Lisvane and Llanishen Reservoirs' Visitor Centre
Submitted by Momentum Consulting Engineers

Awards category
New commercial development (any scale)

Lead or collaborating organisation(s)	**Momentum Consulting Engineers** **LT Studio** **Feilden Clegg Bradley Studios** **Dŵr Cymru Welsh Water**
Location of SuDS	CF14 0BB ST 18493 82325

1. SuDS overview

SuDS components used	• Raingardens • Rills integrated with building perimeter. • Swales • Tree pits • Bioretention • Pervious surfaces • Filter trenches • Gravel filtration below car park • Attenuation storage
Size of the scheme and its local context	The Visitor Centre, car park and associated landscape cover an area of approximately 0.6 hectares. The scheme forms part of the wider Lisvane and Llanishen Reservoir restoration project, covering an area of approximately 45 hectares. The site encompasses two SSSI: • Lisvane Reservoir SSSI is designated for its overwintering wildfowl; • Llanishen and Lisvane Reservoir Embankments SSSI is of special interest for its diverse assemblage of grassland fungi including up to 25 species of waxcap. The site also encompasses various areas designated Site of Interest for Nature Conservation (SINC). This includes the reservoirs, surrounding meadows and woodlands. The Visitor Centre and car park was carefully located within this context on Brownfield, operational land associated with the historic use of Lisvane and Llanishen Reservoirs. In addition to the above the scheme is also located within significant reservoir infrastructure, and listed heritage infrastructure, with Llanishen Reservoir Grade 2 listed as an integral part of the nineteenth century water-supply system for Cardiff.
Approximate age of scheme (years)	< 1 year

Benefits of the scheme	• Manages local flood risk • Improves water quality • Integrates with, protects and improves local biodiversity. • Visually demonstrates benefits of SuDS and careful water management to visitors, through expressed design and signage. • Provides amenity and access to nature for visitors and local community
Briefly describe the scheme	Lisvane & Llanishen Reservoirs' Visitor Centre is a new water sports and visitor centre owned and operated by Dŵr Cymru Welsh Water. It forms part of a wider restoration project to restore the reservoirs and open them to the public with an emphasis on recreation and the conservation of biodiversity. The development serves as a hub for health and wellbeing in the north Cardiff area, reconnecting people with water and the environment whilst protecting, conserving and enhancing the conservation value of the site. The SuDS scheme is situated within an extremely complex site which includes SSSI, SINC, listed infrastructure, and live reservoir infrastructure. The design aimed to openly exhibit the approach to surface water management, and allow visitors to understand its importance. This begins with expressed 'gargoyles' and rain chains around the building perimeter which discharge to rain gardens and rills. This continues in the design of the external landscape and car park with surface water directed to bioretention systems which treat and store water prior to discharge. Infiltration was not possible on site due to ground conditions. Final discharge is therefore at a controlled rate to a watercourse which runs through the site (Nant Fawr).

2. SuDS details

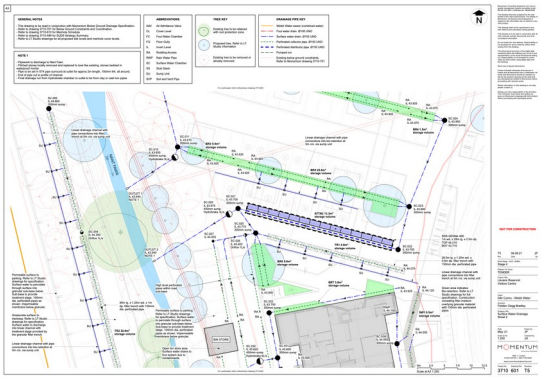
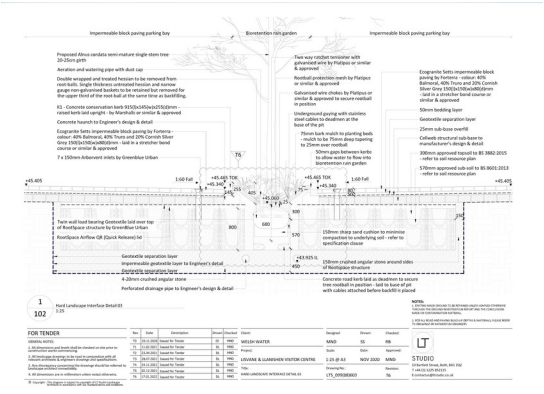
No.	Question	Answer
1	What difference has this scheme made to the local community or area?	This is a hugely popular scheme to the local community, and since opening in July 2023 the site has welcomed over 300,000 visitors. The Friends of Cardiff Reservoirs volunteer society have signed up over 300 members and clocked up over 2k volunteers' hours. The scheme introduced to the local community a high quality visitor centre with fabulous facilities, has created green infrastructure to enable public access whilst protecting and enhancing the environment, introduced a wide range of environmental enhancements to support priority species and brought the woodlands back into active management after decades of neglect.
2	What is exceptional about this scheme beyond a standard approach?	One of the first schemes to go through the SAB process, this project works around significant site constraints to deliver a scheme that protects and enhances the local environment. The scheme is highly expressive in its approach to SuDS, with expressed rainchains, raingardens and bioretention, and actively promotes surface water management to the general public. The SuDS features are carefully integrated into the landscape, creating amenity and improvements in biodiversity to the original Brownfield site, and connecting to the wider site ecosystem. The car park is carefully detailed to provide treatment and storage within a flood risk area.

