

Review of Sustainable Drainage Schemes in Somerset

Summary Report

Somerset
Rivers Authority

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SPONGE 2020
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1 Why have we reviewed sustainable drainage in Somerset?

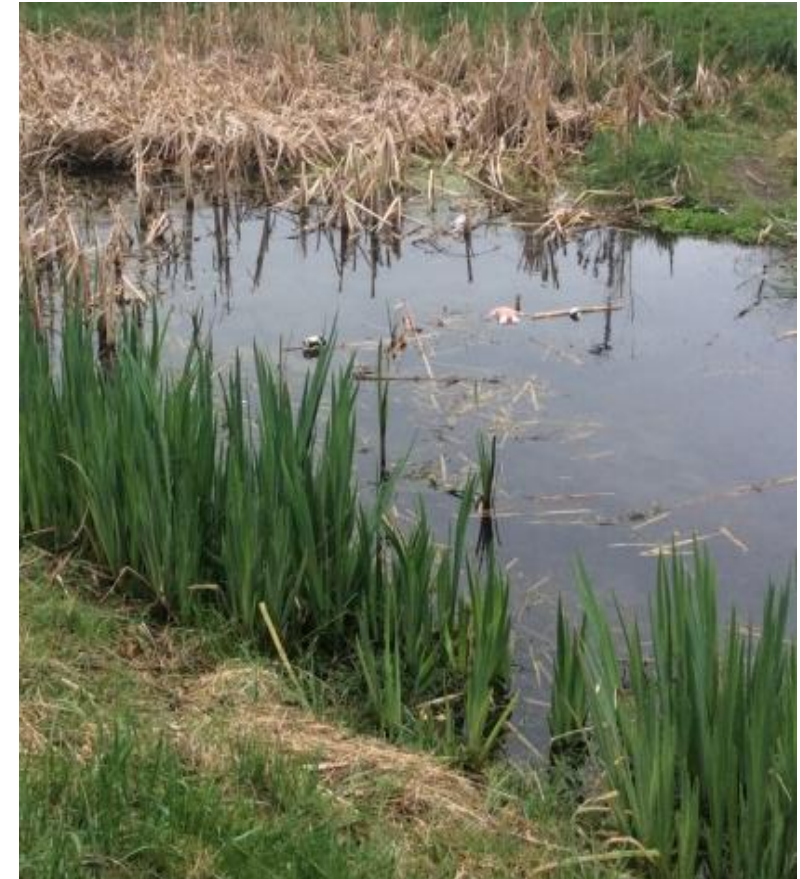
National policy and legislation on sustainable drainage systems (SuDS) has changed a great deal over the last 10 years. Following the widespread severe flooding of June and July 2007, the Pitt Review (published in June 2008) set out numerous recommendations to improve flood risk management in the UK. The Flood and Water Management Act (2010) brought many of its recommendations into UK law. However, the place of SuDS as a part of the solution to flood risk remains unresolved, with the failure to enact the substantial provisions in Schedule 3 of the FWMA (2010). The subsequent alternative arrangements put in place making Lead Local Flood Authorities (LLFAs) statutory consultees in the planning system does not directly address all the shortcomings identified in the Pitt review, particularly regarding construction and maintenance.

From a local perspective, following the flooding in Somerset in 2012 and 2013/14 the Local Authorities prepared a 20-year Flood Action Plan, which led to the formation of the Somerset Rivers Authority (SRA). The SRA is a partnership of a number of organisations involved in flood risk management who are working collectively to deliver the Action Plan. A workstream of the Action Plan focuses on Urban Water Management, specifically the role of urban areas in flood risk.

To understand how urban water management in the county is being affected within this national and local context the SRA partners identified a need to undertake a SuDS review. This review, funded by the SRA and led by Somerset County Council (SCC), investigated whether SuDS installed on new developments:

- were adequately designed;
- were constructed as designed;

- have any deficiencies;
- are being adequately maintained.





2 Who was involved?

We took a partnership approach, with consultation and review by the SRA partner organisations including; Wessex Water, Environment Agency, the IDBs, Natural England, District Councils, and Wessex Regional Flood and Coastal Committee. CIRIA and Highways England were also consulted.

We also consulted with the Local Planning Authorities (LPAs) for each of the five District Councils to try to obtain all the available information about each site.



