

Water management for a research centre near London

The building melts into the landscape and is sensitively integrated into the surrounding nature.

The water cascade has a dynamic optic which can be well appreciated from inside the building. The 180 metre long cascade is a major component of the cooling system.

The revolutionary water and cooling system reduces the need for costly technical systems and shows the way for building cooling systems of the future.



The building cooling system is connected to the outdoor water system via a heat exchanger. The collected heat is released to the atmosphere through the cascade and surface of the lake.

Located in a site of unique natural beauty, the building – designed by Foster and Partners – is a transparent glass structure, half-sunken into the hillside to reduce its visual impact. The massiveness of the building is further disguised by a large adjoining artificial lake which wraps like a ying into the yang of the building. Through reflections and surface movements mirrored onto the glass, the building stands with poetic lightness. Atelier Dreiseitl joined the multi-disciplinary design team to advise on combining stormwater management with a water cooling system. There was a very high cooling demand to accommodate. Rather than relying 100 % on conventional cooling towers, it was an environmental and design challenge to define the potential of lake water as a cooling agent, and then optimize it as a highly visible operating system.

The formal lake has a surface area of over 16,000 square metres, and receives stormwater run-off directly from the roof. A 180 metre long, 4 metre high cascade peels out of the building, accompanying the VIP-road, the main access to the building for guests and clients. Whereas the large surface area of the formal lake provides cooling through evaporation, the cascade was specially designed to vapourise the water into small droplets. This serves the multiple purpose of increasing oxygenation of the water, increasing cooling and increasing a white water visual effect. The water is made more visible, and the resulting rhythmic sweeps have an optical dynamism which is particularly refreshing and viewable from the restaurant opposite.

The VIP road turns along the contour of the lake, sloping down with the cascade so that as the cars pull into the entrance they seem to drive over water for the last 40 metres. The water itself is kept in top condition by a 2,100 square metre cleansing biotope. No chemicals

are added to the lake. It is essentially a natural water body. In a flexible system designed to accommodate fluctuating cooling needs and optimize water quality, water can be variably extracted from the cleansing biotope and/or the formal lake before being pumped to the heat exchanger. Once through the heat exchanger, the now warm water is returned to the cascade where the cooling cycle begins again. In extreme storm events, the detained overflow can slowly be released into the adjacent Bourne river.

The cascade is constructed from a repeated precast, high-density concrete element. The formal lake is water-proofed with a polyethylene liner. A series of thermal, flow and filtration studies were initially carried out, using computer simulations and numeric calculations. These were important consultation documents during the design process for the entire inter-disciplinary project team.

