

Strutts Centre, Belper

SuDS used

- Rain gardens



Benefits

- Effective runoff volumes reduction.
- Effective stormwater runoff treatment.
- Contractor skilled and keen to do more SuDS work.
- Beautiful garden, winning Britain In Bloom East Midlands New Landscape of the Year 2015 which introduces SuDS to a large gardening audience.

1. Location

Strutts Centre, Derby Road, Belper, Derbyshire, DE56 1UU.

2. Description

The Strutts Centre is a former school, now run by a trust as a Community Centre. It is well used by many groups, including the Environment Agency (EA) and Trent Rivers Trust (TRT) who hold meetings there. It is a Grade II listed building in the Derwent Valley Mills World Heritage Site. A former caretaker's house and a children's nursery are located to the north east of the playground with an extensive area of green space rising up to the site boundary.



Figure 1 The main entrance to the Strutts Centre

The EA was keen to have a sustainable drainage system (SuDS) demonstration site in the area to encourage people to have domestic raingardens to cumulatively improve water quality in rivers and reduce flood risk. The water from this site discharges into the River Derwent after being treated at the nearby sewage treatment works. The Derwent is a large river and although this project would not make a demonstrable difference to water quality in the river, its value lies in demonstrating the link between rain water reaching and leaving homes and gardens and in giving a practical example of how we can all make a difference whilst still having beautiful gardens. The site was chosen because of its high visibility as a demonstration project and because the owners were happy to be involved. The site is visible to passers-by and is used by hundreds of people each week.

The project's aims were:

- to implement SuDS on the site;
- to demonstrate retrofitting of sustainable drainage that can reduce urban pollution and flood risk whilst creating a beautiful and interesting addition to the garden;
- to develop an interactive model of a house with and without sustainable drainage;
- to use the scheme to promote SuDS to a wide audience.

The trustees of the centre were keen to engage with the project. Their focus hitherto had been mainly on interiors and this project brought extra attention and resources to their considerable outside space.

The site is 0.86 hectares in size. It has an approximate impermeable area of 0.6 hectares and small permeable areas that provide of 0.26 hectares of green space. Behind the school building is an extensive tarmac surfaced former playground, now used as a car park. An access road links this to the east of the school with another car park and the A6 Derby Road as it runs through the town. An area of formerly mown grass where there used to be two cottages now houses the main rain garden.

3. Main SuDS components used

The design uses a linear raingarden in front of the old caretaker's house, a collector grating (dubbed a 'raincatcher') into a short swale. This delivers runoff into the main raingarden which also takes water from the main Strutts building.



Figure 2 Brick rain channel and linear raingarden in front of the old caretaker's house (1)



Figure 3 Brick rain channel and linear raingarden in front of the old caretaker's house (2)



Figure 4 Meandering channel (foreground)



Figure 5 Main raingarden (background)



Figure 6 Inlet from what the community described as 'raincatcher' grating across the access road



Figure 7 The headwall is mitred, with stainless steel inlet pipe and granite sett surround into the short swale

4. How it works

SuDS retrofit can be described as ‘the art of the possible’. In order to determine what was possible at the Strutts Community Centre a SuDS Audit was undertaken to identify opportunities with recommendations on prioritised actions. This was based on a topographic survey and site visit by the designer and provided a prioritised evaluation of a range of options. This approach was useful in appraising options and choosing the preferred ones with funder and owners and would be a useful approach for other projects.

The creation of a raingarden designed to release a controlled flow of clean water to the combined sewer, bringing a range of benefits to the community, was identified as the most cost effective action. Once this idea was proposed the suggestion of a second, domestic scale raingarden that could be created on a typical house came from discussion with members of the local community. This was built outside the old caretakers’ house and linked to the first raingarden.

The volume of water to be managed by the SuDS components was calculated using the area of roof and road that contribute to the basins, and an appropriate storm return period, that reflects the likelihood of increasing amounts of rain, discharging to the sewer at 5L/sec/hectare.

The volume selected for the small domestic raingarden outside the old caretaker’s house was calculated for the 1 in 2 year return period to reflect day to day runoff from an average house in the Belper area. The 1 in 10 storm return period was used for the main raingarden to retain water from a larger storm event likely to cause local flooding during more intense rainfall events over a prolonged wet period.

5. Specific project details

The site lies within the Derwent Valley Mills World Heritage Site. The Strutts Centre and wider community were enthusiastic landowners and project partners. They easily understood the concept of SuDS and were keen to have another beneficial and interesting aspect to the community centre.

