter environmental regulation mean that effective surface water management is no longer a 'nice to have' - it is essential.

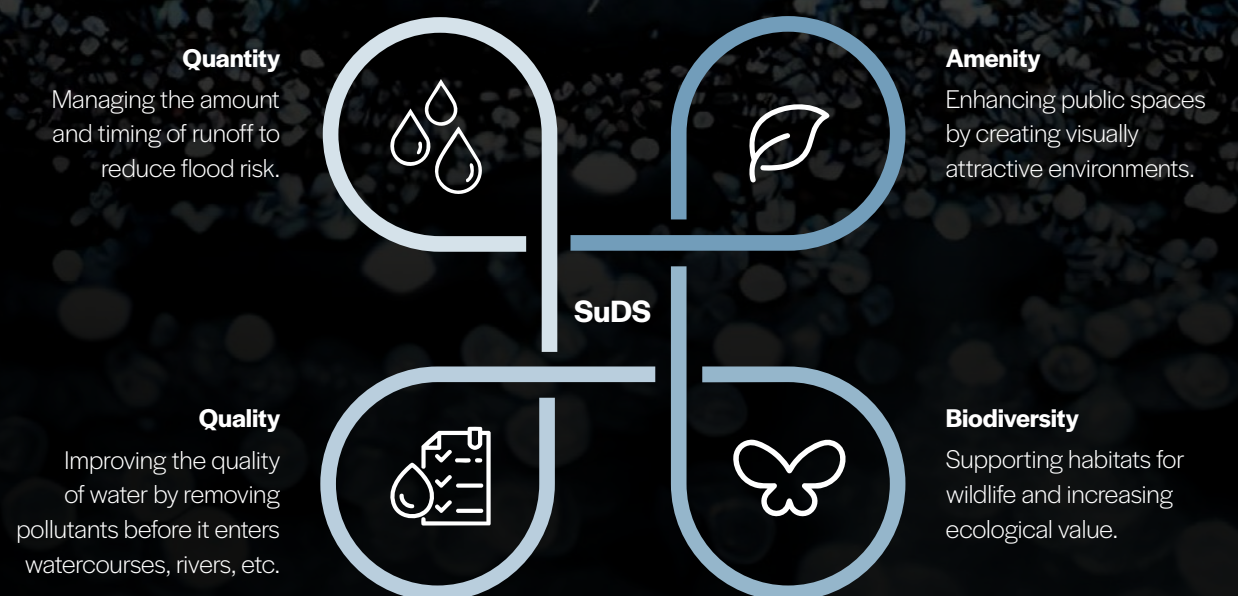
Sustainable Drainage Systems (SuDS) sit at the heart of modern, responsible development. By mimicking natural drainage processes, SuDS manage surface water where it falls, reducing flood risk, improving water quality and helping to create healthier, more resilient places for people to live and work.

Permeable paving plays a critical role within SuDS by allowing surface water to pass through the paving joints into an underlying permeable sub-base, where it can be stored, filtered and managed in line with site requirements.

Systems such as Tobermore's Hydropave permeable paving are designed to deliver this performance while also meeting the aesthetic and durability demands of commercial, residential and public realm environments.

Supported by technical expertise, guidance and design tools, Tobermore helps simplify the specification and delivery of permeable paving solutions - enabling SuDS to be integrated seamlessly into well-designed, functional spaces.

The Four Pillars of SuDS



Permeable paving supports all four pillars of SuDS, helping to manage surface water while contributing to high-quality, functional landscapes.

The challenge

Commercial developments face increasing pressure from urbanisation, flooding, pollution and planning constraints - challenges that intensify as towns and cities continue to expand.

The three big challenges of surface water management are:



Climate change

Rainfall events are heavier and more common, increasing the volume of water. The UK & Ireland's traditional piped drainage systems simply can't cope.

*The winter half-year (October-March) for 2015-2024 was about 16 % wetter than the 1961-1990 average, reflecting an upward trend in heavy rainfall totals linked to climate change.**



Urbanisation

By developing more land and increasing the size of our towns and cities, the number of impermeable surfaces rises. This results in more runoff and faster water movement, overwhelming traditional drainage systems.

*1 in 6 homes are at risk of flooding in the UK. Statistically, UK homes are more at risk of being flooded than burgled. ***



Pollution risk

Surface runoff from roads and paved surfaces picks up pollutants like oil, heavy metals and silt, all of which enter the watercourses unless managed properly.

*In England, 18% (nearly 1 in 5) of watercourses fail to meet environmental legal requirements due to contaminants washed off from impermeable roads.****

* State of the UK Climate Report
** 1 in 100 UK homes burgled each year (2023 ONS Crime Survey)
*** Chartered Institute of Environmental Health

Regulations are catching up

SuDS (sustainable drainage systems) is no longer a 'nice to have', it's a planning requirement. In England, Schedule 3 of the Flood & Water Management Act is expected to be implemented at some point in the future, mandating SuDS on new developments, and has already been adopted in Wales. Similar legislation mandates SuDS in Scotland.

In Northern Ireland, developers are also being asked to deliver better sustainable drainage solutions to align with the Department for Infrastructure's water expectations. In the Republic of Ireland, most councils apply SuDS principles established by the Greater Dublin Strategic Drainage Study (GDSDS).

Local authorities increasingly want developers to prove how they'll control runoff and manage water quality. Groups like the NHBC (National House-Builder Council) and other planning bodies are tightening their design standards.

For many engineers and developers, this means navigating extra cost and design complexity just to tick the boxes. That's where smart solutions like permeable paving come in.





The solution

A practical approach to SuDS-compliant design

As regulatory requirements tighten and surface water challenges intensify, specifiers and developers need drainage solutions that are effective, compliant and straightforward to deliver. Permeable paving offers a proven way to manage surface water at ground level, reducing reliance on traditional drainage infrastructure while supporting wider SuDS objectives.

Tobermore's Hydropave permeable paving has been developed specifically to support this approach, providing a robust, engineered solution that integrates seamlessly into commercial, residential and public realm schemes.

Hydropave manages surface water through the use of open-graded aggregates within the paving joints and sub-base, allowing rainfall to infiltrate, be temporarily stored, and filtered before being released or discharged in line with site requirements. This helps to control runoff, reduce flood risk and improve water quality, while maintaining a durable and visually appealing paved surface.

With over 80 years' experience in concrete hard landscaping and more than two decades supplying permeable paving solutions across the UK and Ireland, Tobermore combines product performance with technical expertise. Design guidance, detailing support and best-practice advice help architects, engineers and contractors specify and install permeable paving with confidence and integrate it effectively within wider SuDS strategies.

Hydropave: Supporting the four pillars of SuDS



Quantity
Hydropave manages rainfall directly where it falls through infiltration.



Quality
Hydropave's permeable sub-base filters and removes pollutants from the surface runoff.



Amenity
Hydropave products create visually appealing spaces with their striking aesthetics.



Biodiversity
Hydropave products fit seamlessly into wider SuDS projects including swales and raingardens that support biodiversity.

The commercial benefits of permeable paving

Environmental & planning benefits



Meets SuDS requirements.



Reduces flood risk & pollution.



Enhances biodiversity and aesthetic appeal of outdoor spaces.

Functional advantages



When designed and installed correctly, permeable paving can be engineered to meet loading categories A–F.



This includes suitability for high load-bearing applications such as HGV yards, car parks, retail parks and distribution centres.



Infiltration rates that meet each project's requirements.

Cost savings



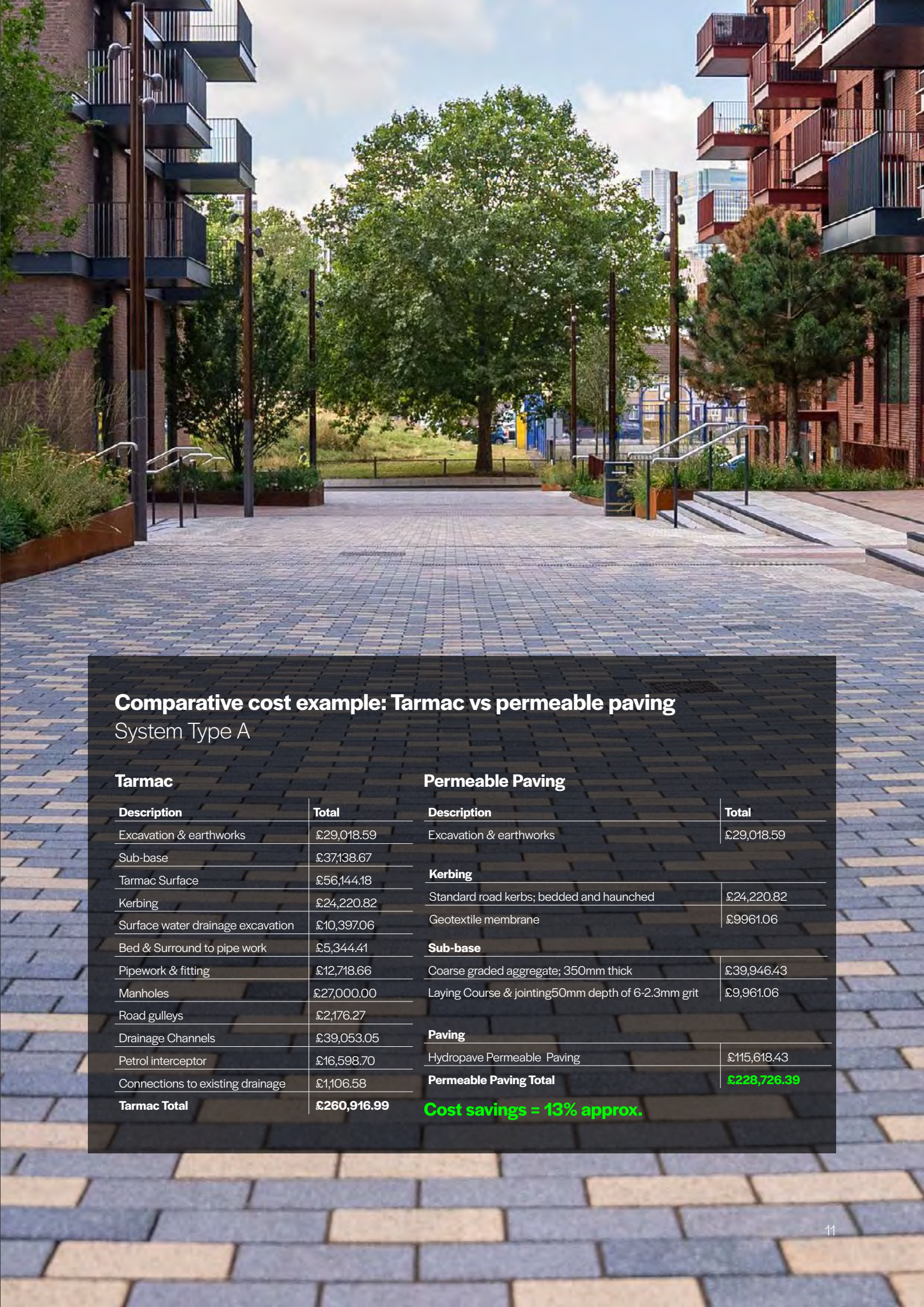
Potential for lower long-term maintenance costs compared to traditional drainage systems.



Reduced need for traditional underground drainage systems.



Can offer a more cost-effective solution than tarmac by reducing the need for separate drainage infrastructure.



Comparative cost example: Tarmac vs permeable paving System Type A

Tarmac

Description	Total
Excavation & earthworks	£29,018.59
Sub-base	£37,138.67
Tarmac Surface	£56,144.18
Kerbing	£24,220.82
Surface water drainage excavation	£10,397.06
Bed & Surround to pipe work	£5,344.41
Pipework & fitting	£12,718.66
Manholes	£27,000.00
Road gulleys	£2,176.27
Drainage Channels	£39,053.05
Petrol interceptor	£16,598.70
Connections to existing drainage	£1,106.58
Tarmac Total	£260,916.99

Permeable Paving

Description	Total
Excavation & earthworks	£29,018.59
Kerbing	
Standard road kerbs; bedded and haunched	£24,220.82
Geotextile membrane	£9961.06
Sub-base	
Coarse graded aggregate; 350mm thick	£39,946.43
Laying Course & jointing 50mm depth of 6-2.3mm grit	£9,961.06
Paving	
Hydropave Permeable Paving	£115,618.43
Permeable Paving Total	£228,726.39

Cost savings = 13% approx.

Adoption of permeable paving

Local authorities across the UK and Ireland are increasingly recognising the environmental, planning and long-term cost benefits of incorporating permeable paving into SuDS strategies.

As awareness of sustainable drainage grows, permeable paving is becoming a more familiar and accepted component of surface water management across residential, commercial and public realm developments.

The number of local authorities adopting permeable paving has increased steadily in recent years. However, a degree of caution still exists in some areas, often linked to assumptions around long-term maintenance requirements or concerns about structural performance over time.

In practice, experience from completed schemes shows that these concerns are often overstated. When correctly

designed, installed and maintained, permeable paving performs comparably to traditional impermeable paving in terms of structural integrity, while delivering additional drainage and water quality benefits.

Maintenance requirements for permeable paving are also misunderstood. In many cases, routine maintenance is similar to that of conventional paved surfaces and does not require specialist intervention, making permeable paving a practical and reliable option for local authority use.

Taken together, the growing number of successfully delivered schemes and the accumulation of long-term performance data continue to build confidence in permeable paving as a robust, reliable and long-term SuDS solution.



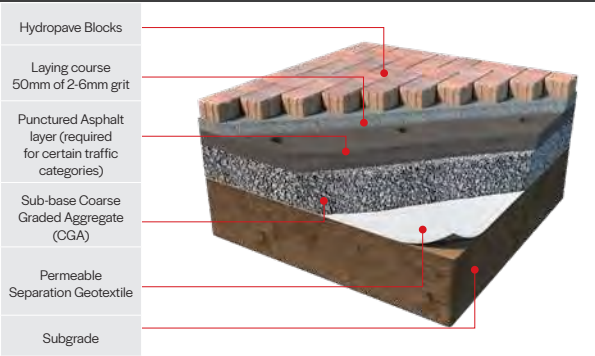
How permeable paving works

There are three system types which can be specified

System types

Full infiltration permeable paving system (Type A)

Best suited to sites with permeable subgrades



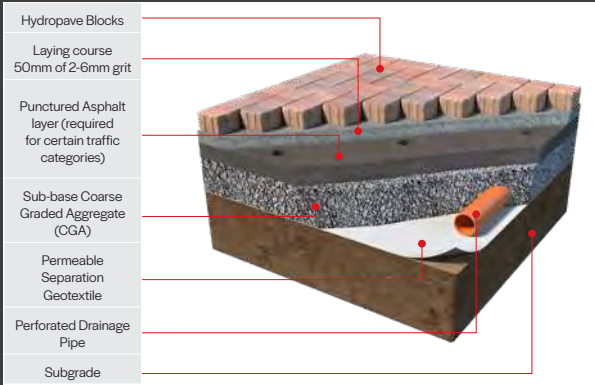
This is specified when the subgrade has been tested and shows sufficient permeability to allow water to drain through at the required rate.

The water falls on the surface and drains through the joints between the blocks. From there, it filters through the laying course of grit and into the coarse graded aggregate sub-base. Finally, it drains through a permeable geotextile and infiltrates directly into the ground.

Water is not sent to drains so there is no need for drainage pipes or gullies, making Type A the simplest and, typically, most economical permeable paving option.

Partial infiltration permeable paving system (Type B)

Used where partial infiltration is achievable



This is specified when the ground is permeable enough to receive some water but not to a level sufficient for Type A to be used.

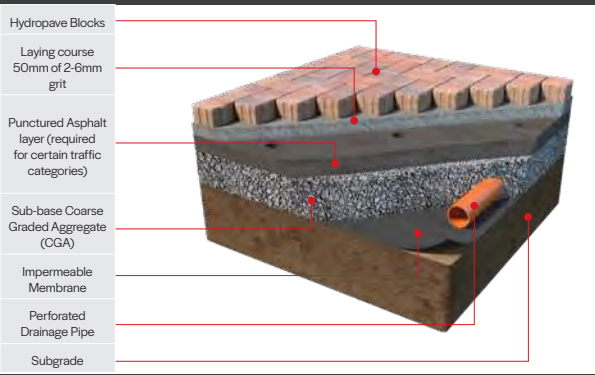
This system can be used in situations where the subgrade may be capable of absorbing some water without losing its stability. Outlet pipes are used in the sub-base to take excess water away to be collected and eventually discharged through a different part of the drainage system.

The rate of discharge will be controlled in line with regulatory guidance to meet local water management requirements.

Tanked (no infiltration) permeable paving system (Type C)

Specified where infiltration is not possible

This is specified when the subgrade has been tested and shown not to have sufficient permeability, or where introducing water into the subgrade would make it become unstable. It can also be utilised where the water is required to be redirected for re-use or irrigation.



An impermeable membrane lines the sub-base and is wrapped up the sides to enable the complete capture of the water and effectively form a storage tank. Outlet pipes are constructed through the impermeable membrane at suitable locations to direct the water to secondary drainage systems such as watercourses, ponds, or treatment systems. The diameter of the outflow pipe is site specific, so should be determined by the project engineer according to the requirements.

System C is also in areas with high water tables, preventing them from entering the sub-base where they would compromise its ability to drain away surface water.

Long-term infiltration performance

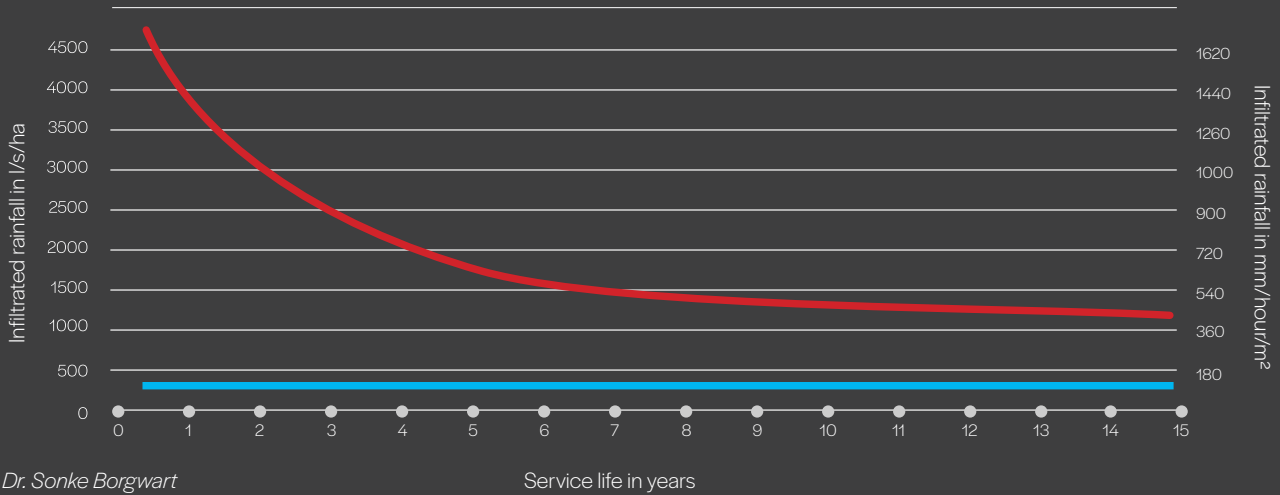
For decades, experience in multiple countries has proven the successful performance of permeable block paving surfaces.