3 What have we done?

3.1 High level review

We gathered basic information from planning applications for 84 sites across Somerset, specifically the planning documentation and evidence documents that were available and what SuDS or traditional drainage features the design included.

All the sites were Major Developments listed on LPA planning portals between 2003 and 2016. The list included a range of residential, commercial and retail properties across all five districts in Somerset.

We analysed trends in this data to find out whether they varied across the county or over time.

3.2 Detailed review

We reviewed 20 developments in more detail, across all five LPAs and dating from 2003 to 2015.

We undertook desk-based assessment of each site using planning applications, supporting documents and sewer maps. We compared designs against relevant standards and good practice, including:

- Calculation of the runoff from the site and the volume of water that should be stored on site
- How much water is discharged from the site and where it goes
- Allowance for climate change and ‘urban creep’
- Exceedance routes (where water will flow if the capacity of the system is exceeded)
- Treatment of pollution and the SuDS ‘management train’
- Suitability of SuDS components for the site conditions

We examined flood risk at each site and noted maintenance and adoption arrangements. We also made a high-level assessment of



'multiple benefits' offered by the design, including water quality, biodiversity, landscape and amenity.

Best practice and key principles of SuDS design (e.g. CIRIA guidance) has not changed significantly over the last 10 to 15 years, although it has never been a statutory requirement. However recommended runoff/volume estimation methods and climate change allowances have changed in recent years. Several of the schemes were approved and constructed over a decade ago, so we assessed older schemes against contemporary standards, while noting whether current standards may have made a difference to the design.

We then carried out site inspections to identify SuDS or drainage features on the ground and assess their compliance. Many of these included liaising with Wessex Water inspection staff on site.

4 What did we find out?

In addition to providing valuable information about each site, the work provided an overview of planning-led SuDS provision in Somerset.

We drew together the findings from each development highlighting common trends.

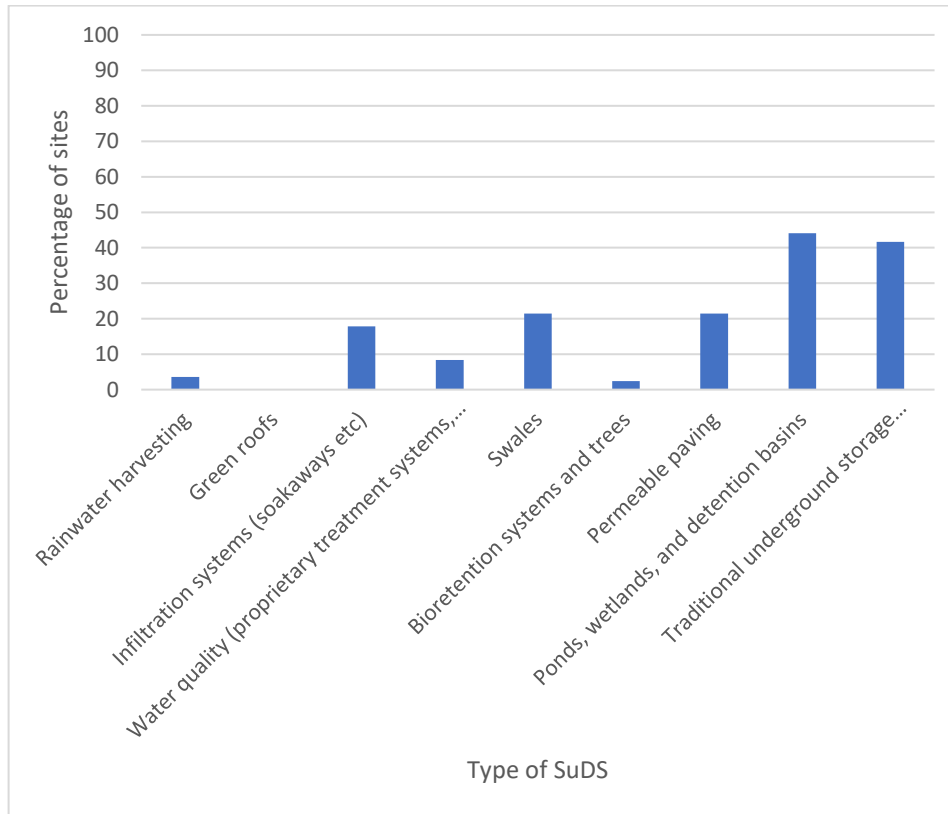
4.1 Available information and audit trail

