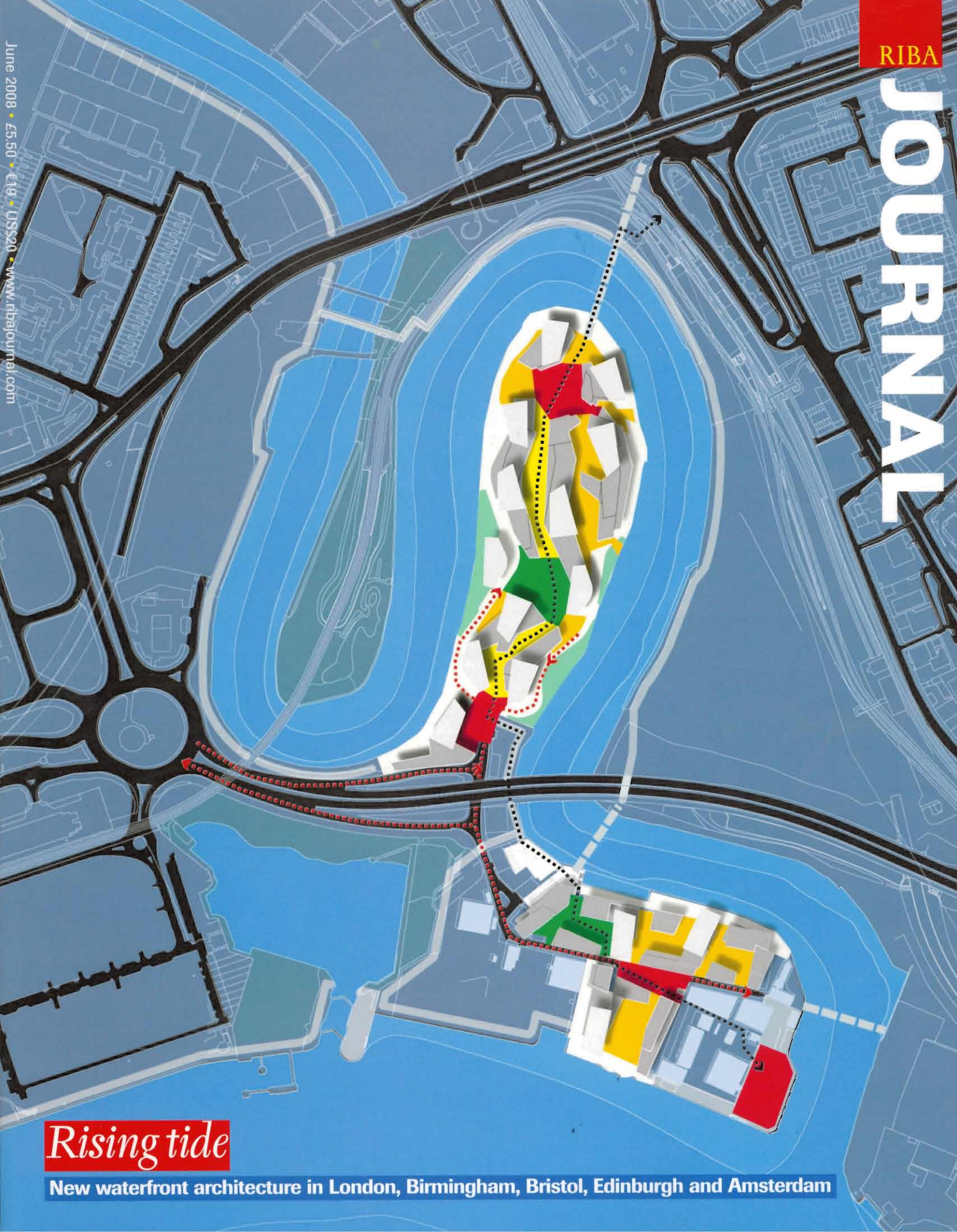


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Rising tide

New waterfront architecture in London, Birmingham, Bristol, Edinburgh and Amsterdam



It doesn't take a miracle to build on water, but the logistics of amphibious housing design can make any architect long for dry land. **By Jan-Carlos Kucharek**

The lowest point in western Europe is 6.76m below sea level, in a boggy area of decomposing peat just outside the cheese mecca of Gouda, in the Netherlands. Plum in the middle of the Zuidplaspolder – or south-west polder – the site is one of the top-risk areas of the 55% of the country that sits below sea level. No surprise then, given projections by Dutch scientists that sea levels are due to rise by up to 85cm this century, that the Netherlands remains at the cutting edge of innovation for building on floodplains, or even on the water itself.