3	How much work went into getting this scheme realised?	A significant amount of work was required to realise this scheme. The story starts back in 2001, when the Reservoir Action Group was founded by the local community to fight plans to build a large housing development on the site of Llanishen Reservoir. After extensive development battles DCWW took over the site in 2016. A scheme was then developed to create a safe environment for recreational activities, an opportunity for education, and protection & enhancement of the local environment. The design had to consider multiple stakeholders, especially the local community, and had to work around the many complexities of site.
4	Is this scheme part of a masterplan or integrated into other initiatives?	The scheme is part of the wider restoration of Lisvane and Llanishen reservoirs. Lisvane reservoir is a Site of Special Scientific Interest (SSSI), and the embankments of both reservoirs are a separate SSSI for their internationally important diversity of grassland fungi. The site is also designated a Site of Importance for Nature Conservation (SINC). The scheme provides a link to various initiatives across the wider site including education, monitoring and enhancement of biodiversity, and community engagement, including the Community Woodland Project. The scheme has been carefully integrated into the historic and contemporary reservoir infrastructure, working across various disciplines and stakeholders.

5	What value does this scheme provide to the local area and beyond?	The project provides positive social impact via access to high quality green and blue spaces: safe access to inland watersports, along with facilities for catering, changing, meeting, and education. Significant amenity is provided throughout the landscape with external seating, walking routes, learning zone (outdoor classroom and Welsh roundhouse), nature trails, and woodland play. The visitor centre was designed to have a light impact on the natural environment, with SuDS features to support bioretention, improve water quality and reduce flood risk downstream of the site. The SuDS features also provide a link to the wider site which is rich in biodiversity.
6	What challenges/problems needed to be addressed to realise this scheme?	Infiltration was not possible on the site due to ground conditions. The design therefore had to carefully consider how to manage surface water discharge from site. This was achieved through incorporation of significant bioretention volumes, along with filter drains, and storage/treatment within the car park subbase. This was supplemented with below ground attenuation. There were also significant challenges working around the extensive site infrastructure, reservoir dam and listed structures. Clear exclusion zones were identified to avoid impacting these existing features, and careful detailing was required (for example forming the final outfalls within the listed stone pitching of the Nant Fawr).
7	How does the scheme address related issues such as water scarcity, nutrient neutrality, or biodiversity net gain?	The scheme integrates the landscape design with SuDS features. The rain gardens include wildflower meadow planting, and the intention is that much of the bioretention areas will be self-sufficient in terms of water demand. With such rich biodiversity surrounding the site, the scheme aimed to improve biodiversity on the Brownfield area of site on which the Visitor Centre was built and create a connection to the wider site ecosystems. The scheme creates a number of blue/green corridors through the car park and around the visitor centre connecting the richly biodiverse reservoirs with the Nant

