

Castle Community Centre Rain Garden



SuDS used

- *Water butts on all gutter down-pipes for collection and storage of rainwater for use in watering the centre's gardens.*
- *Underground pipe connections between waterbutts, with isolating valves allowing waterbutts to be used either separately or as combined system, giving a greater head of water and providing more useable water pressure for use of hoses around the garden.*
- *Overflow system, to divert excess rainfall from the waterbutts into underground pipework to bioretention area.*
- *Outflow system into bioretention area, enabling even distribution of water around the area and protection against backflow and siltation.*
- *Excavated Rain Garden (bioretention area) featuring free-draining backfill comprising sand, gravel and compost mix, with native wetland planting chosen for colour, structure and wildlife value.*

Benefits

- *Reduce the risk of pollution from Combined Sewer Overflows (CSO's) by diverting all rainfall from the centre's roof, away from the combined sewer network.*
- *Provide rainwater collection and storage for use in the centre's garden.*

- *Create new seasonally wet habitat to benefit wetland species and pollinators.*
- *Create new, attractive, sustainable, low-maintenance feature within a programme of developments within the centre's garden*
- *Contribute to Northwich's North West in Bloom entry for 2019.*
- *Adapt best practice as outlined in current literature eg:*
 - *UK Rain Garden Guide (CIRIA, Thames Water, Environment Agency):*
<https://raingardens.info/wp-content/uploads/2012/07/UKRainGarden-Guide.pdf>
 - *Royal Horticultural Society – Advice on Rain Gardens:*
<https://www.rhs.org.uk/advice/profile?pid=1009>
- *Create a learning opportunity for all partners and volunteers, demonstrating opportunities for other local community premises to develop multi-benefit SUDs projects.*

1. Location

Castle Community Centre, Barbers Lane, Northwich CW8 1DT

2. Description

The excavated rain garden at Age UK's Castle Community Centre was designed as a retro-fit project suitable for installation by volunteers. It's primary purpose is to divert all rainfall landing on the Centres' roof away from the local combined sewer network, into which it had always drained. This helps reduce the risk of river pollution from Combined Sewer Overflows (CSOs) at times of peak rainfall. Much of the sewer network in older districts of Northwich is of the 'Combined' type and CSO events are an important source of pollutants in the River Weaver and River Dane within the town.

The project represents part of Groundwork CLM's Love My River Northwich programme, which received funding from the Environment Agency for delivery of a series of demonstration SUDs projects in community premises in Northwich during 2018-19. The design has been inspired by the UK Rain Garden Guide, as developed by CIRIA with support from Thames Water and the Environment Agency: <https://raingardens.info/wp-content/uploads/2012/07/UKRainGarden-Guide.pdf>.

The permeability of the subsoil on site was tested in advance for its suitability for this type of soakaway feature, using methods outlined in the UK Rain Garden Guide. The specific location of the raingarden within the site was chosen carefully in consultation with centre managers and in consideration of locations of other planned garden features: a whole garden design is currently being implemented by centre staff and local volunteers following plans supplied by a qualified garden designer.

3. Main SuDS components used

The first part of the system to be installed was a series of four water-butts; one at each of the downpipes from the guttering around the roof of the single storey community centre building. These enable collection of rainwater for use in watering the centre's developing garden, and when full, overflows into a buried pipe network, which carries water to the excavated raingarden.

The raingarden was excavated by hand in free draining sandy subsoil to a depth of approximately 60cm. A bund approx. 20cm high was created around rim of the excavation to provide extra capacity and avoid flooding of surrounding areas in periods of extreme rainfall.

Prior to backfilling, trenches were dug and pipework installed, using easy-to-install black plastic 40mm waste pipe with pushfit connectors.

Back fill material for the rain garden consisted of a combination of sand, compost and subsoil, to create a free draining substrate containing enough organic matter to hold in moisture around plant roots during dry spells. Final planting included a range of native wetland and marginal plants, together with some annual wildflower seed for early colour. The bund around the excavation was seeded with an amenity grass seed mix.

4. How it works

Downpipes from the roof gutters channel rainwater directly to the four waterbutts. These are connected to an overflow system which carries water through underground pipes to the excavated rain garden. In normal operation, this diverts all rainwater from the centre's roof away from the combined sewer system.

The completed rain garden now acts as an effective soakaway for the rainwater from the community centre roof and has been observed functioning well during periods of extreme rainfall. At the same time, the raingarden provides valuable seasonally wet habitat for wildlife, including pollinating insects.

5. Specific project details

To deal with the unlikely event of a problem occurring with the system (for example, if the rain garden failed to soakaway as intended and other areas of the garden began to flood), a simple bypass option was also incorporated. This enables centre staff to re-connect overflows from the waterbutts into the sewer system if required.

Three of the water butts are connected together by buried pipework and isolating valves, which enable these to be drained down individually or as a single unit providing a greater head of water and increased water pressure for use via hosepipes around the garden.

A major consideration at all stages of the design and implementation of the system was to reduce the likelihood failure occurring as a result of blockage caused by silt accumulating in buried pipework. This possibility has been mitigated as far as possible through the following features:

- A surveyors optical level and ranging pole were used to ensure that a fall of 1:100 was maintained along the length of the pipework to ensure sufficient flow to prevent siltation.
- Silt is also prevented from entering the system at the earliest stage as the waterbutts themselves act as effective silt traps, with water overflowing into the system only from the top of the waterbutt, while any silt will safely accumulate at the bottom.

