July 2021

Uniclass L534:L217

- Project re-visit to assess 17-years continuous use
- On-going performance with minimal maintenance
- On-site testing confirms long-term permeability
- Benefits of permeable paving for trees demonstrated

MARTLESHAM PARK & RIDE SUFFOLK

EDITION 2

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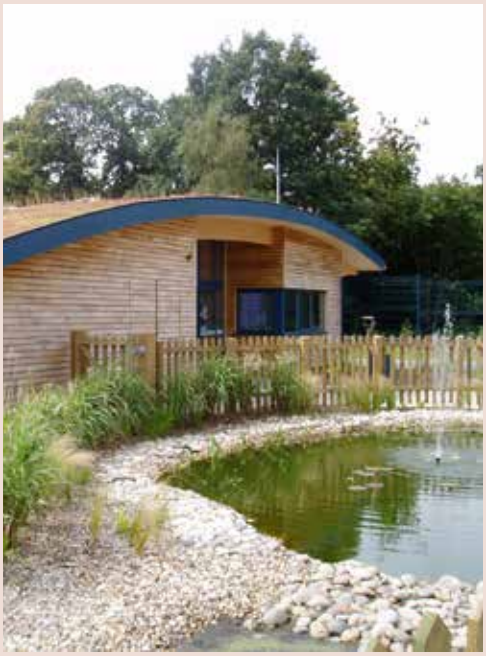
THE PRECAST CONCRETE PAVING AND KERB ASSOCIATION

INTRODUCTION



In 2003, Interpave reported on the new Martlesham Park & Ride facility, published again here on pages 2 and 3. In 2020, an Interpave member re-visited the project, interviewed the original designer about long-term performance of concrete block permeable paving (CBPP) and carried out permeability trials, summarised on page 4. A video of the interview and detailed report on these and other project trials are also available.

Project Overview

The Park and Ride facility at Martlesham was one of Suffolk County Council's top priority transport schemes and the third park and ride to be built serving Ipswich, offering sustainable transport alternatives to the car. Designed by Suffolk County Council Environment and Transport, it was also the first large-scale CBPP project to be undertaken by the Authority. Following extensive public consultation, the park and ride scheme formed part of Suffolk County Council and Ipswich Borough Council's Transport Strategy, which included plans for five park and ride schemes around the town aiming to dramatically reduce the level of traffic congestion within Ipswich.

The Martlesham site was chosen for its prime location on the eastern side of town and accessibility to the junction of the Ipswich eastern bypass. This choice followed extensive consultation and a detailed examination at a public enquiry. The location and access advantages of the site outweighed any potential adverse environmental effects that development might have had on the site and surrounding area: the site is part of a designated 'Special Landscape Area' and also part of a 'County Wildlife Site' with areas of acid grassland.

Project Design

The site occupies a total of 3.2ha with space for 530 cars. The key challenge for the project was to mitigate the adverse environmental and landscape effects of the development. This included a terminal building – designed by architects Mouchel with landscape architects The Landscape Partnership – with a green roof for low-impact on the landscape and rainwater attenuation. All the grey and foul water from the terminal building is treated in a reed bed with no public sewer connection needed, making it a completely zero discharge site.

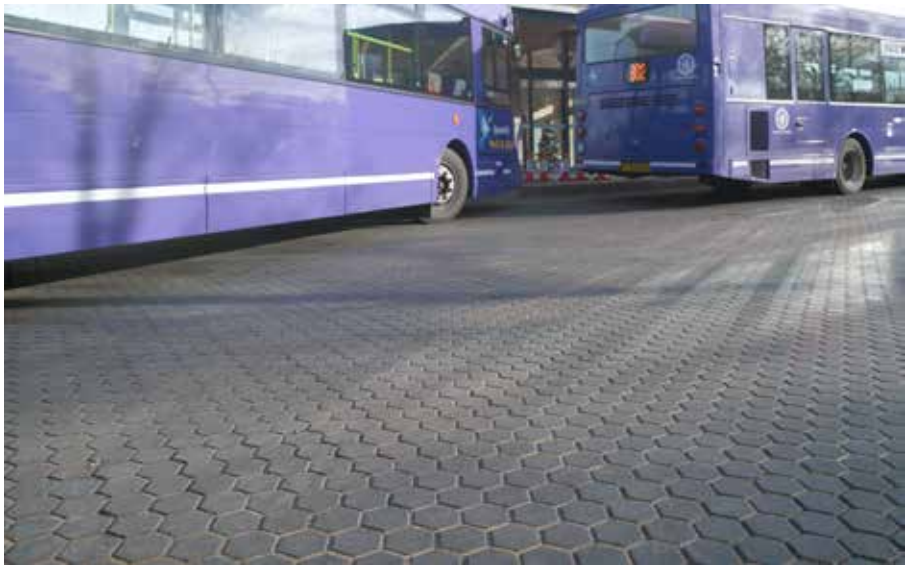
Incorporating SuDS techniques into the overall design reflected the sustainability credentials of the Park and Ride concept. A complete paving solution was also required to create a surface of high industrial strength to withstand heavy vehicles, as well as attractive and accessible pedestrian areas. Overall design objectives included:

