



permeable paving

for adoption



GUIDANCE FOR ACHIEVING
SUCCESSFUL LOCAL AUTHORITY
ADOPTION OF PERMEABLE PAVEMENTS

Interpave

THE PRECAST CONCRETE PAVING
AND KERB ASSOCIATION



www.paving.org.uk

Introduction

This document was originally published in December 2007 and is intended to help local authority planning, drainage, highways and adoption officers, as well as developers and their consultants, with adoption issues. It should be read in conjunction with Interpave's document *Understanding Permeable Paving* which provides essential information on all aspects of permeable pavements. It differentiates concrete block permeable paving (CBPP) from other SUDS techniques and makes the case for its adoption as a matter of course.

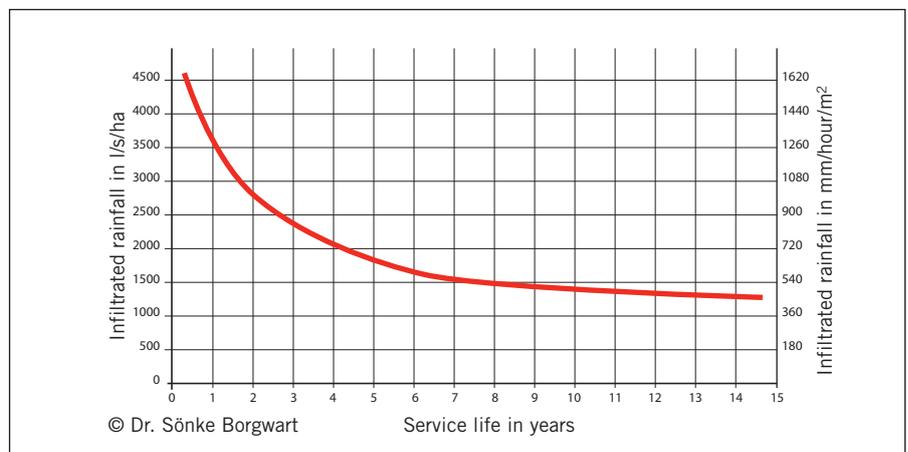
Adopting SUDS

Current governmental planning guidance throughout the UK clearly requires use of Sustainable Drainage Systems (SUDS) on all developments wherever possible and also encourages planners to take a central role in coordinating adoption. This requirement is supported by Building Regulations and other national guidance, including the 'Manual for Streets' and 'Code for Sustainable Homes'. Importantly, draft legislation for England and Wales published during 2009 seeks to make sustainable drainage systems (SUDS) effectively mandatory on all new developments.

Several local authorities have already taken a lead and embraced the adoption of SUDS, including permeable paving, successfully using existing legislation, such as Section 38 of the Highways Act, 1980. Others, however, have raised concerns about some SUDS techniques and resisted adoption – a situation which government is set to change.

If it takes effect as intended in 2011, the Flood and Water Management Bill will apply to surface water drainage from all new buildings and roads in England and Wales. Current arrangements for approval, construction, maintenance and adoption of conventional piped drainage will be replaced with similar procedures for SUDS. A new role for local (unitary and county) authorities as 'SUDS Approving Bodies' (SABs) will be established and they will be required to adopt all SUDS schemes except single properties.

Action is also being taken in Scotland where a steering group has instigated comprehensive guidance on SUDS for adoption. A draft version of SUDS for Roads was launched in September 2009. In any event, there is a strong case for a different approach to CBPP than for other SUDS techniques.



Typical reduction of surface infiltration rate over time.

Unique characteristics of CBPP

While most SUDS techniques fall outside the immediate highway area, CBPP simply provides a sustainable alternative to conventional impermeable paving and drainage systems.

So, at adoption it will itself become the highway and it is appropriate for it to be treated similarly to conventional highways and associated drainage. While CBPP is popular as part of a management train comprising various SUDS techniques it can equally be used in isolation or to improve conventional drainage systems.

CBPP uses established engineering technology and has predictable performance proven over decades in the UK and abroad. For example, in Germany – where over 20,000,000m² of permeable pavements are installed annually – it is treated as standard highway construction. There is also a wealth of experience in the UK with **Interpave** members developing a wide range of products over the years.

CBPP performance

Concern is sometimes expressed about the potential for clogging up with CBPP. Research and experience shows that the infiltration rate will decrease but stabilise with age, as shown above, due to the build-up of detritus in the jointing aggregate.

The design allows for this factor and studies have shown that the long-term infiltration capability of permeable pavements will normally substantially exceed UK hydrological requirements without maintenance.

