### TANK SELECTION

The principal functions of the septic tank are to separate and retain solids from the incoming flow. It should be designed with this in mind, high levels of solids in the drain flow will reduce the life of the drainage field.

Prefabricated septic tanks constructed from glass fibre, thermoplastics or precast concrete are widely available. They should have inlet and outlet pipes, access for desludging and maintenance, and robust seal covers. They should be large enough to serve the number of users (see BS5977) - the minimum permitted capacity is 2000 litres. The tank should have two or more chambers, with the primary chamber providing at least two thirds of the total tank capacity.

You should preferably install a septic tank award third party certification, confirming its structural integrity and fitness for purpose. Glass fibre and thermoplastics tanks should have an Agreement Certificate (3AC) and precast concrete tanks should be constructed to appropriate British Standards (BS6297, BS8110).

### DRAINAGE FIELD DESIGN

The proper design and construction of the drainage field is the key to reliable septic tank system performance. Its objectives are to:
- protect water resources and prevent nuisance
- protect water resources and prevent nuisance
- protect water resources and prevent nuisance

An assessment must be carried out by a suitably qualified engineer to ensure that a drainage field will function on a particular site. A guide to site assessment may be found in British Standard 6297. However, percolation tests on their own do not provide an adequate assessment of the suitability of a site and may give optimistic results in certain weather conditions (e.g. low dry spells). For advice in England and Wales 0645 32111, Scotland 01786 457000, Northern Ireland 01726 254 743.

- subsoil nature, depth (at least 1m) and rate of percolation (e.g. free draining sandy soils, very clayey sands, clayey gravels and very sandy gravel after the better conditions), coarse or gray soil mixtures and a number of moisture loving plants could mean the site is prone to waterlogging and not suitable.

### LEGAL REQUIREMENTS

Any new septic tank system, package plant or cesspool requires planning permission. In Scotland and Northern Ireland the Planning Authority must be consulted in all cases. In England and Wales it will not be necessary to submit a planning application if the disposal method:
- is to serve a single dwelling, and
- is within its curtilage, and
- is not established between the house and a highway (or if so, it is more than 20m from the highway).

In all other cases a planning application must be made. If you are in any doubt, consult your Local Authority. In addition, prior to construction, you must seek Building Control approval from your Local Authority or an Approved Inspector.

The owner of an onsite disposal system, or occupier of the property, has a legal responsibility to ensure that it functions properly. This includes making sure the systems does not cause a nuisance and does not pollute the environment. Control over discharges from septic tanks and package plants to ground and surface waters is the responsibility of the Environmental Regulator. Legal consent to discharge may be required depending on location, local conditions and the volume to be released.

### CONSULTATION

Consult early! This will save time, ease the process of installation, reduce the risk of flooding or pollution, and reduce costs.

To help you choose the correct on-site sewage disposal method it is important to talk to the Environmental Regulator responsible for discharge of effluent in your area. You will also find it helpful to talk to your Local Authority, and to Building Control or the Approved Inspector responsible for approving installations in your area. Again you will find the contact details in the relevant documents issued by your local authority.

### PROJECT FUNDERS

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The report was prepared by David Bottom, Imperial College, Department of Civil Engineering, London NW1 1JE, and designed by Penney Robinson.

It is part of a series which also includes:
- Septic tank systems: a user-guide, Septic tank systems: design and installation, and
- Drains and soakaways: a practical guide (publicly available from the funding organisations and certain local authority offices).

### ON-SITE SEWAGE DISPOSAL OPTIONS

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIRIA</td>
<td>Considered</td>
</tr>
</tbody>
</table>

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*Images and diagrams are not included in the text.*
SELECTING THE BEST OPTION

Correctly choosing your disposal method is still to ensure effective, long-term performance, protection of public health and the environment, and compliance with relevant regulations. You must assess the suitability of your site for each method. The Option Selector will help you to make a preliminary choice between the main alternatives, however, selection should only be finalised after seeking expert advice. The factors that will influence your choice include:

- **SEWER CAPACITY?** Is there an appropriate sewer network, and does it have spare capacity?
- **GO HOME**? Is the subsurface sufficiently well-drained and is the site prone to flooding or waterlogging?
- **ENOUGH SPACE?** Is there enough land to provide an effective drainage field, which is a sufficient distance from a watercourse or water source?
- **NEARBY STREAM?** Is there a nearby watercourse and do you have the Environmental Regulations’ permission to discharge into it?

**CESSPOOL ACCEPTABLE?** is a cesspool an acceptable option to the Environmental Regulations?

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**PACKAGE PLANTS** - These are small-scale treatment plants that can be installed in a small area. They use natural processes to treat sewage and are suitable for small households. The plants are simple to use and require minimal maintenance. The main types of package plants are:

1. **Biological treatment plants**
   - These plants use natural bacteria to break down waste, creating a sludge that can be used as fertilizer. They are suitable for small households and require minimal maintenance.
2. **Ecological filters**
   - These plants use natural processes to treat sewage, creating a sludge that can be used as fertilizer. They are suitable for small households and require minimal maintenance.

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**SEPTIC TANK SYSTEMS**

There are three basic methods open to individual or small groups of properties, and a number of alternative options:

1. **SEPTIC TANK SYSTEMS**
   - Consist of two main components: a septic tank, which stores sewage, and a drainage field, which disperses it into the surrounding soil. The tank must be located at least 30 meters from any watercourse, and the drainage field must be at least 10 meters from any property line.

2. **CESSPOLIS**
   - A cesspool is a watertight underground tank used for the storage of sewage. The tank is emptied by hand, and the sludge is removed. Cesspools are suitable for small households and require minimal maintenance.

3. **ALTERNATIVE OPTIONS**
   - In certain circumstances, it may be feasible to pump wastewater to an appropriate public sewer. Design and construction of such a system requires specialist advice. Alternatively, you could use dry toilets (in conjunction with a dry-toilet treatment system) instead of conventional toilets. These require no water supply or efficient treatment. They include:
     - Electric toilets which dry the waste
     - Chemical toilets which disinfect the waste
     - Composting toilets which compost the waste for return to the land.

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**OPTION SELECTOR**

<table>
<thead>
<tr>
<th>Package plants</th>
<th>Single family house</th>
<th>FEW family house</th>
<th>Correct to sewer</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

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**Drying towers/greywater treatment systems** can also be used in certain situations, but residents must be prepared to take more personal responsibility for their water use.