

Author: Niall McLaughlin of Niall McLaughlin Architects
Research Output 1: ARC (Architecture Centre)

Output Type: Design

Building: ARC (Architecture Centre)

Function: Architecture Centre

Location: Hull, UK

Client: Humber Centre for Excellence in the Built Environment

Practical Completion: January 2006

Budget: £550,000

Area: 220 m²

300 Word Summary

Hull is a seaside town that has suffered from the collapse of the local fishing/shipping industry. This project is an innovative/iconic/movable building housing Hull's Architecture Centre. Re-locatable, the building will be moved over a 20-year period.

Questions/Aims/Objectives

To design a building which:

- (1) Connects Hull to:
 - (1.1) Its history by:
 - (1.1.1) Appearing as a sign-board
 - (1.1.2) Benefiting local industry
 - (1.1.3) Operating as an educational tool.
 - (1.2) The sea by:
 - (1.2.1) Appearing to float
 - (1.2.1) 'Dreaming' of the sea.
- (2) Embodies 'carbonsense'.

Contexts/Methods

To design a building which:

- (1) Connects Hull to:
 - (1.1) Its history
 - (1.1.1) Designed as a sign-board/screen/advertising hoarding, seen from a distance, the building presents itself to the traffic on the motorway over the River Hull.
 - (1.1.2) In collaboration with local industries, construction companies, suppliers and labour, the building ensures maximum advantage for local business.
 - (1.1.3) The building itself is an education tool, expressing the processes that enable it to function, structurally and environmentally.
 - (1.2) The sea
 - (1.2.1) The building structure references the estuarine nature of the landscape and 'floats' on a raft of pre-fabricated floor cassettes bearing onto the hardcore and mud of the site, via concrete padstones on the ground surface.
 - (1.2.1) Images of the sea filmed in real time projected onto the building surface produce dancing patterns of light which illuminate the screen on dull days and at night. As the building 'dreams' about the sea, the images/patterns change depending on the conditions at sea.

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(2) Embodies 'carbonsense':

Working with structural engineers and environmental consultants, the building embodies 'carbonsense' in an elegant and educational way minimising CO² emissions through efficient design and use of renewable energy.

Dissemination/ Esteem

Winner of: limited competitive interview.

Commended in: American Institute of Architecture International Awards, (2006).

Winner of: RIBA Award (2006).

Exhibited at: GBE, Carnegie Mellon Museum, Pittsburgh, (2006–2007).

Published in: *The Independent*, *Blueprint*, *RIBA Journal*.

Authorship

McLaughlin's design teaching at the Bartlett allows him to research architectural design concepts (such as the building as screen) which are developed through his practice Niall McLaughlin Architects.



Image 1

General Description

Hull is a seaside town that has suffered from the collapse of the local fishing and shipping industry.

The brief called for an innovative, iconic, movable building to house a new centre for the built environment in Hull.

The building is re-locatable and will be moved from key site to key site over a 20-year period.

The centre provides opportunities to showcase building and environmental developments arising from regeneration activities in the Humber region.

NMLA collaborated with local industries, construction companies, suppliers and labour to ensure maximum advantage for local business, and to give the sense that the building is from Hull, and would have only been possible to build in Hull. (image 1)



Image 2

Research Objectives driving the Architectural Design of the Building

To design a building which:

(1) Connects Hull with:

(1.1) Its history by (1.1.1) appearing as a sign-board; (1.1.2) benefiting local industry; (1.1.3) operating as an educational tool.

(1.2) The sea by (1.2.1) appearing to float; (1.2.2) 'dreaming' of the sea.

(2) Embodies 'carbonsense'.

These objectives were articulated through the process of designing the building and are evidenced in the final architecture. (image 2)



Image 3

Evidence of Research Objectives in the Architectural Design of the Building

To design a building which:

(1) Connects Hull

(1.1) With its history:

(1.1.1) By appearing as a sign-board.

