

# Sustainable Drainage News



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

Issue 9 – February 2006

This is the ninth bi-annual newsletter on sustainable drainage systems (SUDS). The newsletters aim to communicate the latest innovations in SUDS practices and encourage their widespread incorporation in developments.

## Grassed drainage – on the verge of something new...

Drainage methods used for trunk roads and motorways need to provide a safe, fast and reliable means of conveying runoff away from the road surface so that the trafficking of vehicles and the structural integrity of the road are not adversely affected. This can be achieved with grassed channels, an innovative SUDS method which differs little in appearance from a natural verge.

A research study commissioned by the Highways Agency and undertaken by HR Wallingford in collaboration with Transport Research Laboratory (TRL), demonstrated that road-edge grassed channels can fulfil their main conveyance purpose while simultaneously providing environmental benefits. These include:

- attenuation of runoff
- slower flow velocity compared with concrete channels
- reduction in sediment loads into the outfall pipe system and receiving waters
- reduction in pollution
- attractive “green” appearance.

Having a triangular or trapezoidal cross-section grassed channels for road drainage differ from swales as they need to be very shallow (150-200mm deep) so that the safety of errant vehicles is not compromised; their width is also limited by the available space in the verge, typically resulting in 2-3m wide channels.

A comprehensive research programme was undertaken from 1998 to 2005 to investigate aspects of design, construction, safety, maintenance and performance of grassed channels, including:

- suitable grass mixtures
- suitable grassing methods (turfing, hydroseeding, grassed mats)

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- hydraulic resistance of grassed channels
- sizing of the channels and method for spacing of outlets.

The constructability of these channels has been researched at TRL by building a full-scale, 50m long channel that was used for vehicle safety tests. This enabled recommendations to be made for the construction of 500m grassed channels at three monitoring sites on the M2, near Rochester.

The performance of these channels, in terms of their ability to safely convey runoff from the motorway, was monitored in 2003 and 2004. Rainfall and resulting runoff depth in the channels were continuously monitored with raingauges and ultrasonic pressure transducers connected to the channel inverts and set inside stilling wells on the verge of the channels. The geometric characteristics of the channels (longitudinal profile and cross-section), their permeability, maintenance requirements and alterations of the grass cover with time were also recorded.

Recommendations on the use of grassed channels are being compiled in an HA Advice Note, planned for publication later this year.

Manuela Escarameia *HR Wallingford*



Picture of the rig used for testing



Monitored channel on M2



Constructing SUDS in the new Park

## SUDS, public open spaces and education – a lesson in success

In 2001, Sheffield Wildlife Trust commissioned a scoping study to investigate integrating SUDS in inner city urban regeneration schemes in south-east Sheffield. This highlighted the opportunity within the emerging new district park for Manor and Castle to manage urban run-off. Subsequently a 300 dwelling housing development has been initiated on a substantial part of the park boundary and this opportunity has been realised through a working partnership between the City Council and the Green Estate, a joint venture company established by Sheffield Wildlife Trust and Manor and Castle Development Trust.

The existing main surface water sewer, constructed a few years ago, proved inaccessible to ordinary gravity fed sewer pipes within this particular housing scheme. Fortunately as part of the physical regeneration of the Manor and Castle area a large adjacent open space was being developed as a district park. This site's development was open to reclamation and had an existing watercourse, ideal for SUDS.

The criteria for the design included aspiring to meet the 1 in 100 year return period storage; water quality improvements through a management train; a safe and well integrated attractive design, biodiversity benefits and manageable infrastructure.

### ODDS & SUDS

Download British Water's Guidance to proprietary sustainable drainage systems and components free from their website [www.britishwater.co.uk](http://www.britishwater.co.uk)

No attenuation or treatment occur within the housing area so the park is receiving a 'raw' product in variable flows. All drainage enters the park at one point and is then managed through a series of basins, lowflow and overflow channels, volume controls and filters dropping down the contours of the site. The top basin acts as the main management tool for silt collection and pollution interception. If the third basin is unable to handle flow this overflows onto a grass arena as shallow flow, and exits through a further control device down to a dry valley. The arena is designed to manage storage above a 1 in 30 year storm.

The site is to be a district park so it was appropriate that the parks team of the council took on its management in partnership with the Green Estate Company as contractor. However, this was with the condition that sufficient resources were found for the work. Therefore it was agreed on a commuted sum system to fund the maintenance. As the conventional system was extremely expensive this gave the park project a strong position to argue for a suitable commuted sum. An agreed figure of £250 000 will allow for 25 years of management.

