



**SUDS**  
**features**  
**in private**  
**ownership**




































# SUDS features in private ownership

As explained in the earlier parts of this guide, Cambridge City Council will require source control SUDS to be provided upstream of any ponds, wetlands, basins or other SUDS features it adopts. Most source control features will be located within the private or highway areas of a development and as such will not be adopted by the City Council. The purpose of source control is to manage rainfall close to where it hits the ground instead of allowing it to become a problem elsewhere. The main types of source control that will be used in private areas are:

- Green roofs
- Permeable pavements
- Soakaways
- Geocellular storage

Other features such as filter strips, swales, canals, rills and treatment channels can also be used as source control in private areas. Water re-use features such as water butts or more comprehensive water harvesting systems are also useful additions to a SUDS system to provide an overall sustainable water management system.

### Benefits

Green roofs	Permeable pavements	Soak-aways	Geocellular storage systems
			
			
			
			
			
			
			
			
			
			

## Green roofs

Green roofs have a thin layer of soil like material known as substrate that is planted to meet the specific visual and biodiversity requirements of the roof and location. Varying substrate depths are best from visual and biodiversity points of view with thicker areas located over stronger points in a roof such as columns. Simple sedum mats offer the least biodiversity. A roof top can be an inhospitable place for plants and the planting should be designed to suit the roof and the surrounding area.

Green roofs are very effective as part of a SUDS system and can reduce the volume of ground level storage required. Further information on how to allow for the reduced runoff from green roofs can be obtained from Building Greener, published by CIRIA, and the Environment Agency's Green Roof Tool Kit.



*Green roof on a community building, Lake Ledro, Italy*

## Permeable pavements

Permeable pavements can be used in driveways, parking areas and some roads. They allow water to soak through the surface into the gravel subbase below. This temporarily holds the water before allowing it to either soak into the ground or pass to an outfall, often to another SUDS feature such as a swale. Permeable pavements are very effective at controlling the flow of water and removing pollution from it.

There are a variety of surfacing materials available. The most common are concrete or clay permeable block paving. Other surfaces include porous asphalt, reinforced grass and gravel. Further information is available in CIRIA Report C582, from Interpave and the Environment Agency. Concrete block permeable paving should be designed in accordance with British Standard BS 7533-13:2009.

It is now law in England that new and refurbished driveways in front gardens must be constructed using permeable surfaces, otherwise planning permission will be required for the construction. Their use in new developments is essential under this legislation.

There is common misconception that permeable surfaces quickly clog. Studies in the UK and elsewhere have found that there is a reduction in the permeability of the surface but in normal situations this levels off at a rate that is still more than adequate to deal with UK rainfall. If they become completely clogged they can be cleaned out with a road sweeper using a water jet and suction. Most problems occur due to clogging caused by construction debris or inappropriate levels for the adjacent landscape areas, such that dirt washes onto the surfaces.



*Permeable block paving being machine laid in Cambridgeshire*

## Soakaways

Soakaways are buried chambers that store surface water and allow it to soak into the ground. The potential to use soakaways in many areas of Cambridge will be limited because the presence of clay soils and high groundwater levels. However, where conditions are suitable they can be used to manage water from roofs, driveways and patios for individual houses. Further information is provided in The SUDS Manual (CIRIA C697).



*Reinforced grass car park surface, Lake Garda, Italy*

## Geocellular and other storage systems

Geocellular and other storage (oversized pipes, culverts, etc.) can be used to provide extra storage volume, especially in dense urban areas where open green space is limited. These features if used on their own would not be a SUDs scheme. It should be designed following the principles of source control. Geocellular storage must be designed so that silt is prevented from entering the tanks. The testing and structural design of geocellular storage systems should follow the guidance in CIRIA Report C680. These types of storage systems can double up as rainwater harvesting systems when carefully designed.



*Shallow geocellular storage used below permeable paving as a subbase replacement at a Park and Ride site in Cambridgeshire*

## Rainwater harvesting

Rainwater can be collected in water butts for watering gardens or more complicated systems can be installed for re-using water to flush toilets or for supplying water to outside taps. Larger rainwater harvesting compliments SUDS and helps to provide interception storage. Further guidance is provided in CIRIA Report C539 and British Standard BS 8515: 2009, Rainwater harvesting systems – code of practice.



*Rainwater harvesting tank being constructed below a patio, Derbyshire*