

## INTRODUCTION

Sustainable Urban Drainage Systems (SUDS) are being widely promoted in building development schemes because they reduce the rate of flow of water into conventional piped drainage systems when heavy rain occurs. This reduces the risk of flooding of rivers and of built areas. By reducing run-off and allowing water to seep into the ground more slowly SUDS help groundwater reserves to be recharged. They can also reduce pollution in run-off e.g. from car parks or industrial sites, as the water is filtered through vegetation and particles and oils are trapped.



Fig 1: SUDS by Highway

Drainage authorities have the responsibility of adopting non-traditional and non-piped systems and reducing flooding and so the pressure to use the techniques of SUDS is growing. Furthermore, planning policy mean that developers must maximise the use of all developed areas within each site for which they have responsibility. Adequate areas of green space and recreation land have to be provided within developments. By fitting vegetated SUDS into the landscape, rather than treating drainage simply as separate engineered features, green space and drainage can be provided in one area.



Fig 2: Detention Pond

A variety of techniques have been developed for SUDS, including detention ponds (which remain wet all year and can hold much biodiversity), detention basins (which dry out for part of the year and so can be used in green space), filter drains, infiltration pits and trenches, swales and filter strips all of which can be planted or turfed. They can now be seen in many situations on new housing or industrial developments

## OVERALL BENEFITS TO THE LANDSCAPE INDUSTRY AND COMMUNITIES OF VEGETATING SUDS

- Reduction in proportion of site required specifically for SUDS because of multiple use
- Improved appearance of drainage systems and better integration into the landscape
- Better planned maintenance of SUDS, avoiding costs and technical uncertainty over long-term maintenance
- Additional value of SUDS in landscape design
- Increase of biodiversity and amenity value of SUDS through use of commercially available seed mixes.
- Business opportunities for plant sales, landscape construction and grounds maintenance

## HORTICULTURAL ASPECTS OF SUDS

The main issues that are relevant to horticulture concern planting for biodiversity enhancement, amenity and aesthetics. SUDS also require maintenance in the long term, and planting must be planned with this in mind. The planting and subsequent maintenance of vegetated SUDS elements is unfamiliar to some housing or engineering professionals.

## VEGETATING SUDS

When formulating a planting plan and selecting the species that would be appropriate for a SUDS, a range of factors must be considered. These factors are shown in Table 1.

**Table 1: Site characteristics to consider when planning vegetation of a SUDS**

Factor	Consideration
Climate	temperature ranges wind exposure expected durations of wet/dry times in the annual cycle
Soil and landscape –	pH water flow and percolation rates permanent water depth shore or ditch profile and gradient substrate type
Nature of water run-off	salinity nutrient levels water quality sediment type
Location and usage by the local community	hardiness of plants to pedestrian traffic range of plants where no access is allowed
Natural habitats	proximity of propagules so that a natural community can build up ornamental planting
Maintenance regime	feasibility economics
Community requirements	recreation aesthetics seasonality
Local and national planning	sustainable development targets

## NURSERY OPPORTUNITIES

Horticulturists will need to work with developers so that they grow the right plants for the SUDS and so the plants are available when needed by the developer. Liners and tree whips are useful for rapid vegetating. Also herbaceous seed mixes will be needed for ground cover, particularly in areas of recreation. These seed mixes will often be specific to SUDS because of their need to tolerate a wet / dry cycle. Box 1 shows some of the factors to be considered when producing new seed mixes.

### Box 1: Considerations when selections species and seed mixes for SUDS

- rooting depth of the species
- toleration of drying depth
- which species will give initial germination and at what rates
- which species will give subsequent germination and at what rates
- cultural conditions for optimum hardening-off if glasshouse germination is used
- reaction of each species, and turf, to prolonged inundation with water
- the relevance of the mixture to local biodiversity considerations and to local ecosystems