

## **On Site Treatment Systems**

### **Introduction**

In cases where houses require to be located in the countryside, (i.e. where no sewerage is available), it is necessary to provide a specific on-site treatment system for each dwelling house. In Ireland the wastewater from over one third of the population rely on on-site treatment systems. Approx. 18,000 new on site systems are installed annually in Ireland. In deciding on the location of such systems a local authority must have regard in the protection of the environment.

Many on-site systems are available for the treatment of wastewater from single houses and are designed to

- Treat the wastewater to minimise contamination of soils and water bodies
- Protect humans from contact with wastewater
- Keep animals, insects, and vermin from contact with the wastewater
- Prevent direct discharge of untreated wastewater to the groundwater
- Prevent direct discharge on untreated wastewater to surface water
- Minimise the generation of foul odours.

The crucial elements are

- Proper site assessment
- Proper system design
- Proper location of the system on site
- Proper installation
- Proper maintenance

The conventional on site treatment system is the septic tank system, which consists of

- The septic tank
- The percolation area, which comprises of an effluent distribution system, which is where the real treatment of the effluent takes place.

Workings of a septic tank system

- Waste exits the house and enters the septic tank, where solids settle out and grease and scum floats to the top.
- Next the liquid effluent flows from the tank through a distribution box to the percolation area
- The percolation area consists of several pipes which allow effluent to slowly flow through holes positioned along the length of the pipe.
- The effluent flows through the gravel and enters the soil below and to the side of the trench
- As the effluent moves through the soil, minute solids, bacteria and nutrients are removed.
- The percolation process is a natural biological one, which, if properly designed & maintained, can safely treat the effluent before it reaches groundwater.

### **Potential Detrimental Impacts**

Health and Environmental concerns are the principal reasons why domestic effluent must be disposed of in a proper manner. Poor design, siting and installation of systems can result in significant problems including

- Surface ponding of effluent causing a public health hazard
- Surface water pollution
- Groundwater contamination
- Odour nuisance
- Insects, rodents and pests that create health problems.

Problems may be caused by one or more of the following

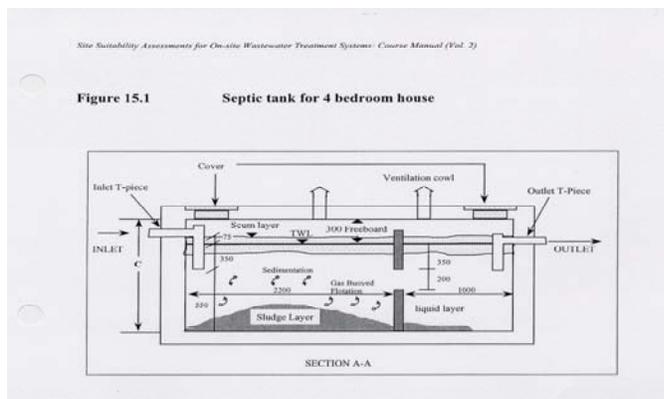
- Inadequate permeability in the soil/subsoil
- Use of soakpits or general absence of percolation areas
- Septic tanks/Soakpits connected directly to a watercourse.
- Poor design, construction and/or installation of septic tanks
- Inadequate maintenance of systems
- Connection of rainwater or surface water into the septic tank
- Not connecting baths, washing machines etc to the septic tank.

### Septic Tank

- Should be two chambered and watertight.
- The septic tank needs to be de-sludged on a regular basis (yearly) to ensure the capacity of the tank is not reduced.
- Accept water from baths, washing machines, dishwashers, sinks etc
- The tank has to be sized properly to ensure there is sufficient volume to provide suitable retention time for settlement while reserving an adequate volume for sludge storage
- Reduce clogging in the percolation area.

### Septic Tanks do not

- Fully treat domestic wastewater
- Significantly remove bacteria or micro-organisms
- Operate properly if pesticides, paints, thinners, disinfectants, chemicals etc discharge to it.
- Accept surface waters from roofs and paved areas.
- Work properly if not adequately maintained.

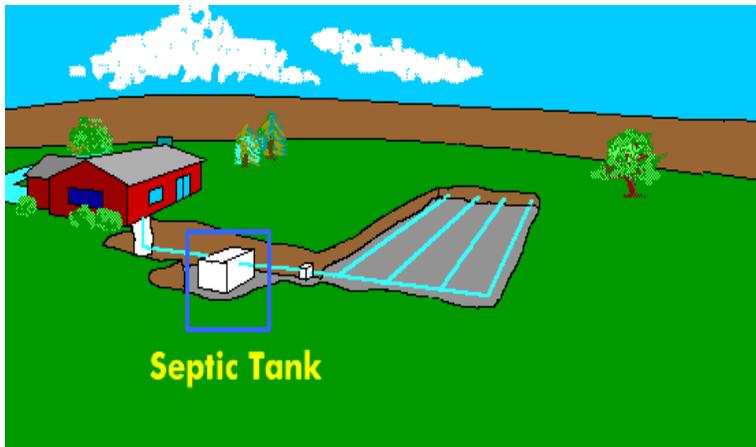
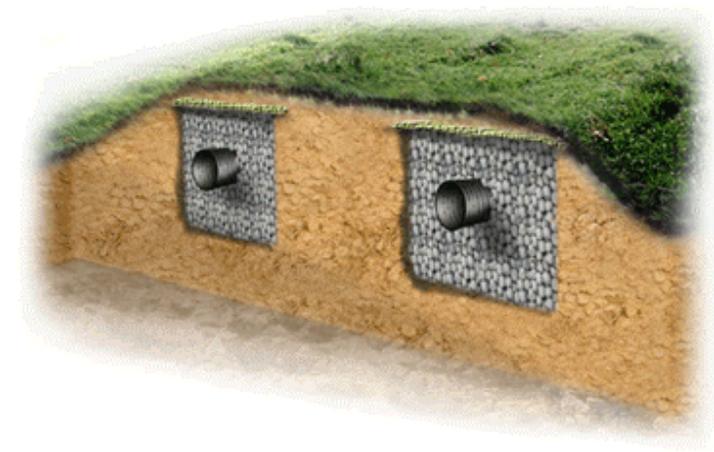