Designed as a sign-board/screen/advertising hoarding, seen from a distance, the building presents itself to the traffic on the motorway over the River Hull. (image 3)

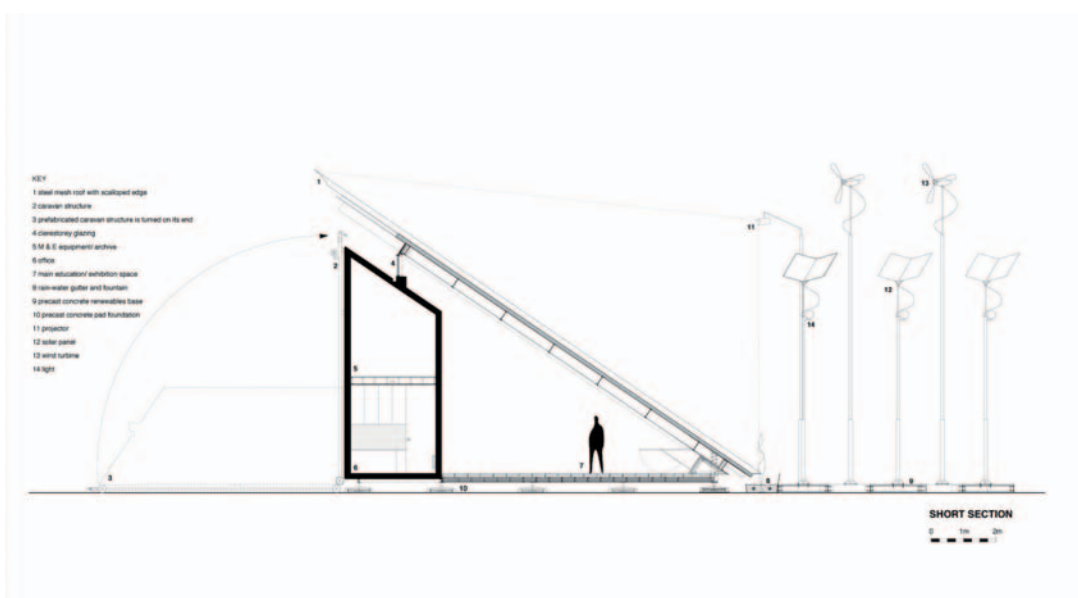
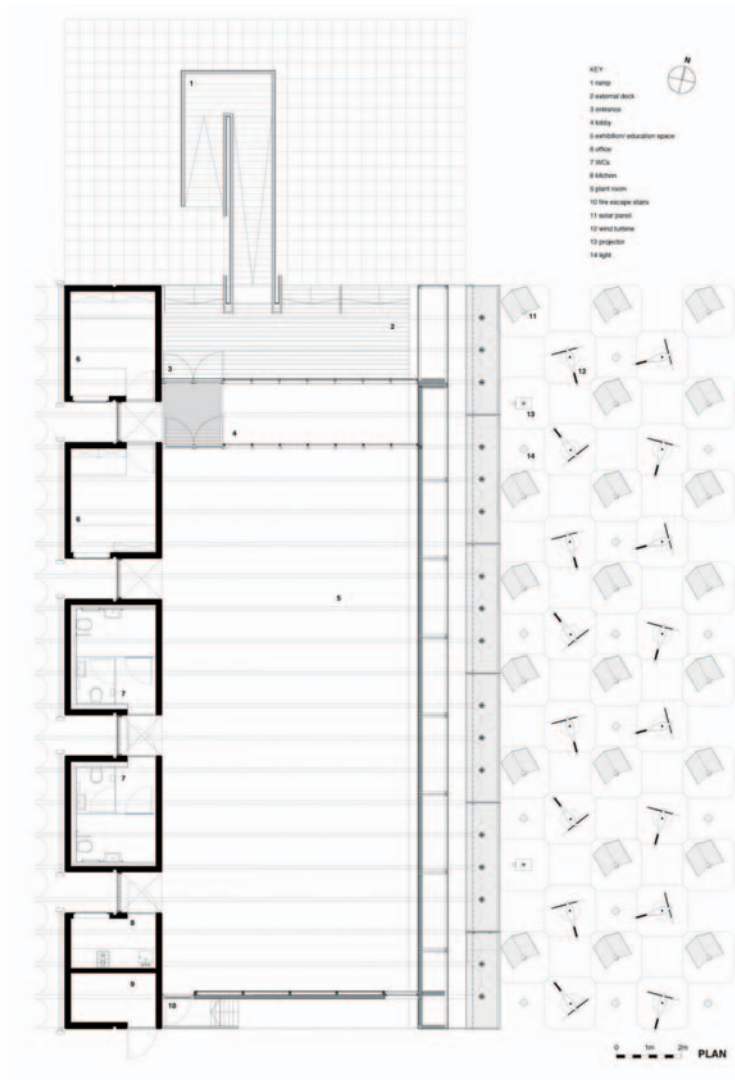


Image 4

To design a building which:

(1) Connects Hull

(1.1) With its history:

(1.1.2) By benefiting local industry.

