Sustainable Drainage News

The bi-annual bulletin of news and development in sustainable drainage systems

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This is the third in CIRIA's series of bi-annual sustainable drainage systems (SUDS) newsletters, which communicate the latest innovations in SUDS practices and encourage their widespread incorporation in developments.

This issue discusses collaborative work under way to promote the sharing of knowledge and experiences in the field of sustainable drainage.

SUDS in Wales

Dwr Cymru/Welsh Water held a SUDS awareness day in 2001, to promote more sustainable ways of dealing with urban runoff. At this seminar, there was general agreement that creating a Welsh SUDS working party would encourage the implementation of SUDS and stimulate greater co-operation between organisations.

A working group was established in January 2002, which aimed to:

- work in partnership to promote the use of SUDS
- protect the environment
- agree responsibilities for design, implementation, ownership and approval of SUDS
- influence legislation (especially planning procedures)
- encourage re-use of water
- monitor the performance of SUDS
- provide a source of expertise on SUDS
- provide a focus in Wales compatible with other national foci
- educate stakeholders and the public on sustainable drainage.

This is to be achieved by:

- working in partnership to promote SUDS in Wales
- developing a framework in which SUDS can be applied in Wales
- participating in the National SUDS Working Group to ensure the outcomes are of relevance to Wales
- promoting a better understanding of sustainable drainage systems, including their economic, social and environmental effects.

The group comprises representatives from the Environment Agency (Wales), the Welsh National Assembly, the Housebuilders Federation, the Welsh Local Government Association, Hyder Consulting, Dwr Cymru/Welsh Water, the Welsh Development Agency and CIWEM.

The working group would be interested in hearing about any case study sites in Wales. For further information please contact Roger Noden (02920 925000) or Gaye McKissock (0131 226 4638).

Gaye McKissock,
Hyder Consulting

In this issue

Seed heads of Typha latifolia (Reedmace) at Blythe Valley last winter.
Courtesy of Munro + Whitten

ODDS & SUDS

At the end of 2001 there were 3913 systems and 767 sites registered on the Scottish SUDS database.

Working in partnership – the South East Wedge Project Group

Maximising the potential benefits of SUDS involves the various stakeholders working together. In Scotland, a unique collaboration has been established to promote the sustainable management of surface water in a proposed major new development in Midlothian and Edinburgh.

6000 new homes will be constructed in four new or expanded local communities for the South East Wedge Development, which will cover 1370 hectares. A South East Wedge Project Group has been established to ensure the environmental potential of the new development is optimised by integrating amenity, natural habitat and urban drainage. The group comprises representatives from Midlothian Council, City of Edinburgh Council, the Scottish Environment Protection Agency (SEPA), Scottish Natural Heritage (SNH) and Scottish Water, with project management being provided by the Scottish Institute of Sustainable Technology (SISTech). As well as promoting the use of SUDS, the group also recognises the importance of linking this to the naturalisation of existing culverted and channelised watercourses in the development area.

The cornerstone of the group's work has been the production of its *environmental enhancement action plan*, which provides detailed design information for the implementation of SUDS features and the enhancement of watercourses in the development. Central to these proposals is a strategic overview of how SUDS features, watercourses and other urban green spaces in the proposed development could be linked to increase accessibility and biodiversity. This body of work already serves as a vital point of reference for the developers, master planners, planning officers and engineers involved in the development.

Writer and broadcaster Chris Baines launched the action plan in July 2002. After the launch, SEPA's diffuse pollution project manager Brian D'Arcy said: "The South East Wedge has the potential to become the UK demonstration site for integrating SUDS and river restoration. This is an opportunity to enhance as well as protect the local environment."