Various studies carried out around the world have demonstrated that the infiltration rate of surfaces will decrease due to the build-up of detritus in the jointing material. However, as demonstrated in the graph below, infiltration rates then stabilise.

To allow for the effect of clogging over a 20-year design life without maintenance, research recommends that the design infiltration rate through the surface should be 10% of the initial rate.

Studies have shown that even after allowing for clogging, the long-term infiltration performance of permeable pavements (shown in red on the graph) substantially exceeds UK & Ireland hydrological requirements. For example, an extreme storm of 100mm/hour is shown in blue on the graph.

The graph below illustrates how infiltration rates reduce over time before stabilising at a level that continues to exceed UK & Ireland drainage standards.





The alternatives: Which one suits my project?

Category	Permeable block paving	Traditional drainage system
SuDS compliance	Fully compliant - SuDS hierarchy, attenuation & infiltration capable	Requires separate SuDS infrastructure (e.g. tanks, swales)
Permeability	Very high (up to 10,000 mm/hr)	Impermeable - surface runoff managed by gullies (~50mm/hr)
Clogging risk	Low - joints cleanable and replaceable	Not applicable - impermeable system
Maintenance	Low - vacuum sweep every 1-2 years; joints topped up every 5-10	High - jetting, CCTV, gully clearance
Durability/Design life	25-40 years with basic maintenance	20-30 years; dependent on pipe condition & subsidence
Oil & chemical resistance	Excellent - blocks inert; joint fill replaceable	Poor - asphalt and sub-base degrade with fuel/oil
Repairability	Modular blocks - easy localised replacement	Disruptive - excavation needed
Installation speed	Moderate - ~150 m²/day/team	Slow - trenching, gulleys, surfacing in phases (~80-100 m²/day)
Aesthetics	Functional with design flexibility; textures & colours available	Basic - functional only
Lifecycle cost	Low - maintainable, durable, long replacement cycles	High - pipework repair, reactive maintenance, cleaning
Use case suitability	Roads, car parks, shared surfaces, SuDS schemes, tree pits	All surfaces, but requires additional SuDS & attenuation

Category	Permeable resin-bound	Permeable asphalt
SuDS compliance	Compliant if underlain by permeable base and maintained properly	Compliant if well designed; may need supporting attenuation
Permeability	High (1,000-3,000 mm/hr); can clog if not maintained	High (500-2,000 mm/hr) initially; reduces over time
Clogging risk	Moderate - once clogged, resin hard to restore	Medium to high - fine pores prone to silting
Maintenance	Regular sweeping & pressure washing; algae and fine clogging difficult to remove	Requires jetting; surface cleaning to prevent clogging
Durability/Design life	15-20 years for pedestrian/light use; shorter under traffic stress	15-25 years; shorter if oil/fuel exposure or poor sub-base
Oil & chemical resistance	Good - polyurethane-based resin resists oil better than asphalt	Moderate - oil can soften asphalt binder over time
Repairability	Poor - cracked resin cannot be invisibly repaired	Difficult - patch repairs visible and prone to weakness
Installation speed	Moderate - ~150 m²/day for hand-laid areas	Fast - up to 200 m²/day for machine-laid applications
Aesthetics	Seamless, decorative, wide colour choice	Uniform, practical
Lifecycle cost	Moderate to high - less maintainable long-term	Moderate - shorter life; more maintenance as permeability drops
Use case suitability	Paths, plazas, courtyards - aesthetic priority, light traffic	Roads, paths, car parks - when quick install is needed



Why Tobermore?

From project planning to on-site completion, we are on hand to support your permeable paving journey. Our permeable design services and support are complemented by:

Design services

We offer a wide range of design tools and services, so your project planning is smooth and straightforward.

Clear, responsive pricing

Transparent, accurate pricing supported by a dedicated team who understand permeable paving systems and programme constraints.

Unrivalled stock availability & on-time delivery

There is no need for costly delays on-site. We get the products to you when you need them, and we're proud that 99.4% of our deliveries arrive on time and in full.

Support beyond specification

Ongoing technical and practical support before, during and after installation, not just at the point of sale.

After-sales

Have questions about your project after it's completed? Whether it's one or ten years down the line, please get in touch.





Permeable paving solutions for every SuDS application

From private driveways and shared surfaces to large-scale residential, commercial and public realm developments, permeable paving must perform across a wide range of design, loading and drainage requirements.

Tobermore's Hydropave permeable paving range has been developed to support SuDS-compliant design across diverse applications, offering solutions that balance drainage performance, durability and visual quality. With options suitable for different system types, site conditions and aesthetic requirements, the range provides flexibility to meet the demands of each individual project.

Hydropave Braemar

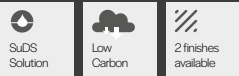
Hydropave Braemar is a premium permeable block designed to deliver SuDS performance alongside a refined, contemporary aesthetic.

Its rich, granite aggregate surface finish and subtle tonal variation give the block depth and clarity, making it well suited to high-quality residential and public realm schemes.

Suitable for:



Refer to relevant guidance in BS 7533



300 x 200

LOADING CATEGORIES

A, B, C* & D*

200 x 100

LOADING CATEGORIES

ALL A-F*

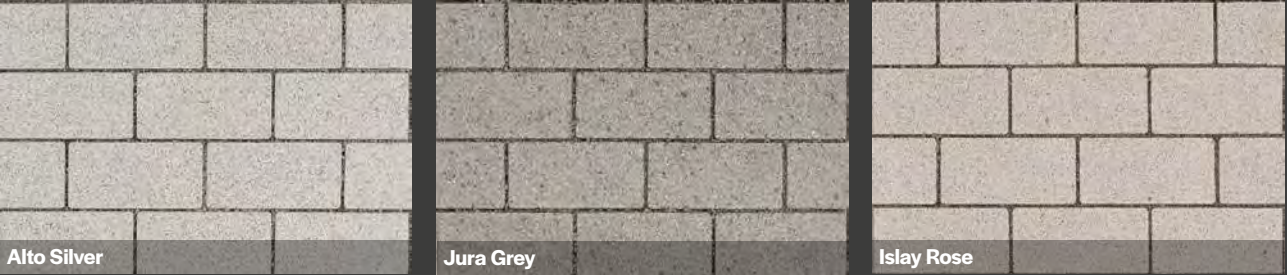
All dimensions include the nibs

*C- F must be laid herringbone

Letters indicate the maximum loading category for each unit. Please refer to the loading categories table on page 73 for more information.

Stock

size (mm)	finish	colours available	m² per pack	m² per slice	no. per m²	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
200 x 100 x 80	Ground/ Ground Textured	Alto Silver, Jura Grey, Islay Rose	9.6	1.6	50	480	1739	1729
300 x 200 x 80	Ground/ Ground Textured	Alto Silver, Jura Grey, Islay Rose	9.6	2.4	16.66	160	1756	1746



Hydropave Artro

Hydropave Artro is a refined permeable block characterised by slender proportions and a subtle surface finish, creating timeless European character suited to both traditional and contemporary settings. Its elongated format and understated detailing bring visual rhythm and definition to streetscapes, courtyards and pedestrianised spaces.

Designed to deliver contemporary SuDS performance without compromising on appearance, Hydropave Artro supports high-quality public realm and residential schemes where material detail and proportion are key design considerations.

220 x 55

All dimensions include the nibs

LOADING CATEGORIES
A, B, C* & D*

*C- F must be laid herringbone

Letters indicate the maximum loading category for each unit. Please refer to the loading categories table on page 73 for more information.

Stock

size (mm)	colours available	m² per pack	m² per slice	no. per m²	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
220 x 55 x 80	Bracken, Carbon, Slate, Steel	6.776	0.847	82.64	560	1266	1266



Suitable for:



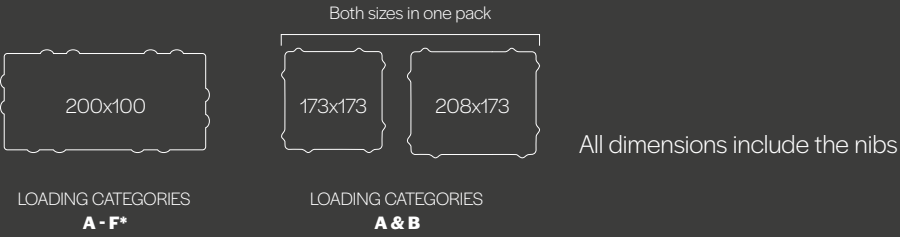
Refer to relevant guidance in BS 7533



Hydropave Fusion

Hydropave Fusion is a contemporary permeable block designed to combine SuDS performance with a distinctive exposed aggregate finish. Its textured surface and carefully selected aggregates give the block visual depth and character, making it well suited to commercial developments and high traffic public realm schemes.

Available in multiple formats, including mixed size packs, Hydropave Fusion allows designers to introduce patterns and visual interest while maintaining consistent drainage performance. The result is a robust, visually confident permeable paving solution suited to modern, design led environments.



*C- F must be laid herringbone

Letters indicate the maximum loading category for each unit. Please refer to the loading categories table on page 73 for more information.

Stock

size (mm)	colours available	m² per pack	m² per slice	no. per m²	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
200 x 100 x 80	Graphite, Mid Grey, Oat, Silver	9.6	1.6	50	480	1739	1729
208 x 173 x 60 173 x 173 x 60	Graphite, Oat, Silver	12.87	0.99	30	195 195	1790	1790
Both sizes in one pack							



Suitable for:



Refer to relevant guidance in BS 7533



Hydropave Tegula

Hydropave Tegula is a classic permeable block designed to deliver proven SuDS performance. Its tumbled finish creates a timeless, sustainable aesthetic, making it well suited to traditional settings and contemporary spaces alike.

Available in two sizes (Duo), Hydropave Tegula offers added design flexibility across a wide range of residential and public realm applications.

Suitable for:



Pedestrian Use



Light Traffic



Commercial Traffic

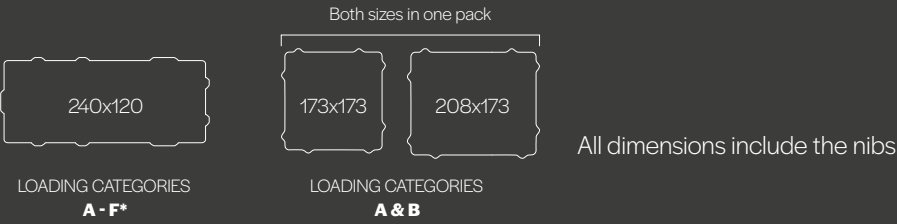
Refer to relevant guidance in BS 7533



SuDS Solution



Low Carbon

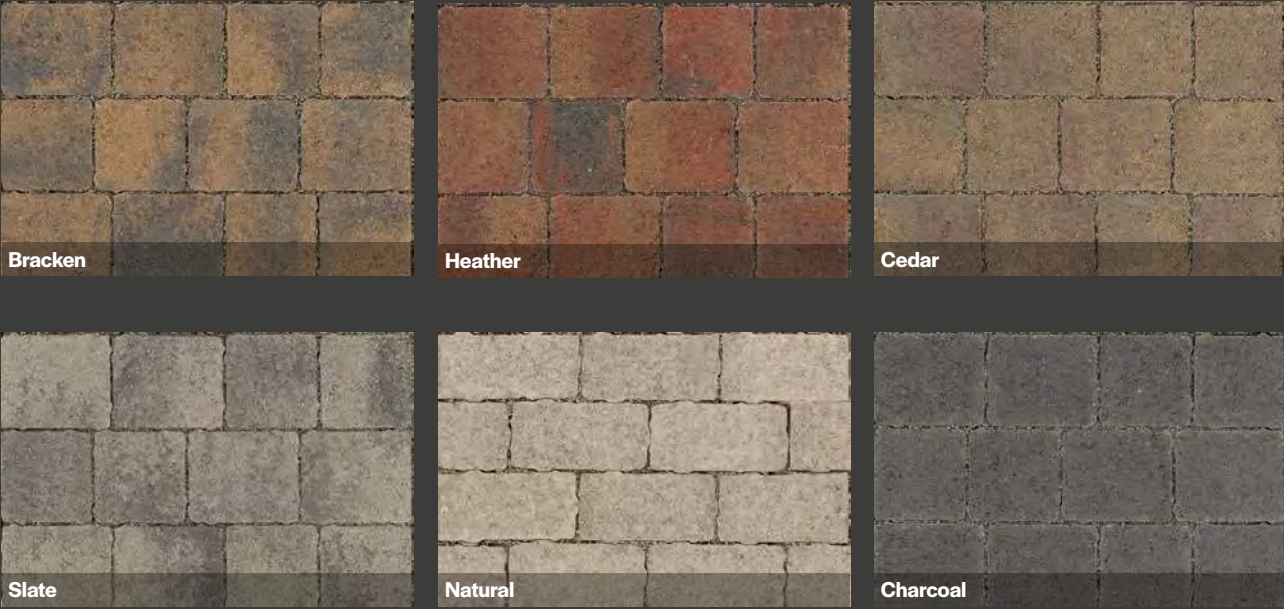


*C- F must be laid herringbone

Letters indicate the maximum loading category for each unit. Please refer to the loading categories table on page 73 for more information.

Stock

size (mm)	colours available	m² per pack	m² per slice	no. per m²	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
240 x 120 x 80	Bracken, Charcoal, Natural	10.08	2.02	34.72	350	1781	1771
208 x 173 x 60 173 x 173 x 60	Bracken, Cedar, Charcoal, Heather, Slate	12.87	0.99	30	195 195	1711	1711
Both sizes in one pack							



Hydropave Shannon

Designed for SuDS applications, Hydropave Shannon combines a smooth, contemporary aesthetic with proven permeable performance to create stylish, sustainable spaces.

Its clean, defined lines make it an ideal choice for projects where a polished, modern visual finish is key.

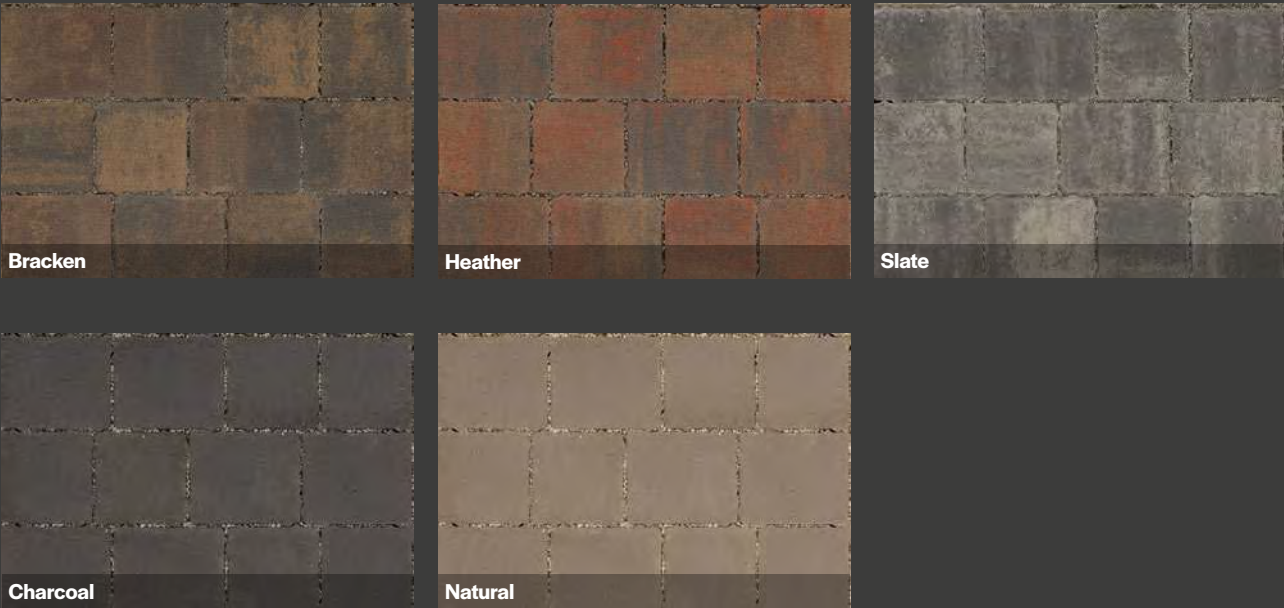


*C- F must be laid herringbone

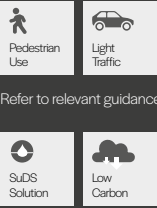
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Stock

