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Designing drainage schemes

Good practice note 2

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The Environment Agency is the leading public body protecting and improving the environment in England and Wales.

It's our job to make sure that air, land and water are looked after by everyone in today's society, so that tomorrow's generations inherit a cleaner, healthier world.

Our work includes tackling flooding and pollution incidents; reducing industry's impacts on the environment; cleaning up rivers, coastal waters and contaminated land; and improving wildlife habitats.

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Designing drainage schemes

Poorly designed drainage is a major cause of environmental pollution and flooding from sewers. This leaflet gives an overview of best practice in providing drainage for new developments.

In England and Wales, most urban areas are served by public sewers. These are operated and maintained under licence by regional sewerage companies.

The Government and the Environment Agency prefer to see wherever possible foul sewage to be disposed of by new development connecting to the public sewerage system. Although this can be done with surface water, a modern approach is to install a sustainable urban drainage system (SUDS). The concept behind such schemes is to copy nature as closely as possible and control the way surface water flows from the site.

Drainage problems can arise when:

- both surface water and foul sewage are allowed to share the same sewer: a situation which can cause flooding during periods of high rainfall;
- increased surface water run-off leads to flooding problems;
- there are no nearby public sewers and alternative arrangements have to be made for disposal of foul and surface water sewage;
- maintenance arrangements for the drainage system are not put in place before the development is occupied;

- the system is not designed and constructed to a nationally agreed standard;
- foul sewage is connected into a surface water system causing pollution problems.

To combat these problems, the Environment Agency has provided guidelines on pollution prevention. There are strict regulatory controls on discharges to the water environment: you are advised to contact your local Environment Agency office for further advice.

Step 1 – Identify any existing drainage arrangements on the site where public sewers are available.

Good practice

1. Contact the sewerage undertaker for information regarding the availability of public sewers to connect to. There are limited rights for a developer to be able to connect to the public system. The sewerage undertaker has 21 days to refuse a connection and the sewerage undertaker also has the right to decide the point of connection.
2. Should a direct connection to the public sewer not be possible it may be viable for the developer to requisition a sewer from the sewerage undertaker to connect the development to the public sewer.
3. Contact the Environment Agency and the sewerage undertaker for advice on the use of SUDS for surface water disposal.
4. Design and construct on-site drainage in accordance with the WRc publication *Sewers for Adoption*. Before construction enter into a section 104 Water Industry Act agreement with the sewerage undertaker to adopt the on-site sewers.

Step 2 – Where public sewers are not available

Good practice

1. Contact the Environment Agency to establish what (if any) constraints the Environment Agency may impose on sewage disposal. For example restrictions will probably apply if the development is within a source protection zone (SPZ).

2. Investigate the possibilities of entering into an agreement with the sewerage undertaker to adopt the on-site sewers and (if used) the package sewage treatment plant.
3. Consider alternative methods for sewage disposal/treatment i.e. package plants, septic tanks and cesspools.
4. Contact the Environment Agency for advice on the use of SUDS for surface water disposal.

Step 3 – Drainage design

Sustainable Urban Drainage Systems

Typically, an area drained using SUDS techniques may include features such as ponds, wetlands, swales and porous surfaces. The idea behind SUDS is to copy the natural environment as far as possible and to smooth the flow of surface water runoff by reducing the peaks and troughs caused by rainfall events. As a general rule, the rate of surface water runoff after development should be the same as if the site had not been developed.

Example of poor drainage



Many developers use SUDS to enhance their development by constructing features such as attractive ponds to smooth peak flows. Such features may form part of the open space of a development. Developers should be aware that there may be difficulties with sewerage undertakers adopting

such features: alternative arrangements for their maintenance may be required. However, the use of SUDS has provided many developments with an attractive and sustainable method of surface water disposal.

SUDS features include:

- **source control measures** such as permeable surfaces;

Permeable paving



- **landscape features** such as filter strips, swales and ponds can be incorporated into the design of amenity areas – these benefit people and wildlife as well as holding back flood flows;

Example of a balancing pond



- **engineered features** such as soakaways, filter drains and infiltration trenches.

