

ASDA Supermarket, Leicester



SuDS used

- *Filter drain*
- *Swale*
- *Detention area*
- *Gully guards*

Benefits

- *Improved water quality*
- *Biodiversity gain*
- *Green boundary to site*

1. Location

1 Exploration Drive Leicester LE45NU

2. Description

ASDA is a major supermarket chain. When starting to consider the perceived impact of the Flood and Water Management Act 2010 they decided to explore different ways to manage their surface water on site. As a supermarket with a large hard surfaced area this led to an innovative solution. The water from the roof of the store and also a significant part of the car park drains through channels and gully to a 10m wide filter drain running across the car park. The reimagining area of car parking drains through a much smaller filter drain; but both drain into a swale system that eventually connects into the sewer system.

3. Main SuDS components used

- Filter blanket, providing mechanical filtration (cleanable silt filtering between run-off; collection by channel and water exiting. There are 13 gully outlets along this length of this channel. All have gully guards which can be rinsed to clean and there are 4 no filter cartridges
- The final part of the car park runs to a 1m wide silt trap strip
- Excess run off continues directly from car park at grade over swale side slopes to swale
- There is a petrol station on site – the outflow from this goes via a surface and oil separator then to a hi performance soluble metal separator then to the swale
- The swale features proprietary swale outlet; the swale itself is 'wobbly' along its length to provide further slowing and increasing micro habitats.

4. How it works

- Rain falls upon the roof and car park and runs to drains
- Car park run-off picks up pollutants; this water is collected. Sediments are settled out before water drains into stone beds.
- Polluted water is cleaned (first stage) by natural filtration
- Water is cleaned again (second stage) by plant action and natural organisms in the ground.
- Cleaned water soaks deep into the ground (infiltration) or evaporates or gets consumed by plants (evapotranspiration).
- Any clean water that remains is stored in the swale and is released slowly (attenuation).