The building is formed of a 'kit of parts': a simple set of re-arrangeable parts that will be assembled and re-assembled on future sites. The most simple structures are 'lean-to structures', where a roof covering is leant against a wall. This design follows that principle – the roof could be leant against any wall structure in Hull, perhaps a quay wall or maybe the wall of a row of terrace houses. (image 4)

The spine wall of the centre is formed from tilted up caravan-like structures. These units form office spaces, storage, a plant room and WCs.

NMLA collaborated with local industries, construction companies, suppliers and labour to ensure maximum advantage for local business.



Image 5

To design a building which:

(1) Connects Hull

(1.1) With its history:

(1.1.3) By operating as an educational tool.

The building aims to teach people about its inner life and engage them with the landscape of their city as a whole. The project delivers education and new opportunities for learning about the built environment for the local community and aims particularly at engaging young people and forging links with local community projects. The centre provides opportunities to showcase building and environmental developments arising from regeneration activities in the Humber region.

The building itself is an education tool, in that it overtly expresses the processes that enable it to function, structurally and environmentally. (images 5–7)



Image 6



Image 7

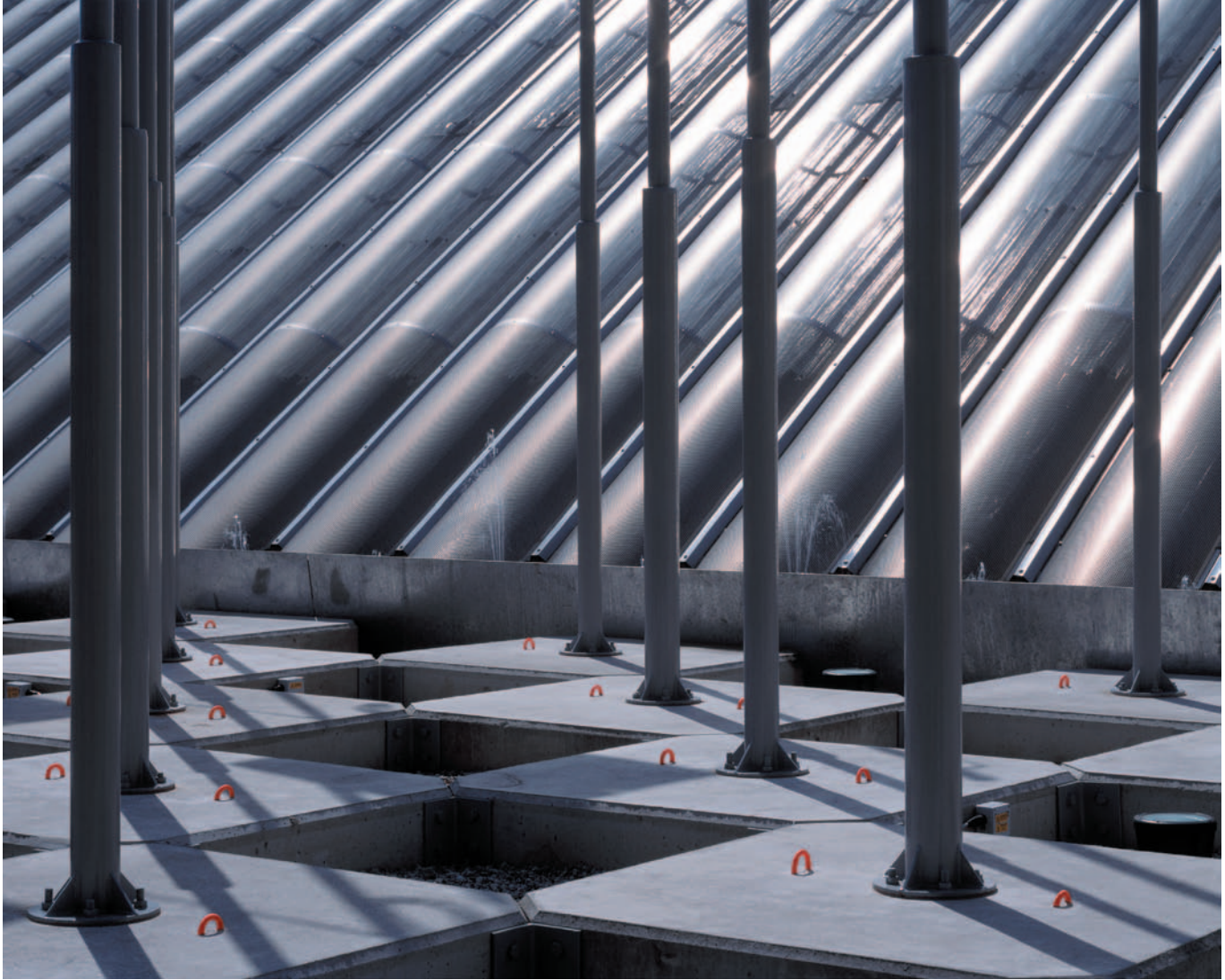


Image 8

To design a building which:

(1) Connects Hull

(1.2) With the sea:

(1.2.1) By appearing to float.

The building structure takes its cue from the estuarine nature of the landscape and 'floats' on a raft of pre-fabricated floor cassettes bearing onto the hardcore and estuarine mud found on the site, via concrete padstones that sit on the ground surface. (image 8)

The foundations are constructed from reinforced concrete and sit on the surface of the site, so that they can be easily removed and moved to the next site. The bases of the renewables posts are also made from pre-cast concrete. The floor cassettes are constructed from a steel frame with brick rubble ballast (to hold the building down against wind uplift pressure). Each floor cassette is framed with timber and has insulation, underfloor heating and vinyl flooring installed as a unit, so that when the building moves, each cassette moves as one unit. The caravans are steel and timber framed units with insulation built into the walls, floors and roofs. They are stressed skin plywood structures and the water-proofing is provided by epoxy fibre glass and epoxy paint, a system used on boats. These units form office spaces, storage, a plant room, kitchen and WCs. The roof is constructed using steel beams with translucent GRP insulating roofing panels. The outside of the roof is protected by perforated aluminium mesh, which also forms a screen for the projections.

