

Fact sheet 5: earth bank slurry stores

Are you planning to build or substantially alter an earth bank slurry store?

This fact sheet will help you meet the requirements of the Water Resources (Control of Pollution) (Silage, Slurry and Agricultural Fuel Oil) (England) Regulations 2010. These are commonly referred to as the SSAFO Regulations and apply in England.

For above and below ground steel or concrete slurry stores and reception pit construction see fact sheet 1. For slurry bag installation see fact sheet 4.



Slurry must only be stored in a storage system that satisfies the requirements of the SSAFO Regulations.

The Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018, (known as the Farming Rules for Water (FRfW)), also require that, where slurry and other organic manures are stored, they must be stored at least 10 metres away from inland freshwaters or coastal waters, and at least 50 metres away from a spring, well or borehole. You should also consider the risk of agricultural diffuse pollution, such as field drains or connectivity via roads and ditches, when deciding where to store organic manure beyond the distances outlined above.

We have a duty to protect groundwater. We will normally oppose the construction of new slurry storage systems within a drinking water Source Protection Zone 1 unless we agree to site-specific mitigation measures that minimise the risk to drinking water supplies.

We advise that you seek specialist advice on the siting, design, construction and installation of your slurry system. We recommend that you choose a contractor who fully understands the SSAFO Regulations and building standards who will provide you with written confirmation that the design, construction, and installation, will meet the legal requirements.

You may require planning permission. We recommend that you check with your Local Authority. CIRIA Report C759F, [Livestock manure and silage storage infrastructure for agriculture](#) also provides guidance on planning requirements.

You are legally required to notify us of your proposals at least 14 days before work constructing the new or improved store is to begin. We recommend that you notify us earlier than this to help ensure costly mistakes are avoided.

What is slurry?

The SSAFO Regulations define slurry as: “liquid or semi-liquid matter composed of excreta produced by livestock while in a yard or building (including that held in wood chip corrals); or a mixture wholly or mainly consisting of livestock excreta, livestock bedding, rainwater and washings from a building or yard used by livestock, of a consistency that allows it to be pumped or discharged by gravity at any stage in the handling process”.

Other terms have been used to describe slurry of varying strengths or dilutions, such as dirty water and lightly fouled water. These are all forms of slurry.

Wash water and contaminated rainwater runoff can be kept in a separate store from your main slurry store, but you must store and handle it as slurry. They must be included in your slurry storage calculation.

What is other fouled water?

CIRIA Report C759F [Livestock manure and silage storage infrastructure for agriculture](#), describes other fouled water as unclean water arising on a farm that is not directly contaminated by livestock excreta. It applies to drainage from farm buildings and yards not accessible to livestock but used for farm activities and by farm vehicles. Common contaminants include mud, spilt feed, fertiliser, and detergents. It includes roof water contaminated with dust from animal housing. It may not be acceptable to discharge other fouled water to ground, surface waters or to soakaways without interception and treatment. We advise you to discuss your proposals with us, before discharging any fouled water.

What is clean water?

Clean water refers to water draining from roofs or other surfaces that is free of contamination, including dust from animal housing. Clean water kept separately from slurry and other fouled water may be discharged to ground, surface waters or soakaways without interception and treatment.

What are the storage requirements?

The SSAFO Regulations require a minimum of 4 months slurry storage capacity.

Additional rules concerning slurry storage capacity apply to farmers within [Nitrate Vulnerable Zones \(NVZ\)](#) and operators of permitted [intensive livestock](#) farms.

Farmers in NVZs must have a minimum of 6 months storage for pig slurry and poultry manure. The storage period is 1st October to 1st April inclusive. For cattle and other livestock slurry at least 5 months storage is required. The storage period is 1st October to 1st March inclusive.

We strongly recommend you have at least 6 months storage capacity for all types of slurry. Installing more slurry storage than minimum required by law may also be necessary for practical management purposes. This will help you to make the best use of nutrients and organic matter within the slurry. It will reduce pollution risk, save money and will help ensure that you comply with the FRfW by allowing you to apply slurries and manures when soil and crops need nutrients and at times when ground and weather conditions are appropriate.

Defra's Slurry Infrastructure Grant supports the construction of new storage or expanding the existing storage on farm to 6 months capacity. Further information is at [About the Slurry Infrastructure grant, who can apply and what it can pay for - GOV.UK \(www.gov.uk\)](https://www.gov.uk/about-the-slurry-infrastructure-grant-who-can-apply-and-what-it-can-pay-for)

How do I calculate total slurry production?

The slurry store, along with any other slurry storage, must be large enough to accommodate the maximum quantity of slurry likely to be produced and directed to it in any continuous four-month period, including rainfall and all water contaminated with livestock manure.

To meet SSAFO Regulations requirements the maximum quantity of rainfall likely to be produced in any four-month period, usually October to January inclusive, needs to be used in the slurry storage calculation. To meet this requirement the Environment Agency expects rainfall figures that predict the wettest year in the last five years to be used (known as M5 120-day rainfall).

We recommend that you use the AHDB Slurry Wizard to carry out the slurry storage calculation, which estimates M5 120-day rainfall, and other periods up to 12-months.

Note: You will be required to use the Slurry Wizard to support your application if you are applying for a grant under the Slurry Infrastructure Grant scheme. See [Slurry wizard | AHDB](https://www.ahdb.co.uk/slurry-wizard)

How do the regulations affect slurry systems?

The SSAFO Regulations set design and construction standards for slurry systems that are new, or substantially enlarged or reconstructed since 1991.