This scheme brings SUDS technique to the attention of professionals in Sheffield. The gradual increase of working examples of SUDS will persuade professionals to become more at ease with the concepts and processes involved. One lesson to be taken from Sheffield is that the best place to start is where there are the least number of barriers to deliver.

The SUDS facility in the park has already attracted the interest of the Water Cycle Management for New Developments (WaND) project which focuses on water quality, public perception and stakeholder involvement in the development process.



Finished basin in Manor Park

One of these WaND projects, conducted by the University of Bradford, is researching the social aspects of SUDS. Together with Signpost (an organisation working with young people from the Manor and Castle area) an educational program about SUDS was begun to make local young people more aware of the SUDS processes and systems in their area.

The system, which is nearly complete on the ground, will create attractive water features such as landscaped ponds, wetland, habitat for wildlife and facilitate improved management of flooding. If the SUDS is successful there is the potential to develop a manmade fishing lake for the local community, so it is imperative that the local community are involved in the project to ensure success. When asked, local people perceived vandalism by young people as the biggest threat to SUDS in the park. Anita Redfern of Signpost responded by suggesting a complete educational project to try to prevent this.

### ODDS & SUDS

Want to talk odds and SUDS? Why not visit CIRIA's electronic SUDS forum at [www.ciria.org/suds/eforum.htm](http://www.ciria.org/suds/eforum.htm)

As part of the programme the project hosted a successful event celebrating young people's involvement in the innovative development in the new district park. Anita Redfern of Signpost stated:

*"This was a good opportunity for young people to learn about the environment in their local area. They made posters and built models showing how the water would be cleaned through the ponds in the park. The project worked really well as there were many different jobs to do to keep everyone busy. We are very proud of them and what they have achieved."*

The event displayed working models they had made of the SUDS in Manor Fields Park. Prizes were awarded for accuracy and imagination by a team of judges.

*"The new SUDS in the Manor & Castle area is one of the first in the UK to use these techniques, and it is great to see young people engaging with their environment like this"*

Professor Richard Ashley.

After the event one teenager involved in the project commented. *'It was challenging. We weren't just doing it for the sake of it. Our models had to actually work and we were educating the community about something.'*

The aim of the Manor Park project is to provide information, experience and comfort to other local authorities who have not recognised the advantages of SUDS for facilitating and enhancing the character of public open space.

Roger Nowell – Green Estate Company

Christine Sefton – Bradford University



Young people working on the SUDS educational project

## SUDS in Northern Ireland

The UK now has a number of national SUDS groups championing sustainable drainage. In response the Northern Ireland SUDS Working Group are seeking an appropriate legislative approach with the intention of applying it to their situation.

Government agencies play a more central role in Northern Ireland than other parts of the UK. Many of the regulatory and infrastructure development roles are taken by central government organisations. Table 1 summarises the key organisations which are involved with SUDS.

Table 1 – SUDS organisations in Northern Ireland

Environment & Heritage Service (EHS)	Environmental regulator
Planning Service	Responsible for determining all planning applications centrally
Rivers Agency	Responsible for land drainage and flood defence
Roads Service	Responsible for all roads and road drainage in Northern Ireland
Water Service	Responsible for water supply, sewerage, sewage treatment and storm

The benefits from SUDS are spread across these organisations. For example, EHS promotes SUDS because of the potential benefits to water quality, whereas the attenuation of surface water runoff will contribute to flood risk management and the work of the Rivers Agency. However, there are also some problems, particularly associated with poorly draining soils and high water tables that will reduce the range of features available.

There are currently few SUDS schemes in place, as the usual practice is to construct traditional surface water drainage schemes that are adopted by Water Service. However, Roads Service have for some time used SUDS features within new projects. These are mainly ponds and wetlands and help reduce the impact of highway runoff.

The aim of this project is to examine the implications of adopting SUDS in Northern Ireland, to recommend approaches for implementation based on the current legislative framework and possible changes to that legislation. The potential benefits for Northern Ireland are clear, particularly:

- improvements in water quality
- attenuation of surface water flows, reducing both flood risk and the need to construct additional flood defences
- improvements in amenity/biodiversity
- an improved contribution to sustainable development.

Throughout the project, consultation was held with a range of stakeholders, including a project workshop where a detailed review of potential options was carried out.

The project recommends that SUDS are encouraged in Northern Ireland and that they should be enforced through the planning system. Drainage assessments may be used to ensure sufficient information is obtained from developers when planning applications are received.

The Northern Ireland SUDS Working Group are currently reviewing the potential options to promote SUDS. It is possible that the use of SUDS will become more widespread in Northern Ireland in the future.

Jon Reed – Atkins

#### ODDS & SUDS

– Keep up to date on events and news by visiting [www.ciria.org/SUDS](http://www.ciria.org/SUDS)

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