Wessex Water SuDS system, Bath

Location

Wessex Water Ltd Operations Centre, Claverton Down Road, Bath, BA2 7AL
SuDS Used

The £22 million development containing office buildings, an operations centre, car park, roads and l andscaped areas uses both natural and engineered SuDS.There are three green roofs, total size 700m2; one is maintained as oolitic limestone grassland, a small area covered with shrubs and ivy, and a roof originally planted wild flower meadow but changed to a turf lawn with shrub borders to improve aesthetics.Permeable paving is used in the car parking areas. To the north, porous blocks transfer surface water runoff into individual soakaways, while to the south, permeable grass paviors discharge via pipes into a storage tank at the bottom of the site.A swale runs down the western edge of the site. This also drains to the main storage tank. Water from the storage tank is pumped back to soakaway points at the top of the site and also feeds an ornamental water feature.Rainwater and treated greywater are stored in three intermediate tanks. Water from these tanks is used for toilet flushing, to minimise the use of potable water.
How it works The drainage and water supply of the Wessex Water Operations Centre have been integrated. Much of the surface water runoff will be harvested for use, and the storage tank at the bottom of the site provides attenuation and an emergency overflow into the surface water sewer. 45% of the total water used within the building is recycled rainwater.

The greenroof growing medium is a calcareous soil salvaged from the site construction. The plants chosen are native to oolitic limestone grasslands. Thirteen different species of wild flower were seeded including, Achillea (Yarrow), Anthyllis vulneraria (Kidney Vetch) and Primular veris (Cowslip).Ten different grass species were also seeded.

The car parking areas are surfaced with permeable paving ? concrete blocks for the car park in re gular use, and grass paviors for the overspill car parking areas. The entrance and main vehicle route through is bedded on concrete. The sub-base of the car park to the north of the site will provide attenuation, with surface water runoff infiltrating into the Great Oolite limestone through soakaway points. The grass paviors provide limited infiltration, with excess water draining to the storage tank located at the southern end of the site.

Roof water from the building will drain to three intermediate tanks for use. Overspills drain directly to the main storage tank at the southern end of the site.

Surface water runoff from the paved areas outside the building drain to a swale on the western side of the site. This discharges by piped outlet into the same storage tank.

The storage tank at the southern end of the site provides additional storage for water use, and provides an emergency overflow into the surface water sewer, which runs down Brassknocker Hill to the east of the site.

Specific details The £22m Operations Centre was designed with sustainable drainage in mind, both for f oul and surface water. This was driven by the client, Wessex Water, who was keen to promote sustainable solutions on this site. Solutions such as grey water use, stormwater storage and re-use, the use of permeable paving and disposal of surface water runoff by infiltration have all been put into practice on this site.Water from the roof is collected in 380,000 litre tanks in each of the courtyards. This water is filtered and pumped back into the building to header tanks on each of the roofs where it goes through an ultraviolet filter to remove microorganisms. This water supplies toilets and the water feature in the main building. Even during dry summers rainwater supplies approximately 90% of the toilet water with approximately 10 weeks supply. The building manager stated they would have liked to have installed a reed-bed system for filtering their sewage onsite but were constrained by the size of the site.Much of the surface water runoff is disposed of by infiltration through chamber soakaways constructed in the car park sub-structure. The underlying Great Oolite limestone is heavily fissured, and the Environment Agency were initially concerned about the stability of the ground under infiltration conditions. Discussions led to the solution that discharge into gull fissures should be avoided, and open fissures should be bridged or filled if they were uncovered during construction of the soakaways.The storage tank at the downstream end of the system provides an emergency overflow into a surface water sewer running down Brassknocker Hill. The system could have been designed without an overflow, but one was included to give a potential flow monitoring site.During the evolution of the project, opportunities were found to integrate the surface water drainage into the landscaping. A swale runs down the western edge of the site, and the southern car park uses grass paviors, integrating the parking area into the surrounding grassed areas. The ponds and water features are not part of the drainage system. Design and Construction
Design of the new Wessex Water Operations Centre began in 1998. Wessex Water wanted to promote SuDS and its use avoided upsizing the combined sewer running along Brassknocker Hill.

Green roofs were chosen to provide an important biodiverse habitat and a connection between the building and the pre-existing grasslands to the east and west. The architect also included green roof areas to soften the edges of the building and give an impression of it being absorbed into the landscape.
Benefits and Achievements

The work promoted SuDS and reduced flows to the sewer network. The SuDS and water re-use allowed all stormwater to be disposed of on site. The SuDS were integrated into the landscaping, with swales and grass pavers forming part of the landscape design.

The roof provides a habitat for wildlife and has a thick layer of substrate and vegetation, which attenuates rainwater runoff. A particular benefit is that the roof is visible from areas inside the building.
Challenges

The site was constrained with limited available space.

The green roof wild flower meadow was considered to not look aesthetically pleasing all year round and replaced with a turf lawn.
Site Constraints

Approximately 1.5ha of the 2ha site will be roofed or paved. The geology is heavily fissured Great Oolite limestone and the site is steeply sloping. Due to residential properties being in close proximity to bottom of the Wessex Water site, the soakaway was installed at the top leading for the need for an automated pumping system.

Maintenance
The tanks are cleaned out annually and the permeable paving requires sweeping free of moss once every 2-3 years. The grassland meadow roof is cut once yearly after plants have set their seeds. The cost is minimal and included in grounds maintenance of the site.
Project team and details

Architects ? Bennets Associates

Landscape architects ? Grant Associates

Designer ? Buro Happold

Green roof provider ? Emersgate Seeds
Project status

Completed in 2000