

water harvesting

# rainharvesting with permeable paving



The Hazeley School in Milton Keynes – featured in an earlier issue of *Pave-It* (May 2006, page 8) – used concrete block permeable paving in a number of innovative ways including controlling the flow of water down a steeply sloping site, providing clean runoff for wildlife ponds and preventing newts and other wildlife disappearing down gully pots. The next phase focuses on permeable paving as a collector and cleaning mechanism for rainharvesting, described by Bob Bray.

Robert Bray Associates, in association with SEL Environmental and Rainharvesting Systems Ltd., have developed a rainharvesting model that uses roof water, playground runoff and rain falling directly on permeable paving to provide a low maintenance rainwater use facility for the new Hazeley School complex.

The system relies on rainwater collection from low pollution risk surfaces, including roofs and playgrounds. The permeable pavement collects direct rainfall, runoff from adjacent hard play surfaces and roofwater (directed onto the paving from ‘shoes’ on downpipes, discharging across surface channels). The collected rainfall passes through the joints in concrete block permeable paving, bedded on 6mm grit and a filter geotextile, directly into a geocellular storage box. This polypropylene geocellular box is enclosed in a second filter geotextile, with a waterproof polypropylene geomembrane to the sides and base, to form an open topped tank. The tank can overflow at the edges into the existing SUDS system. This arrangement filters and treats the water before it passes into storage or overflows to the SUDS system.



Robert Bray Associates has been designing SUDS schemes since 1996, including Motorway Service Areas such as Oxford and Hopwood – early EA ‘demonstration sites’, housing, public parks and schools. The practice is at the forefront of innovation and promotion of this new approach to managing rainfall on development sites. Bob Bray has presented conference papers on the subject and contributed to a number of guidance documents, notably the new ‘SUDS Manual’ CIRIA 697.

## IMPORTANT BENEFITS

A pump chamber delivers cleaned rainwater to a header tank for toilet flushing in the school buildings. The system offers a number of cost and maintenance benefits, as well as an effective sustainable water resource management solution. Firstly, the permeable pavement provides a collection and surface filter function replacing the in-pipe filters generally associated with rainharvesting that require regular maintenance. All the available rainwater is collected at Hazeley, including the typical 15% wastage

experienced with normal rainharvesting systems, and surplus water overflows directly to the SUDS system within the construction. In terms of construction, the geocellular box system replaces sub-base voided stone avoiding

separate excavation, spoil removal, bespoke storage chamber, selected backfill and significant pipe connections. And, of course, maintenance requirements are minimised.

## EXTENSIVE POTENTIAL

A minimum of two SUDS treatment stages using protected filters within the pavement structure provide both silt removal and bioremediation of oils and other contaminants in the runoff. Water is stored below ground at relatively low temperatures, so that risk from bacterial contamination is reduced, which is similar to systems used throughout Europe for this type of function. This rainharvesting system is particularly suited to developments with large rainfall surface collectors, low risk sources of runoff and a significant non-potable use of water following risk assessment – such as schools (using playgrounds) or commercial developments (using car parking). It is hoped that this installation will act as a template for the use of concrete block permeable pavements as passive collectors and treatment systems for rainharvesting in future.