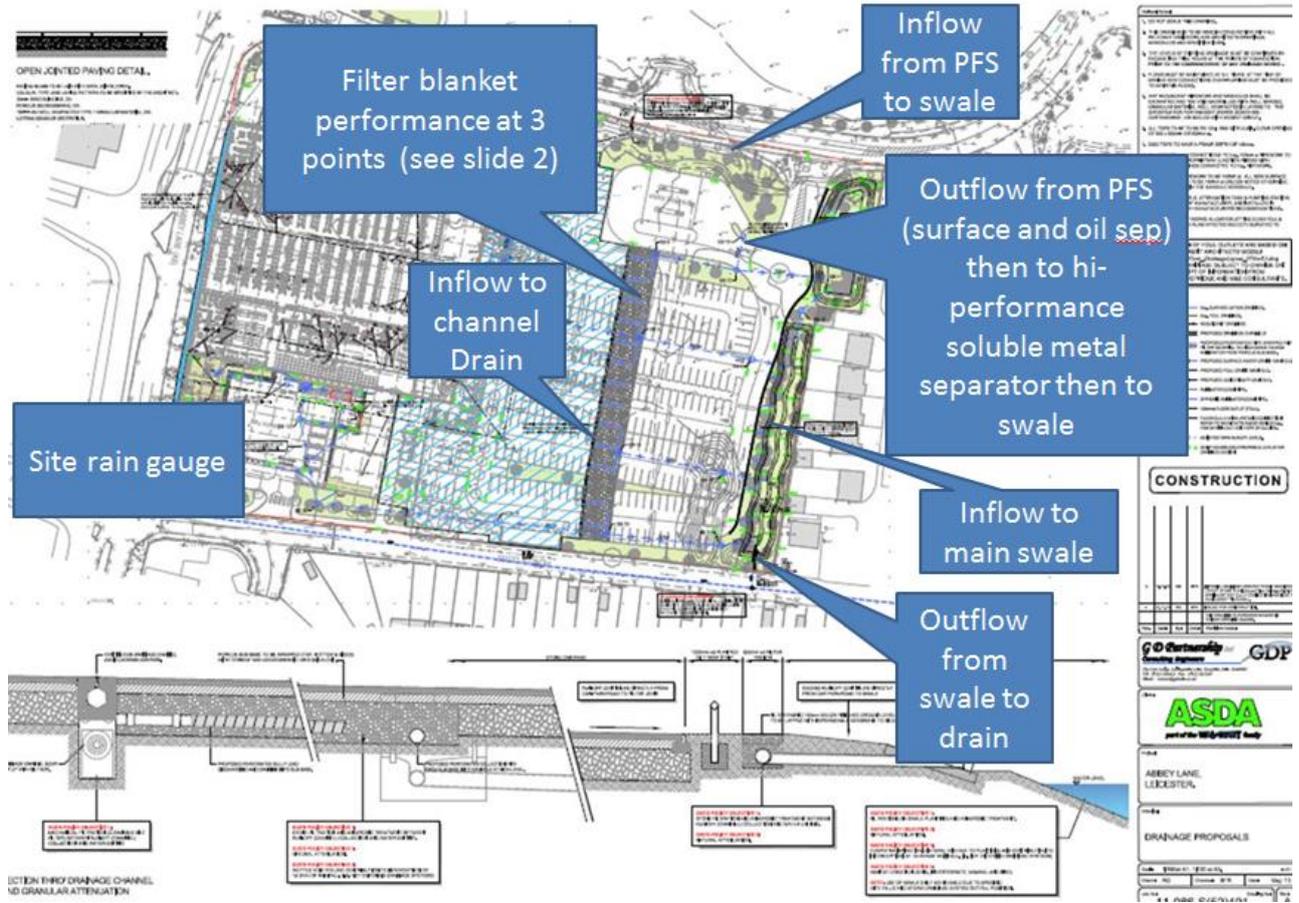


Fig 1.

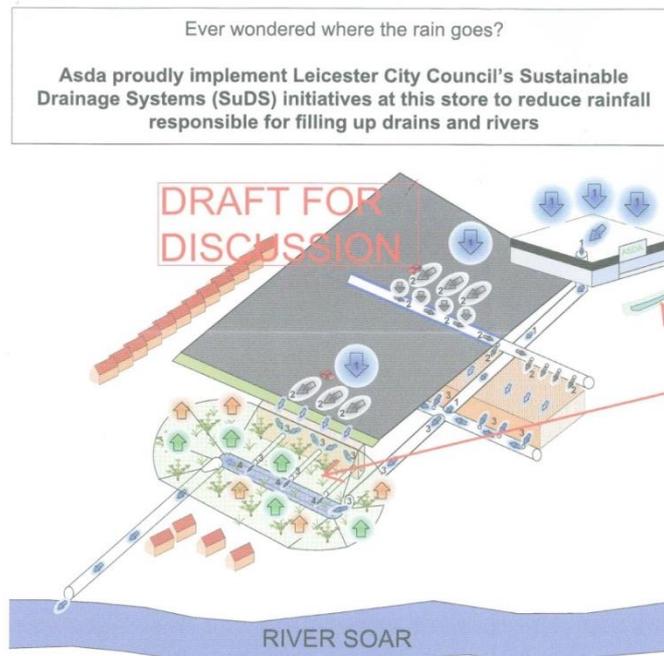


Fig 2.

The whole system is designed to slowly transport water ; limiting risks of flooding.

This sketch was to illustrate the concepts; the main store building is shown top right with the alrge grey area being car parking.

5. Specific project details

Further information.

There is a film on u tube and at this site

<https://www.externalworksindex.co.uk/entry/128707/ACO-Water-Management/Sustainable-drainage-scheme-for-new-Leicester-Asda-store/>

Apart from the overall concept a lot of new products were tested here such as the high capacity slot drainage system; draining a catchment of over 4000m² over its 90m length. Gully guards were used in gully pots that can be rinsed through and new outlets were used in the swale.

6. Maintenance & operation

Details of maintenance and operation

The scheme receives minimal maintenance; but was designed recognising that this would be the case. If there are blockages then the gully guards can be rinsed out to remove material. There is sufficient filtering that limits materials reaching the swales. Apart from some litter the swales seem to be working well.

7. Monitoring and evaluation

Details of monitoring and evaluation

There was some early work monitoring the scheme by a PhD student who had been involved from early in the project.

Leicester supermarket surface water drainage analysis

This document is intended to provide superficial evidence of SuDS performance following 4 months of car park operation on a supermarket car park in Leicester. It is intended to stimulate further research into the performance of the 'management train' rather than isolated discussion of individual components. Indeed, the components discussed – a filter based separator and treatment system (3P) and a swale are part of the train – the 3P product conveys water to other parts of the system before the swale.

Grab samples from 3P filter and swale.

1 sample of approximately 250ml was taken from each component by immersing the Nalgene sample bottle into the water by more than 150mm. The samples were transferred within 2 hour to analysis and to a beaker and stirred. 3 subsequent samples were taken from the beaker and analyzed for visual particulate properties.

NB in order to take samples from the 3P filter the manhole cover had to be removed with potential particulate matter falling on to the surface.

Results

Table 1 illustrates that greater concentration of particulates were present in the 3P filter outlet. However this was part of a management train – communicating to a further detention basin and then on to the swale.

