Supporting guidance for Rural Sustainable Drainage Systems – Sediment Traps and Bunds

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For recent changes to this guidance, please see the bottom of the page .

A sediment trap is a containment area where surface water run-off is temporarily stored to allow sediment to settle out before the run-off is discharged. They can be constructed either by excavation or by creating an earth berm / bund or by a combination of both.

Generally they are relatively small features, typically less than one per cent of field area, and can be used as the first of a series of measures improving the longevity and functioning of the downstream structures, e.g. a pond.

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Benefits

Sediment traps and bunds can reduce pollution risk by intercepting run-off and allowing the soil carried in the run-off to fall out. They can also be useful in emergency situations to intercept and capture any small slurry or chemical spills on the steading.

Steadings

In regards to steadings, sediment traps are useful for accepting run-off from clean yard areas as part of a treatment train approach where the sediment trap accepts run-off and then discharges to another feature such as a swale, pond or wetland for further treatment.

They are most appropriate where run-off polluted with sediment is the main concern and are not appropriate for accepting more polluted types of run-off such as slurry. Having a sediment trap upstream of a pond or wetland will help provide the opportunity for heavier particles within the run-off such as soil and sediment to settle out.

This will help maintain the effectiveness of the downsteam pond or wetland and also ease maintenance as generally sediment traps are easier to clean out than wetlands etc.

In-field

Sediment traps or bunds can also be used in-field to help reduce soil erosion. For example sediment traps can be a useful method of collecting run-off from a particular area at higher risk of soil erosion, such as a gateway or used in combination with a swale to maximise the settlement of dissolved sediment.

Bunds are particularly useful on sloping fields where the run-off tends to exit the field at a particular point, such as a valley bottom, where slopes converge or the low corner of the field.

What needs to be done

Drainage from a steading

Where it is proposed that the sediment trap or bund will take drainage from a steading the first step should be to carry out a diffuse pollution steading assessment.

The principle aim of this is to illustrate which parts of the yard areas will be suitable to be discharged to the trap and to assess the current diffuse pollution risk.

See Annex: Identifying run-off types.

It is important that the assessment clearly identifies where the run-off originates from, where it currently discharges to and how it currently gets there.

Where a new Rural SuDS or surface water drainage system is to be created it is important to ensure that these are not located within 10 meters of any slurry store, effluent tank, silage clamp or silage bale storage area.

For concrete yards/ tracks and farms buildings constructed after 1 April 2007 there is a statutory requirement (Controlled Activities Regulations GBR10) that any water runoff should be discharged via a Sustainable Urban Drainage System (SUD).

This excludes areas draining to a silage tank or slurry store. Therefore applications for any RSuDS options may be considered as ineligible for cases where the entire farm steading or new buildings adjacent to the original steading have been built since 1 April 2007 without the benefit of any associated SUD.

Similarly, where a large proportion of the original steading has been redeveloped since 1 April 2007 it may be considered ineligible. If the redevelopment does not involve significant changes to the surface water drainage system and/ or increasing the amount of runoff discharging to a water course then the case may well be eligible.

Cases involving substantial changes to surface water drainage etc. with no associated RSuDS are likely to be ineligible.

Field run-off

For arable situations, the principle aim of the sediment trap or bund will be to intercept overland run-off to allow sediment to drop out. In grassland situations the purpose of the trap may be to intercept run-off from a track or road used by livestock or machinery and to allow sediment or heavy material to drop out prior to discharge to grassland away from watercourses.

For in-field situations it will be necessary to carry out a simple diffuse pollution risk assessment to determine where the traps or bunds should be created to be most effective and how they could be integrated with other rural sustainable drainage system features, such as swales or ponds.

Using a map, identify all ditches, burns and rivers on the farm or area of land in question.

The next step is to consider where the potential for soil erosion is greatest and where this can pose a risk to the water environment.

This assessment should consider the following:

- proximity to nearby watercourses – the closer the area is to a watercourse, the greater will be the risk
- slope of the land will be one of the most significant factors, the steeper the downward slope towards the watercourse the greater will be the risk. Slopes of over three degrees (1 in 14) should be considered moderate risk and those above eight degrees (1 in 7) considered high risk. Fields with slopes which tend to converge or fall to a specific low point or corner of the field near to a watercourse will have a particular high risk of causing pollution. Long, uninterrupted slopes are also of greater risk of erosion
- gateways and tracks – areas which are frequently used can be at increased risk of erosion. Gateways can also act as exit points for run-off from a field
- past experience – consider where it has previously been noted that surface run-off from entered a watercourse or soil erosion has occurred
- soil texture – light soils with a high sand content are at greater risk of erosion

Once the assessment has been completed, identify on the map those fields or areas which are at risk of soil erosion and which may potentially pollute a watercourse. Mark on the map where the sediment trap or bund would be best located to intercept the run-off and where it should discharge to.

Design guidelines

Anyone considering creating a Rural SuDS on their farm should refer to the recently published (December 2016) guidance document - Rural Sustainable Drainage Systems - A Practical Design and Build Guide for Scotland's Farmers and Landowners.