Maintenance costs

It is recommended sweeping is undertaken twice a year as a precaution against clogging, but this is no greater than is normally undertaken on traditional pavements. However, experience suggests that this is rarely carried out. Recent independent research available at: www.paving.org.uk has demonstrated that Whole Life Costs are similar or lower than conventional materials with piped drainage.



Steps to successful adoption

Although CBPP is now a mainstream technology, it is essential to follow basic precautions during design, construction and any reinstatement. Ideally CBPP should be free of statutory services, to avoid the need to excavate for future maintenance work to these services. Taking the following precautions and making full use of Interpave guidance will ensure that CBPPs are non-problematic, low-maintenance, long-life assets.

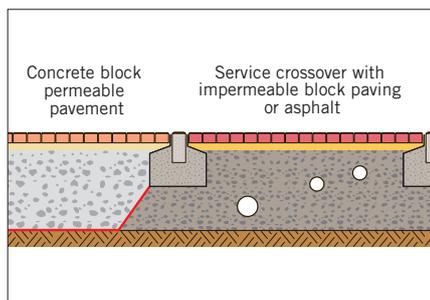


Planning ahead

Full liaison and discussion between all stakeholders is essential from the earliest stage – before a planning application – and must include adoption officers. Planners should remember their key role as SUDS coordinators, required by governmental guidelines.

Layouts for statutory and other services

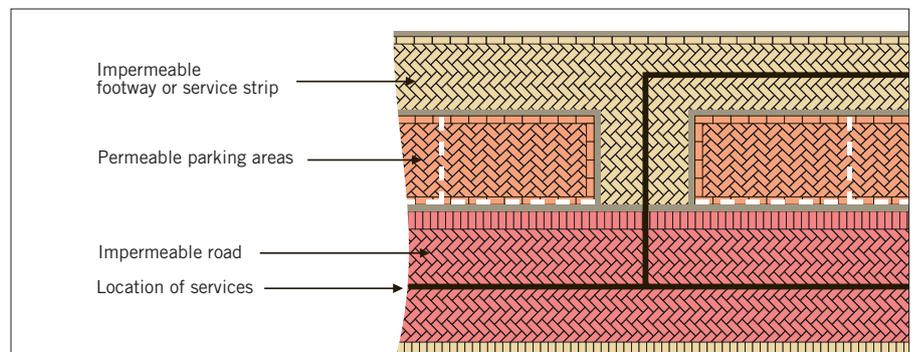
This issue is of fundamental importance to the long-term performance of CBPP. It is not necessary to design all surface



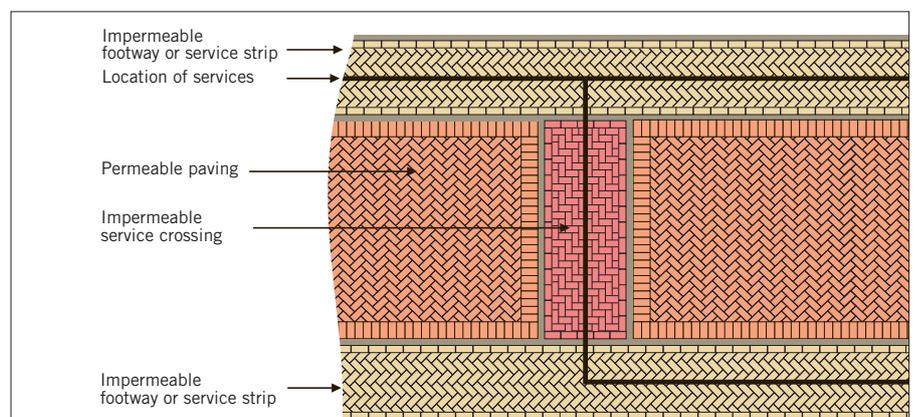
Cross section of a typical service crossing using impermeable pavement construction within a concrete block permeable pavement.

areas as permeable, as CBPP can cope with runoff from adjacent impermeable surfaces, including roofs, based on a rule of thumb ratio of 2:1 impermeable: permeable. With careful layout design, services and utilities can be located within conventional impermeable areas, service corridors or verges, avoiding the CBPP, negating the need to excavate and removing the risk of disturbing the CBPP to access these services.

This approach can also form a key part of the overall layout design both visually and technically, allowing designers to use their imaginations and



Plan of an alternative layout with services in an impermeable road.



Plan of a typical service crossing using impermeable pavement construction within a concrete block permeable pavement.

realise the aspirations of the 'Manual for Streets'. For example (as shown above), an impermeable central carriageway might be employed to contain services, visually differentiated from CBPP parking bays. Or impermeable service crossings could also be used as pedestrian ways, clearly differentiated from CBPP intended for vehicles.