Funding for the project has been provided by a number of sources, including a grant from the BOC Foundation. For more information and copies of the report contact Tim Darlow (SISTech) 0131 451 8149 or email tim.darlow@sistech.co.uk

Tim Darlow
SISTech

Reedbed inlet structure. Stone-filled gabions filter and slow water into the reedbeds. *Courtesy of Munro + Whitten*

Environment Agency sponsors SUDS Science Group for England and Wales

Following the success of the Scottish Sustainable Drainage Working Party in supporting the introduction and monitoring of SUDS techniques in Scotland, the Environment Agency is collaborating with a number of English universities to establish a similar research group. The SUDS Science Group, comprising staff from the Universities of Bradford, Sheffield, Coventry, Imperial College, Middlesex and Nottingham Trent, held its first meeting in December 2001 under the chairmanship of Professor Chris Pratt.

The aims of this group are to:

- share scientific knowledge of SUDS research
- review and recommend new research in the field
- identify sites for monitoring SUDS techniques
- suggest possible sites for the retrofitting of SUDS
- widely disseminate research findings and details of activities likely to be of interest to SUDS stakeholders.

The Science Group has modelled itself on the Scottish Working Party, and is holding meetings around England and Wales with the eventual aim of drawing new members of the research community into its work. One of the group's aims is to involve universities in what will hopefully be an increasing number of field studies in their immediate vicinity, which will reduce monitoring costs.

As part of the programme of information dissemination, members of the Science Group will assist in updating the SUDS Techniques Literature Review, which is hosted on the CIRIA website (under SUDS research projects). To ensure knowledge and collaboration throughout the UK, representatives from both the Scottish SUDS Working Party and the Science Group will attend each other's meetings. Information on activities will be disseminated through CIRIA and at national events.

Professor Chris Pratt
Coventry University

Pervious pavements and specification of sub-base

The recently published CIRIA book *C582 Source control using constructed pervious surfaces*. Hydraulic, structural and water quality issues provides definitive guidance for designers on durable and effective pervious surfaces for use beneath trafficked areas such as car parks.

The sub-base of a constructed pervious system can be defined as the unbound layer of aggregate immediately below the surfacing layers. It is laid on the soil to provide a stable foundation for construction of the road pavement.

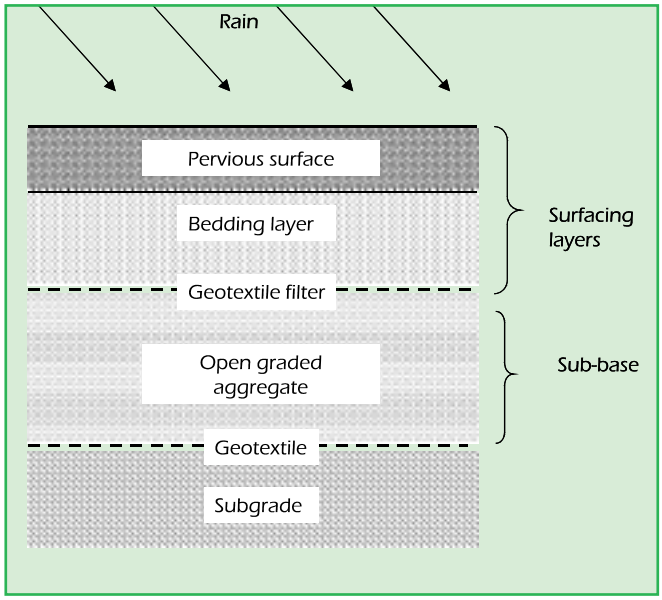
This guidance removes the common misconception about specifying sub-base, that Type 1 sub-base (Specification for Highway Works, Highways Agency et al, 1998) can be used in such systems. Designs for pervious surfaces in which Type 1 material is specified to store and/or transmit water are currently common, but it is eminently unsuitable for this purpose.

The underlying construction of a pervious surface must be able to support traffic loads and store and transmit water. The table below examines the required properties and the reasons why Type 1 sub-base is not suitable.