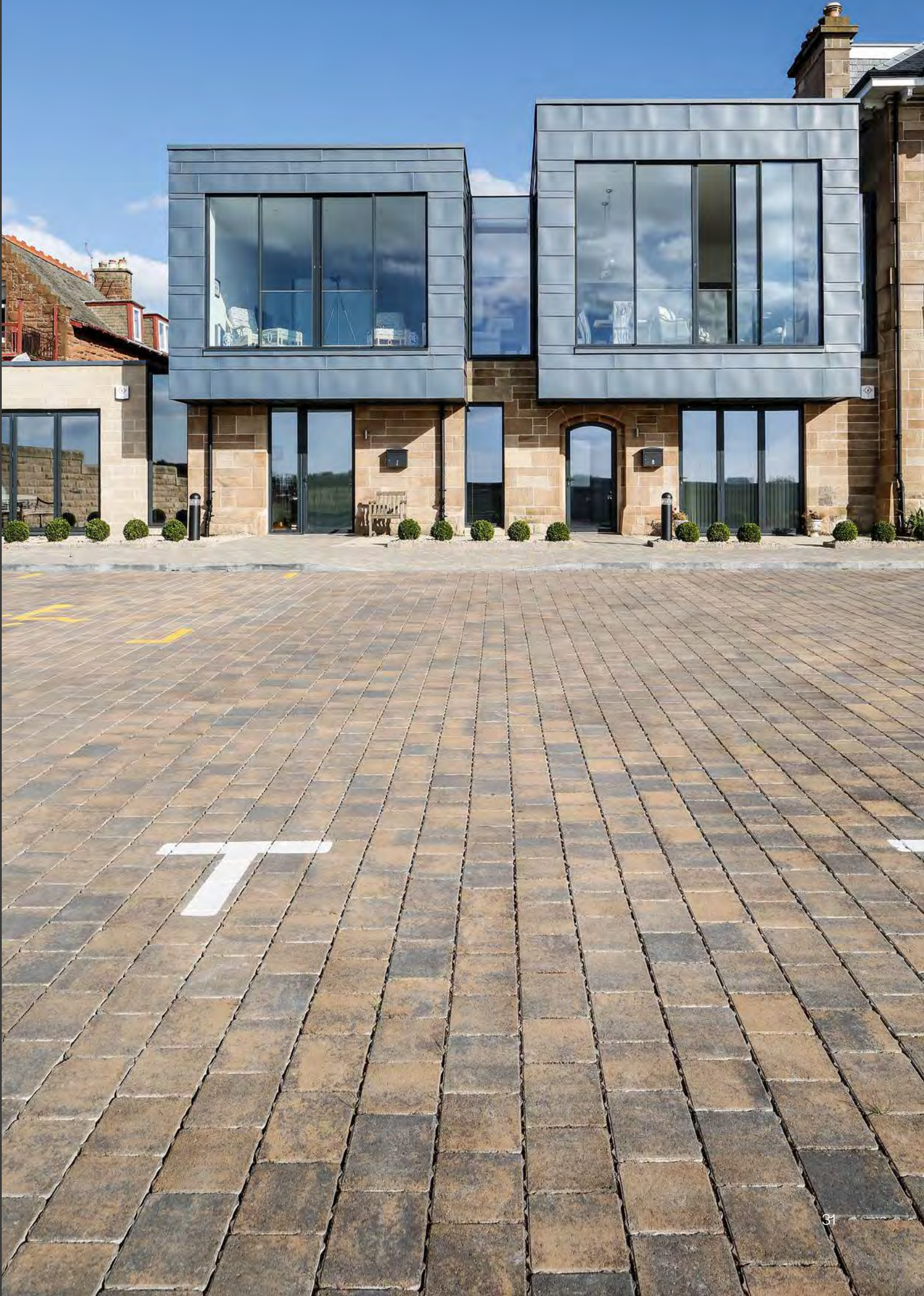
size (mm)	colours available	m ² per pack	m ² per slice	no. per m ²	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
208 x 173 x 60 173 x 173 x 60 Both sizes in one pack	Bracken, Charcoal, Heather, Slate, Natural	12.87	0.99	30	195 195	1764	1754



Suitable for:



Refer to relevant guidance in BS 7533



Hydropave 240

Hydropave 240 is an efficient and versatile permeable paving solution with a familiar linear format, delivering reliable SuDS performance across a wide range of applications.

Designed to balance functionality and appearance, it provides a practical surface solution for commercial and residential schemes alike. Its straightforward design allows for quick installation, helping projects stay on programme while meeting sustainable drainage requirements.



All dimensions include the nibs

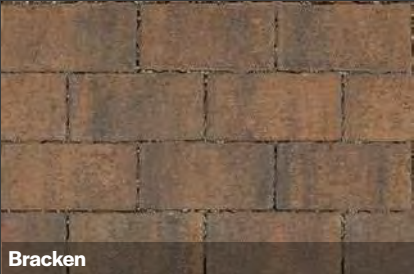
LOADING CATEGORIES
A - F*

*C- F must be laid herringbone

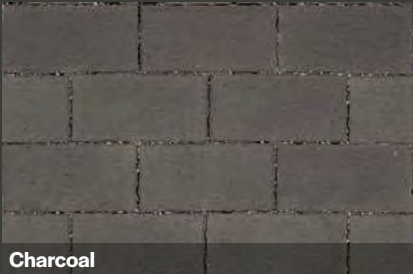
Letters indicate the maximum loading category for each unit. Please refer to the loading categories table on page 73 for more information.

Stock

size (mm)	colours available	m² per pack	m² per slice	no. per m²	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
240 x 120 x 80	Bracken, Charcoal, Natural	10.08	2.02	34.72	350	1810	1800



Bracken



Charcoal



Natural

Suitable for:



Pedestrian Use



Light Traffic



Commercial Traffic

Refer to relevant guidance in BS 7533



SuDS Solution



Low Carbon



Hydropave Pedesta

With its straightforward rectangular format, Hydropave Pedesta can be laid in a variety of practical patterns to support SuDS-compliant design. It is well suited to projects that prioritise efficiency, durability and value, offering a simple permeable paving solution for commercial and infrastructure schemes.

Hydropave Pedesta provides reliable drainage performance with a clean, consistent finish, making it a dependable choice where function and cost control are key considerations.



All dimensions include the nibs

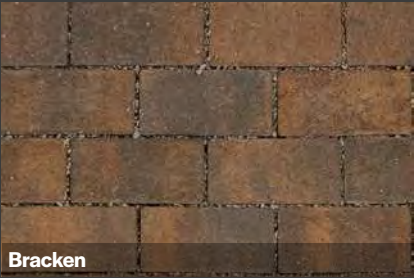
LOADING CATEGORIES
A - F*

*C- F must be laid herringbone

Letters indicate the maximum loading category for each unit. Please refer to the loading categories table on page 73 for more information.

Stock

size (mm)	colours available	m² per pack	m² per slice	no. per m²	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
200 x 100 x 60	Bracken, Brindle, Charcoal, Natural	13.44	2.24	50	672	1808	1798
200 x 100 x 80	Bracken, Brindle, Charcoal, Natural	9.6	1.6	50	480	1732	1722



Bracken



Brindle



Charcoal



Natural

Suitable for:



Refer to relevant guidance in BS 7533



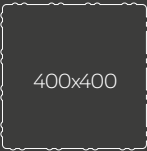
Hydropave Textured Slabs

Offering subtle, tasteful visual appeal, Hydropave Textured slabs are perfect for elevating the aesthetic and sustainability credentials of your project, ensuring that your public spaces are compliant with environmental legislation and futureproofed for decades to come.

Suitable for:



Refer to relevant guidance in BS 7533



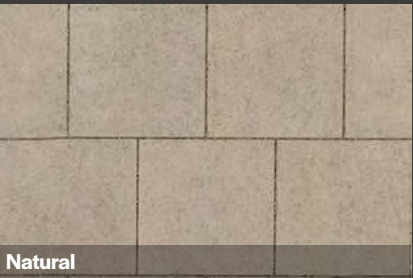
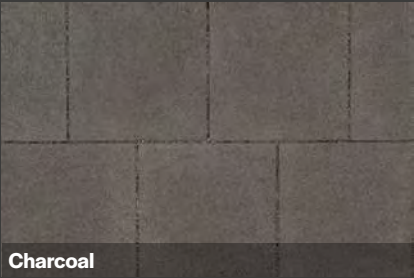
All dimensions include the nibs

LOADING CATEGORIES
A & B

Letters indicate the maximum loading category for each unit. Please refer to the loading categories table on page 73 for more information.

Stock

size (mm)	colours available	m ² per pack	m ² per slice	no. per m ²	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
400 x 400 x 65	Charcoal, Natural	10.56	3.52	6.25	66	1556	1546



Turfstone

Featuring honeycombed cavities that facilitate the growth of grass and straightforward drainage, Turfstone is a paving product that harmonises nature and the built environment in unique style.

Perfect for car parking and utility access, Turfstone is a permeable paving product with sustainability at its core.



Stock

size (mm)	colours available	no. per m2	no. per pack	no. per pallet	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
600 x 400 x 100	Natural	7.68	3.84	4.17	32	1060	1060

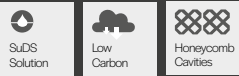


Natural

Suitable for:



See page 87 for typical Turfstone designs



Rain Garden Kerbs

Our range of Fusion and Textured kerbs can be used to create rain gardens. They are the perfect choice for visually pleasing, environmentally friendly outdoor spaces, ensuring your project meets expectations in aesthetic and sustainability goals.

Add Fusion or Textured kerbs to your Rain Gardens for a beautiful blend of soft and hard landscaping

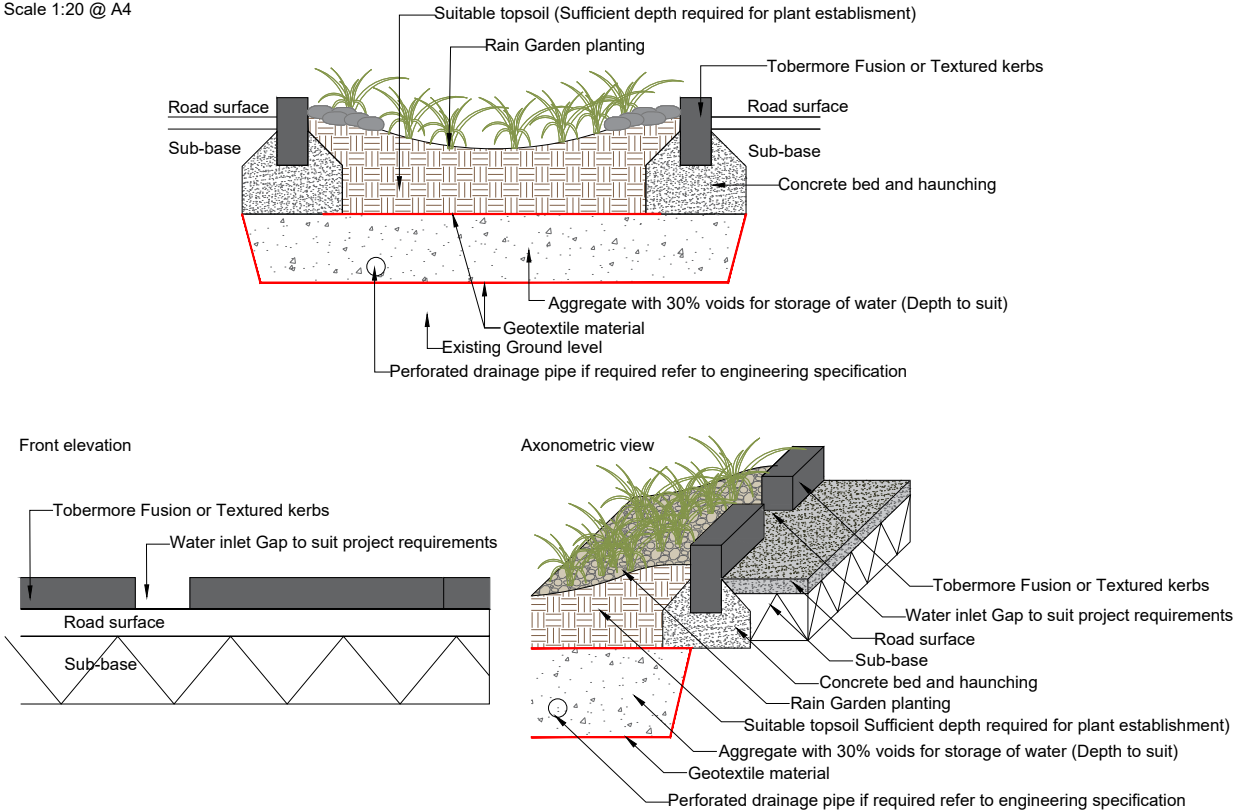


Stock

product	size (mm)	colours available	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
Fusion Kerb	125 x 255 x 915	Silver	16	1113	1103
	145 x 255 x 915		16	1290	1280
Textured Kerb	255 x 125 x 915	Natural	16	1102	1112



TYPICAL RAIN GARDEN WITH KERBS
Section drawing
Scale 1:20 @ A4



Accessory products



Kerbs & edging

Kerbs can offer form as well as function, and our range of stunning decorative kerbs are perfect for public spaces that will stand out from the crowd.

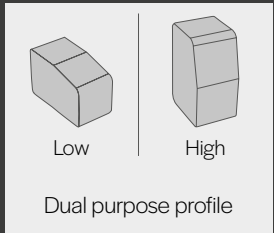
Kerbstone

size (mm)	colours available	no. per slice	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
190 x 160 x 100	Bracken, Charcoal, Heather	35	210	1459	1449
104 x 173 x 80	Charcoal	72	504	1638	1628



Tegula Kerb Large (TKL)

size (mm)	colours available	no. per slice	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
200 x 127 x 100	Charcoal	48	288	1549	1539



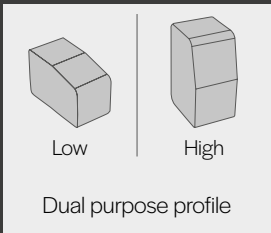
Kerb Small (KS)

size (mm)	colours available	LM per pack	no. per slice	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
125 x 127 x 100	Charcoal	43.2	5.4	432	1505	1505



Kerb Large (TKL)

size (mm)	colours available	LM per pack	no. per slice	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
200 x 127 x 100	Charcoal	28.8	4.8	288	1550	1540





Commercial applications and case studies

Hydropave in practice

Showcasing examples of how Hydropave permeable paving products have fitted seamlessly into projects utilising SuDS solutions, enhancing both the aesthetics and functional properties of the spaces.

Poplar Riverside, London



Client Architect

LDA Design

Contractor

Berkeley Group

Groundworker

Elite Landscapes Limited

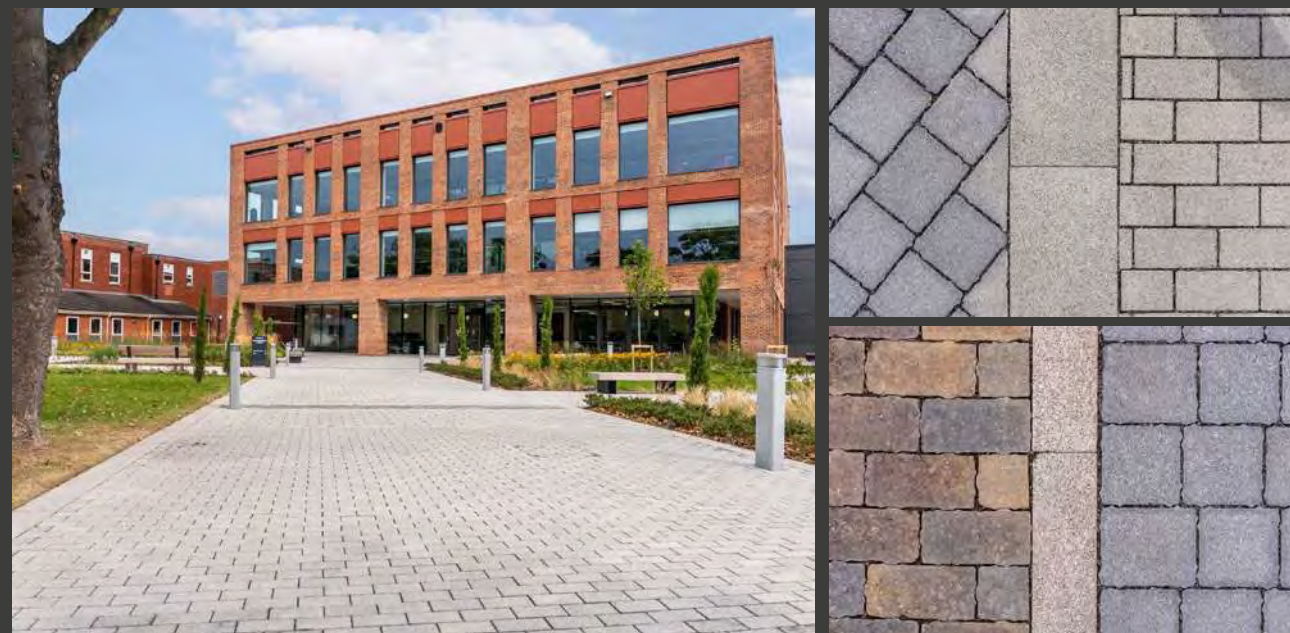
At Poplar Riverside, Tobermore demonstrated how high-performance permeable paving can deliver both sustainability and design excellence. Integrated as part of the Aberfeldy Village regeneration, Hydropave Fusion was specified alongside Artro block paving to meet SuDS requirements.

The project balanced a warm aesthetic and practicality, helping the Poplar Harca Housing Association deliver 96 shared ownership properties to support first time buyers. Tobermore's support from concept to completion enabled the project's architects, contractor and groundworker achieve their environmental goals without compromising on quality or visual impact.





Monkwearmouth Hospital, Sunderland



Client Architect

Place on earth

Contractor

Sir Robert McAlpine

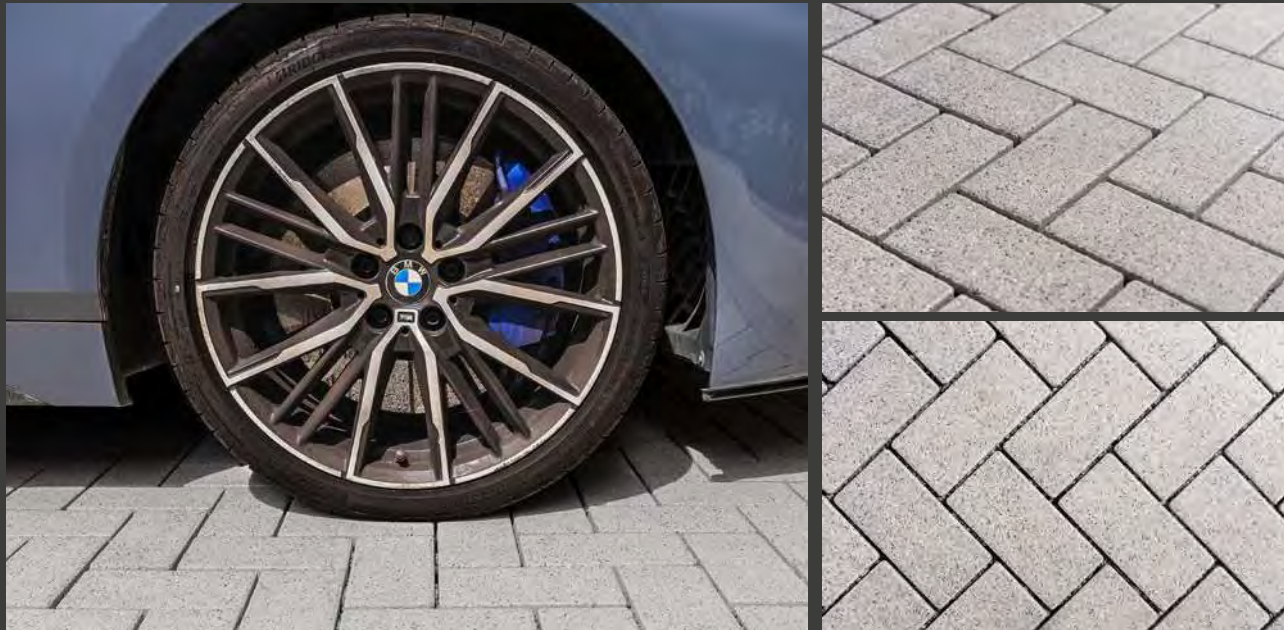
Groundworker

Hewitsons

At Monkwearmouth Hospital, Tobermore used its SuDS and permeable paving expertise to full effect, transforming the entrance with Hydropave Fusion and Hydropave 240 to meet drainage requirements without compromising on aesthetics. A sleek, modern exterior design welcomes patients and visitors via an accessible space, helping promote the wellbeing of the end user.