This guide was written with the Scottish Rural Development Programme in mind and will help you to select, size, design, and build the most suitable Rural SuDS for your farm.

Maintenance

Importantly, the above guidance document also explains how to look after the systems and maintain them, which is essential in order to optimise their effectiveness.

It also promotes the wider benefits, such as coping with extreme weather related to climate change, localised flood prevention and enhancing biodiversity.

Factors affecting performance

- it's important to remember that sediment traps are not intended to treat slurry or effluents but to help to treat run-off which currently discharges directly to a watercourse
- minimise the volume or level of polluted run-off that the feature must deal with. On a steading, several localised features (or grass areas) may be a more practical option than creating one large feature on a steading. Within an arable field, steps such as running tramlines across slopes, relieving compaction etc will help to reduce the risk of soil erosion and enhance the effectiveness of rural sustainable drainage system features and reduce maintenance requirements
- maintenance - to be effective it is important that Rural SuDs features are regularly maintained. For example, accumulated sediment should regularly be removed from the sediment trap

Sediment traps and bunds are best used as part of a treatment chain whereby the trap accepts the run-off and discharges to another Rural SuDS feature such as a wetland or pond. Just as in a natural catchment, drainage techniques can be used in series to change the flow and capture pollution from the surface water run-off in stages.

Additional benefits

- flood mitigation benefits – sediment traps and bunds can reduce the amount of run-off entering watercourses during peak flood flow by releasing at a slower rate
- the build-up of sediment within ditches and watercourses downstream is reduced by capturing sediment in a trap
- biodiversity benefits if the bund is planted with native vegetation

Further information

- Rural Sustainable Drainage Systems - a practical design and build guide for Scotland's farmers and landowners
- The SuDS Manual CIRIA Report C697, CIRIA (2007)
- Rural Sustainable Drainage Systems (RSuDS), Avery LM (2012), The Environment Agency, Bristol (pp. 17–18 and 50–51), ISBN: 978-1-84911-277-2
- Sedimentation in Small Constructed Wetlands. Retention of Particles, Phosphorus and Nitrogen in Streams from Arable Watersheds, Braskerud BC (2001), Doctor Scientiarum Theses 2001:10, Agricultural University of Norway, As, Norway, ISSN: 0802-3220
- Constructed Farm Wetlands – Treating Agricultural Water Pollution and Enhancing Biodiversity, Mackenzie SM and McIlwraith CI (2013), Wildfowl and Wetlands Trust with Natural England (May 2013)

Annex – Identifying run-off types

In general, farm steadings, particularly livestock farms, produce a wide range of run-off ranging from relatively clean roof water to highly contaminated run-off and slurry.

Roof run-off can be considered relatively clean and may already directly discharge to a watercourse. Exceptions may include poultry or pig house roofs with roof vents. Also, any buildings or areas constructed after 1 April, 2007 must be drained by a sustainable drainage system, and roof water can discharge to a closed soakaway or to a watercourse via an infiltration trench or swale.

Yard run-off tends to vary to a greater degree in its polluting load. Therefore, for the purpose of producing the plan for this option, run-off should be classified as:

Slurry and silage effluent

The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (Scotland) Regulations 2003 as amended (SSAFO) defines slurry as excreta produced by livestock while in a yard or building and includes a mixture of run-off containing excreta, bedding etc, from yards and buildings used by livestock and middens, weeping wall structures etc.

Silage effluent is defined by SSAFO to include effluent produced from any forage crop which is being made or has been made into silage. This will also include any mixture consisting wholly of or containing such effluent or run-off emanating from a silo or silage effluent collection system.

Run-off from such areas requires to be collected in a suitable storage system. However there is a provision to allow certain types of slurry and silage effluent to be conveyed to a constructed farm wetland that has been designed in accordance with the Constructed Farm Wetland Design Manual. The types of slurry that can be conveyed to such constructed farm wetlands for treatment includes run-off from:

- areas used by livestock occasionally, but excluding areas where livestock regularly move on and off to be milked, housed, fed or gathered
- silos within the period 1 November to 30 April, unless a crop has been added to the silo within this period. This excludes run-off from silos where livestock have access, such as self-feed silos

Lightly contaminated run-off

This could include drainage from yards and areas where livestock do not frequently have access, which are not contaminated with oils and pesticides. It is accepted that such areas will build up a degree of contamination from passing machinery and other activities carried on nearby. In the majority of cases this run-off would be suitable for treatment via a rural sustainable drainage system or alternatively could discharge to local grassed areas.

Dairy washings

This includes washings from the milking parlour and rinsings from the milk storage tank(s), milking machine and ancillary equipment. These types of effluent can be highly polluting and should be collected in a slurry storage facility or a dedicated storage tank.

Pesticide contaminated run-off

Drainage from pesticide handling and loading areas must not be allowed to discharge into a surface water drainage system or a rural sustainable drainage system. There is a capital item available for upgrading pesticide handling facilities.

Recent changes

Section	Change
Benefits - steadings	Additional advice added regarding sediment traps
What needs to be done - drainage from a steading	Additional advice added in boxes
Whole page	Text changes and updates

Previous versions

Previous versions of this page