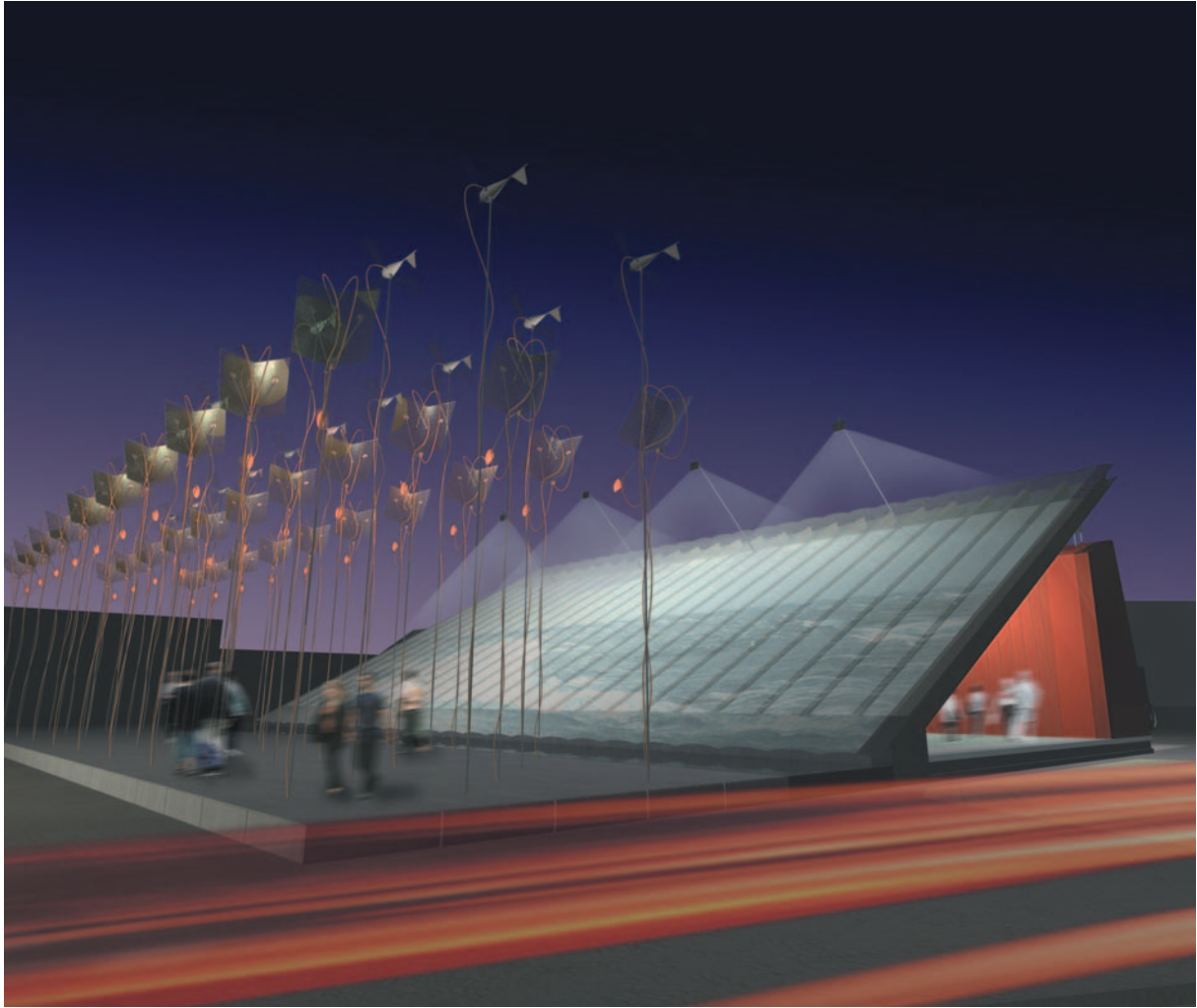


Image 9

To design a building which:

(1) Connects Hull

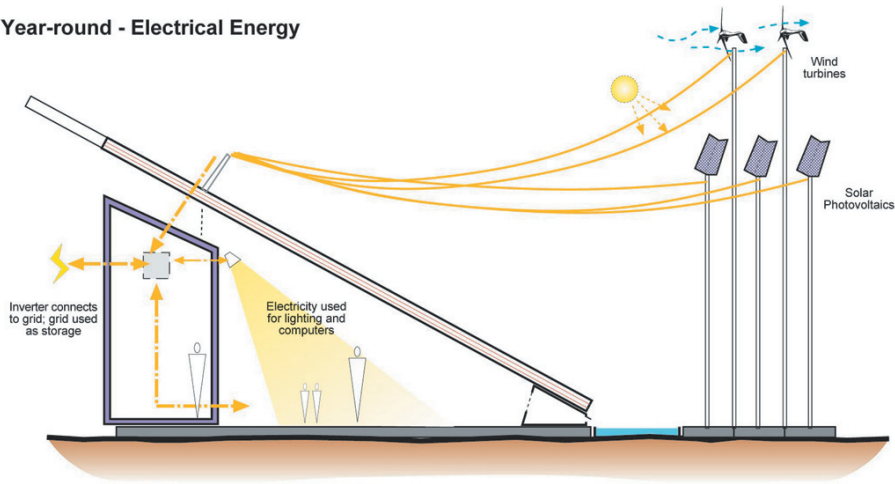
(1.2) With the sea:

(1.2.2) By 'dreaming' of the sea.

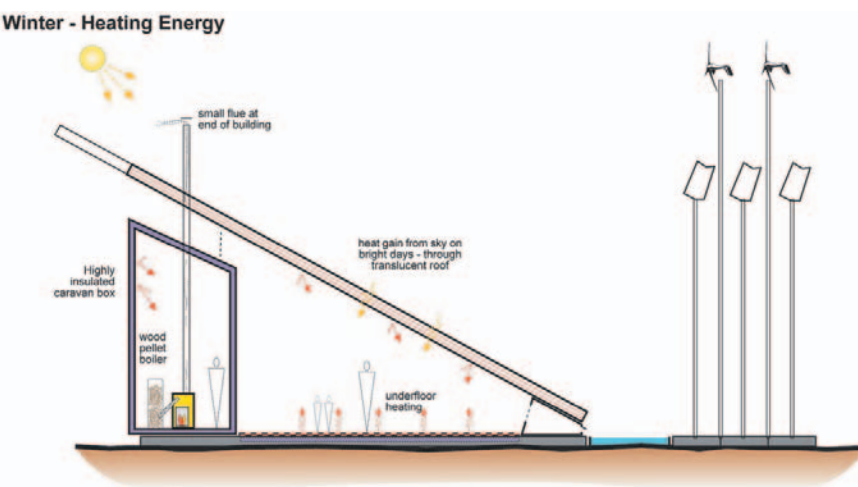
From NMLA's conversations with some of Hull's residents it seemed that Hull has turned its back on the sea, once at the heart of the city. NMLA were interested in Hull's fading memory of the vast hinterland of the sea that once formed part of the imagination of the city. In order to engage with the environment of the sea, filmed images of the sea are projected in real time onto the 'screen' forming the main elevation of the building.