### The Percolation area

The percolation area is the most critical part of an on-site system, as most of the treatment takes place in the percolation area.

- Effluent from the septic tank must remain in the subsoil for a sufficient period for bacteria and other disease causing organisms and pollutants to be removed rendering the wastewater suitable for discharge.
- Steep slopes, depressions, the bottom of slopes or bowl shaped sites are generally unsuitable for the installation of percolation systems.
- Provision must be made for the interception of all surface runoff and its diversion away from the proposed percolation area.
- If there is a private well on site the treatment system should be located down gradient from the well at a minimum distance of 30m.

- Inspection/access manholes should be installed and be accessible at all times.



### Distribution boxes

- Must be designed and constructed to ensure equal distribution of effluent among the various distribution pipes.
- Must be watertight and constructed of precast concrete or plastic.
- Must be set on firm ground or concrete to prevent uneven settling.
- Assessable for inspection, need regular inspection to ensure not clogged and even flow.

In general, for septic tank and percolation system to function satisfactory it is necessary for a minimum of 2 meters depth of suitable soil to be available over rock and groundwater. Ground that is waterlogged or has heavy impervious soils should be avoided. Similarly ground which shows evidence of rock outcrops or soils which effluent seeps too quickly would not be suitable. In all cases the minimum depth from ground level to the water table/bedrock must be 500mm.

### Alternative Systems

Proprietary Effluent Treatment (PET) systems are used to treat wastewater from a dwelling where a site is unsuitable for a conventional septic tank system e.g. low or high permeability subsoils and where the watertable is high. **But PET systems should not be regarded as an instant solution for all problem sites.**

- PET systems & Intermittent Filters are all followed by a polishing filter, to reduce micro-organisms and phosphate.

- It is crucial that systems are properly designed and installed, and that proper maintenance and monitoring procedures are put in place. Maintenance contract should be taken out with the system supplier.
- Adequate capacity to allow for one-year sludge storage should be provided with all PET systems.
- At present reedbeds/wetlands are not considered satisfactory, as there are no agreed design/installation criteria.

### **Distances**

- Minimum separation distances as set out in Environmental Protection Agency Wastewater Treatment manuals.
- No treatment systems to be installed within 300m of a public water supply source or 100m of any lake.
- There must be a minimum of 35m from the development to the site boundary to allow a septic tank and percolation area to be installed.

### **Site Improvement works**

It is sometimes possible to carry out site improvement works by drainage or the importation of suitable soils to allow for a Proprietary effluent treatment system to be installed. Site improvement works requires a considerable degree of expertise, and should only be undertaken by an experienced competent company/engineer. The specialist engineer or company with indemnity insurance must design and supervise the installation, and sign off on the proposed system. Following improvement works/drainage work having been carried out on a site, the site must be reassessed after a sufficiently long period, to establish whether the improved subsoil is satisfactory.

### **Maintenance**

All single house sewage treatment systems require regular maintenance in order to prevent the risk of pollution. Documentary evidence of regular maintenance may be required to be submitted to the Local Authority.

### **Agents/ Designers**

Have a responsibility to ensure that site tests are conducted properly and accurately. Engineers/Architects with appropriate professional indemnity will be required to certify that the treatment system (including the distribution box and percolation/polishing filter etc.) complies with the planning conditions and the Environmental Protection Agency Wastewater Treatment manuals.

### **Builders**

Have to be familiar with the planning conditions for the site and requirements in relation to the installation of the on-site effluent treatment system.

### **On-site treatment system Suppliers**

Have a responsibility to ensure that the site tests which they have based their proposal on correlate with the ground conditions when they come to install the unit.

### **General Public**

Awareness of the potential of on-site systems to cause pollution must be conveyed. There can be a tendency to adopt an 'out of sight - out of mind' approach. In the rush to obtain planning permission and build, many applicants do not consider the implications of their on-site treatment systems. On sites, problems may not emerge in the first few years, but may do so in subsequent years. A long term view is necessary to ensure that there is no risk of water pollution or risk to public health from these systems.

Sligo County Council is in the process of drafting a guidance document for the design and installation of on site treatment systems. Applicants/agents/designers of systems applying for planning permission which includes an on site treatment system will be advised to take account of this document when submitting a planning application in order to avoid delays.

Sligo County Council is also in the process of drafting an information leaflet in relation to on site treatment systems for the information of the public.