Specification of sub-base in Source control using constructed pervious surfaces

This book specifies the use of open graded aggregates with a high void space and high permeability instead of Type 1. It provides definitive guidance on specifying materials with an appropriate grading, strength and resistance to degradation, which should also be readily available from quarries. For more information see the CIRIA website at www.ciria.org.uk/suds

Steve Wilson
Environmental Protection Group



Pervious surface sub-base

Required property	Why can't Type 1 sub-base satisfy this requirement?
The presence of water must not significantly affect strength and stiffness.	• It can only provide necessary stiffness when kept dry and well drained. • Loading of the saturated material results in a reduction of strength and premature failure of the pavement because the fines prevent dissipation of pore pressures.*
It must have adequate pore space to store water.	• It has porosity in order of 20% 30%; typically open graded materials have 40% 50% porosity. Therefore Type 1 requires more material to provide an equivalent void space for water storage.
It must have sufficient permeability to transmit water and prevent clogging.	• It is relatively impermeable (material with a similar fines content to Type 1 was specified for a dam core, to prevent leakage*). • It does not transit water effectively. • It is prone to clogging by fine particles. • All of these result in slow transmission of water, which in turn leads to reduced strength and reduced capacity to accept further inflows.*

**Cedergren, 1974*

References

Cedergren, H R (1974). Drainage of highway and airfield pavements. Wiley Interscience

Highways Agency, Scottish Executive, National Assembly for Wales and Department for Regional Development Northern Ireland (1998). Manual of contract documents for highway works. Vol. 1: Specification for highway works. Stationery Office, London

ODDS & SUDS
Check out the UK SUDS database @ www.suds-sites.net

A landscape vision at Blythe Valley

Travellers on the M42 section from the M40 to the M6 will notice a striking new bowstring bridge near Junction 4. The bridge, however is not the only notable feature of the 220 acre Blythe Valley Business Park that it serves. The development also has what may be one of the largest SUDS in England and Wales, protecting the River Blythe SSSI, which borders the site.

Munro + Whitten, landscape architects are part of the master planning team working for joint developers Solihull MBC, Prologis and British Land. They have been involved since the planning stages in 1996, through completion, to the recent production of the 20-year landscape management plan for the park.

The two SUDS systems form an important component of the new landscape. They channel surface water from roads and roofs in the 80 acre development via swales, detention basin lakes, horizontal flow reed beds (containing Typha and Phragmites species) and a final polishing pond, discharging to the SSSI via Hawkeshaw Brook. A third pond, discharging to the second tributary crossing the site, Illshaw Brook, will act as a detention basin for future plots.

Invertebrates are sampled to monitor the quality of water entering and leaving the systems, and results have shown a steady improvement. Ecological surveys indicate that biodiversity along this stretch of the river is also increasing thanks to new habitats created from arable fields. Park workers regularly report new birds and animals coming to live on the site.

The 90 acre countryside park, currently managed by the BVP Management Company, will be handed over to a trust to ensure that the success achieved so far is maintained. The subtle charms of the countryside park are a vital element in the success of the development, and are certainly worth exploring.

David Singleton
Munro + Whitten

ODDS & SUDS

For information on SUDS further afield visit the Centre for Watershed Protection's website @ www.cwp.org

The main detention basin at Blythe Valley.
Courtesy of Munro + Whitten

Supporting CIRIA's dissemination work....

This newsletter and CIRIA's SUDS website (www.ciria.org.uk/suds) are the outputs of a project to promote good practice relating to SUDS. If you would like to sponsor this newsletter and website and participate in the project please contact CIRIA.

Sustainable drainage news has been sponsored by the following parties:

ENVIRONMENT AGENCY

EPG

Useful links and contacts

Listed below are websites, featuring SUDS work, which you may find useful:

www.ciria.org.uk/suds
www.environment-agency.gov.uk
www.boc.com/foundation
www.epg-ltd.co.uk
www.sepa.org.uk

CIRIA has recently published the following on SUDS:

C523
Sustainable urban drainage systems – best practice manual

C522
Sustainable urban drainage systems – design manual for England and Wales

C521
Sustainable urban drainage systems – design manual for Scotland and Northern Ireland

C582
Source control using constructed pervious surfaces

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