- We found there was inconsistency in planning documentation and level of detail of evidence submitted, both between individual applications and between different LPAs that made it difficult in some cases to make a reasonable assessment of the scheme design.
- It was difficult to follow an audit trail of changes and approvals to drainage designs, particularly on phased sites with multiple applications.
- The number of FRAs and drainage strategies submitted on the planning portals, and the number of drainage strategies that include

evidence of runoff and storage calculations have gradually increased over the last 10 years.

4.2 Were SuDS adequately designed?

- We considered basic greenfield runoff and volume calculations to be broadly acceptable when compared to contemporary guidance (where they could be replicated).
- Climate change had been considered to contemporary guidance in most designs. Urban creep had not been taken into account by any design.
- There was often little evidence that designs for managing surface water had included sufficient design for exceedance, and we noted that several sites had the potential for on-site flooding should capacity be exceeded, due to layout and threshold levels.
- Due to the lack of information available, it was very difficult to assess whether these developments have increased flood risk off-site.
- Only a few of the sites incorporated source control features, with a tendency towards underground or 'pipe-to-pond' solutions. The most popular SuDS type was ponds, wetlands and detention basins (44%), followed closely by traditional underground storage (42%). For other features, 18% provided infiltration systems, 21% proposed swales, and only 2% (2 sites) proposed bioretention systems (raingardens, tree pits etc). Most designs include only one or two types of different SuDS feature.



Type of SuDS features proposed in planning applications

- We found little evidence of the deliberate provision of biodiversity and amenity benefits in the drainage design, and some sites had missed potential opportunities. The best example used surface SuDS features to provide amenity and biodiversity benefits, including reed bed channels, tree pits and bioretention planters in public and semi-public amenity areas.

- We found little evidence of consideration of the water quality treatment train explicitly in the designs, although several sites did include features that would improve water quality.
- The best example had considered SuDS at an early stage, incorporating SuDS into the design brief and through the master planning stage.

4.3 Were SuDS constructed as designed?

- There were no full Construction Method Statements in the available planning documentation, although there was some evidence they had been requested through conditions.
- Generally, schemes had been built in accordance with design drawings and we did not find any major discrepancies. We could not confirm all features that were underground.

“The layout of surface water drainage features, including the rill channel system, attenuation pond and reed bed have been constructed as designed in the drawings provided at planning”

“The attenuation basin and its components, such as the Hydro-brake, have been constructed as designed”

- Site inspections on some sites still under construction showed poor site management practices happening at the time of the inspection with respect to managing sediment and pollution entering surface waters.

“Poor construction site management practices (the site is still under construction) have led to significant blockages of highway drainage systems as a result of sediment-laden runoff.”
“Construction debris was found in the flow control chamber”



4.4 Do schemes have any deficiencies?

- Individual defects were identified on some sites, for example poorly constructed permeable paving and ineffective surface water sewer invert levels.

“The surface water sewer has been constructed with a lower upstream invert level than downstream invert level, causing standing water in the inspection chamber”

“The attenuation basin does not contain an overflow control feature, such as an overflow pipe or spillway, to manage an exceedance event or blockage of the outfall structure”

“Permeable paving on driveways had been laid without incorporating voids between the blocks, causing restricted infiltration through the paving”