Dancing patterns of light illuminate the screen on dull days and at night. As the building 'dreams' about the sea, the images and patterns will change depending on the conditions out at sea. (image 9)

Year-round - Electrical Energy



Winter - Heating Energy



Summer - Daylight and Ventilation

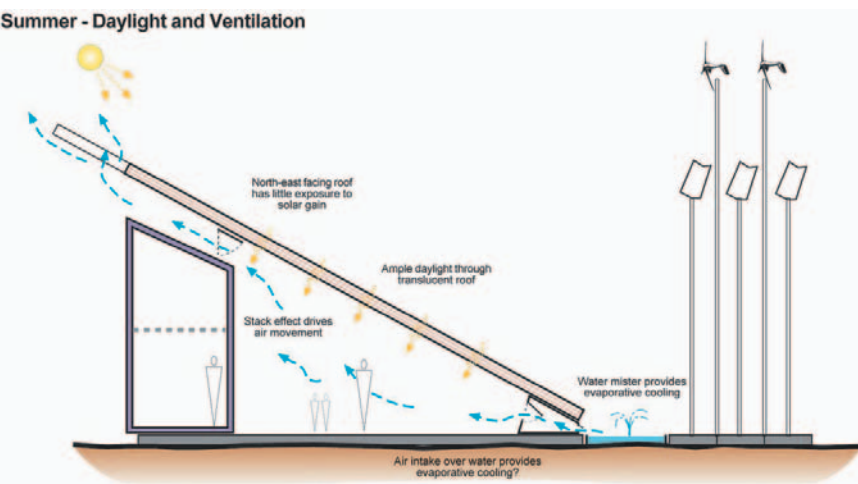


Image 10

To design a building which:

(2) Embodies 'carbonsense'

The design relates the built environment to the wider environment as a whole. NMLA worked with Price and Myers structural engineers and environmental consultants XCO² to design a building which is a 'mechanical garden', engineered to embody 'carbonsense' in an elegant and educational way minimizing CO² emissions through efficient design and use of renewable energy.

An array of wind turbines and solar panels are mounted on tall poles in front of the building, and these form a 'mechanical garden'. A wood pellet boiler provides the heating and hot water. In summer, air is cooled using water mist sprays in the pool at the lower edge of the roof – air is cooled by evaporative cooling before being drawn into the building at low level. The stack effect draws hot air out of the building at high level.

Sustainability was an important part of the brief and, together with XCO², NMLA developed a proposal for a 'zero carbon' building. Electricity is generated by wind turbines and photovoltaics. The heating and hot water are provided by a wood pellet boiler, which emits zero carbon into the atmosphere. The building utilizes high levels of insulation, so that minimum amounts of energy are required to heat up the building. (images 10–12)