Stylish granite aggregate surfaces, carefully selected kerbs, and clear delineation between walkway and landscaped areas ensure the space feels high end, professional and inviting. The project demonstrates how Tobermore balances practical SuDS compliance with hard landscaping design excellence.

Lawrence Road, Tottenham, London



Architect

Vabel

Contractor

Vabel

At Lawrence Road in Seven Sisters, Tobermore delivered a permeable paving solution that combined a premium granite aesthetic with outstanding SuDS capability for a major residential regeneration project. Hydropave Braemar and Hydropave Fusion were used across parking bays, access routes and shared surfaces, providing strong, trafficable performance while supporting on-site drainage requirements.

Complemented by Braemar paving in pedestrianised areas, the scheme achieved a cohesive finish across permeable and non-permeable areas. Tobermore's Create & Construct approach was demonstrated by design stage support, technical guidance and a Virtual Sample Studio session that enabled the project's designers to refine material choices, protect their design intent and meet long term durability expectations.





Aberavon Leisure Centre & Fitness Centre, Port Talbot



Architect

MAP Belfast

Contractor

Heron Bros Ltd.

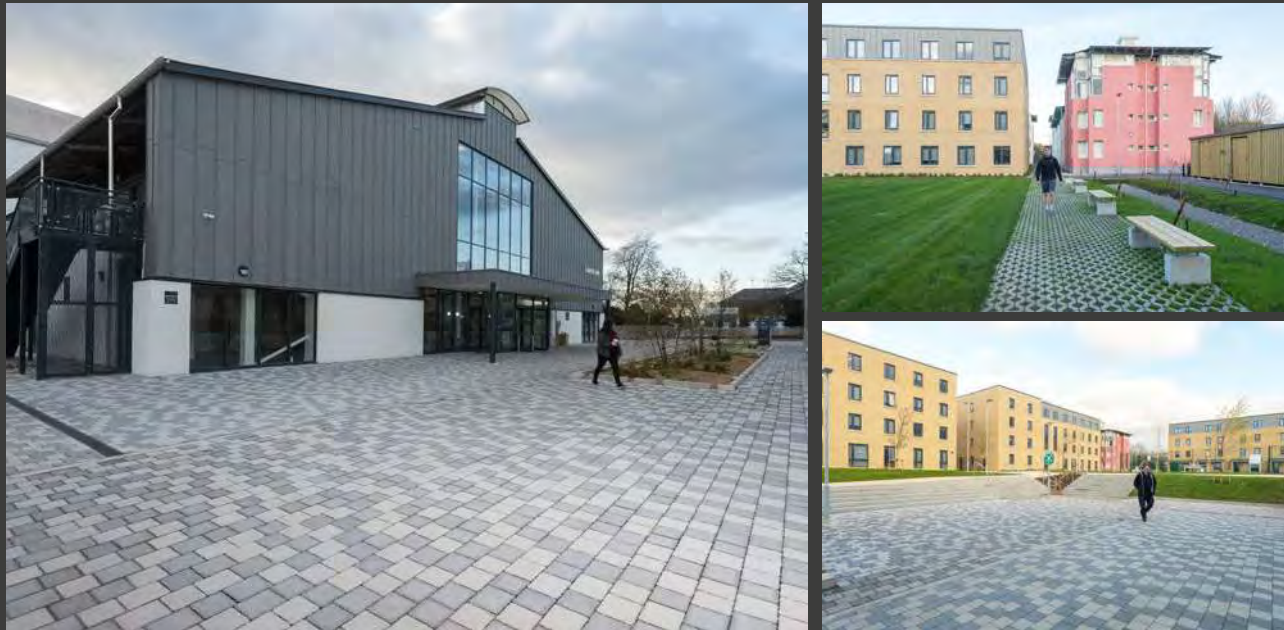
Groundworker

Castle Paving

At Aberavon Leisure & Fitness Centre in Port Talbot, Tobermore delivered a visually appealing permeable paving solution that meets SuDS requirements without sacrificing design quality. Hydropave Tegula Duo provided a durable, aged stone aesthetic for the entrance and car park areas while enabling surface water to drain through the paving and into the sustainable drainage system.

SuDS-compliant performance was paired with robust specification support and access to project-ready technical assets, helping the design and construction team achieve both functional and visual goals. The result is a hard landscaped environment that enhances a public space while addressing drainage and long-term performance needs.

Pittville Student Village, Cheltenham



Client

University of Gloucestershire

Landscape Architect

Ireland Albrecht

Contractor

Bouygues UK

At Pittville Student Village in Cheltenham, Tobermore delivered a permeable paving solution that met both aesthetic and drainage goals for this vibrant university courtyard. Hydropave Fusion and other permeable blocks were specified alongside complementary non-permeable paving to create a harmonious public space that enhances SuDS performance.

The design allowed water to drain sustainably without interrupting pedestrian flows or campus activity. Tobermore's technical support and Virtual Sample Studio helped the team refine product choices early, ensuring a cohesive, resilient landscape that contributes to a thriving learning environment.





Create & Construct for SuDS projects



Create and Construct

with Tobermore

Your partner in landscape solutions, from concept to completion

Our Create & Construct approach is designed to carry your Hydropave permeable paving project from early concept, planning and specification through to tender, construction and post completion. Here we highlight some key services that will make planning permeable paving projects simple.



Permeable paving design

We have partnered with Civil Engineers who specialise in SuDS (sustainable drainage systems) to help you plan and complete the perfect Hydropave permeable paving project. At technical design stage, our design partners will provide you with site-specific preliminary design drawings that show the suitable sub-base design requirements for our Hydropave product range. This is usually sufficient for planning consent and will save you time and money.



Virtual Sample Studio

Want to get a look at the permeable paving blocks and the spacer nibs that sets them apart? Join us for a Virtual Sample Studio session where we will bring your permeable project ideas to the table, demonstrating colours and finishes remotely and in real time via video call.



2D/3D Design

Our 2D/3D Design service is designed to simplify your decision-making process by offering tailored solutions for your specific project needs. Whether you're a housebuilder, landscape architect, civil engineer, or project manager, we're here to help you bring your permeable paving vision to life. Tobermore's 2D & 3D designs help you select and organise the right products for your project.

For more information on how our Create & Construct approach can help you achieve a smooth SuDS project from start to finish, scan the QR code.





Technical excellence

Materials & installation guidance

A comprehensive overview of the material requirements and best practice for installing Hydropave permeable paving products as part of a SuDS solution.

Materials

Capping layer (if required)

On sites where the CBR (California Bearing Ratio) of the ground is lower than 5%, a capping layer will be required to improve the bearing capacity. The capping layer material is installed below the sub-base. The type and depth of material will be dependent upon the CBR and the system type being specified. The capping materials should meet the requirements of 6F5 from Table 6/5 of Highways Agency Specification for Highways Works – Series 600 – Earthworks.

Sub-base aggregate specification

The sub-base material provides both structural integrity and storage of runoff water, meaning the material must provide sufficient porosity. The sub-base material should be in accordance with BS 7533-13:2009, Pavements constructed with clay, natural stone or concrete pavers – Guide for the design of permeable pavements constructed with concrete paving blocks and slabs, natural stone slabs and setts and clay pavers.

The recommended material is 4/20mm Coarse Graded Aggregate (CGA). The grading of this aggregate is shown in **Table 1** and should provide a porosity of between 30%- 32% within the aggregate voids. Aggregates with this porosity provide approximately 1m3 of water storage for every 3m³ of sub-base aggregate.

The strength of the CGA should be sufficient to accommodate the loads which will be applied to it under trafficking. The flakiness index, shell content and mechanical properties should be in accordance with BS EN13242: 2002+A1:2007 Coarse graded crushed rock or gravel. The recommended physical properties for the CGA can be found in **Table 2**.

Important

The material should be categorised as LA30, F120 and MDE20 according to table A.3 within BS 7533:13:2009.



Table 1 Grading recommendations for sub-base material

Sieve size (mm)	Percentage passing	Grading requirements	
40	100	Recommended BS EN 12620 aggregate (mm)	4/30
31.5	98-100		
20	90-99		
10	25-70	Recommended BS EN 1262 grading/tolerance category	Gc80/20 GTc20/15
4	0-15		
2	0-5		

Table 2 Physical property recommendation for CGA

Properties	Category to BS EN 13242 or BS 12620
Grading	4/20 (preferred) or 4/40, Gc 85-15, GTc 20/17.5
Fines Content	14
Shape	F120
Resistance to Fragmentation	LA ₃₀
Durability: Water absorption to BS EN 1097 6:2000 + A1:2005, Clause 7 - for WA > 2% -Magnesium sulfate soundness	WA ₂₄ MS ₁₈
Resistance to Wear	M _{de} 20
Acid-soluable sulfate content: - Aggregates other than air-cooled blast furnace slag and - Air-cooled blast-furnace	AS _{0.2} AS ₁₀
Total sulfur: Aggregates other than sir-cooled blast-furnace slag Air-cooled blast-furnace slag	< 1% by mass < 2% by mass
Volume stability of blast-fumede and steel slags: air-coced blast furnace sig - Steel slag	Free from dicalcium silicate and iron disintegration in accordance with BS EN 13242:2002+A1:2007, 6.4.2.2V ₅
Leaching of contaminants	Blast-furnace slag and other recycled materials should meet the requirements of the Environment Agency “Waste Acceptance Criteria) for inert waste when tested in accordance with BS EN 12457-3.

Laying course and jointing aggregate specification

A laying course material is required to provide an even layer on which the blocks can be installed. The grading of this material should be in accordance with **Table 3** and provide maximum infiltration to allow water to easily pass through the joints and laying course. An angular crushed aggregate will ensure maximum interlock between the blocks to provide structural integrity to the paved surface.

Table 3 Grading details & requirements

Grading details		Grading requirements	
Sieve size (mm)	Percentage by mass passing ISO 565 sieve		
31.5		Recommended BS EN 12620 aggregate grading (mm)	2/6.3
20			
14	100		
10	98-100		
6.3	80-99	Recommended BS EN 1262 grading/tolerance category	Gc80/20
4			
2	0-20		
1	0-5		
0.063	0-2		

Important

As testing the physical properties of the 2-6.3mm material is not possible, the source material should have the same physical properties as the sub-base aggregate (CGA.)



Important

A permeable paving system relies heavily on using the correct aggregates. Prior to installation, we would ask you to test both the 4/20mm coarse graded aggregate and also the 6.3-2mm bedding and jointing grit as per the relevant British Standard specification (BS EN 13242:2002). In particular, the material should be categorised as LA20 according to Table 9, SZ18 according to Table 10 and MDE15 according to Table 11 within this standard. The grit should be insoluble in dilute hydrochloric acid and should be naturally occurring material. In our experience, incorrect use of aggregates is one of the most common reasons for failure of a permeable paving system.

You must ensure the grit and coarse graded aggregate are compatible. For example, if you use a finer grit it may percolate into the sub-base and may destabilise the pavement. Please refer to the following source of information – BS7533-13:2009 Pavements constructed with clay, natural stone or concrete pavers. Guide for the structural design of permeable pavements.

Impermeable membrane for System Type C

An impermeable membrane will be required in System Type C permeable paved surfaces. For the majority of projects, a 2000 Gauge Polythene membrane (500 mu) is suitable. The membrane should be overlapped by 300mm and the joints taped with Visqueen jointing tape.

However, when there is a requirement for a high level of water tightness a membrane with welded joints must be used and specialist advice sought.

An effective seal around outfall pipes can be achieved with the use of top hat seals.



Top hat seal



Impermeable membrane



Visqueen jointing tape

Geotextile for infiltration in system Types A & B (installed between the sub-base and subgrade)

Installing a geotextile provides two benefits. (1) It acts as a separation layer between the sub-base and subgrade, preventing migration of aggregates. (2) It also increases the water cleansing effectiveness of the system. It should be installed directly above the subgrade in System Type A (infiltration) and System Type B (partial infiltration).



Edge restraints

All paved areas will require edge restraints. These can be walls, buildings or precast concrete kerbs. All edge restraints should have sufficient strength to prevent lateral movement of the paving caused by traffic.

When installing precast concrete kerbs, ensure that the concrete haunching is smooth. If an intermediate restraint is required, the haunching for this can be installed directly onto the coarse graded aggregate (CGA).

Installation

We strongly advise that this overview is read in conjunction with the relevant parts of the BS 7533 series of standards and a full in-depth detailed design is carried out by a qualified professional.

The longevity, durability and performance of a paved surface relies not only on the quality and characteristics of the chosen surfacing material, it also relies on the bedding, jointing and sub-base materials being specified and installed correctly.

Materials used for permeable paving laying courses and sub-bases differs from the traditional materials used in conventional impermeable pavements. The main difference is the lack of fines; therefore, there is potential for separation during transporting and installation. The grading of the materials also differs depending on where it has been sourced from. Best practice is to undertake site trials of the materials to establish a suitable construction procedure.

Care must be taken to ensure that the permeable sub-base materials and joints do not become contaminated during installation. The use of silt fences and temporary drainage swales to divert runoff should be given consideration.

Special care must be taken when soft landscaping works are being carried out to prevent soil or mud from entering the joints. It is good practice to cover areas of permeable paving during the installation of soft landscaping.

Construction traffic

On certain sites, a partially completed permeable paved road will need to be used as an access route during the construction phase. Construction traffic will cause rutting to the sub-base material and introduce dirt and mud which can cause the sub-base to become clogged. The solution to this is to install a protective layer of AC (asphalt concrete) over the sub-base aggregate. The AC layer can be used by construction traffic and prior to the installation of the laying course material and paving blocks, the AC is perforated with 75mm diameter holes to allow the infiltration of water to the sub-base layer beneath.

Capping

When installing a System Type C then an impermeable capping material can be used. E.g. MOT Type 1. For Type A or B systems, the capping layer should be the same as the 4/20mm sub-base material. Compact the material in layers not exceeding 150mm in thickness. Conventional rollers can be used for compaction, but these should not be vibrating.

Draining impermeable areas onto permeable areas

When the project layout requires runoff water to be drained from impermeable surfaces, including roofs, the ratio of impermeable area to permeable paving should be 2:1.

There may be a need to increase the depth of aggregate in the permeable construction where there is insufficient hydraulic storage capacity.



Guidance for installation

For infiltration systems A & B

Lay the geotextile onto the subgrade layer or capping (if present), ensuring there are no wrinkles and bring it up the sides of the kerbs prior to installing the sub-base material. Overlap the joints by 300mm.

For non-infiltration system C

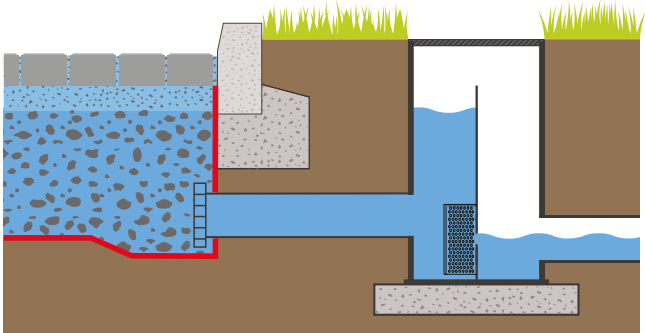
The capping/subgrade should be free from sharp objects or protrusions before installing the membrane. The joints in the membrane should be overlapped by 300mm and taped with polythene jointing tape. The membrane should be brought up to the top of kerb and trimmed off. For the majority of applications, taped joints are sufficient. However, sites which require a high level of water tightness or where the water table is high or areas over basements, the membrane should have welded joints and specialist advice should be sought.

Non-infiltration system

Outfall pipes should be installed at the low point of the sub-base.

Controlling flow at outlets

The use of outlet flow control chambers with orifices which accurately limit flows are now common. They can be specified as part of the SuDS design approval process and are accessible for observation and adjustment if required.



Sloping sites/Gradients

Although impermeable paving requires surface falls for drainage, the surface of permeable can be completely flat, thus avoiding any surface water ponding.

In System B and System C, the sub-base can have a gradient of approximately 0.5% towards the outlets. For sloping sites where the subgrade gradient exceeds 5%, extra design methods will need to be introduced.

Without design input on steeply sloping sites, the water will flow to the low end of the paving construction and reduce the volume of available storage. (See figure B)

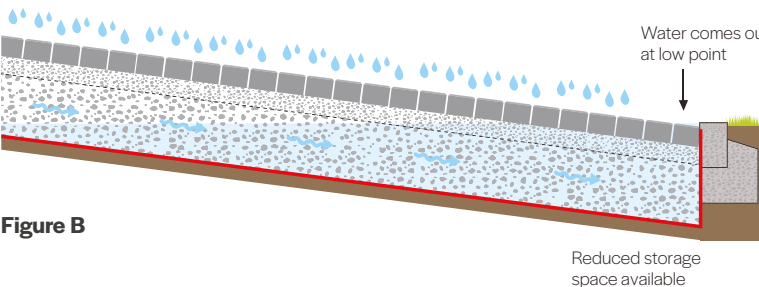


Figure B

On these sites it will be necessary to check the hydraulic storage capacity and, if required, the sub-base thickness increased or check dams or terracing introduced.