Project management was by TRT who:

- commissioned all elements of the project;
- managed finances;
- ensured good communication and clarity around decision making;
- arranged planting and initial maintenance;
- commissioned and provided content for interpretation and;
- held a launch event and gained publicity.

The EA funded the project and provided technical and project management support as required. They also filmed the video and helped with publicity. The EA were keen to deliver projects which meet their objectives in partnership in this region. This flexible approach paid dividends by supporting the TRT to take on and successfully deliver their first SuDS project and more broadly it supported the TRT to develop skills and confidence in urban river work.

Designers Robert Bray Associates (RBA) used initial meetings and site visits to consult with the clients and draw up a SuDS audit. This guided the selection of the most appropriate solutions. The RBA team then drew up detailed designs and advised the clients through the process of tendering for contractors. They worked closely with contractors Pugh-Lewis and Trent Rivers Trust, drew up detailed planting plans and maintenance guidance and even took a leading role at the community planting day! They were always on hand with advice and answers to questions and provided graphics for the interpretation panels. Pugh-Lewis Ltd. delivered the project conscientiously, on time and on budget.

Strutts Centre Belper

Retro-fit SuDS Audit - SuDS (Sustainable Urban Drainage) uses the landscape to manage rainfall in an environmentally friendly way.

Key

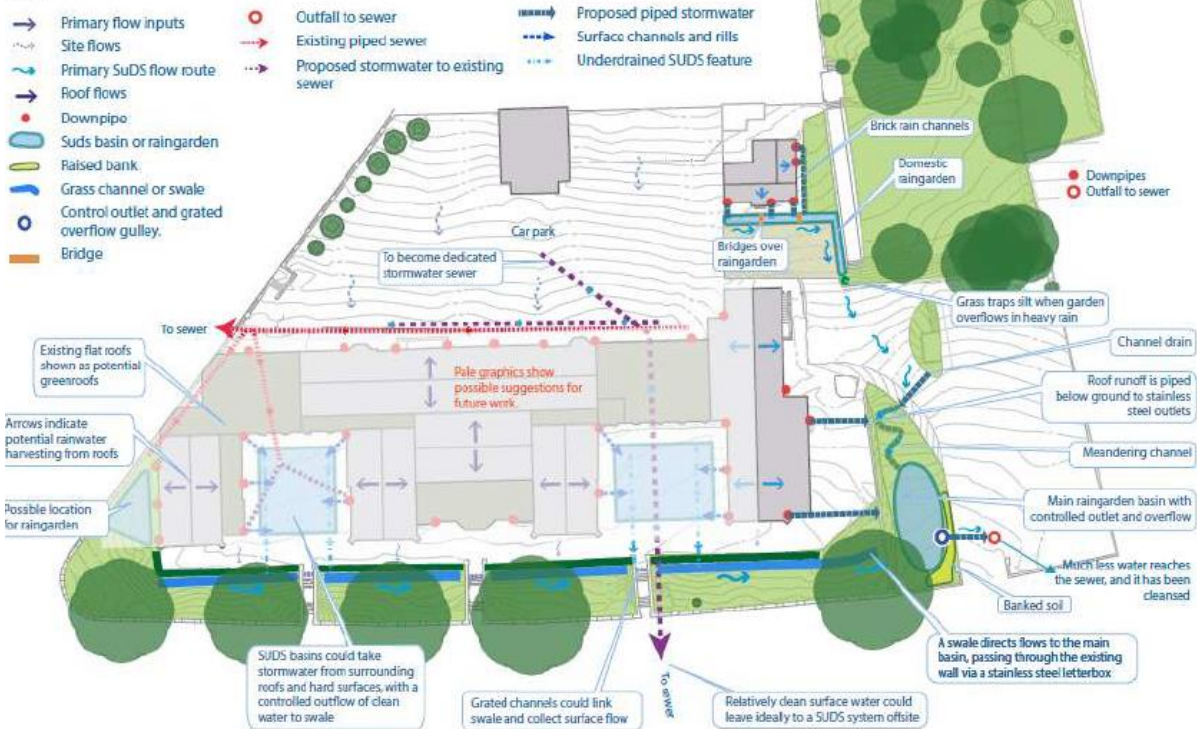


Figure 8 Illustration of SuDS Audit

Early discussions with the local planning authority established key parameters such as not adding anything more than 1m above ground level or excavating more than 1m below ground level which were adhered to and avoided the need for planning permission.