- As it enters the raingarden, the pipe carrying rainwater from the waterbutts passes through an inspection chamber which allows for dismantling of the pipework at its lowest point, enabling flushing and de-silting if required.
- From this point the pipe divides into five branches, each branch having its own outfall. This also enables water to be more evenly distributed around the excavation. Each outfall empties into a bucket which has a series of drainage holes drilled into the sides of the buckets at regular spacings between the top and half way down. This enables any silt entering through either the outfall pipe or the drainage holes to settle at the bottom of the bucket.
- Before final back-filling, the buckets were wrapped with a geotextile material cable tied into place to reduce the likelihood of silt entering through the drainage holes.

6. Maintenance & operation

Regular maintenance requirements of the system are designed to be easily carried out by Age UK staff and volunteers, with ongoing support from Groundwork CLM. Regular tasks include:

- Annual cutting back and periodic weeding of the raingarden vegetation
- Annual monitoring and desilting of outfall buckets as required.
- Monitoring of flow and desilting of main pipe as required.
- Periodic isolation and draining down of water butts to remove accumulated silt and debris.

Any problems encountered with the system can immediately be prevented from becoming worse by isolating elements of the system or returning overflows to the sewer network, pending further investigation and maintenance/repair.

7. Monitoring and evaluation

Initial regular monitoring during the early stages of the operation of the system has been an essential and reassuring process. Monitoring in all weather conditions, including extremes of wet and dry, have shown all features to be working exactly as expected.

Initial evaluation has revealed excellent results in terms of client satisfaction, system reliability and effectiveness, establishment of vegetation and overall benefits

8. Benefits and achievements

Benefits achieved have included:

Reducing the risk of pollution from Combined Sewer Overflows (CSO's) by diverting all rainfall from the centre's roof, away from the combined sewer network.

Providing rainwater collection and storage for use in the centre's garden.

Creating new seasonally wet habitat to benefit wetland species and pollinators.

Creating new, attractive, sustainable, low-maintenance feature within a programme of developments within the centre's garden

Contributing to Northwich's North West in Bloom entry for 2019.

Adapting best practice as outlined in current literature eg:

- UK Rain Garden Guide (CIRIA, Thames Water, Environment Agency):
<https://raingardens.info/wp-content/uploads/2012/07/UKRainGarden-Guide.pdf>
- Royal Horticultural Society – Advice on Rain Gardens:
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Creating a learning opportunity for all partners and volunteers, demonstrating opportunities for other local community premises to develop multi-benefit SUDs projects.

Cementing long-term partnership links between Groundwork CLM and Age UK Cheshire/Castle Community Centre.

Establishing a partnership between Age UK and the Vale Royal Conservation Volunteers, whose work at the site began with their involvement in implementing the rain garden project under the supervision of Groundwork CLM and now includes regular work on developing and maintaining the garden on behalf of Age UK.

9. Lessons learnt

Key lessons emerging from the project have included:

- The importance of basing SUDs projects on best practice advice from respected sources
- The value of working closely with those with local and site knowledge to enable generic advice to be adapted to local circumstances
- The value of working with a range of local; community volunteers, many of whom contributed greatly to the quality of the project through on-site application of their life and work experience and problem solving ideas, as well as some key features such as the silt-trap bucket idea.
- The importance of regular tea, biscuits and smiles provided by the lovely Age UK volunteers to help fuel the labour and ideas of the volunteer teams

10. Interaction with local authority

The principal client for the project at the outset was the Environment Agency's Greater Manchester, Merseyside and Cheshire team who managed the funding for Groundwork CLM's Love My River Northwich programme. Their support, encouragement and flexibility ensured that the project was able to test out existing advice in a local context and adapt the project as it went along to account for lessons learned along the way and achieve multiple benefits beyond those originally planned.

Also acting in a client role were Age UK Cheshire, whose trust in Groundwork CLM's vision and flexibility over working arrangements on site also helped many of the wider benefits to be achieved. Groundwork CLM are very grateful to Age UK Cheshire for enabling us to use their site to experiment with new adaptations to existing good practice and for making our teams feel so welcome.








11. Project details

Construction completed: *March 2019.*

Cost: approx. £6000 from within a larger budget covering several small scale community SuDS projects

Extent: Raingarden area approx. 5m x 3m within a site of approx. 1Ha

12. Project team

Funders	<ul style="list-style-type: none"> Environment Agency 	
Clients	<ul style="list-style-type: none"> Age UK Cheshire 	
Designers	<ul style="list-style-type: none"> Groundwork Cheshire Lancashire & Merseyside 	
Contractors	<ul style="list-style-type: none"> Groundwork Cheshire Lancashire & Merseyside 	
Other	<ul style="list-style-type: none"> Crewe Conservation Volunteers; Vale Royal Conservation Volunteers; Grozone Community Garden Volunteers; Love My River Northwich Volunteers; 	  

13. Project Photos

1. Crewe Conservation Volunteers install the water butts



2. Water butts showing isolation valves and overflow pipe to raingarden



3. Vale Royal Conservation Volunteers excavate the rain garden



4. Vale Royal Conservation Volunteers excavate the pipe trenches



5. Love My River Volunteers installing five-point outfall and silt-trap buckets



6. Testing silt-trap buckets being for water-flow



7. Grozone volunteers wrap buckets with geotextile and complete rain garden back-fill



8. Completed rain garden shown soon after planting, the day after a night of heavy rain.