Image 11

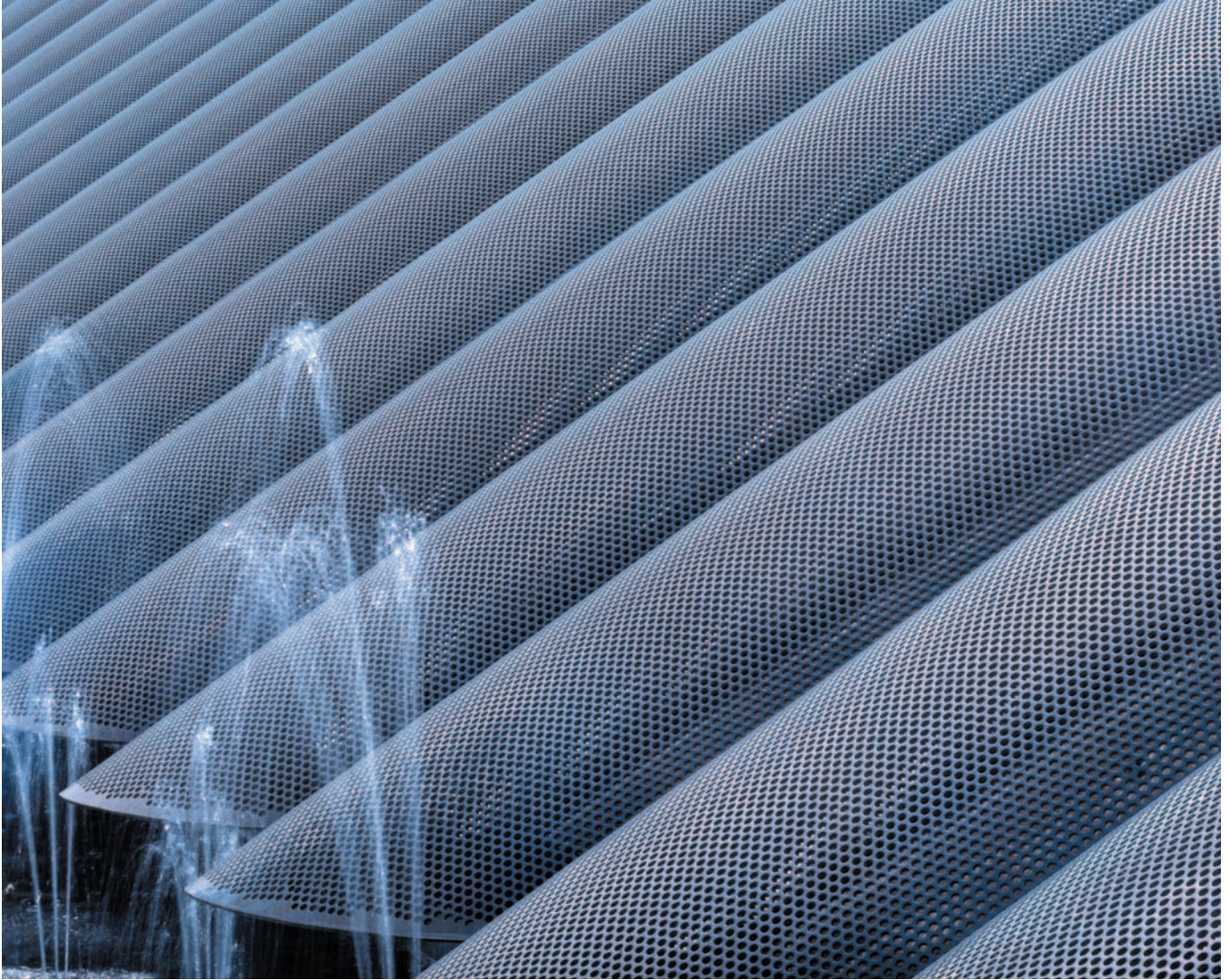


Image 12



Image 13

Dissemination/ Esteem

Winner of: limited competitive interview.

Commended in: American Institute of Architecture International Awards, (2006).

Winner of: RIBA Award (2006); RIBA White Rose Award for Design and Quality (2006).

RIBA Client of the Year Awards for the Yorkshire and Humber Region (2006); RIBA Sustainability Shortlist (2006).

Exhibited at: GBE, Carnegie Mellon Museum, Pittsburgh (2006–2007).

Published in: *The Independent*, *Blueprint*, *Building Design*, *RIBA Journal*.

Appendix 1: Related Articles by this Author

(1.1) Niall McLaughlin, 'A Royal Gittern at the British Museum', in Katie Lloyd Thomas (ed.) *Material Matters* (London: Routledge, 2007), pp. 29–42.

Appendix 2: Critic's Reviews

(2.1) www.thisishull.co.uk (July 2004).

(2.2) *Yorkshire Post* (July 2004).

(2.3) Jay Merrick, *The Independent* (September 2004).

(2.4) *Building Design* (March 2005).

(2.5) Sarah Herbert, *Blueprint* (August 2005).

(2.6) Carlos Kucharek, *RIBA Journal* (June 2006).

(2.7) Eleanor Young, editorial, *RIBA Journal* (June 2006).

(2.8) www.bbc.co.uk (June 2006).

(2.9) *The Independent* (June 2006).

(2.10) *Urban Building* (January 2007).

(2.11) *Architecture 06: The Guide to the RIBA Awards* (London: Merrell, 2006).

(2.12) *RIBA Government & Public Sector Review 2006* (London: Excel Publishing, 2006).