- You must notify us, ideally in writing, about any new, substantially enlarged or substantially reconstructed system at least 14 days before any construction begins.
- You must tell us about the type of structure (with or without a synthetic liner) and where it is to be used.
- We will request evidence of the site/soil suitability and proposed design and construction.
- Slurry systems should be designed and constructed so that with proper maintenance they last for at least 20 years.

- No part of the system can be within 10 metres of any inland freshwaters or coastal waters.
- FRfW also require that organic manures are stored at least 10 metres away from inland freshwaters or coastal waters, and at least 50 metres away from a spring, well or borehole.
- You should consider the risk of agricultural diffuse pollution when deciding where to store organic manure beyond the distances outlined above.
- All parts of the system must comply with the regulations whenever it is used. Maintenance is therefore essential, for example, do not allow tree growth on the embankment and repair rodent damage frequently.

Note: "inland freshwaters" includes any stream, ditch, or land drain, even if it flows for only part of the year.

Requirements that apply to earth banked slurry stores

- Earth banked stores must be designed and constructed to include a freeboard of at least 750mm and must never be filled above this level.
- Where slurry can flow from the drainage outlet of a slurry store, the outlet must be fitted with two lockable valves in series, unless the outlet drains to a receiving tank that is larger than, or is at the same height, as the outlet tank.
- Each valve must be capable of completely shutting off the total flow of slurry from the store.
- The design and positioning of the valves should account for the possibility of a single piece of debris obstructing both valves.
- The distance between the valves must be at least one metre.
- The valves must be locked shut when not in use. They must only be used under close supervision and never left unattended while open or partly open.
- We will normally oppose the construction of new slurry storage systems, including earth banked stores, within a drinking water Source Protection Zone 1 unless we agree to site-specific mitigation measures that minimise the risk to drinking water supplies.

What is an earth bank store and when are they suitable?

Earth banked stores can be constructed above ground, below ground, or part above ground and part below ground on sloping ground, for example on a hillside. They fall into three types:

- Stores constructed in situ in soil that is demonstrated to be sufficiently impermeable.
- Stores constructed and lined with suitable imported soil that is demonstrated to be sufficiently impermeable.
- Stores constructed with a synthetic liner.

Where the soils are suitable (impermeable and stable), earth banked stores may be appropriate for storing semi-solid manure or slurry.

To be suitable without a synthetic liner, the soil must have a final permeability of 0.000001 mm per second or less, following compaction, if necessary. Impermeable soil must be present to a depth of at least one metre below the bottom of the store.

Soils with a clay content of between 20-30 per cent are generally ideal and with proper construction can be engineered to produce stable embankments. Lower soil clay content may not meet the required permeability, whilst a higher clay content may be suitable for the base but may be difficult to form into a stable embankment and could be liable to shrink and crack on drying. The suitability of the materials to be used should be confirmed by analysis in an appropriate laboratory, and preferably verified by suitably qualified specialist.

Soil testing

Initial soil tests should be taken from trial pits dug to the depth of proposed excavation from at least 5 locations (recommended 4 around the perimeter and one central) to identify any variability in soils. The final number and location of soil samples will be determined by the design engineer. Where there is little variability in clay content, soils from only one sample location needs to be sent for detailed testing, otherwise send a range of samples. They need to be tested in an approved soils' laboratory to show whether the required level of impermeability can be achieved. This involves the direct measurement of soil permeability as well as other soil characteristics. Testing should meet BS 1377 (methods of tests for soils for civil engineering purposes) or BS EN 1997-2:2007 and should be directed by the design engineer. Material that is intended for use in-situ without any re-compaction need only be tested for permeability and depth.

Where the in-situ soils are not suitable, you can import appropriate material to construct your store or use an impermeable synthetic liner. Imported material would need to meet the permeability parameters. These options add significantly to the cost.

Site selection

It is important to avoid sites in a flood plain or with a high water table, spring lines and ground that has been previously made up or disturbed.

- Trees, scrub, roots, etc. need to be removed.
- You must relocate any land drains to at least 10 metres away from the outside of the embankment, and carefully back-fill the trench with impermeable material.

Comprehensive guidance on site selection is given in CIRIA selection guide [Livestock manure and silage storage infrastructure for agriculture](#)

Note: For information further information on soil suitability and testing for earth lined slurry stores see fact sheet 5a.

What happens after I submit proposals to the Environment Agency?

We will assess your proposals and the site. In many cases we will visit the site and meet with you or your agent. We will usually make our assessment clear to you in writing.

Note: if you are applying for a Defra grant under the Slurry Infrastructure Grant scheme, launched in 2022, your application will be sufficient to meet the legal requirement to notify us about new, substantially enlarged or reconstructed slurry storage systems. You will have to supply supporting information as part of your grant scheme application to the Rural Payments Agency (RPA) who will share it with the Environment Agency. You should check the grant scheme guidance.

What happens if pollution occurs?

The responsibility for preventing pollution falls to the person with custody or control of the slurry. Normally that is you, the farmer.

If pollution occurs, you may be liable. Great care is essential in the construction, operation, and maintenance of the system.

If pollution occurs, you should report it. Call the Environment Agency incident hotline.
Telephone: 0800 80 70 60

Where can I find further help?

You can find further information on GOV.UK at [Storing silage, slurry and agricultural fuel oil - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/storing-silage-slurry-and-agricultural-fuel-oil)

There is detailed guidance on the construction of slurry stores and other installations in CIRIA Report C759F, [Livestock manure and silage storage infrastructure for agriculture](https://www.ciria.org/publications/livestock-manure-and-silage-storage-infrastructure-for-agriculture)

To help identify any Source Protection Zones, look at [Groundwater source protection zones \(SPZs\) - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/groundwater-source-protection-zones).

If you are unsure, please contact your local Environment Agency office via our general enquiries line. Telephone 03708 506 506