Rural Sustainable Drainage Systems

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What are rSuDS?

Rural Sustainable Drainage Systems

- Nothing new
- Replicate natural processes
- Attenuate flow by collecting and slowly releasing
- Using natural processes to improve the quality of rural runoff

Why control runoff?

- Diffuse pollution:
  - Myriad of smaller sources
  - Water Framework Directive
  - 66% of Diffuse pollution is agricultural
  - The majority of silt, 60% of nitrate and 28% of phosphate entering watercourses is from agriculture

Why control runoff?

- Soil erosion:
  - Soil erosion affects 76% of agricultural land
  - The agricultural contribution to total soil erosion is between 75% to 95%
  - Soil erosion leads to a build up of sediments and associated pollutants in rivers
  - Directly impacts on river ecology

Why control runoff?

- Protection of water resources:
  - Area of water stress
  - Diffuse pollution impacts on the amount of treatment required for potable water

Why control runoff?

- Flooding:
  - rSuDS reduces flash flooding
- Climate change:
  - hotter, drier summers
  - warmer, wetter winters
  - greater variability in year-to-year precipitation
  - changes in the number of intensive rainfall events
  - associated changes in soil moisture and the length of the thermal growing season

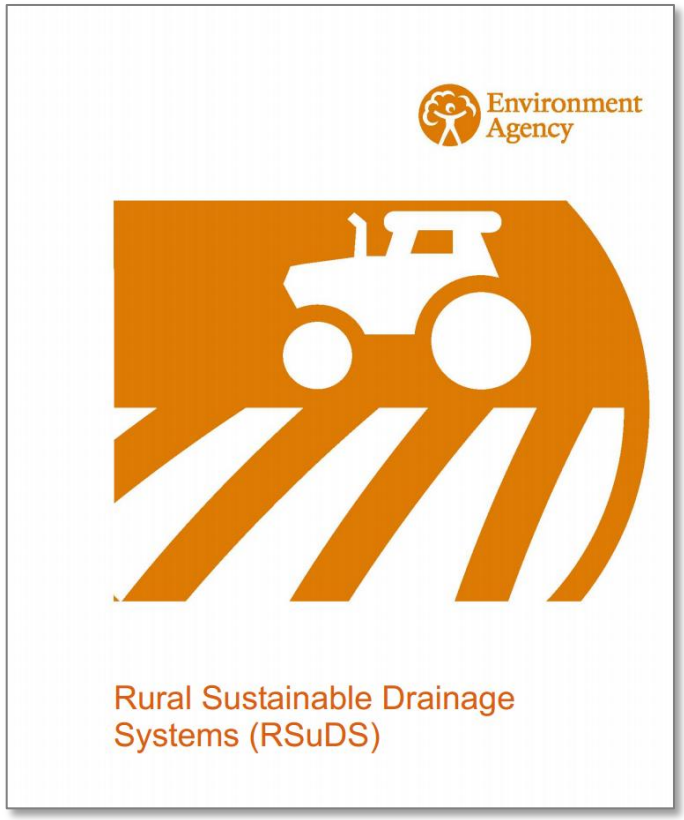
Why control runoff?

- Biodiversity:
- rSuDS could have a positive impact on:
  - Rivers and streams (a specific action plan exists for chalk rivers), standing open water and canals, oligotrophic and dystrophic lakes, ponds, mesotrophic lakes, eutrophic standing waters, aquifer-fed naturally fluctuating water bodies, arable and horticultural arable field margins, boundary and linear features, hedgerows, broadleaved, mixed and yew woodland, wet woodland, neutral grassland, lowland meadows, improved grassland, coastal and floodplain grazing marsh, fen, marsh and swamp lowland fens, reed beds, bogs lowland, raised bog

The Cam Corridor Strategy vision:

- A river system and riverside land that supports a flourishing and varied wildlife and provides an attractive environment for residents, visitors and businesses to enjoy.
- Rural sustainable drainage can go along way to contributing to this.

Guidance….