Particles / ml	Sample 1	Sample 2	Sample 3
3P filter	460,673	319,623	453,477
Swale	119,300	113,953	118,262

Table 1 Particles per ml

Generally the 3P product contained smaller particles as evidenced in tables 2 and figure 1. It should be noted that the repetition of single data indicate that few or even single particles were responsible for the results shown. For example the single strand of filamentous algae shown in figure 2 comprises 77.45% of the entire sample particulate volume.

Volume % Less Than Diameter	Swale	Swale	Swale	3P	3P	3P
10	75.53	47.88	42.87	12.13	13.2	3.78
25	291.46	92.36	83.11	28.51	39.7	9.55
50	291.46	123.91	132.26	41.68	133.71	24.65
75	291.46	200.45	175.46	57.77	133.71	48.43
90	291.46	200.45	175.46	77.63	133.71	55.49
100	291.46	200.45	175.46	77.63	133.71	55.49

8. Benefits and achievements

There are short-term and immediate public benefits from a design which has used both innovative technology and natural vegetation to reduce the amount of urban diffuse pollution running off hard surfaces into drains. Water quality has been improved by reducing the pollutants near to source, naturally filtering out particles by allowing water to drain into the swale and filtrate out naturally.

This water drains to the nearby River Soar; not only benefitting the environment locally, but strategically throughout the Soar catchment by encouraging similar schemes to come on board. This is an innovative scheme that could be rolled out across other supermarkets. It achieves a visual and pleasing amenity landscape by providing an area of green space openly observed as customers enter and leave the main supermarket car park.

The supermarket chain were looking at ways to manage surface water on site. Permeable paving was an option that they had decided against for several reasons; the numbers of wheel turning movements which could dislodge joint filling material; the risk of claims from heels getting stuck in joint material; the degree of design inspection possible with design and build contracts etc. This scheme deliberately tried out new proprietary products. And it has allowed for natural infiltration; which however small if it can be achieved is a key SuDS.

Careful design of this area has resulted in a low maintenance and attractive space for customers, and for adjacent local residents whose houses abut the site. Visual amenity, natural landscapes and the attraction of our native fauna on a daily, almost incidental basis has been recognised as having strong mental and physical health benefits. As well as customers and residents ASDA employees also benefit from this local facility.

This small, but important green space also provides a haven for wildlife. Biodiversity is sometimes seen as a key constraint to development, but this scheme found opportunities to enhance the environment and provide habitats for a number of flora and fauna. Whilst complying with Core Strategy Policies to avoid losses and enhance biodiversity and the green network where possible (Leicester City Council planning policies; CS 17 Biodiversity and CS 13 Green Network), the swale area was planted up with a mix of native wildflowers to attract insects; particularly pollinating solitary and bumble bees that have suffered huge declines in their populations recently. The wetland and flowing water is also a place for frogs, toads and newts to live and breed.

Specialist bat and bird boxes were installed discreetly onto the building and the swale area provides a ready food source of insects and seeds for these fauna to feed on nearby and so safeguard their conservation and improve the amount of biodiversity locally.

Supermarket development achieves a first in sustainable urban drainage

A collaborative approach achieves effective surface water management whilst introducing a level of biodiversity never attained before on a retail development.



Leicester City Council has worked collaboratively with Asda, ISG and ACO Water Management to achieve a first in sustainable urban drainage within a supermarket development. The solution is an integrated drainage solution that combines proprietary and vegetative systems to achieve effective surface water management, whilst introducing a level of biodiversity never attained before on a retail development.

Fig 3.

9. Lessons learnt

This was a scheme that was mintended as a trial to be rolled out across other stores in readiness for the wholesale adoption of Schedule 3 of the Flood and Water Management Act 2010. This would have made it essential that developments considered all options before just connecting into existing sewers.

It did provide good experince in working with a big project developer. One of the good things about the project was the developer was prepared to engage in discussion with the local authority.

There is a warning sign that helps to spread the word about the benefits of suds; it says:

Warning! Sharks!

Okay, there aren't really any sharks but this pond is not for swimming or fishing or anything else.

It's part of an innovative system that collects rainwater and helps to prevent flooding in the area.

Please stay safe and stay out of the water

It is good to see a supermarket chain with a sense of humour!

10. Interaction with local authority

Close working initially through the planning authority.

The head of ASDA infrastructure and highways came out to meet us on site. As the scheme developed the local authority were able to visit site regularly to check progress. A film was made with the authority and the head of infrastructure came to speak to the County Wide Suds group.