Installation of check dams (baffles) within the sub-base to delay water, either for infiltration or with flow controls to the drainage network, thus avoiding water discharging through the paving surface. (See figure C)

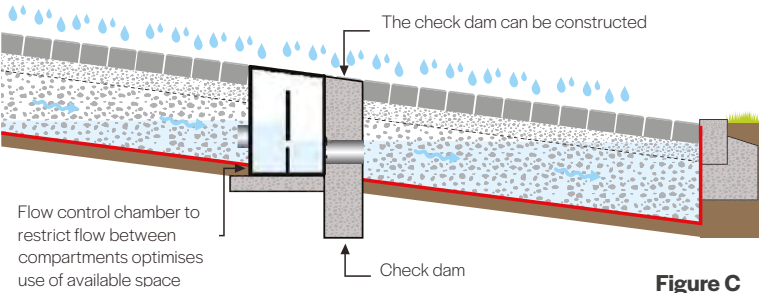


Figure C

Introduction of terraces to create flat areas of permeable paving will separate storage compartments. (See figure C1)

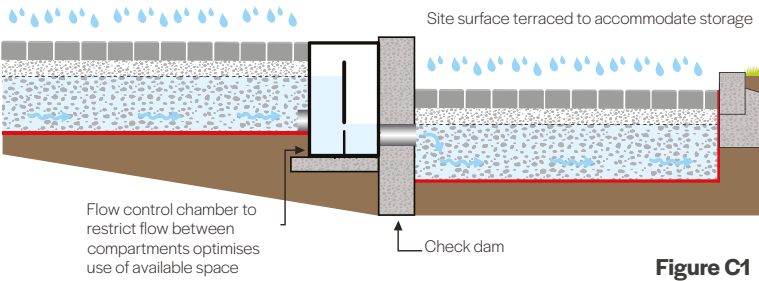


Figure C1

Sub-base material: 4/20mm sub-base aggregate

The open graded 4/20mm sub-base material (in accordance with Table 1) is installed in layers no greater than 150mm using a non-vibrating roller or plate compactor. This ensures that the void ratio of the material remains at 32% and avoids over-compaction of the material.

As materials can differ, it is good practice to carry out a compaction trial. Aim for a tolerance of +/- 20mm from the level specified.



Asphalt concrete (AC) layer

When the loading category requires additional structural support or where temporary site access during construction is required, an asphalt concrete layer is installed over the sub-base.

Using a mini tracked paving machine makes it easier to install the asphalt concrete over the CGA. Rutting in the CGA can be kept to a minimum by ensuring the paving machine keeps to one laying track. Any rutting of the 4/20mm CGA can be corrected by hand raking.

The material should be a 0/32mm size dense base as given in BS4987:2015 +A1:2017 Coated macadam (asphalt concrete) for roads and other paved areas – Part 1: Specification for constituent materials and for mixtures (clause 5.2). The binder will typically be 50 pen in accordance with clause 4.7. However, it may vary dependent on the specific loading conditions.

Once set, 75mm diameter cores are drilled through the AC layer at 750mm centres and filled with the bedding/jointing material. This allows water to permeate into the sub-base beneath, see figure 1. If the cored holes are not being filled immediately, they should be covered to prevent any contamination entering which may clog the system.



Figure 1



Laying course

Spread and screed the 6.3-2mm laying course material (Table 3) to a depth of 50mm (+/- 20mm) over the 4/20mm CGA to provide an even surface for the blocks to be installed on.

The laying course materials will have different properties to traditional sand and does not compact in the same manner. It is good practice to complete a trial area to gain an understanding of the material characteristics.



Installing the Hydropave blocks

Blocks should be installed in the specified laying pattern to achieve a level surface within the permitted tolerances. To maintain the laying pattern, string lines should be used. Factors such as the manufacturing tolerances and frequency of string lines will have an impact on the straightness of lines achievable.



Blocks should be installed ensuring the nibs interlock with neighbouring blocks. Where it is necessary to maintain straight lines or to maintain bonding, joint widths can be varied slightly.

When the circumstances allow, complete one area of paving by using products taken from the same batch. This is achieved by checking the batch code label displayed on the packs.



Always select blocks from a minimum of three packs to ensure the correct colour blending is achieved. Where products are supplied in packs with vertical slices, always take them "vertically, slice by slice." This ensures that colours are distributed evenly.

When the circumstances do not allow the use of products from the same batch, it is extremely important to minimise possible colour banding/shading by always thoroughly mixing products from a minimum of three packs concurrently, with some overlap between deliveries/batches.

Where products from different batches are being installed in the same area of paving, it is the installers responsibility to

carry out a colour match check by comparing colours from each batch. If a noticeable variance in colour/shade or texture is visible, do not proceed with the installation and contact your supplier for further guidance.

Mixing thoroughly from a minimum of three packs is of particular importance when installing single colours such as Natural, Charcoal, Graphite, Silver, Mid-Grey, Oat etc.

During installation the installer must make regular visual checks to ensure the blending of colours is consistent. We would always recommend that when purchasing products, especially in larger quantities, they are all ordered at the same time and a delivery schedule provided.

On slopes or gradients, commence laying from the bottom and work upwards.

Cutting in

Once all full size units have been installed, cut blocks will be required to fill any gaps around the perimeter or obstacles. Small cut pieces can break or become loose. To prevent cut units becoming loose or breaking, no unit should be cut to less than one quarter of its original size. The use of inboard cutting should be used to avoid small cut pieces. Units should be measured and cut to maintain the permeable joint width in the range of 3-6mm. On curves, the maximum joint with should not exceed 6mm.



Jointing and final compaction

Before final compaction of the paving commences, brush any loose debris from the paving surface. Leaving excess material on the surface can lead to scratches or scuffs on the blocks. Brush the 6.3-2mm jointing material into the joints. Brush off any excess and compact using a vibrating plate with a rubber protective mat as specified in Annex F of BS 7533-3:2005 and A1:2009.



Important

Ensure that the grit is brushed off prior to compaction to avoid scratching the paving. Repeat this process 2-3 times until the joints are filled to the top. Any joints that are not completely filled can lead to movement of the paving during trafficking and subsequently blocks can chip and become loose. Tobermore recommends that after a few weeks of use, the joints should be checked and topped up if necessary.

Warning

Permeable paving joints **MUST NOT** be filled with kiln dried jointing sand.

Joint sealing

If sealing the joints is required, special permeable joint sealers are now available. These sealers bind the jointing aggregate whilst allowing the infiltration of surface water. Only sealers which are suitable for permeable paving should be used. Advice should always be sought from the sealant supplier. Never use conventional block pavement sealants on permeable paving.

Typical design examples

Although a full engineering approach will be needed for virtually all pavements, Tobermore's experience suggests that the following standard solutions will be suitable in most circumstances and can be used at project appraisal stage.

Category / Application	No. of standard axles	Traffic guide	Application
A / Domestic	0	No large HGV	- Patio - Private drives - Decorative features enclosed playgrounds - Footways with zero overrun
B / Car parking	100	Emergency vehicles only	- Car parking bays and aisles - Railway station platforms - External car showrooms - Sports stadium pedestrian routes - footways with occasional overrun - Private drives - Footway crossover
C / Pedestrian	0.015msa	1 large HGV / Week	- Town/City pedestrian street - Nursery access - Parking areas to residential development - Motel parking - Garden centre external displays - Crematory/Crematorium - Airport car park (no bus pick up) - Sports centre
D / Shopping	0.15msa	10 large HGV / Week	- Retail development delivery access route - School/college access route - Office block delivery route - Garden centre delivery route - Deliveries to small residential development - Fire station yard - Airport car park with bus to terminal - Sports stadium access route/forecourt

E / Commercial	1.5msa	100 large HGV / Week	- Industrial premises. - Lightly trafficked public roads - Light industrial development - Mixed retail/industrial development - Town Square - Footway with regular overrun - Airport land side
F / Heavy Traffic	15msa	1000 large HGV / Week	- Main road - Distribution centre - Bus station (bus every 5 minutes) - Roundabout - Bus lane

Note: In the case of attenuation designs, subgrade CBR values are equilibrium moisture content values, in the case of infiltration designs, subgrade CBR values are soaked values.

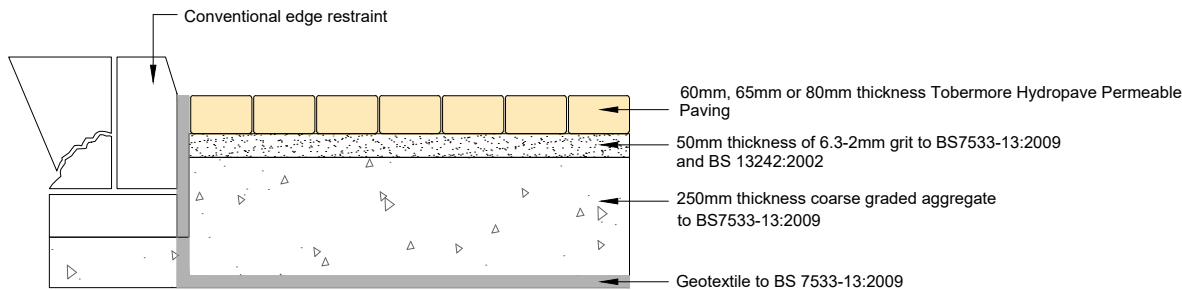


Infiltration designs Type A & B*

* For system Type B a perforated drainage pipe should be included and connected to a suitable outlet.

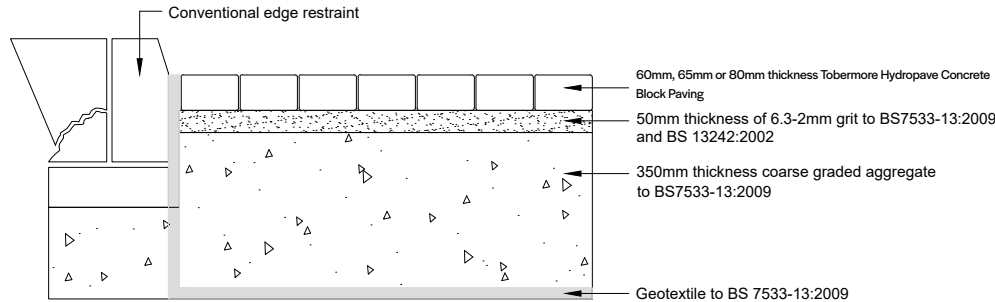
Loading Category A: 5% CBR

An upper geotextile is optional on this design.



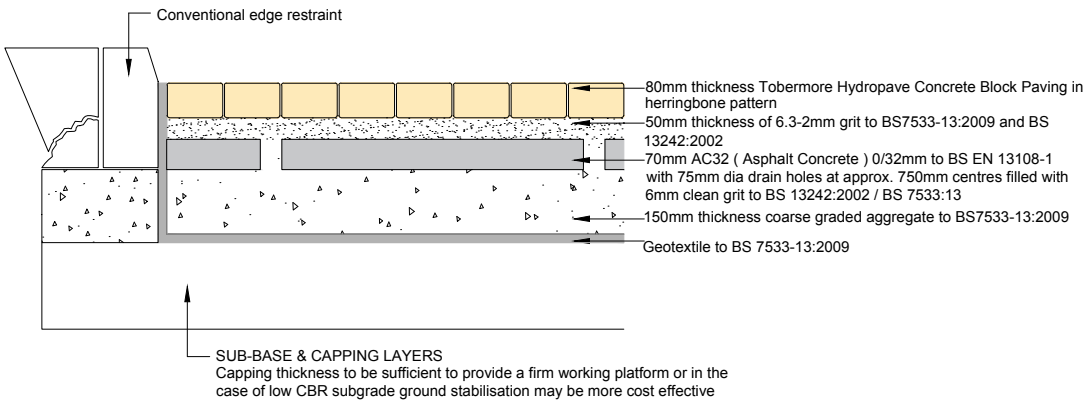
Loading Category B: 5% CBR

An upper geotextile is optional on this design.



Loading Category C: 5% CBR

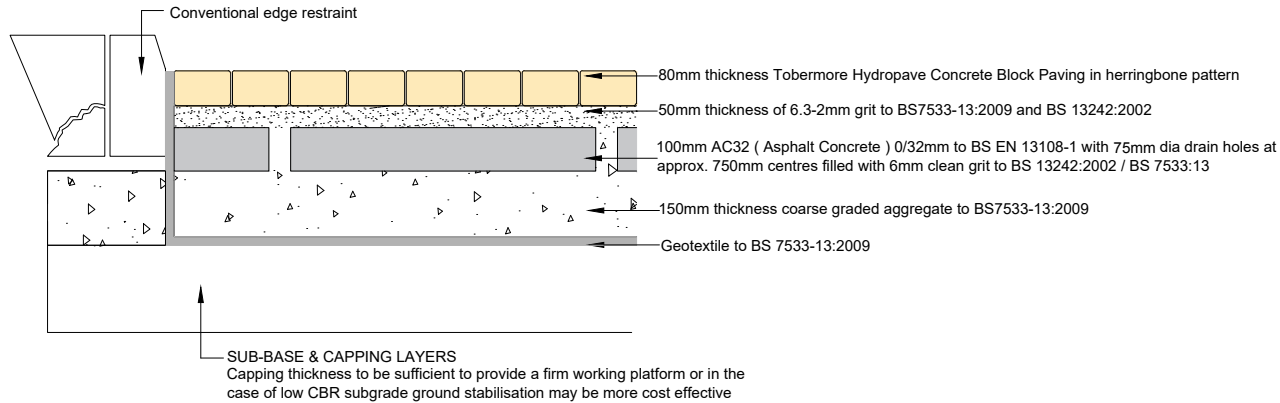
An upper geotextile is optional on this design.



DBM (Dense Bitumen Macadam) can be used as an alternative to the cement stabilised coarse graded aggregate. Please refer to BS 7553 Part 13

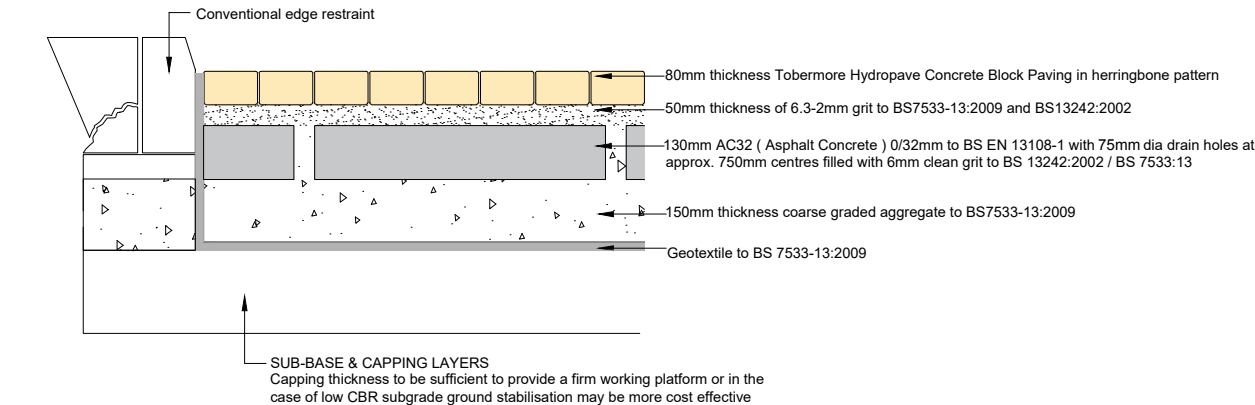
Loading Category D: 5% CBR

An upper geotextile is optional on this design.



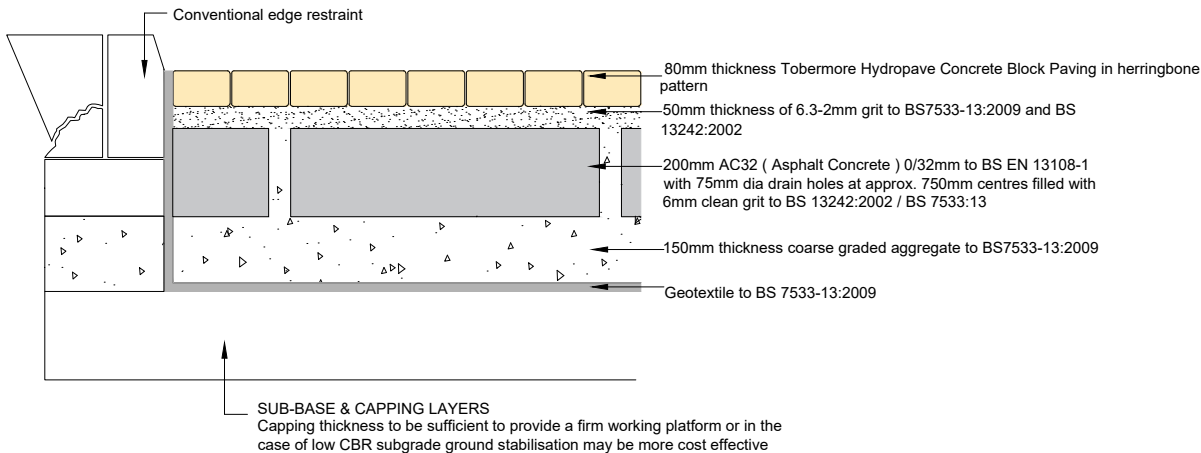
Loading Category E: 5% CBR

An upper geotextile is optional on this design.



Loading Category F: 5% CBR

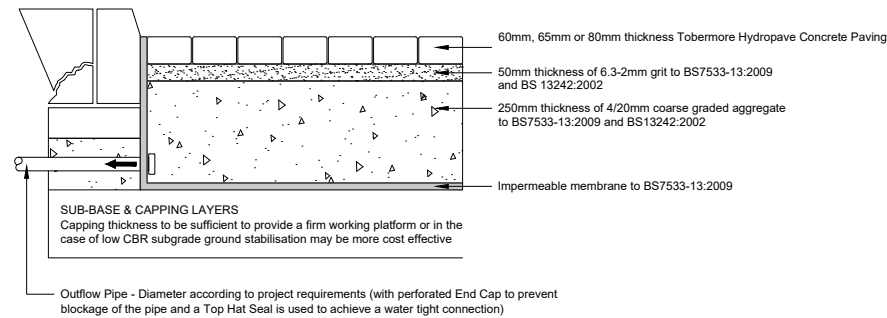
An upper geotextile is optional on this design.



Attenuation designs Type C

Loading Category A: 1-5% CBR

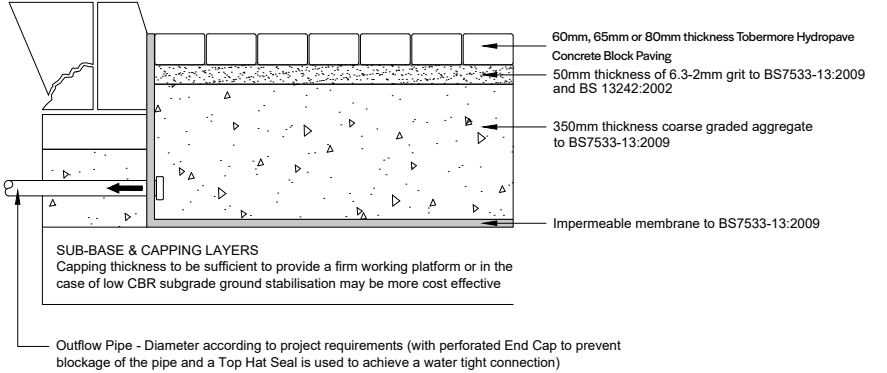
Conventional edge restraint



An upper geotextile is optional on this design.