		Fawr watercourse and surrounding woodland.
8	Is learning from the scheme continually captured and communicated? Please give examples.	Many of the lessons learned from the project have already been rolled out to other Welsh Water sites. The project has become a blueprint for how Welsh Water can enhance biodiversity on their sites through community engagement, active management of woodlands, and carefully considered development. Welsh Water continue to monitor the performance of the scheme and will feed this back to the project team for use on future Welsh Water projects. The project also incorporates educational features to communicate with the general public. This includes expressed SuDS features, educational signage around the site and outdoor learning facilities.
9	What approaches/measures are taken to ensure the scheme is properly managed and maintained?	The SuDS features within the site are designed to minimise their maintenance requirements. This includes features which capture silt and litter at their surface, easy access, and a robust maintenance plan. The scheme benefits from an experienced client (owned and maintained by Welsh Water). Various discussions with internal stakeholders at Welsh Water throughout the design process ensured that systems were easily maintainable and accessible through the life of the project, including for reservoir infrastructure changes. The design team have also returned to the project since its opening to assess the performance and have continued open dialogue with the client.
10	Have you collected any feedback on your scheme? What do people say about it? Can you provide any quotes?	The project has been hugely popular, attracting around 165,000 visitors in the first 3 months. Deputy Minister for Mental Health and Wellbeing, Lynne Neagle said: “This has been eagerly awaited and will be an asset to the community and those visiting the area. ...Being able to access green spaces and water environments in our cities is important for our physical and mental health and wellbeing….” Julie Morgan, Member of the Senedd for Cardiff North, said: “After a long and united community effort for the last 20+ years, it is fantastic that Llanishen and Lisvane reservoirs are back in operation.''

3. Supporting materials

Image (low resolution)	Caption	Image credit
	Momentum drainage drawing showing part of the SuDS scheme. This includes various areas of bioretention around the building and car park. It shows the various outfalls to the Nant Fawr and additional areas of filter drains and supplementary attenuation. The plan also shows some of the existing infrastructure that the drainage scheme needed to work around. This includes reservoir pipework, Dam Exclusion Zone, Nant Fawr with lists stone pitching, tree root protection zones.	Momentum Consulting Engineers
	LT Studio section through a typical bioretention zone. This includes detailing of the surrounding car park area to ensure a robust treatment train through the gravel subbase of the car park and into the bio-retention.	LT Studio

	Site prior to construction. The site has a long history stretching back to the 1860s. Construction of a new storage reservoir at Lisvane began in 1864 and it was completed a year later in 1865. Filter beds were also constructed on what would later become Llanishen Reservoir. Work started on Llanishen Reservoir early in 1884 and was finished in 1886. In the mid 1970's it was decided that Llanishen Reservoir had come to the end of its useful life. It was not drained and started to be used as a venue for sailing. The site of the visitor centre and car park were Brownfield areas of operational use.	Momentum Consulting Engineers
	Aerial overview photo. This photo shows the extent of the development. Llanishen Reservoir is at the top of the photo and Lisvane is at the bottom. Various reservoir infrastructure can be seen around the visitor centre. This is the same infrastructure that can be seen on the site photo prior to development. The Nant Fawr watercourse can be seen running along the edge of the main car park, with the overflow car parking to the other side. Bioretention strips run through the car park, connecting the reservoir with the Nant Fawr and woodland areas.	Rebecca Noakes Photography

	Rain chains, rain gardens and rills. The feature rain chains are located around the perimeter of the building. These discharge directly to rain gardens and rills. Seating is located around the perimeter of the building, embedded within the landscape.	Rebecca Noakes Photography
	Car park. There are various surface treatments to the car park including porous surfacing and permeable paving, draining to tree pits and raingardens. Gap kerbs are utilised to allow surface water to drain to the bioretention areas.	Rebecca Noakes Photography

	View of car park and visitor centre from Nant Fawr. This view shows the various rainchains and raingardens to perimeter of the building. Discharge from the SuDS scheme is to this watercourse at a controlled rate. Outfalls had to be carefully detailed around the listed stone pitching of the Nant Fawr.	Rebecca Noakes Photography

	Raingardens and rills to the perimeter of the building are fed by the distinctive 'gargoyles' and rain chains, creating a visible link for visitors between rainwater discharge and treatment. The raingardens create additional amenity, and are surrounded by seating integrated into both the building edge and landscape, from which visitors and the locals can connect with nature and enjoy the beautiful views across the reservoirs. New porous resin bound surfacing provides access to walks around the reservoirs, with falls away from the reservoir to bioretention with wildflower meadow planting. The path runs along the head of the reservoir's clay dam, and careful consideration was required for all aspects of the drainage works to ensure safety of the dam. The plaque to the right of the image commemorates the work of the local community to save the site, and reads: "Reservoir Action Group (RAG) 2001-2023. Llanishen and Lisvane reservoirs, under threat of development as a housing estate, were saved for the enjoyment of future generations as a result of a campaign led by RAG and supported by the local community."	Rebecca Noakes Photography