Design

Interpave's comprehensive *'Permeable Pavements – Guide to the Design, Construction and Maintenance of Concrete Block Permeable Pavements'*

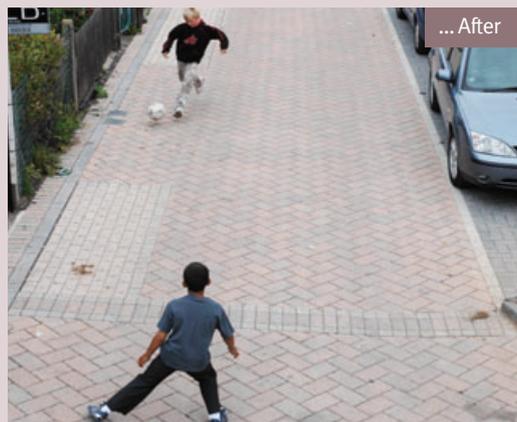
provides the latest methodology for CBPPs to:

- Support the traffic loads
- Manage surface water effectively (i.e. provide sufficient water storage)

This document includes advice on the location and depth of appropriate soakage tests to replicate a permeable pavement, rather than a soakaway. It also deals with layouts and detailing suitable for CBPP, and a growing library of standard details and other best practice advice can be found on www.paving.org.uk.

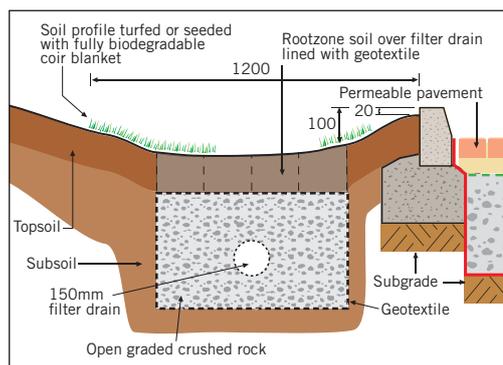
BRISTOL

Retrofitted concrete block permeable pavements at a Home Zone in Bristol, subsequently adopted by the local authority.



Landscaping

Landscaping should be designed so that it does not cause soil and mulch to be washed onto the permeable pavement and cause clogging. Detailing of the landscape edge is especially important.



A typical Interpave standard detail – in this case a landscaped perimeter.

Construction work

Preventing and diverting impermeable contaminants such as soil and mud from entering the base and pavement surface both during and after construction are imperative to ensure that the CBPP

remains permeable throughout its design life. Simple practices such as keeping muddy construction equipment well away from the area, installing silt fences, staged excavation and temporary drainage swales which divert runoff away from the area should be considered. Often there is a need to use roads and hardstanding areas as temporary routes during construction.

Obviously, this would quickly block the open graded permeable sub-base with mud. There are various solutions available, all described in the Interpave guide available via www.paving.org.uk.

General maintenance

While maintenance requirements are minimal, basic programmes should be put in place – whether for the local authority’s own staff or outside management company – for inspection every six months for the first 2 years of use to check for:

- adequate quantity of jointing material in the joints
- silting up of joints

- weed growth
- discharge (for Systems B and C)
- general structural integrity

Long-term management

‘As constructed’ drawings should be provided so that areas of CBPP can be identified in future and the area designated a ‘Road of special engineering importance’ to protect the CBPP from abuse during later works.

Committed sums

Some adoption authorities apply ‘Committed Sums’ to SUDS techniques recognising that they fall outside the highway area (such as swales and ponds) or require a higher level of maintenance than normal. Neither applies to CBPP and there is a strong case not to use any committed sums.

By applying standardised details, specification and guidance (available from Interpave) – just as conventional highway construction – adopting authorities can have confidence in the long-term performance and life span of CBPP and consider it a mainstream technology.

OXFORDSHIRE

Oxfordshire County Council has been particularly active in encouraging the use of CBPPs, taking a positive and pragmatic approach to adoption.