Loading Category B: 1-5% CBR

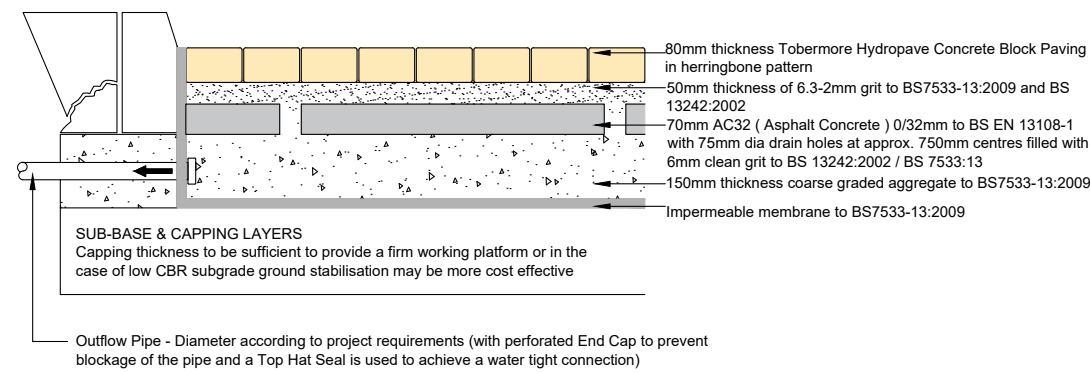
Conventional edge restraint



An upper geotextile is optional on this design.

Loading Category C: 1-5% CBR

Conventional edge restraint



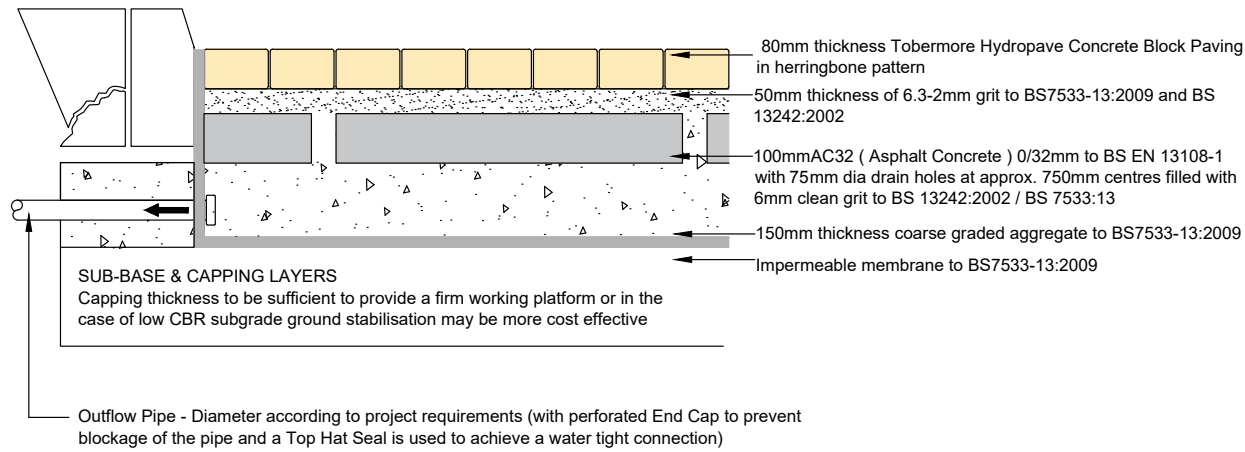
An upper geotextile is optional on this design.

DBM (Dense Bitumen Macadam) can be used as an alternative to the cement stabilised coarse graded aggregate. Please refer to BS 7553 Part 13

Loading Category D: 1-5% CBR

Conventional edge restraint

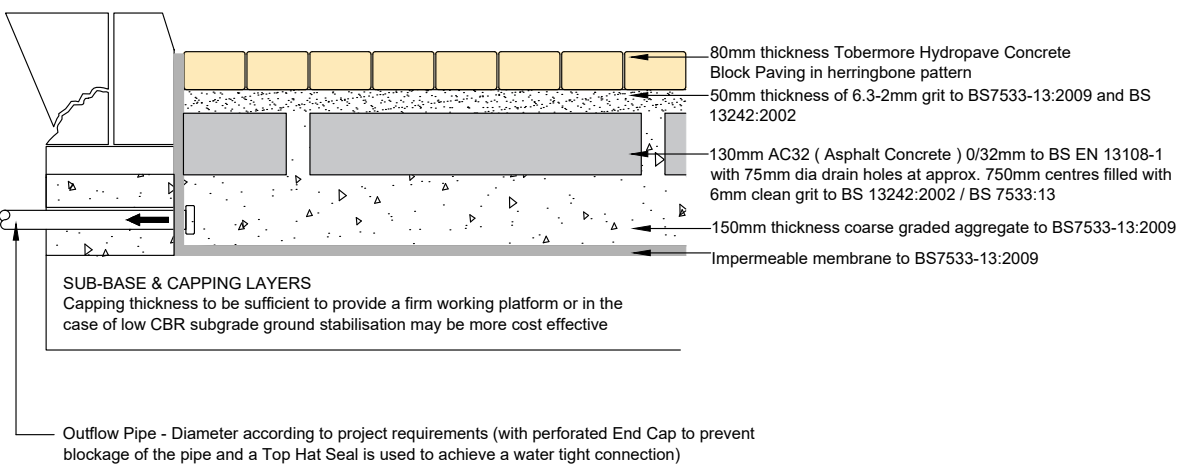
An upper geotextile is optional on this design.



Loading Category E: 1-5% CBR

Conventional edge restraint

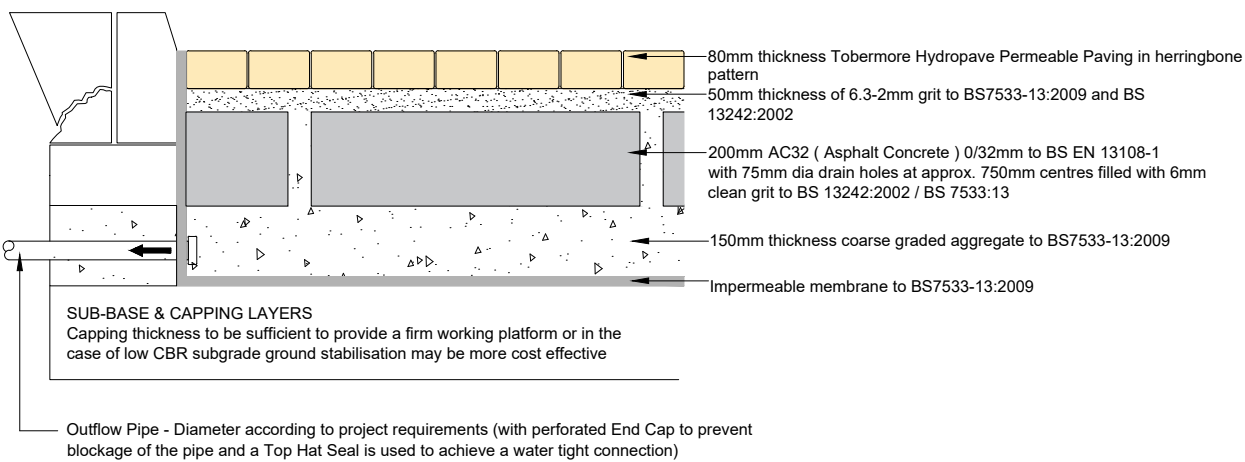
An upper geotextile is optional on this design.



Loading Category F: 1-5% CBR

Conventional edge restraint

An upper geotextile is optional on this design.



Infiltration designs Type A & B

Additional thickness of coarse graded aggregate for Systems A & B for low CBR values.

CBR of Subgrade %	Additional thickness of coarse graded aggregate
1	300 * ^
2	175 v
3	125 v
4	100 v

* Expert guidance should be sought. ^ Subgrades less than 5% are often too fine to permit sufficient infiltration.

Attenuation designs Type C

Total thickness of capping material for System C

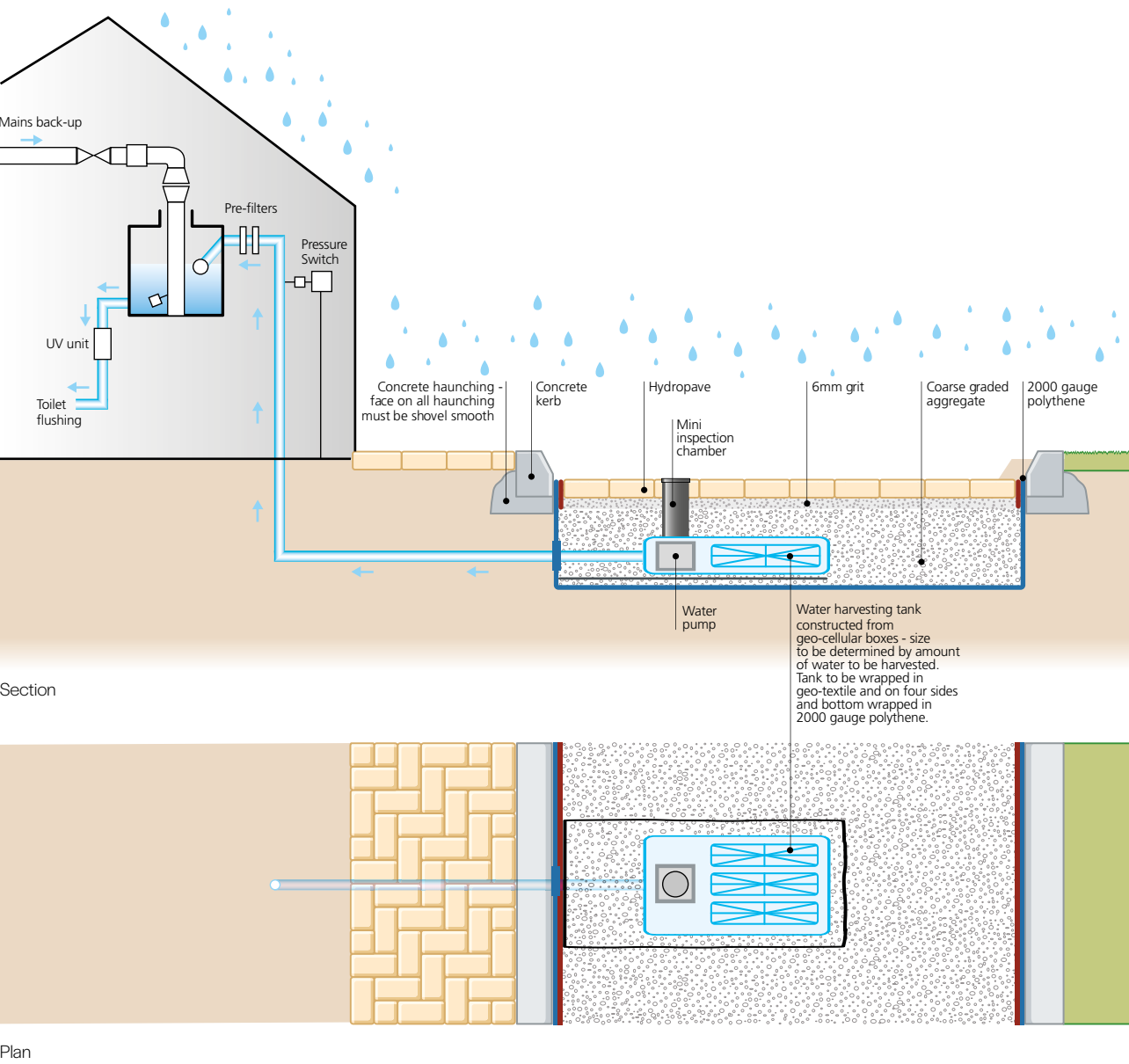
CBR of Subgrade %	Adjustment of capping layer
1	600 *
2	350
3	250
4	200

* Expert guidance should be sought.

Water harvesting

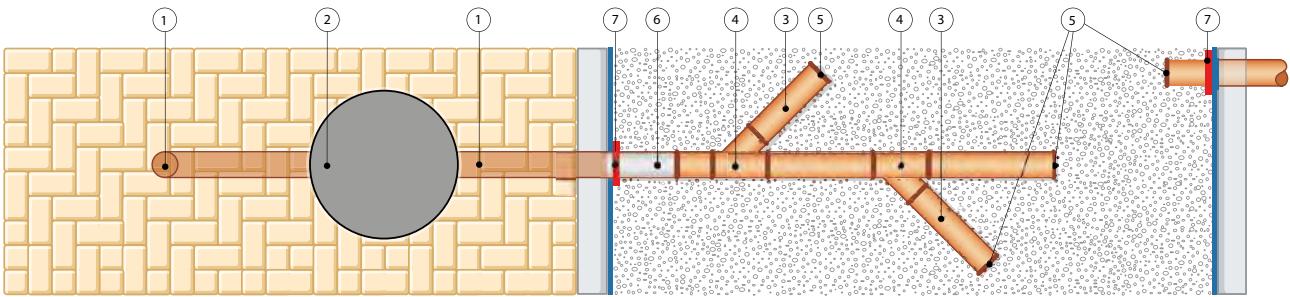
Tobermore Hydropave products can also be used in rainwater harvesting projects. Rainwater harvesting is a system where the rainwater from roofs and hard surfaces is collected through geo-cellular boxes under the paving.

This water is then distributed around the buildings and used for toilet flushing and watering gardens. Permeable paving provides the necessary filtration to remove debris and sediments which will improve the quality of the water. A rainwater harvesting system needs to be specially designed.



Paving utility items

Installation of permeable paving will require additional components based on the design of the system that is specified by the engineer. Some of the typical components which may be required are listed below and are available from Civils and Drainage Merchants.



1	PVC Underground drainage pipe
2	460mm inspection chamber with lid
3	PVC perforated drainage pipe
4	PVC unequal single junction
5	PVC end cap with 6mm holes drilled
6	PVC adaptor
7	Polyethylene/polypropylene Top Hat seal
Visqueen jointing tape	

Combining soft & hard landscaping elements

Trees require protection due to the vital environmental benefits they offer, particularly in urban environments. These benefits include improving air quality, reducing flood risk, and helping to regulate the effects of climate change. Due to their importance, it is a criminal offence to cut down, lop, uproot, top, damage, or destroy a protected tree without the necessary authorisation.

To help permeable pavements.

What are cellular confinement systems?

Engineered specifically for tree root protection, they create a stable, load-bearing surface for vehicles and pedestrians while preventing damage to roots caused by soil compaction or drying out.

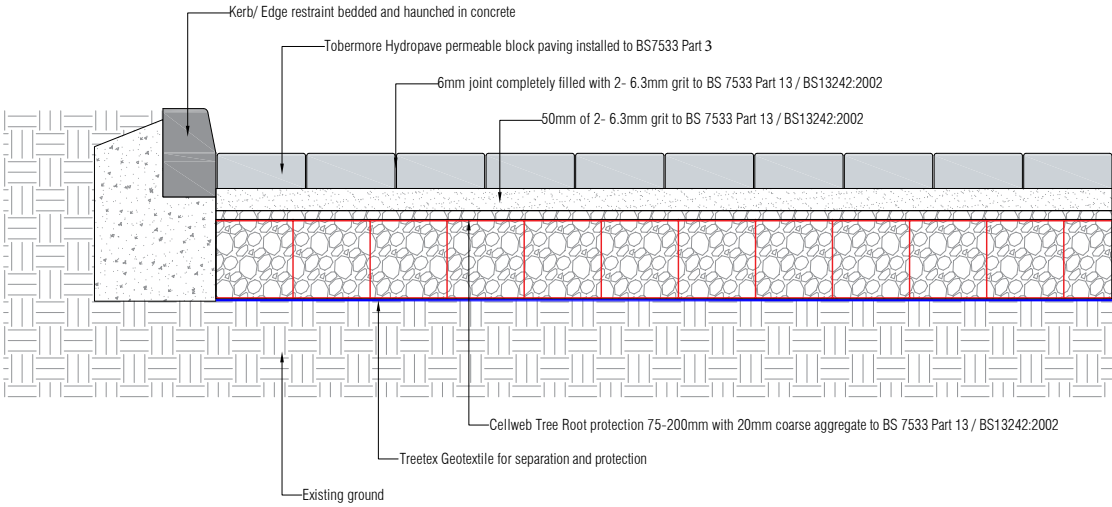
Together, these elements form a robust and highly effective tree root protection solution.

One of the key advantages of these systems is its no-dig design. This ensures that surface loads are spread laterally, rather than being transferred directly onto the soil and roots beneath.

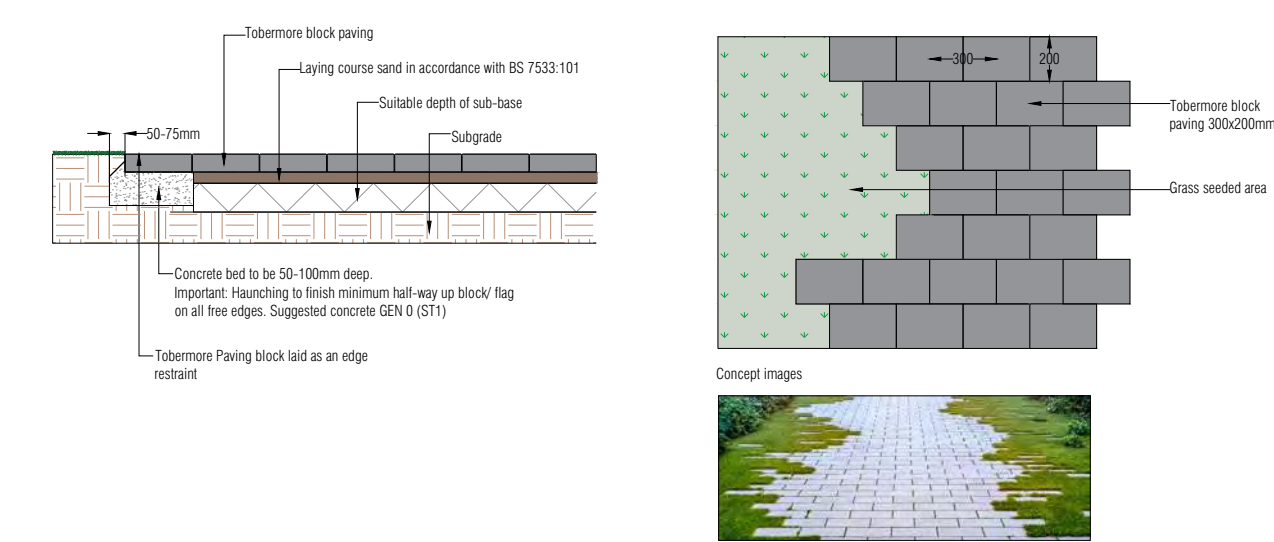
The perforated walls of the cells, combined with the angular aggregate infill, allow free movement of air and water; this helps maintain essential supplies of oxygen and moisture to the tree roots.