Disposal of foul sewage

Public sewers

The preference for the disposal of foul sewage is always for a connection into the public sewer. This gives surety for the environment and confidence to the householder of a reliable and cost-effective service. However there may not be a public sewer that is within reach, either by a direct connection or by a sewer requisitioned from the sewerage undertaker. In this case, alternative methods of disposal will have to be considered.

Example of a filter drain



Package sewage treatment plants

These can be purchased and installed from several reputable suppliers. The package plant can be tailored to meet the discharge limitations that the Environment Agency might apply. Sewerage undertakers are able to adopt package plants under sections 102 and 104 of the Water Industry Act. You will need to apply for a discharge consent from the Environment Agency.

Septic tanks

This is the most popular method of foul sewage disposal for individual properties. The septic tank consists of two or three chambers in which the effluent is retained for sufficient time to allow solids to form into sludge in the base of the tank. The remaining liquid then drains out through an outlet pipe. They require de-sludging at least once a year. You will need to apply for a discharge consent from the Environment Agency.

Cesspool

A cesspool should only be considered where there are no alternative means of sewage disposal. It consists of a watertight tank, which will require regular emptying. It has to be emptied by tanker, which unloads its contents at a special waste disposal site: usually a sewage treatment works.

The Environment Agency will oppose all schemes involving cesspools unless the applicant can prove that no other options are possible.

Step 4 – Submit details of drainage arrangements with the planning application.

Good practice

1. A drainage plan should accurately identify all drains and sewers. This should be made available to future occupants of the site/building.
2. Calculations should be included to demonstrate that surface water run-off from the site will not increase as a result of the proposal.
3. If non-mains drainage for foul sewage is proposed, complete a foul drainage assessment form (obtainable from the Local Authority).
4. Follow the Environment Agency's pollution prevention guidelines.

Useful pollution prevention guidelines:

PPG 01 General guide to the prevention of water pollution
PPG 02 Above ground oil storage tanks
PPG 03 The use and design of oil separators
PPG 04 Disposal of sewage where no mains drainage is available
PPG 05 Works in, near or liable to affect watercourses
PPG 06 Working at construction and demolition sites
PPG 08 Storage and disposal of used oils
PPG 09 Pesticides
PPG 11 Preventing pollution at industrial sites
PPG 13 High pressure water and steam cleaners
PPG 14 Marinas and craft
PPG 15 Control of spillages and fire fighting run-off
PPG 20 Dewatering underground ducts and chambers
PPG 24 Stables, kennels and catteries

These can be downloaded at www.environment-agency/netreg/resources

Notes

Where to find out more

Further guidance and advice

Sewers for Adoption, published by WRC
Sustainable Urban Drainage Systems,
C522 CIRIA 2000

Soakaway Design, BRE 365

Drains and Sewers outside Buildings,
BSEN 752 part 4

*Planning Requirement in respect of
the Use of Non-Mains sewerage
incorporating Septic Tanks in New
Development*. DETR circular 10/99

*Policy and Practice for the Protection
of Groundwater*. Environment
Agency (1998). Available from the
Stationary Office

Pollution Prevention. Planning Policy
Guidance Note 23. Available from
www.planning.odpm.gov.uk

Sustainable Urban Drainage Systems,
C522 CIRIA 2000.
www.ciria.org.uk/suds

**Soakaways should be designed in
accordance with the following
guides and standards:**

*Infiltration Drainage Manual of Good
Practice*, CIRIA report 156

Soakaway Design, Building Research
Establishment (BRE) Digest 365

Drains and Sewers Outside Buildings
Section 3.36, BSEN 752 part 4

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Other Good Practice Notes in this series

Flooding

Practical advice on how to ensure
new development is at minimal risk
of flooding and does not increase
the risk of flooding elsewhere.

Drainage

Practical advice for designing
drainage schemes to avoid pollution
and help return water to the
environment naturally.

Watercourses

Practical advice on restoring and
enhancing watercourses to benefit
wildlife and the community.

Wise use of resources

Practical advice for resource-
efficient design and construction, to
conserve natural resources and
reduce operational costs.



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