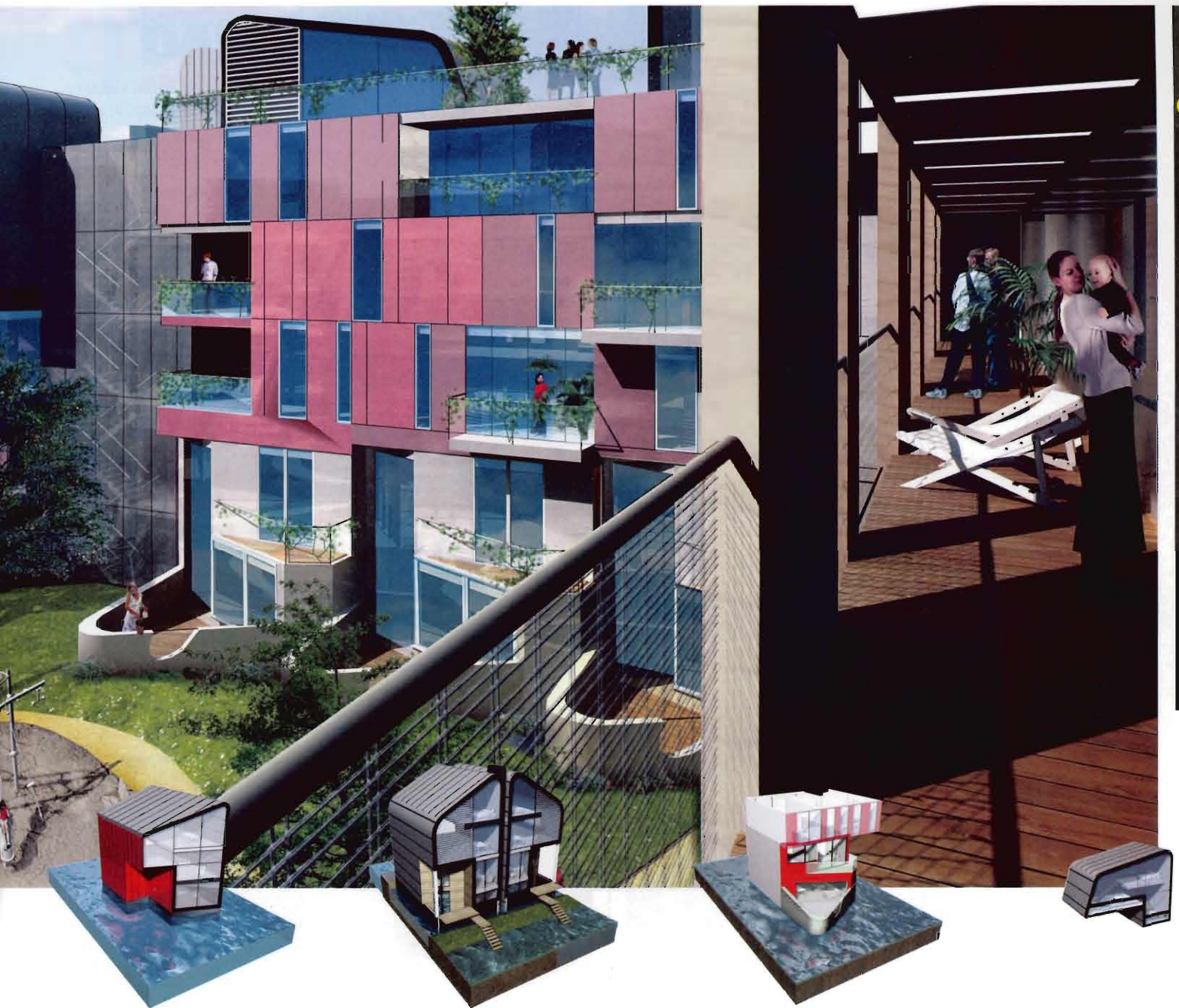
What is a surprise is that last month a young English firm, Baca Architects, was presented with first prize in the International Design Awards 2008 Land and Sea competition, for a £15m, 170-unit 'floating' housing scheme planned for the river estuary in Dordrecht. And according to partner Robert Barker, there's every chance it might get built. Not only that, but the project is up for discussion in the context of the Thames Estuary 2100 initiative with the Environment Agency and Espace (European Spatial Planning: Adapting to Climate Change) in the Hague. So what qualifies

an English practice to give the Dutch a run for their money?