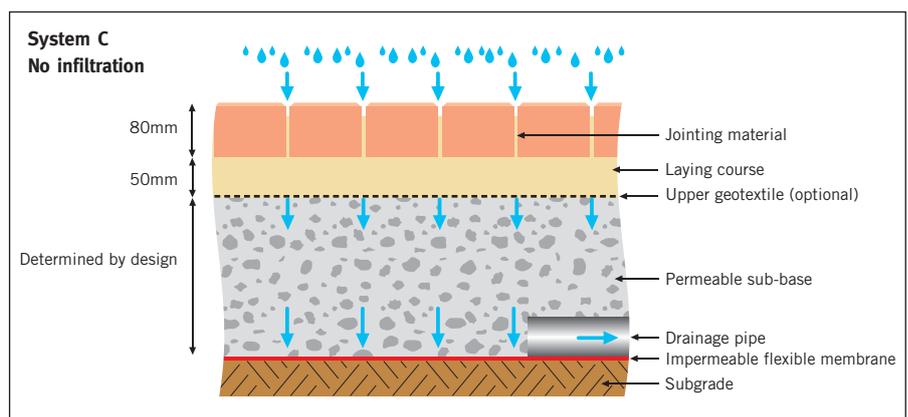
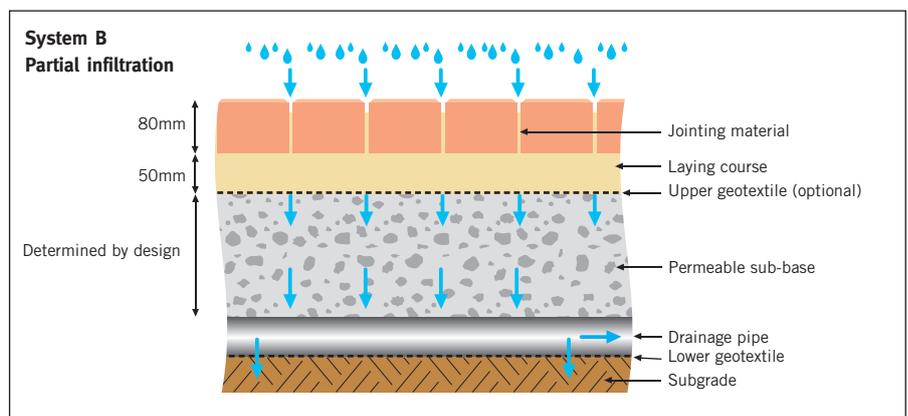
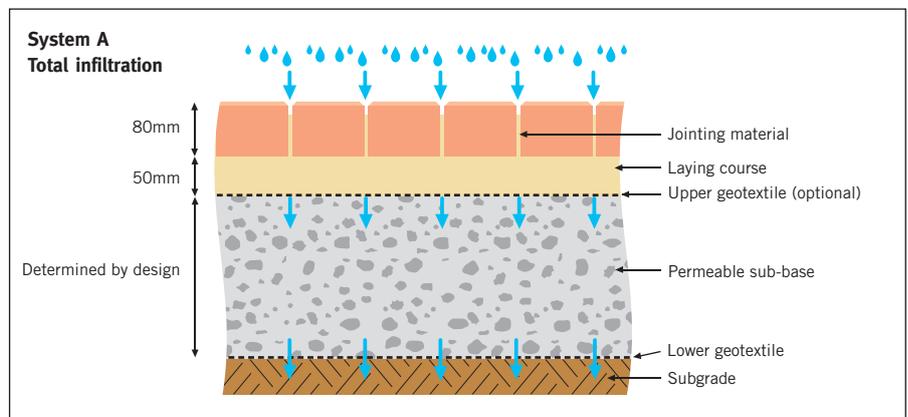
Concrete block permeable paving



Concrete block permeable paving is a unique sustainable drainage system with important attenuation and pollution source control characteristics. It provides an attractive pavement surface suitable for trafficking that also acts as a drainage system. More information is available in *Understanding Permeable Paving* available on the Interpave website www.paving.org.uk

In conventional pavements rainwater is allowed to run across the surface to gullies which collect and direct it into pipes which remove it as quickly as possible, as it is undesirable to allow water into conventional sub-base material. In contrast, concrete block permeable pavements have a dual role and also act as the drainage system as well as supporting traffic loads. They allow water to pass through the surface – between each block - and into the underlying permeable sub-base where it is stored and released slowly, either into the ground, to the next SUDS management stage or to a drainage system. Although particularly popular for new projects, CBPP can also be retrofitted to sites, for example during refurbishment work or as part of a planned operation to reduce storm-water runoff and improve quality.

- CBPPs provide a structural pavement while allowing rainwater to infiltrate into the pavement construction for temporary storage.
- It is well established that CBPPs play an important part in removing a wide range of pollutants from water passing through them.
- The treated water can then infiltrate to the ground, be harvested for re-use or released to a water course, the next SUDS management stage or other drainage system.
- CBPPs are suitable for a wide variety of residential, commercial and industrial applications.
- They optimise land use by combining two functions in one construction: structural paving combined with the storage and attenuation of surface water.
- CBPPs can handle rainwater from the pavement itself, as well as from roof drainage and impervious pavements.





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