Richard Bett, a local artist, provided the stainless steel interpretation. The idea was to visually enhance the SuDS, picking up on the stainless steel used in the spouts and to interpret the scheme to all ages, including the children and parents on the nursery which uses the site. By creating something resembling a 'treasure trail' they draw people into the SuDS train as the water flows through it. A physical working model of domestic SuDS was built by TRT staff with hidden talents! It has proved very popular and has 'toured' more than 10 public events over the summer of 2015 showing the public how SuDS work. A two minute video of the model can be seen here: <http://www.trentriverstrust.org/site/Rain-Gardens>



Figure 9 SuDS model (1)



Figure 10 SuDS model (2)

An interpretation panel and bespoke stainless steel signs which aims to engage people on following and understanding the SuDS management train were installed, ensuring they keep with the building's historic status.



Strutts Centre Rain Garden

The River Starts Here!

Cross section of the rain garden in front of gow



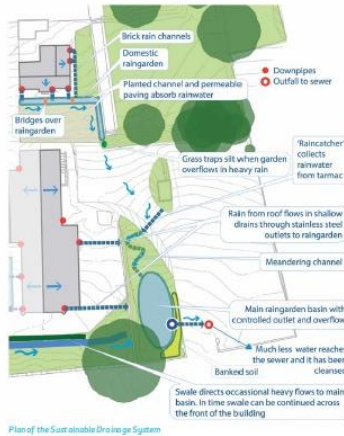
Have you ever wondered where all the water goes when it rains?

Tarmac, paving and buildings prevent rainwater soaking into the ground. Instead it flows quickly 'down the drain' taking pollution to the River Derwent or to Coppice Brook, or joins the foul sewage going to the sewage works.



What is the problem?

- Excessive runoff can lead to flash flooding of roads and properties
- Storm water and sewage can overflow into our rivers
- Pollutants from our urban areas contaminate our rivers
- Sewage works have to manage large volumes of storm water which adds to the energy demands and cost to the customer



Sustainable Drainage Systems are a good solution

Sustainable Drainage Systems (SuDS) mimic nature, absorbing rainwater and creating beautiful features loved by wildlife. The flower bed outside the house takes rainwater from the roof. In front of it permeable paving lets water soak in. Follow the metal signs around the site to see how these features make up the SuDS strategy here at Strutts.

What can I do at home?

- Install a water butt to collect rain for your garden
- Divert your downpipes to a rain garden. (Seek advice about the size and position needed).
- Use your slope to take rainwater to a small basin or pond - wildlife will love it!
- Need to park your car? Instead of tarmac use permeable paving or two rows of slabs with gravel and low plants between.



Want to find out more?

Susdrain's website www.susdrain.org has lots of information about SuDS including more about the Strutt Centre National Demonstration site whilst Trent Rivers Trust's website www.trent-rivers-trust.org also has information about this and other river projects.

Figure 11 Interpretation panel showing a cross section of the main 'rain garden' looking towards the Strutts Centre

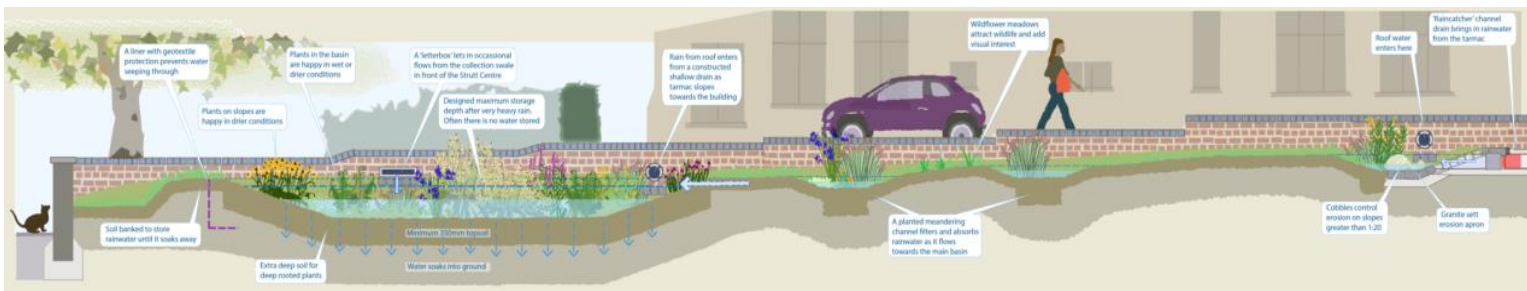


Figure 12 Interpretation board cross section (1)