In 2007, Defra chose Baca's Life project (long-term initiatives for flood-risk environments) to receive £250,000 from its innovation fund for research as part of its 'Making Space for Water' programme. Baca is developing its research in collaboration with BRE and with consultant partners Halcrow, Cyril Sweett, Fulcrum Consulting and LDA Design.

The research will culminate in the publication this September of a set of guidelines for an integrated approach to planning and design in

walking



flood-risk areas, exploring ways in which to limit the risk to life and property through long-term and adaptive processes and zero carbon design. The guidelines will be published alongside the policy guidance set out in Planning Policy Supplement 25.

The research will investigate three British case study sites. 'We picked the sites to be representative of three different kinds of flooding according to the catchment areas they are associated with,' explains Barker. Flood waters behave differently according to their topographical positions along the river's course, so

three sites were chosen to exemplify the different conditions and effects at specific points in its flow. 'We chose the River Wandle at Hackbridge, Sutton as an upper catchment, the River Nene at Peterborough as a middle catchment, and the River Arun at Littlehampton as a lower catchment area,' he says. 'For each of them we wanted to address individual flood scenarios to see if we could find transferable ideas and therefore commonalities in flood design.'

The three scenarios provided opportunities to investigate everything from 'resilient units' –

concrete structures designed to withstand flooding, sacrificing only the surfaces – to fully amphibious units with concrete basement ballast, that simply ride above the floodwaters. The studies, however, are not just about building design, but about the whole ecology of flood mitigation. That encompasses the maintenance of daily life during a flood, creating space for and managing flooding through ecological measures, and a zero carbon approach to development.

Meanwhile, back in Holland, Dutch architect and practice director Marlies Rohmer has ▶

been specialising in amphibious housing design for years. Working for developer Ontwikkelings-Waterbuurt West, she has designed a 75-home, high-density (100dw/ha) floating development on Steigereiland, in the IJburg island chain outside Amsterdam, due to be completed next year. Some of the homes are on stilts, attached to the walls of a dyke in Eiselmeer Lake, while others sit atop semi-submerged concrete basement 'barges', which are held in position by pylons sunk into the lake bed, and are accessed via boardwalks.

The floating homes are a mixture of private and social housing. The principle of the design, an interchangeable steel frame atop a standard size floating concrete base, is essentially a simple one. For Rohmer, the obstacles to this development have been logistical and bureaucratic ones.

One difficulty was that even though the lake is separated from the sea by locks, because it is a storage point for flood drainage, the design needed to be capable of responding to changing water levels. 'While the actual prefabricated housing system is quite simple in principle, all the time and effort went into solving the logistical problems of connecting the houses back to the necessary services,' explains Rohmer. 'The movement had to be allowed for, which involved the creation of patented flexible connections to deal with gas, electricity and sewage, the last requiring constantly flushing runs to counter the possibility of the Legionella virus forming. All of these services run beneath the boardwalks and connect back to the service runs in the dykes.'

The methodology is neat, but it did require concessions, in this case on overall sustainability. 'There is a real drive to have an holistic, cradle to grave approach in new Dutch housing developments,' Rohmer says. 'While we were keen to adopt micro CHP technology and district heating, it became apparent as the design went on that we couldn't get around the safety issues associated with flexible high temperature, high pressure supply systems feeding the floating housing. We had to compromise on sustainability with individual gas systems in each home unit.'

This, in turn, had a bearing on the fire escapes, the distance between homes and on access for emergency services. In planning terms it meant bridges spanning the boardwalks, or lifeboats stationed at their ends to enable escape in a fire, and the raised main boardwalk running beneath the fixed homes along the dyke had to allow access for emergency vehicles.