There are specialist suppliers of cellular confinement systems who can provide further technical assistance.

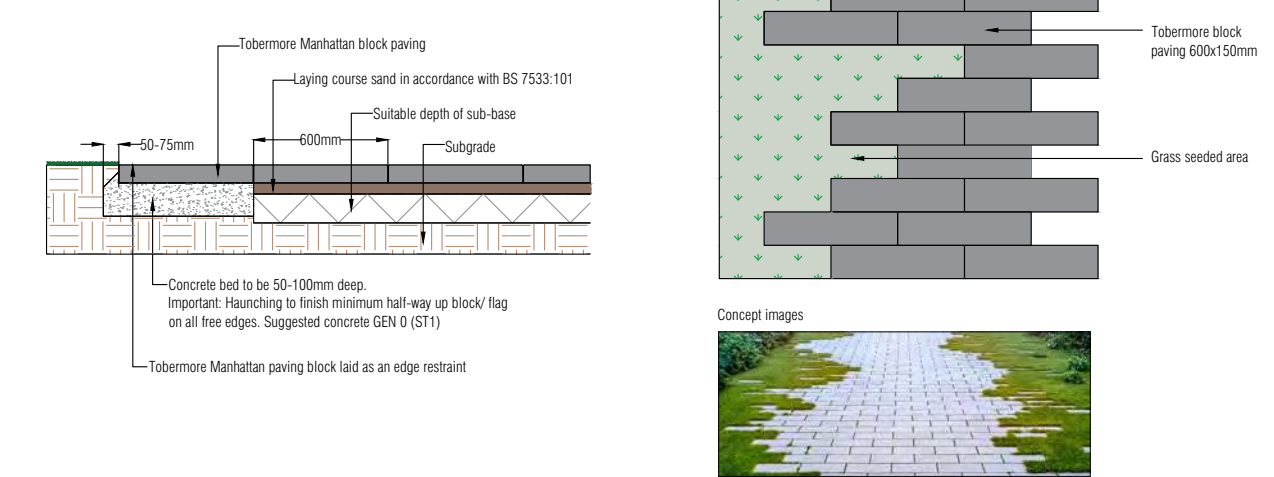
Tree root protection



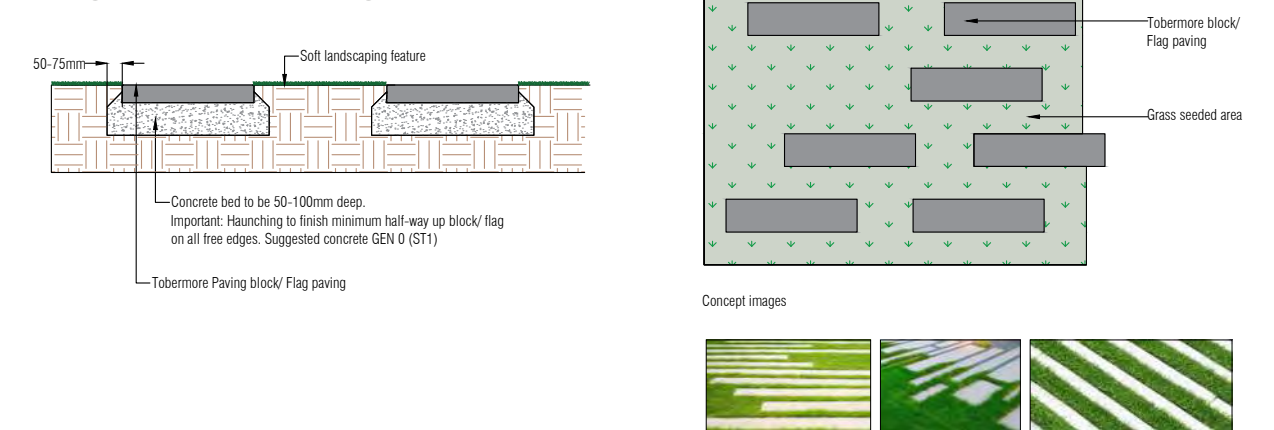
Blending soft & hard landscaping 300x200mm



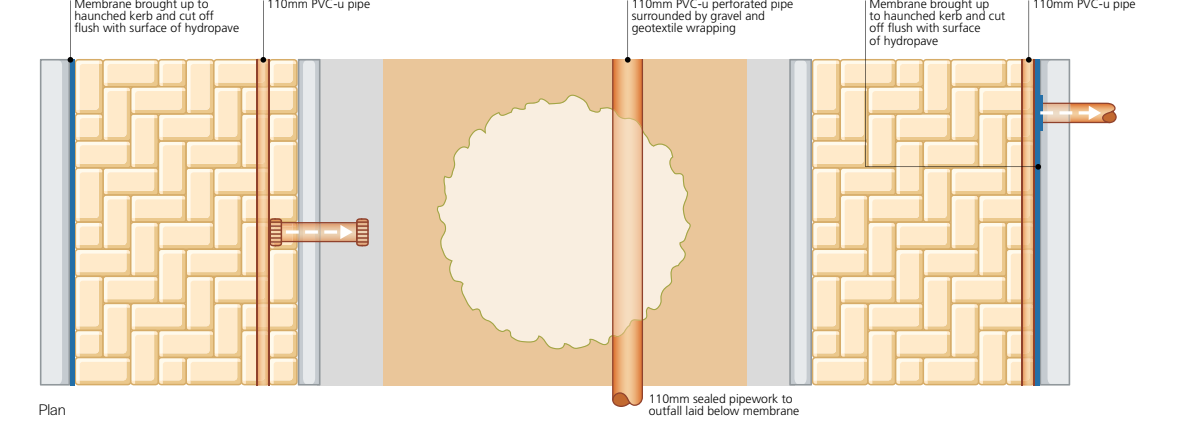
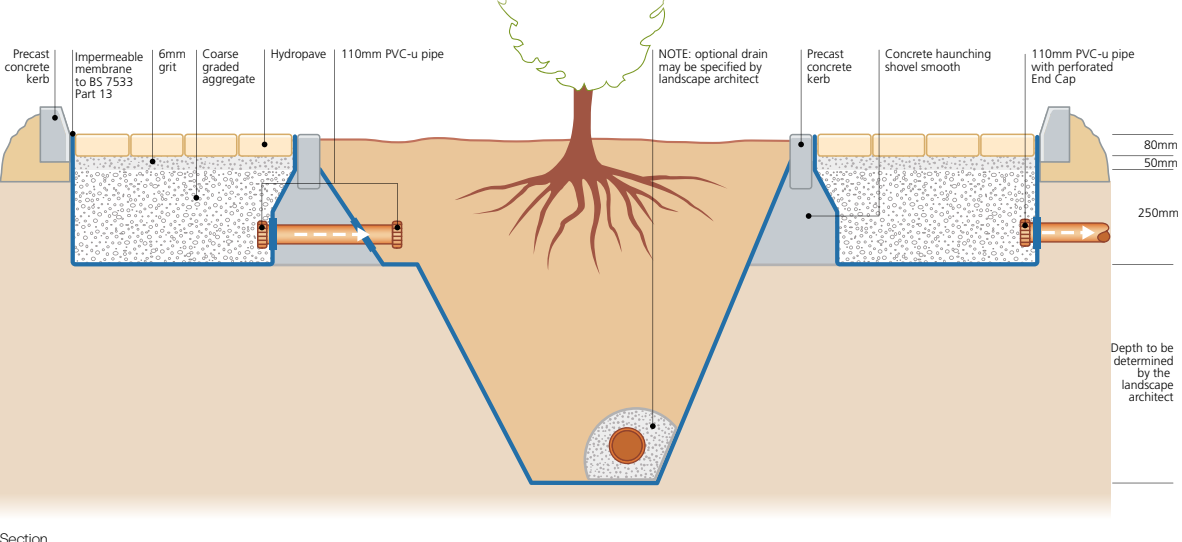
Blending soft & hard landscaping Manhattan 600x150mm



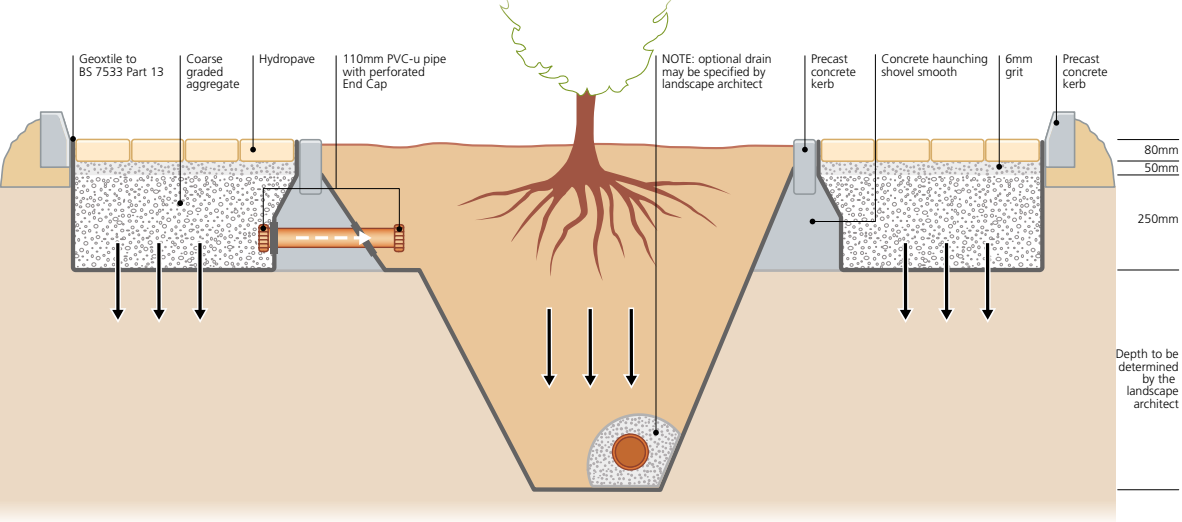
Blending soft & hard landscaping individual blocks



Tree planting attenuation system



Tree planting infiltration system



This diagram illustrates a cross-section of a permeable pavement system designed for rainwater infiltration. The components and their arrangement from left to right are as follows:

- Rainwater downpipe:** A vertical pipe on the far left that channels rainwater into the system.
- Mini inspection chamber (Catch Pit):** A dark grey cylindrical structure that receives water from the downpipe and directs it into the main infiltration pipe.
- Concrete haunching - face on all haunching must be shovel smooth:** A label pointing to the smooth, finished concrete surface where the pipe enters the chamber and where it exits the chamber.
- Precast concrete kerb:** A grey L-shaped structure that supports the edge of the pavement layers.
- 6mm grit:** A layer of small, light-colored aggregate directly beneath the kerb.
- 110mm perforated pipe:** A long, orange-colored pipe with multiple small holes along its length, allowing water to infiltrate into the ground.
- Hydropave:** A layer of coarse, light-colored aggregate that surrounds the perforated pipe.
- Coarse graded aggregate:** A layer of larger, light-colored aggregate beneath the Hydropave.
- 110mm PVC-u pipe with perforated End Cap:** A pipe at the far right end of the system, featuring a cap with small holes for water to exit the aggregate layer.
- Impermeable membrane to BS 7533 Part 13:** A blue line representing a waterproof barrier that prevents water from passing through the bottom of the aggregate layers.

Arrows indicate the flow of water from the downpipe, through the inspection chamber, along the perforated pipe, and finally out through the end cap into the ground.

Labels in the diagram:

- Rainwater downpipe
- Mini inspection chamber (Catch Pit)
- 110mm PVC-u pipe
- Precast concrete kerb
- Even dispersal of water through 110mm dia. perforated pipes.
- Coarse graded aggregate
- Impermeable membrane to BS 7533 Part 13

Rainwater downpipe

Mini inspection chamber (Catch Pit)

Concrete haunching - face on all haunching must be shovel smooth

Precast concrete kerb

6mm grit

110mm perforated pipe

Hydropave

Coarse graded aggregate

Geotextile to BS 7533 Part 13

The diagram illustrates a cross-section of a drainage system. On the left, a brick wall contains a rainwater downpipe. This pipe leads to a circular mini inspection chamber (Catch Pit). From the chamber, a 110mm PVC-u pipe extends horizontally. This pipe passes under a precast concrete kerb and then turns downwards into a layer of coarse graded aggregate. The pipe is perforated to allow for the even dispersal of water. A geotextile layer, specified as BS 7533 Part 13, is shown at the bottom of the aggregate layer.

A detailed cross-section diagram of a permeable pavement system. The layers from top to bottom are: a precast concrete kerb, coarse grade aggregate, 6mm grit, 110mm PVC-u pipe (shown in two sections), 200mm high concrete baffles at 10m centres, Hydropave, and Impermeable BS 7533 Part 13. The system is shown on a sloped ground surface. On the right side, a vertical dimension line indicates a total depth of 350mm, with sub-labels for 80mm and 50mm sections. A 110mm PVC-u pipe with a perforated end cap is shown at the bottom right.

Precast concrete kerb

Coarse grade aggregate

6mm grit

110mm PVC-u pipe

200mm high concrete baffles at 10m centres

Hydropave

Impermeable BS 7533 Part 13

110mm PVC-u pipe with perforated End Cap

80mm

50mm

350mm

Flow path to follow contour direction of slope →

110mm PVC-u pipe

200mm high concrete baffles at 10m centres

110mm PVC-u pipe

Membrane brought up to haunched kerb and cut off flush with surface of Hydropave

Precast concrete kerb

Layer of geotextile to BS 7533 Part 13

500 x 500 trenches at 10 metre centres

6mm grit

Coarse graded aggregate

Hydropave

Lowest trench 500 x 500mm

80mm

50mm

250mm

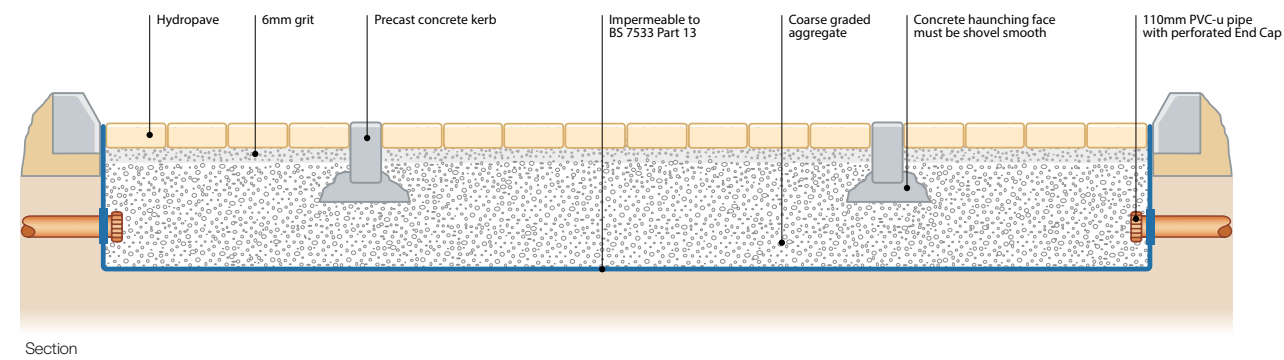
500mm

The dimensions and spacing of trenches may need to be adjusted to suit the permeability of the subgrade

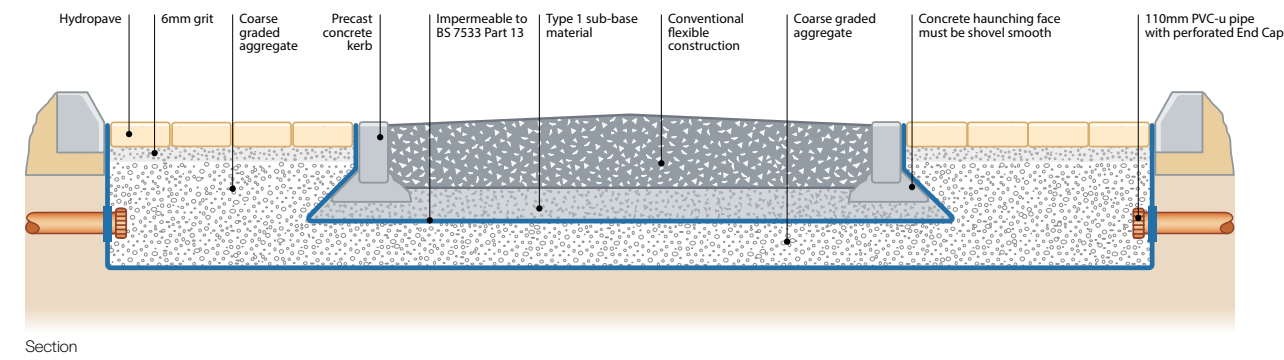
Note: Lateral restrains are recommended on sloping sites greater than 1 in 20.