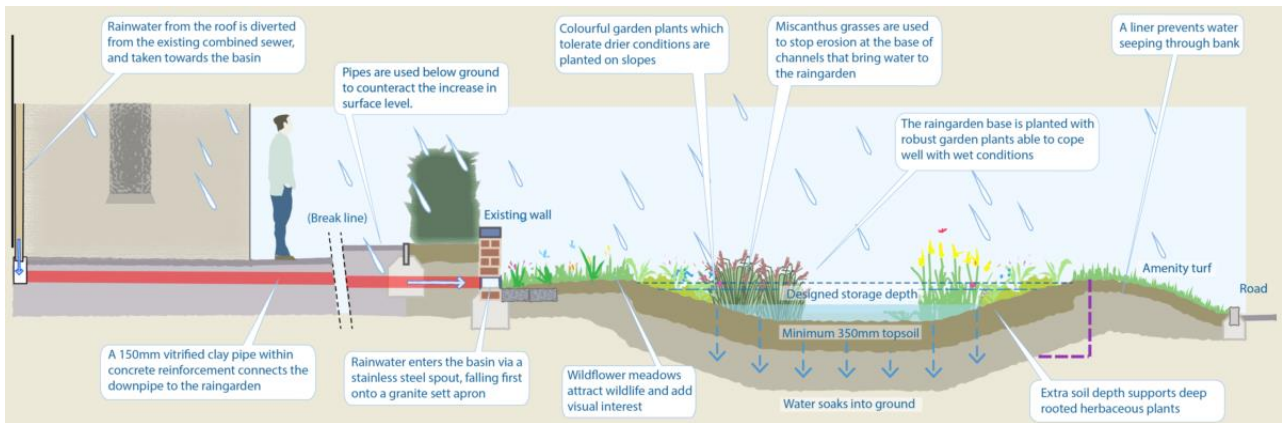


Figure 13 Interpretation board cross section (2)



Figure 14 Artist Richard Bett creating stainless steel interpretation of the SuDS management train throughout the site, complementing the stainless steel detailing of the features



Figure 15 Disconnected downpipe which was diverted to an underground pipe due to the reverse fall to the raingarden. Note interpretation and stainless steel spout inlet



Figure 16 Raincatcher' grating, originally specified as stainless steel but the tight budget unfortunately meant a more conventional finish. Dowbpipe is from a small shed



Figure 17 Main sign to give a brief message to the passing public

6. Maintenance & operation

The substrate was clay and a humus-rich soil was added to both raingardens along with the topsoil that was lifted and stored during construction. Both raingardens were planted with perennials. Plants were selected on the basis of being suited to both wet and dry conditions with some species as erosion control in areas of highest gradient. On the bank side plants which thrive in drier conditions were chosen while at the top of the banks plants which provide ground cover to reduce erosion were selected. The basin was also sown with Pictorial Meadows seed mixes for immediate visual impact. In hindsight this mix, on the fertile soil, ‘drowned out’ some of the perennials so a less dense sowing would be recommended in future.

The aim was that the raingardens would, once built, belong to the Strutts Centre. However, as the design and build process had been managed by TRT, albeit with careful consultation and involvement of all, the transition from ‘their project with us’ to ‘our raingarden’ was not automatic and needed considerable support.

Most of the existing Strutts Centre volunteers had little spare time so a specific team was recruited by TRT from people who contacted the centre. The Project Manager invested time irrigating the planting through a very dry April 2015 to keep the plants alive and into recruiting, gardening with and supporting the volunteers. She ensured that they were well linked with the Centre’s other volunteers and trustees to ensure that the raingarden would be looked after through the first and future years.

The designers helpfully provided a brief, two page maintenance plan to advise on future gardening requirements and they also gave advice by phone when required.

