



Filter drains

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Description

Filter drains are gravel filled trenches that collect and move water. They also treat pollution. The trench is filled with free draining gravel and often has a perforated pipe in the bottom to collect the water. They are widely used to drain roads and are often seen along the edge of main roads.

There is frequently a geotextile just below the surface that is used to trap silt and stop it clogging the gravel deeper in the trench. A small filter strip before the trench is also a good way of stopping silt clogging the trench.



Road side filter drain, A74, Scotland



Filter drain protected from silt by a filter strip

Benefits

Filter drains



How they work

Surface water runs off the edge of a hard surface such as a road and into the filter drain. The water flows down through the gravel which removes some of the pollution. The gaps between the pieces of gravel also provide space to temporarily store water during rainfall.

Cambridge specific design considerations

Filter drains are essentially an engineering feature and are to be used only as a last resort where no other feature will work. Often an area of permeable surfacing or open graded subbase below an impermeable area can be used instead of a filter drain, which in Cambridge is an advantage as it keeps the system shallow. In some cases there may be opportunities to integrate them into the landscape in innovative ways that enhance the local environment.

In Cambridge it is important to keep filter drains shallow because of the flat landscape. Where filter drains lead to ponds or basins it helps keep these shallower. It will also help prevent problems meeting shallow outfall points.

Practical issues and solutions

Many problems that have occurred with filter drains are due to a lack of attention to detail during design and construction. Some of the most common pitfalls and solutions are discussed below. CIRIA publication C698: Site Handbook for the Construction of SUDS also contains practical construction help and advice.

Problem: Using a geomembrane instead of a geotextile just below the surface (geotextiles are specified to be permeable whereas geomembranes do not allow water through).

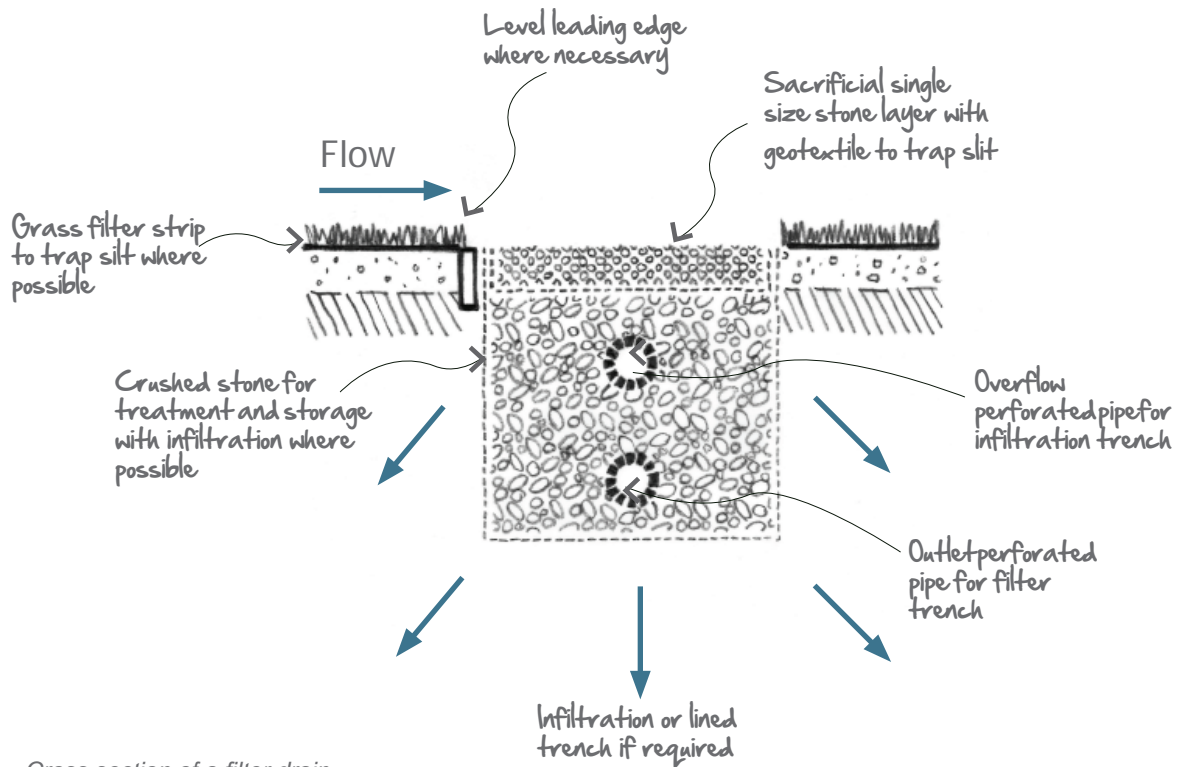
Solution: Good site supervision and communication to the staff that are constructing the drain about the purpose of the different materials.

Problem: Filter drains cause problems when mowing surrounding grass if they become overgrown (the stones are thrown up and can damage mowers if they go over them).

Solution: Regular cutting back of grass is required to keep the surface clear and visible.

Problem: Silt build up during construction

Solution: Manage construction runoff and prevent it entering the filter drain by using straw bales or geotextile traps. Filter drains should not be used to control construction runoff because of the high silt loads.



Maintenance schedule and costs

Maintenance of filter drains is relatively straight forward if they are constructed in accordance with The SUDS Manual (CIRIA C697) and incorporate a sacrificial geotextile layer close to the surface. Routine maintenance involves removing debris and litter from the surface and cutting back vegetation. More intensive maintenance work such as removing and cleaning or replacing the surface layer of gravel is only required intermittently, about once every five to ten years.

Cleaning and replacing gravel is the preferred option as it is more sustainable than disposing of the gravel. There are specialist contractors that remove the gravel from filter drains, clean and replace it.

The costs of maintenance can be found at Appendix B.