Road attenuation

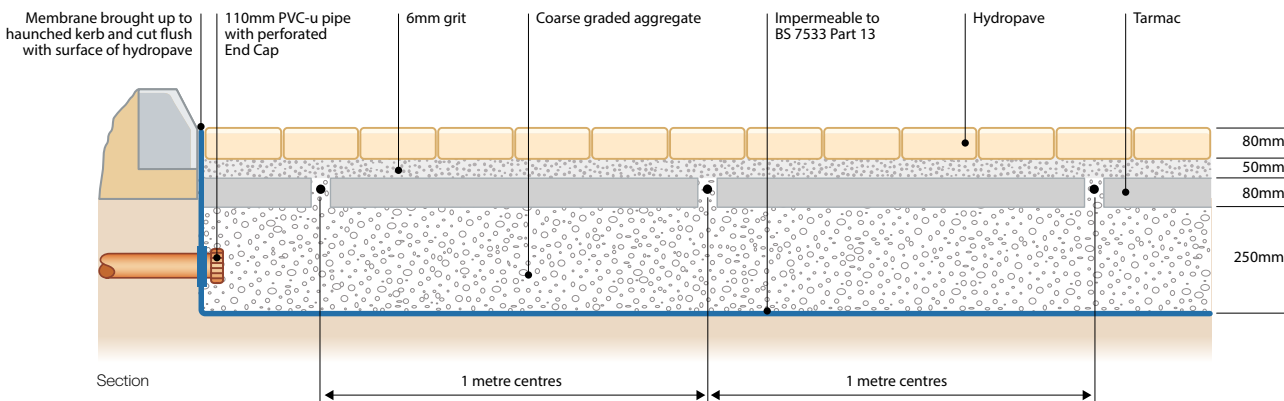
Hydropave road attenuation system



Hydropave road attenuation system

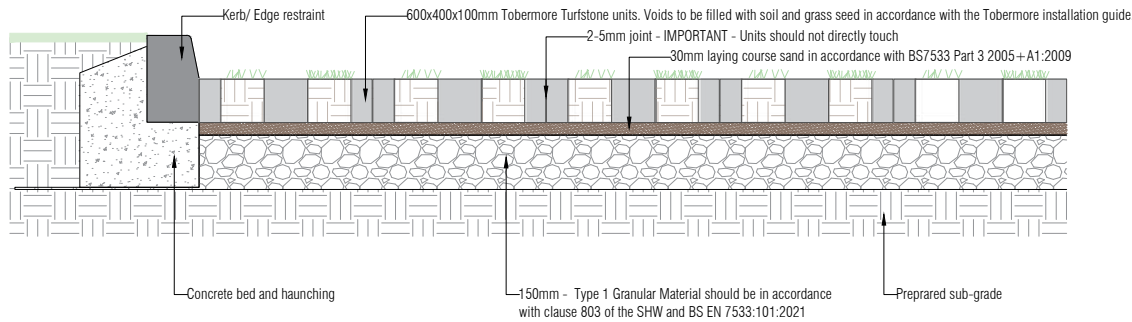


Hydropave road adoption/temporary running service

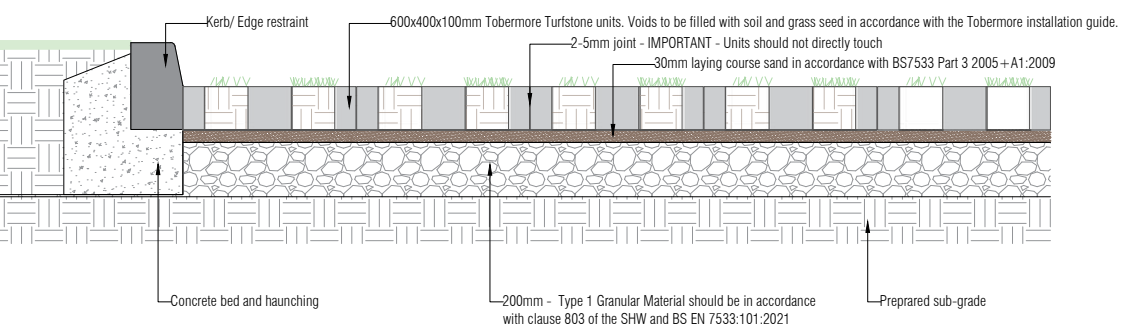


Turfstone designs

Domestic driveways

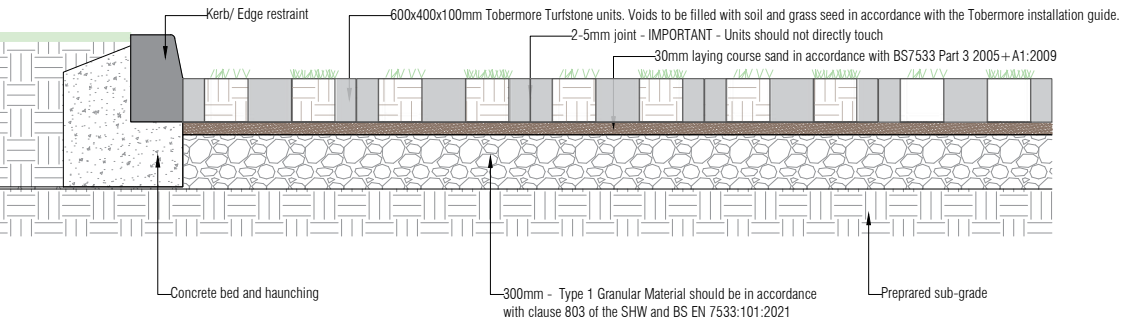


Car Parks (Cars & light vans < 3.5t) and fire tender access



Areas receiving up to 7500 equivalent standard axle loads (ESALs) over a 25 year design life

(For example; 1-2 bin lorries per week or, 3 buses / coaches per week or, 2 HGVs per week)



Important notes for Turfstone

Designs are based on a 3% CBR.

Voids should only be filled with soil and grass seeds. (Gravel must not be used) The grass must be allowed to establish before trafficking by vehicles.

Turfstone must be installed in accordance with the Guidelines for the installation of Tobermore Turfstone.

Turfstone is not suitable for applications subjected to regular trafficking by commercial vehicles.

Turfstone is suitable as a pedestrian walkway when suitable footwear is worn. Stiletto heels would not be suitable for a Turfstone walkway.

Disabled access - Due to the grass filled nature of the voids, a Turfstone surface is not ideal for those using wheeled mobility devices, people with restricted mobility or those who are visually impaired.

Appendix 1

Opening & reinstatement of permeable paving

Important

The appointed contractor should have prior experience and knowledge of the installation method and materials which are required when installing permeable concrete block paving as these are different to non-permeable concrete block paving.

The ongoing infiltration effectiveness of a permeable paving system relies heavily on the use of the correct aggregates for the sub-base layer, bedding layer and jointing.

All materials used for reinstating should comply with BS 7533-13.

Removal and excavation method

- Remove as much jointing material from the joints around the first block/slab using a trowel to allow easier removal.
- Use an extractor tool to remove the first unit. It will now be possible to remove further units.
- Remove blocks/slabs at a minimum of 1m either side of the area to be accessed.
- Lifted units should be cleaned with a stiff brush and stacked to the side of the area.
- The laying course material should now be removed and disposed of.
Note: Laying course material should not be reused.
- Excavate the sub-base aggregate and place onto a polythene sheet beside the excavated area.
Note: the sub-base aggregate can be reused.
- Any geotextile/geogrid or impermeable membrane materials that are found should be cut out, removed and disposed of.
- Carefully excavate aggregate from over and around the services/pipework/fittings and keep for reuse.
- Carry out maintenance, repairs or inspections.

Reinstatement

- Reinstall products in accordance with BS 7533 Part 3.
- If needed, measure and cut a new piece of geotextile/geogrid/impermeable membrane. The new piece should allow for an extra 300mm for overlapping onto the existing material.
- Tape it securely in place.
- If a welded impermeable membrane has been installed, this will need to be correctly welded again.
- Replace the previously removed sub-base aggregate and compact in two layers.
- Install the laying course using fresh material screeded to a depth of 50mm. This material should be 6.3-2mm grit in

accordance with BS 13242. See Table 1 for typical grading for this material.

- Reinstall the blocks/slabs to the original pattern and compact.
- Brush in fresh jointing material. The material for jointing should be the same material used for the laying course. (Table 1)
- Brush off excess material and compact. It will be necessary to repeat this process 2-3 times to ensure the joints are completely filled to the top.

Permeable paving close to buildings (5m rule)

Currently the Building Regulations Approved Document H states that infiltration devices including swales, soakaways and filter drains should not be constructed within 5m of a building or road.

However, as permeable paving allows water to infiltrate into the ground in a similar way to a lawn or flower bed it may be used close to buildings as it provides dispersed, rather than 'point', infiltration.

The government has clarified that the guidance in Approved Document H does not apply to System C. However, when a concentrated outflow (such as a roof drainage outlet) is used, it is important to ensure the stability of the building. This can be achieved by limiting the paving to an appropriate distance from the building. **(See figure E)**

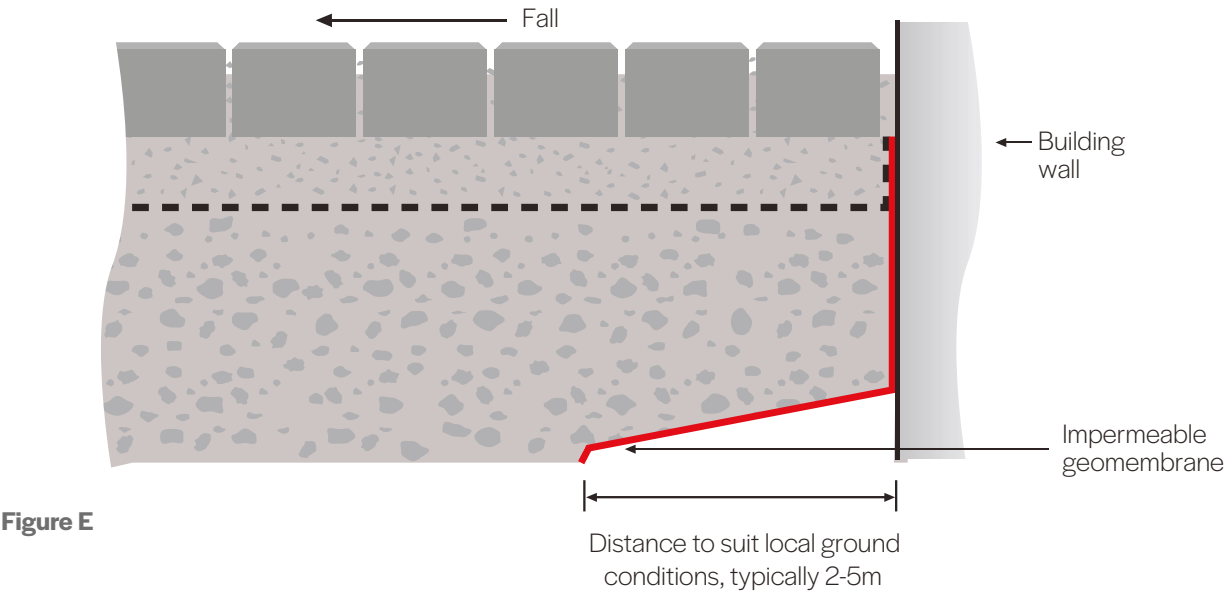


Figure E

Services/utilities

Ideally, at design stage, consideration should be given to the placement and location of underground utilities and, where possible, these should be placed beneath areas of non-permeable paving for easier access and reinstatement.

Different colours of paving can be used to visually differentiate an impermeable footpath containing services from permeable paving in car parking bays. Colours can also be used to distinguish an impermeable service crossing from a permeable road. **(See Figure D)**

However, if it is necessary to place utilities under pavements surfaced with Hydropave permeable paving, the paving can be lifted for access to enable maintenance etc. When reinstated correctly the paved surface does not show an ugly scar which is often the case with other types of surfacing materials. **(See Appendix 1 for “Reinstatement of permeable paving”)**

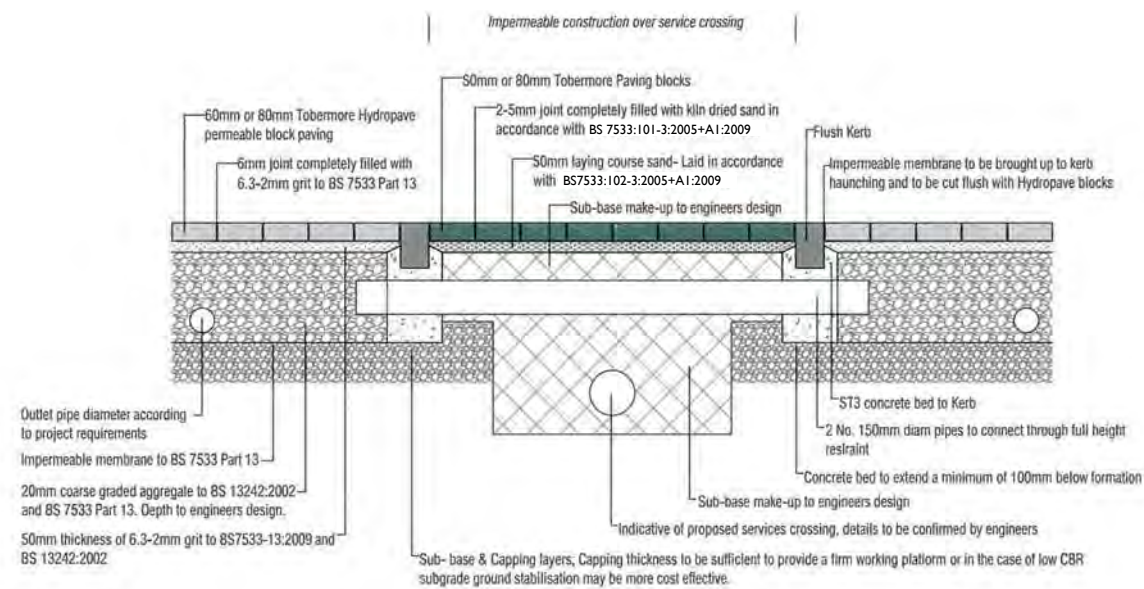


Figure D





FAQs

Answers to common questions about Hydropave permeable paving products, covering everything from ground conditions to maintenance.

Are Hydropave paving blocks suitable for sloping sites?

YES

Slopes on a site will affect the volume of water storage within the sub-base. Consideration should be given to this during the design process. To compensate for the slope, the inclusion of baffles or integrating terracing will increase the amount of storage.

Can Hydropave only be used on sites where the ground has good permeability?

NO

Where the infiltration capabilities of the subgrade rules out using a Type A or B design, system C can be used to provide temporary storage and a slow controlled outflow from the sub-base. The source control and water cleaning benefits are not compromised and are the same as would be achieved by using a Type A or B design.

Do Hydropave surfaces require a lot of maintenance?

Maintenance is minimal – it is no more extensive than for conventional block paving and less than for gulley and piped drainage. There is now sufficient long-term experience in the UK to endorse the minimal maintenance requirements of CBPP (concrete block permeable paving) now recommended by MPA Precast. It is also important to remember that any problems with CBPP would become apparent on the surface with a visual inspection, unlike the complex below-ground inspections needed for pipe drainage.

Hydropave permeable paving relies upon its ability to infiltrate surface water through its joints into a sub-base beneath. Hydropave permeable paving requires much less maintenance than is perceived by many. However, maintenance of the pavement should be carried out when necessary to ensure the infiltration of the paving is maintained and the paving is kept looking at its best. During design, construction and after construction care should be taken to ensure that the paved area is protected and maintained to minimise clogging of the joints.

With age and use, detritus and silt collect in jointing material at the top of the joints. This forms a thin crust-like layer over the joints. However, this does not severely impact the ability of the joints to infiltrate surface water. Research has demonstrated that, whilst the infiltration rate of the joints decreases over time, it stabilises and still exceeds UK & Ireland hydrological requirements. A major benefit of permeable paving over traditional drainage systems is the ability to quickly and cost effectively assess that it is working correctly. This can be done by visually inspecting the paved surface during or following heavy rainfall.

In general, routine visual inspections are all that is required to determine whether or not remedial maintenance is required. Any infiltration issues are shown up by water ponding on the surface of the paving. If ponding is not visible then remedial action is not required. Frequency: Once a year during or following heavy rainfall.

Remedial maintenance for ponding: If surface water ponding is visible the joints should be brushed and vacuumed. Brushing and vacuuming should be carried out in a manner which ensures that the paving blocks are not damaged and that jointing material is not removed from the joints. Any jointing material which is removed must be replaced, refer to Figure 2 for correct grading of jointing material. The size of sweeper used will be dependent on the overall size of the paved area. A range of

large mechanical sweepers are now available as well as smaller lightweight equipment. These are available from specialist companies.

The structural integrity of permeable paving may be compromised if the joints are not filled to the top with jointing aggregate. It is good practice to complete a trial area first and then any adjustments to suction rates can be made if necessary. The effectiveness of Hydropave permeable paving is not significantly compromised by moss, leaves or weeds on the surface as these are not impenetrable barriers.

Important

Avoid dumping soil, mulch, sand or other loose materials onto the surface of permeable paving.

Always protect the surface using polythene or wooden sheets.

Frequency: As and when required.

Rainfall experienced in the UK & Ireland is typically 20mm per hour with an extreme rainfall event being 75mm per hour. Research has concluded that the infiltration capacity of a newly installed permeable concrete block paving is over 4,000mm per hour. The bedding course and sub-base aggregates will have an even higher infiltration capacity.

The UK guidelines require the infiltration rate of the surface joints to be 400mm an hour which is only 10% of the actual rate of newly installed permeable paving. Even allowing for clogging over the long term, there is a large factor of safety built in.

Does the Hydropave system improve the quality of water?

YES

Numerous research studies have been carried out in the UK and around the world which demonstrate the efficacy of permeable paving at removing pollutants from the water as it flows over the paving units and filtrates down through the aggregate in the paving joints and sub-base.

Will the Hydropave joints become clogged and stop the water infiltrating?

NO

An independent study concluded that surface water will still infiltrate through the joints even if they appear clogged. The conclusion of the study found that even after allowing for clogging, the long-term infiltration capability of permeable paving will in most cases substantially exceed UK & Ireland hydrological requirements.

Can Hydropave deal with heavy trafficking?

YES

Hydropave block paving has been extensively installed in areas subject to heavy traffic loadings. The British Standard design code BS 7533:13 provides sub-base design recommendations for a range of different traffic scenarios.

Can services be placed beneath Hydropave?

Best practise is to isolate services wherever possible from permeable paving. This is because it is easier to reinstate standard non-permeable paving than permeable. Service corridors can be placed under conventional block paving. Soakaway design requires the 5m rule.

Do you require a soakaway design for permeable paving?

NO

Permeable paving disperses the infiltrated water across a large area which is different to soakaways. However, it is important to manage the volume of runoff if, for example, roof water is being discharged into the sub-base.

Next steps

If you are interested in planning and completing a Hydropave permeable paving project, **please contact** sales@tobermore.co.uk. We are on hand with our Civil Engineering partners to assist you with our permeable paving design service, and answer any queries you may have about any stage of your permeable paving journey.

We're here to make hard landscaping easy for you.



Instructions & warnings

Stay informed: Scan for important guidance.

To ensure the best results when using Tobermore products, we've made our latest installation guidelines, care instructions and product warnings easily accessible online.

Always up to date

Get the latest product and installation information.

Expert advice

Best practices for achieving a high-quality finish.

Care & maintenance

Tips to keep your products in top condition.

Troubleshooting

Guidance on common issues and how to resolve them.

Simply scan the QR code below to access everything you need for a smooth installation and long-lasting results.



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