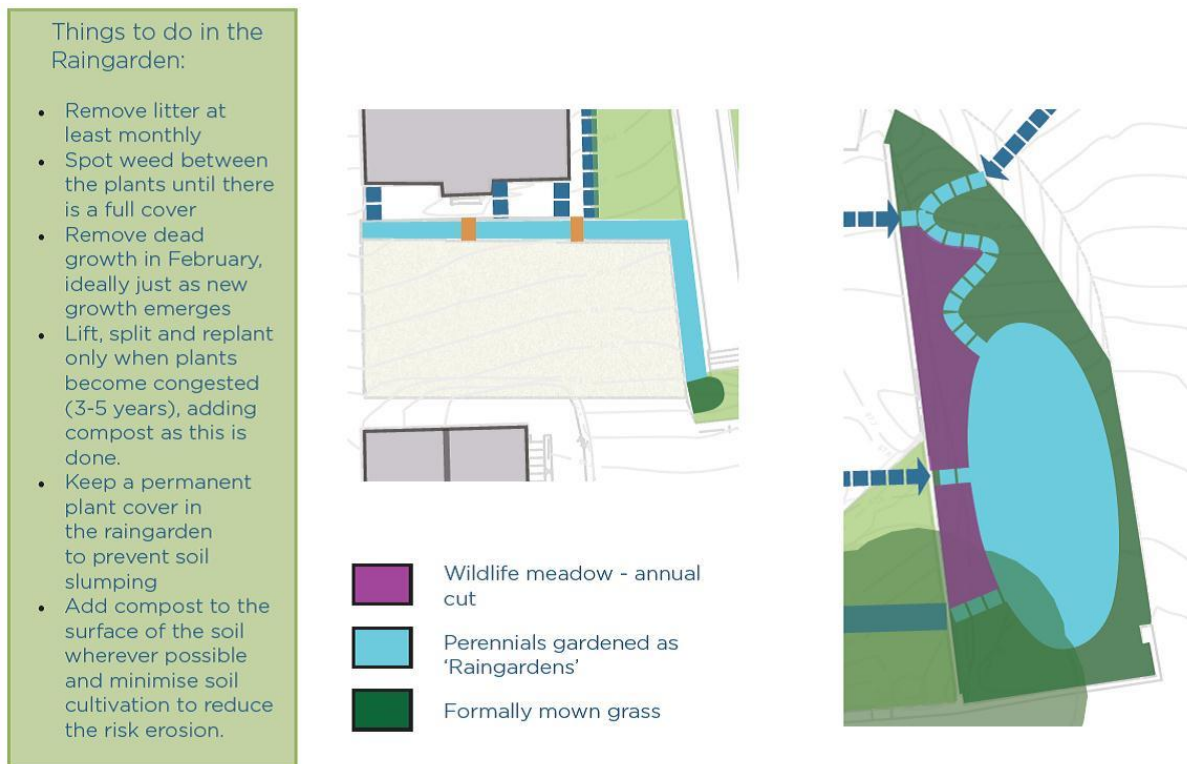


Figure 18 Extract from maintenance plan

7. Achievements

- Demonstration SuDS project in this area, where there are very few;
- Creation of a SuDS Audit to involve clients and community in design and decision-making process;
- SuDS highlighted to various audiences through press coverage and social media;
- SuDS model and video. Video also appeared on River Restoration centre website highlighting SuDS to a River Restoration audience. Video has 257 views and model toured over 12 events over 2015;
- Launch event, ongoing presentations to Rivers Trust and Catchment Based Approach audience and enthusiastic 'word of mouth' in the community;
- Beautiful garden, winning Britain In Bloom East Midlands New Landscape of the Year 2015 which introduces SuDS to a large gardening audience;

- Some rainwater will enter the sewer system but more slowly and of better quality;
- Contractor skilled and keen to do more SuDS work.

8. Lessons learnt

- It is possible to deliver a complex SuDS project on a listed building in 6 months but you have to project manage closely, commission carefully and be lucky with the weather!;
- Pro-active EA involvement helped to secure good outcomes;
- Pay careful attention to key decisions;
- Involve landowner in design process;
- Procure carefully – accurate topographical survey, good designer and contractor;
- Having a follow-on project to provide interpretation and publicity achieved good results;
- Art and working models explain SuDS succinctly and effectively and draw people in by making them curious. People intuitively understand the concept.

8.1. Project funders and partners

Funding was initially from DEFRA's Catchment Restoration Fund, with significant further funding from the EA which included the model and launch. Severn Trent Water paid for much of the interpretation.

Total budget: £49,200

9. Project team

- **Overall project management and delivery:** Trent Rivers Trust (TRT)
- **Technical support, funding for SuDS scheme, model and launch:** Environment Agency (EA)
- **SuDS audit, consultation, design, supervision of construction process, planting scheme, ongoing support and advice:** Robert Bray Associates (RBA)
- **Contractor:** Pugh Lewis Ltd
- **Stainless steel interpretation:** Richard Bett, artist
- **Interpretation panel design:** The Art Department
- **Funding for interpretation board:** Severn Trent Water