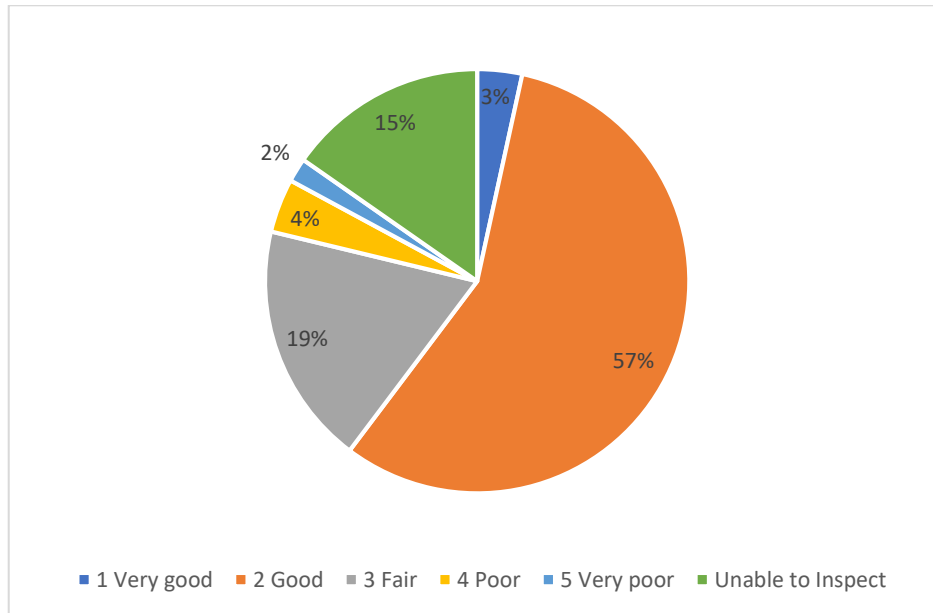
- A few sites showed visible signs of oil pollution and algal growth in surface water features, although we were not able to identify whether these were from instantaneous point sources (i.e. spills) or wider runoff from the site.



4.5 Are SuDS being adequately maintained?

- Detailed maintenance plans were not generally present within the planning documentation, although some of the applications did briefly set out adoption and maintenance arrangements.

We inspected a total of 113 SuDS features and gave condition scores to 438 elements of these features (inlets, outlets, screens, general structure, overflows, vegetation, fencing etc). We found that of all the assets inspected, 60% were in good or very good condition, but 6% were poor or very poor.



- Site inspections found that many of the sites were being maintained regularly and adequately.

“The western boundary swale was densely vegetated, including tree growth in the base of the swale”

“The attenuation basin, road drainage and swales were generally well maintained during site inspection, having recently been mown”

- However, we found several sites appeared to have poor maintenance of SuDS features, often in terms of vegetation growth, scour, and debris present in drainage features. The level of maintenance varied depending on the adopting organisation.



- For those where poor maintenance of SuDS was evident, we know little about who is responsible for maintenance or what the maintenance regime should be.

“Maintenance was adequate within the larger water body features, with healthy yet controlled vegetation growth within the pond”

“Inlets are typically overgrown and/or buried, leading to potential surcharge of upstream pipework which may result in flooding”

“Scour appears to be occurring immediately downstream of the site outfall into the ditch, which will lead to erosion and potential damage to the outfall structure”

5 What are the next steps?

The SuDS review has provided useful information to inform how the statutory consultees work with planning authorities and developers to achieve the best SuDS possible. We are also using the findings of the review to identify and support projects and initiatives that will enhance SuDS provision in Somerset. Several of these have already begun.

5.1 SuDS guidance document

The County Council is using funding from the Somerset Rivers Authority to create Somerset-specific guidance for developers to assist them in creating high quality, multi-benefit, integrated SuDS when designing developments in the county. This will incorporate

specific requirements from all partners involved in the planning process and draw upon some of the challenges identified through the SuDS review. The intention is that the guidance will be adopted by Somerset’s LPAs and will set a high standard of development that integrates SuDS into a design and delivers multiple benefits; environmental, amenity, and economic.

5.2 SuDS inspectors

An SRA funded inspection service has been established by the County Council to try and address the potential disconnect between the designs agreed through the planning process for drainage and their subsequent construction. In addition to evidencing the need for an inspection service, the SuDS review has provided us with some specific areas of the construction process on which to focus this work.

5.3 SuDS demonstration sites

To promote SuDS as a technique and increase understanding of their function we are implementing a number of demonstration sites, initially focusing on Somerset’s Garden Town, Taunton.

The largest of these is an EU-funded project named SPONGE 2020. Through SPONGE the County Council and Westcountry Rivers Trust are working with community groups to implement a range of SuDS schemes within existing urban areas of Taunton. In addition to creating showcase SuDS sites these projects offer an opportunity to address surface water and environmental problems within urban areas built before SuDS were required. Retrofitting SuDS into already developed sites presents different challenges to implementing them through development and redevelopment. We hope these sites will also inspire others to follow this example.