Produced by:

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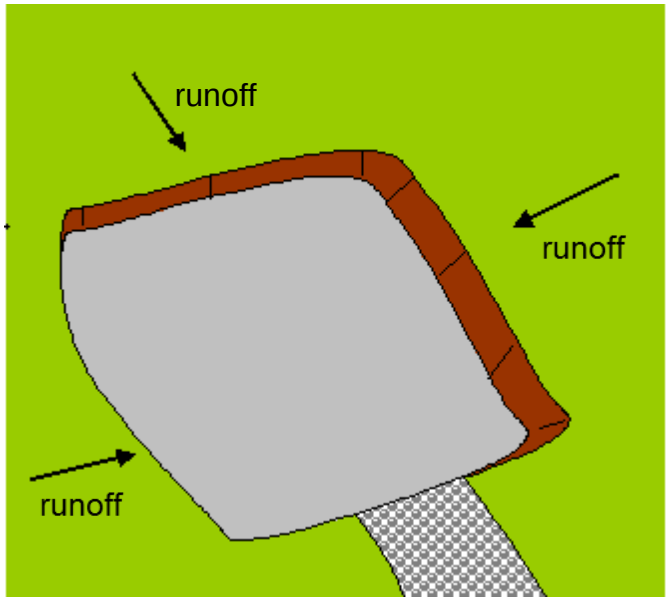
rSuDS features: Sediment trap

Description	An area to contain sediment laden runoff temporarily allowing the sediment to settle out before discharge.
Flow	Medium
Suspended solids	High
Total phosphorous	Medium
Total nitrogen	Low
Pesticides	Medium
Pathogens	Medium

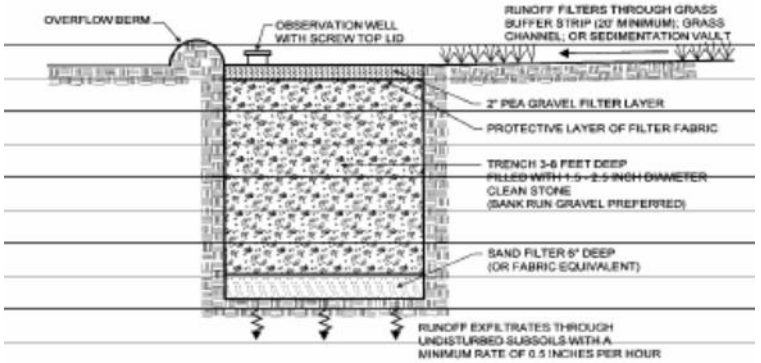


rSuDS features: Grassed waterways and swales

Description	Swales are broad and shallow vegetated open channels, designed to convey runoff, reducing its volume and velocity and removing pollutants.
Flow	Medium
Suspended solids	High
Total phosphorous	Medium
Total nitrogen	Medium
Pesticides	Medium
Pathogens	Medium

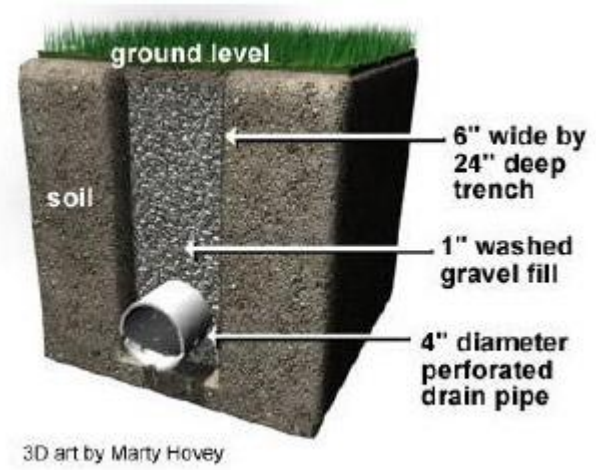
rSuDS features: Infiltration trench

Description	A narrow trench filled with stone with no outlet.
Flow	High
Suspended solids	High
Total phosphorous	Medium
Total nitrogen	Medium
Pesticides	Medium
Pathogens	High



rSuDS features: Filter/French drains

Description	A narrow trench filled with stone with an outlet.
Flow	High
Suspended solids	High
Total phosphorous	Medium
Total nitrogen	Low
Pesticides	Medium
Pathogens	Medium



rSuDS features: Barriers/traps within ditches and swales

Description	A barrier or trap to cause water to pond inducing sedimentation and filtration.
Flow	High
Suspended solids	Medium
Total phosphorous	Medium
Total nitrogen	Low
Pesticides	Low
Pathogens	Low

rSuDS features: Wetlands within ditches

Description	Small linear wetland features with a ditch, increasing sedimentation and denitrification.
Flow	High
Suspended solids	Medium
Total phosphorous	Medium
Total nitrogen	Medium
Pesticides	Medium
Pathogens	Medium

rSuDS features: Detention Pond

Description	Normally dry basins that temporarily store and slowly release runoff water.
Flow	High
Suspended solids	High
Total phosphorous	Medium
Total nitrogen	Medium
Pesticides	Medium
Pathogens	Medium

