

HUMANITY'S IMPACT

The Living Rainforest's new building is a testament to sustainability

the green issue



The Living Rainforest's Human Impact Building was officially opened on 21 March 2006, boosting visitor numbers to this education facility in Berkshire, UK, to over 85,000 people a year. The new building will allow visitors to explore man's relationship with the environment and what we can all do as individuals to lessen our negative impact on the planet. The Living Rainforest is a new type of institution committed to education in context and sustainability in action. Visitors are immersed in real rainforest experiences to learn about the relationships between plants, animals, ecosystems, human needs, economics and cultures.

With National Lottery funding from the main benefactor, the Millennium Commission, and others, including the European Community, the £1.6 million-facility comprises a 21.5m by 11.5m single-storey hall linked to existing glasshouses by a covered walkway. As structural, mechanical and electrical engineer, Halcrow Yolles had a key role to play in its development. Other key members of the team included Alastair Binnie Architecture and Environment, project manager Scott Wilson and contractor Feltham Construction.

To celebrate the opening, around 200 Blue Morpho (*Morpho peleides*) butterflies were released into the Living Rainforest's Amazonica House. The butterflies were chosen because 'morpho' means change or transformation. Recognised for their vivid blue colour, the butterflies are found in the depths of the rainforests in Central and South America.

Sustainability first

The attractive building is a testament to recycling and renewable sources.

Recycling began with the demolition of the old glasshouses on the site. Concrete was crushed and used for fill on site, bricks from the dwarf walls were saved for re-use and glass was sent away for recycling. Even the timber structure was stockpiled for fuel.

Wherever possible, materials with a low embodied energy were used to construct the new building. Less energy is required to extract and make such materials, as well as transport, construct, maintain and dispose of them. All the wood came from sustainably-managed forests, the roofing and flooring were made using natural or recycled rubber, and the insulation in the walls, roof and floor was made of recycled newspaper. Even the worktops in the new animal husbandry facility were made from recycled plastic bottles.

Before the project, the Living Rainforest relied on a heating system powered by oil-fired boilers, which emit large quantities of carbon dioxide. A new biomass boiler, fuelled by woodchip from a local sustainable source and designed by Halcrow Yolles, is now the facility's primary source of heating.

"Although burning wood releases carbon dioxide into the atmosphere, these emissions are cancelled out by the trees having fed on carbon dioxide during their lifetime," explained Halcrow's Allen Shaw. "As a 'carbon-neutral' process biomass boilers are becoming increasingly recognised as valued contributors in the fight against global warming."



The new Human Impact Building

Other notable features include the natural ventilation of the facility's exploration space and the on-site production of electricity using photovoltaic panels installed on the south-facing café canopy.

And when economics clashed with sustainability, it was the environment that came out on top. In one case, aluminium was rejected as the most economically-sound choice for the glazed canopy over the walkway in favour of timber from sustainable Scandinavian forests.

Value for money

As the need to balance the centre's environmentally-focused philosophy with cost considerations was a key challenge for the team, it became clear the building was going to be too expensive as originally proposed. Revisiting the design concept, the team carried out a value engineering exercise to find cost savings that would not impact the project's scheduled completion date. As a result, the building plan area was dramatically reduced and the structural form simplified. The original proposals included a complex support arrangement utilising timber 'tree' columns. While this arrangement was striking, aesthetics were not the client's top priority. Instead a simple glulam beam and column arrangement was developed, retaining the architect's original curved roof profile.

The original underfloor venting system was abandoned in favour of a more cost-effective and reliable solution proposed by Halcrow Yolles, which comprised a roof-mounted, wind-driven supply and extraction ventilation system. And the original harvested rainwater scheme was switched to a soakaway system capable of weathering a once-in-a-century storm.

The Halcrow Yolles team also had to come up with innovative solutions for many of the structural elements. This included the use of plywood fins in the structure of the covered walkways to achieve a stepped roof profile and a snow barrier to protect the existing glasshouse. Halcrow Yolles masterminded the use of pre-cast concrete beams for the foundations to facilitate the under-floor natural ventilation system originally proposed by the architect. As well as minimising excavation, the beams were produced off-site, improving safety on what was a restricted building site.

Throughout 2006 there will be further additions to the Human Impact Building. Already open are a new children's play area and the UK's largest poison frog exhibit, while the Amazon River Aquarium is still to come. ■

FURTHER INFORMATION
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