- Visually attractive CBPP capable of full infiltration of rainwater to the ground
- Effective car park lighting with minimum impact on surrounding landscape and wildlife habitats, and optimised energy use
- Landscaping with extensive planting of indigenous trees to complement local flora and habitats, and a layout to accommodate the existing trees
- Provision of bat and bird boxes to encourage colonisation within the site.

COMPLETED PROJECT 2003

The project utilised 14,000 m² of CBPP for circulation, parking and pedestrian areas. Local conditions allowed for a 'System A' form of construction with total infiltration of surface water to the ground. Here, all rainwater falling on the CBPP, and adjacent impervious areas draining onto it, infiltrates through jointing material, the constructed layers below and eventually into the subgrade. This effectively eliminates the requirement for additional drainage systems whilst also recharging the natural groundwater.

Performance tests carried out at the time at Martlesham Park and Ride, replicated a 20-year in-service lifespan and demonstrated that the stability of the surface would be retained with CBPP construction. In addition to the CBPP, some 1,400 m² of impermeable block paving for bus access areas and 1,300 m² of flag paving for pedestrian areas were also installed at the project. Since completion, the number of people using the park and ride scheme gradually increased with a high level of regular customers. The local residents were pleased with the new service and have been extremely complimentary about the site design and facilities.



This substantial and impressive example of CBPP forming part of a completely sustainable facility, clearly demonstrates:

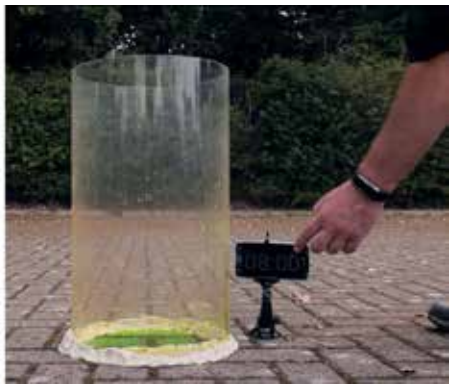
- Elimination of traditional drainage components including pipes, gullies and soakaways
- Potential for total cost savings over other pavement types, including asphalt with traditional drainage
- Maintenance of stability of CBPPs under traffic and in different applications
- Ability for CBPP to replicate original drainage before intervention, therefore minimising impact on the environment
- Compliance with planning guidance and Building Regulations, requiring local infiltration wherever possible.

PROJECT RE-VISIT 2020

Martlesham Park and Ride was one of three older projects where field tests were undertaken by an Interpave member to better understand the effect trafficking, weathering and time have on CBPP systems. To measure the permeability of these existing CBPP pavements, the trials used the American Standard ASTMC1781/ C1781M method.

The research demonstrates that all three CBPP sites tested, despite receiving no specific maintenance to improve permeability, still provide infiltration rates that would cope with any likely UK rainfall event.

The Martlesham project was also the subject of a video showing the trials. In this test 10 litres of water in a sealed tube created a head of about 140 millimetres – equivalent to more than a month of heavy rainfall. Here, the surface absorbed the 10 litres of water in 8 minutes and 1 second, equivalent to a rainfall intensity of 1,055mm per hour. For context, the heaviest UK rainfall event in history was 92mm per hour.



The video also includes an illuminating interview with the original project designer about long-term performance and maintenance, and also the benefits of CBPP for trees. Constructed in 2003 and with around 500 car spaces, the 13,000 m^2 of concrete block permeable paving has delivered problem-free performance over 17 years.

The grit-filled joints do have moss in them but, as a porous substance itself, water passes through without problems. The site is surrounded by vegetation, with some tall trees and well-established shrubs. Maintenance has effectively been cosmetic – occasionally sweeping tree debris and vegetation from the surface after storms and leaf fall in the autumn.