11. Project details

Construction completed: -

Cost: *not known*

Extent: *2.58 Ha entire scheme; of which SuDS accounts for about 0.8ha.*

12. Project team

Funders	<ul style="list-style-type: none"> ASDA
Clients	<ul style="list-style-type: none"> ASDA
Designers	<p>HGP architects</p> <ul style="list-style-type: none"> GD partnerships
Contractors	<ul style="list-style-type: none"> ISG
Other	<ul style="list-style-type: none"> ACO

13. Site images and illustrations



Fig 4. Headwall



Fig 5. Creating the 'wobbly' swale



Fig 6: Meadow flowers in detention area and swale



Fig 7: A gully guard



Fig 8: Swale outlet



Fig 9: Installation of final filter drain



Fig 10: Signs around the site

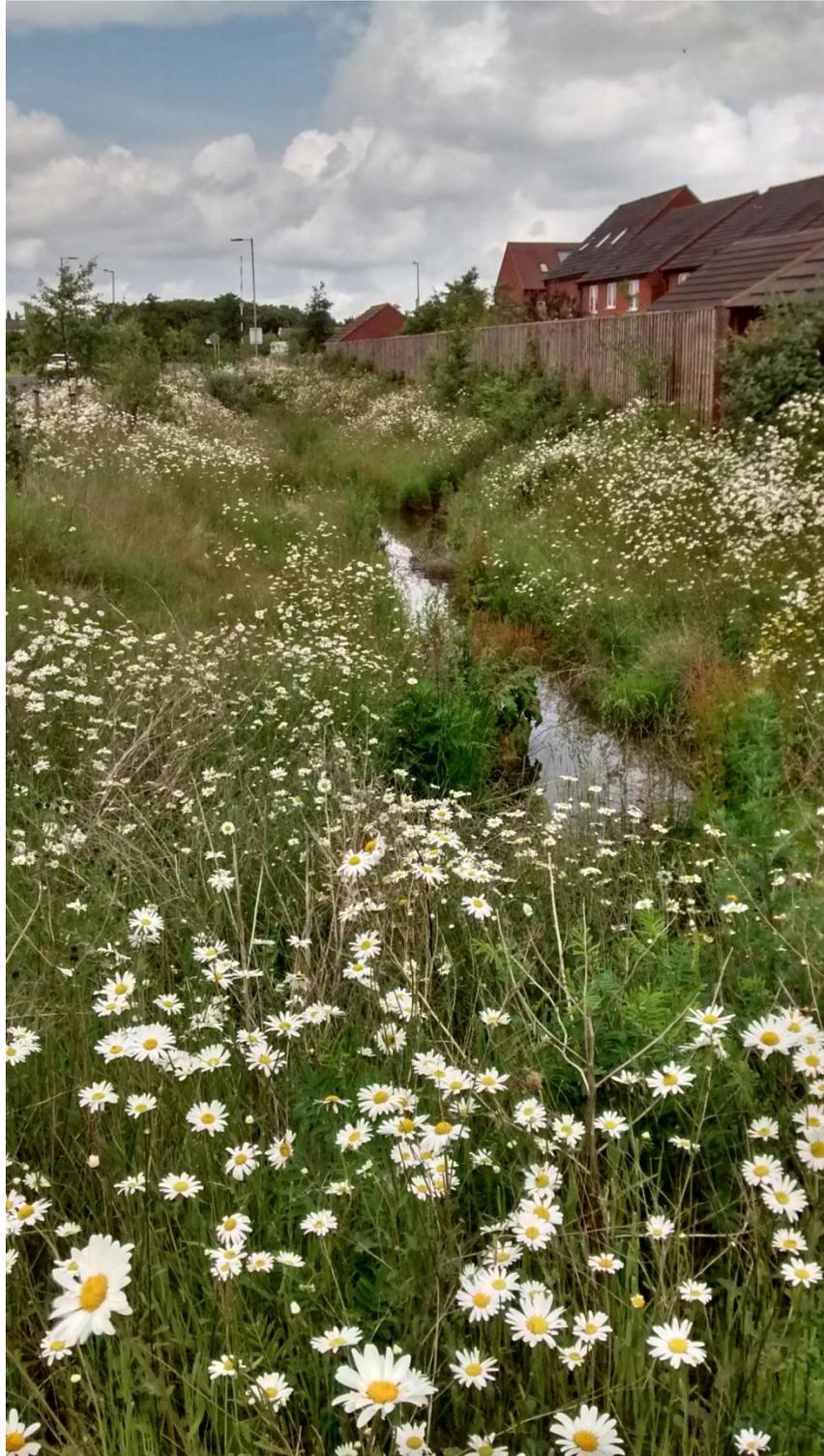


Fig 11: The swale