rSuDS features: Infiltration basin

Description	A depression designed to store runoff and infiltrate into the ground.
Flow	High
Suspended solids	High
Total phosphorous	Medium
Total nitrogen	Medium
Pesticides	High
Pathogens	High

rSuDS features: Retention ponds

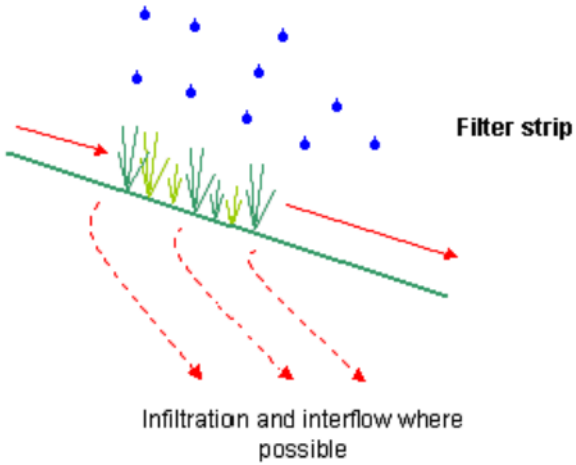
Description	Wet ponds, designed to permanently retain some water at all times and provide temporary storage above it, through an allowance for large variations in level during storms.
Flow	High
Suspended solids	High
Total phosphorous	Medium
Total nitrogen	Medium
Pesticides	High
Pathogens	High

rSuDS features: Woodland shelter belts

Description	Planting mixed woodland to produce a belt which primarily reduce wind speeds, but also encourages infiltration and prevents soils erosion.
Flow	Medium
Suspended solids	High
Total phosphorous	Medium
Total nitrogen	Medium
Pesticides	High
Pathogens	Medium

rSuDS features: Dry grass buffer/filter strip

Description	Broad, gently sloping area of grass or other dense vegetation that can be placed on slopes around the farm to intercept run-off around vulnerable areas.
Flow	Medium
Suspended solids	Medium
Total phosphorous	Medium
Total nitrogen	Low
Pesticides	Medium
Pathogens	Medium

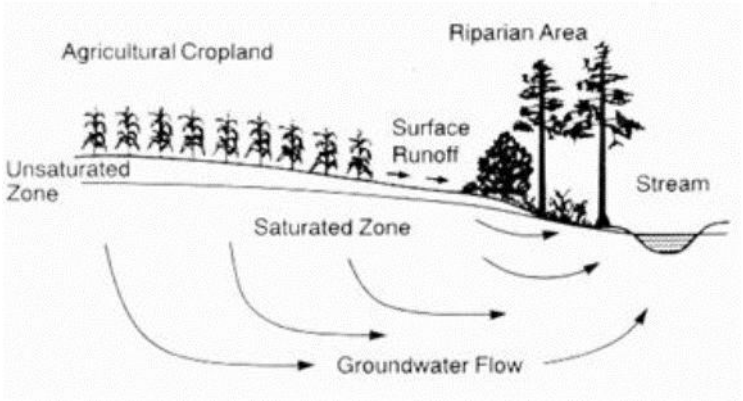


rSuDS features: Riparian buffer strips (dry)

Description	Medium width, dry, bands of natural or naturalized vegetation situated alongside waterbodies.
Flow	Medium
Suspended solids	High
Total phosphorous	High
Total nitrogen	Medium
Pesticides	High
Pathogens	High

rSuDS features: Riparian buffer strips (wet)

Description	A broad, strip of natural or naturalized wetland vegetation or wet woodland alongside a water body.
Flow	Medium
Suspended solids	Medium
Total phosphorous	Medium
Total nitrogen	High
Pesticides	Low
Pathogens	Low



rSuDS features: Constructed Wetlands/Wetland Restoration

Description	Constructed wetlands are engineered systems designed to utilise natural processes for water quality improvements. They perform this function by removing contaminants via a combination of physical (filtration, sedimentation), biological (microbial processes, plant uptake) and chemical (precipitation, adsorption mechanisms.
Flow	High
Suspended solids	High
Total phosphorous	Medium
Total nitrogen	Medium
Pesticides	Medium
Pathogens	High

Conclusions

- rSuDS:
  - Replicate natural processes
  - Use natural features
  - Manage runoff, slowing the flow, providing treatment and increasing biodiversity potential and amenity