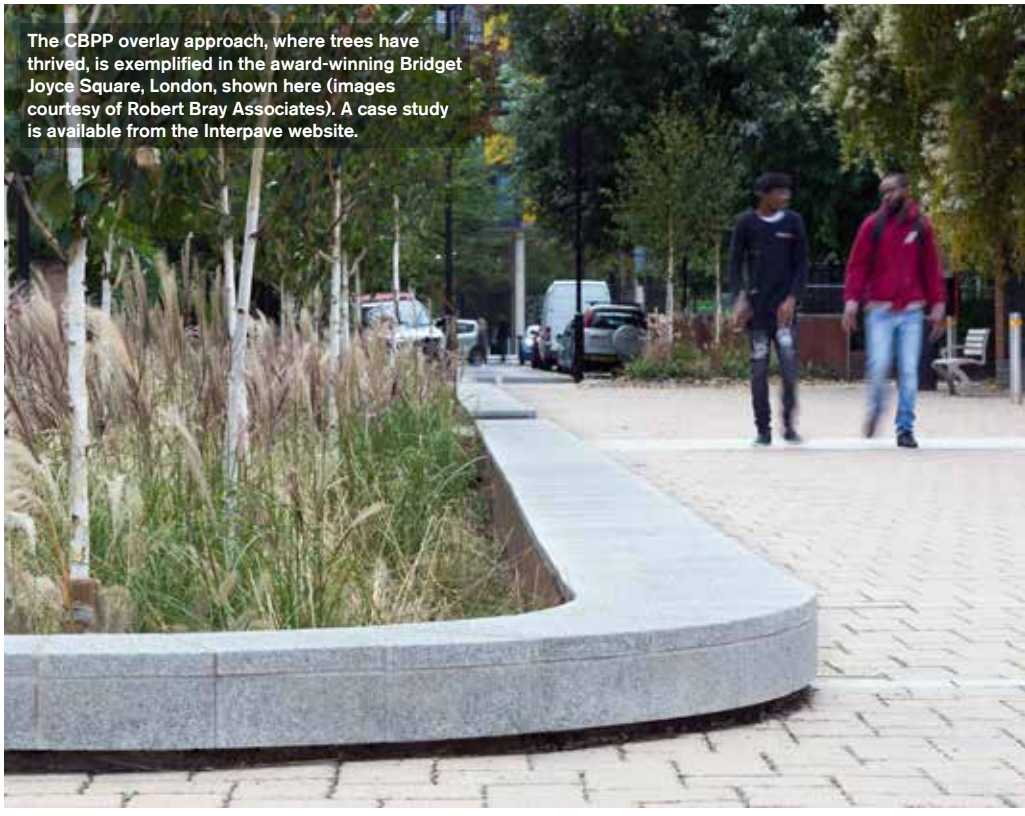
Extensive mature trees around and within the site were simply retained as part of the scheme. The CBPP removes pollutants from water passing through, providing treated water sustenance for trees. The roots have continued to grow within the permeable pavement sub-base but – importantly – there have been no visible signs of block rutting or lifting, or roots coming through the surface. The designer's only regret at the time was not to do more with rainwater conveyance and storage within the CBPP and raingardens specifically for tree and green infrastructure sustenance.

PERMEABLE PAVING FOR TREES

Retaining and introducing trees, and other green infrastructure, within our towns and cities is now a key planning requirement. For example, the National Model Design Code says: 'All schemes will be expected to follow national policy by achieving a 10% net gain in biodiversity. All new streets should include street trees'. Urban design that enables sustenance of green infrastructure is therefore crucial. But measures must be put in place to nurture and allow trees to mature, enabling them to actually deliver their real potential – including net carbon storage, urban cooling through shading and evapotranspiration, biodiversity and public wellbeing.

As CBPP allows the same pattern of run-off transfer to the ground as natural vegetation, it allows water to reach tree and shrub roots, despite providing a hard surface above. This is endorsed by the current Code of Practice for accessibility in the external environment, BS 8300-1:2018, which states that: *'Tree grilles should be avoided. Smooth or paved permeable surfaces should be used wherever practicable'.*

In addition to new permeable pavements for developments, CBPP overlays to existing, conventional road bases, used in conjunction with raingardens or bioretention areas, offer major opportunities to convey, treat and store water for irrigation while regenerating the public realm with attractive shared surfaces.



The CBPP overlay approach, where trees have thrived, is exemplified in the award-winning Bridget Joyce Square, London, shown here (images courtesy of Robert Bray Associates). A case study is available from the Interpave website.

Interpave Information Resource

A full report on this research and project video – as well as more information, detailed guidance and case studies on concrete block permeable paving – are available from the Interpave website.

Interpave is a product association of the British Precast Federation Ltd.

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