Rohmer admits these innovative projects in Holland are led more by the developer than by legislation. While allowing design freedom, the lack of hard and fast rules in Dutch building control means schemes are dealt with on a case-by-case basis. This can lead to protracted negotiations with statutory

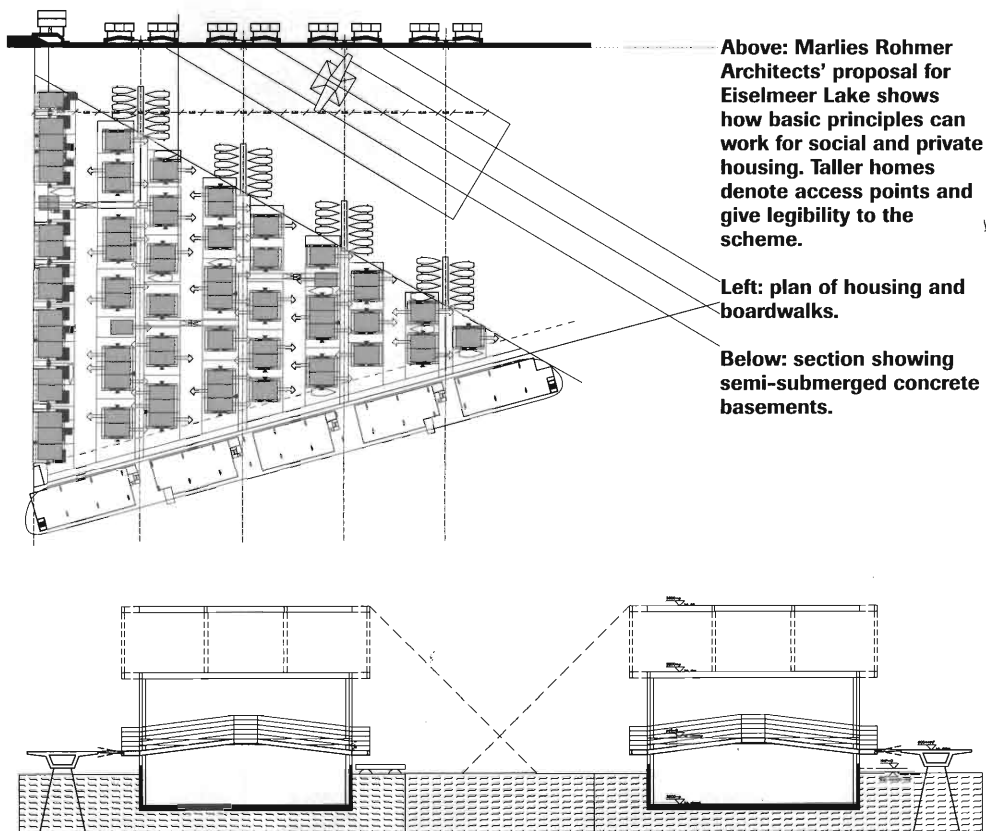


bodies and utilities, a process Rohmer likens to a soap opera.

The lack of tried and tested guidance also has a stifling effect on the financial viability of these developments, with Dutch lenders and mortgage companies having to take a view on them. 'The general perception in the market is that these are houseboats, rather than hybrid homes, and therefore less durable and of higher risk,' says Rohmer. 'This can affect the willingness of banks to offer mortgages on them, and at about €500,000 market value for a single private house, the outlay is not dissimilar to traditional land-based homes.'

Insurance firms have an obvious interest in fire safety, but the concerns get more detailed than this. Developments on water need to address safety concerns, particularly with regard to children, as well as accessibility for the elderly, and requirements in Holland are as onerous as in the UK. Rohmer admits that these issues compromised the openness and accessibility of the plans.

The lesson learned here is that in Holland as well as the UK, flood strategies are important, but unless statutory legislation and robust design provide the impetus for the market to invest in amphibious housing, then flood-mitigating design itself is at risk of being cast adrift. ■



Above: Marlies Rohmer Architects' proposal for Eiselmeer Lake shows how basic principles can work for social and private housing. Taller homes denote access points and give legibility to the scheme.

Left: plan of housing and boardwalks.

Below: section showing semi-submerged concrete basements.