Narrow route to the deep warmth

Architects faced with a challenging site and a brief to create a passive house in Cork tell *John Cradden* how they brought in the sun

GABRIELLE MOREHEAD

Designing a home to take advantage of the sun's free heat is a big part of what makes a passive house passive. So how do you meet the low-energy standard when your narrow site faces away from the sun and is overshadowed by neighbouring houses and trees? The answer that architects John Morehead and Jennifer Kenefick, of Wain Morehead, came up with for a house in Cork was to rebuild it around an internal courtyard.

The site had been home to a two-storey house with several extensions and the client initially hired the architects to renovate it. The old house was poorly organised internally, however, and they decided to knock it down and replace it with an energy-efficient, bright and modern home.

Before they could do that, the architects had to overcome obstacles. Access to the site was among them. "The main challenge was getting light into that long and narrow site. We had to chisel it out," says Morehead.

The site is overshadowed by homes on three sides, as well as by mature trees. It also faces northeast and is bounded by 2.4 metre-high walls that obscure any low-lying sun.

"It was a very cold site, which we knew by doing our climate-data modelling. We did very intensive solar studies, as we had to work out where we could coax the sun into the bowels of the site," he says. "We were trying to avoid overlooking, any intrusion on neighbours or upsetting solar access to their gardens."

What Morehead and Kenefick came up with was a design made up of two double-storey sections connected by a single-storey link. The building wraps around an internal courtyard that takes advantage of the sun at all times of the day.

The house was commended in the Royal Institute of the Architects of Ireland awards this year; left, the kitchen/living area on the ground floor

The path of the winter sun through the sky was used to guide the trimming of trees along the southeast boundary, helping to optimise solar gain.

The finished design aims to balance light, connectivity of the internal spaces and integration into the surrounding landscape, while maintaining privacy. With their solution to the light problem, the architects were setting a precedent in Cork for courtyard-type development.

However, the project was held up during the planning process and ended in an appeal, after permission was refused. This delayed building by almost a year and required that the architects redesign the rear of the house, reducing its width and changing the internal layout, which compromised the amount of sunlight entering this part of the house.

The completed house measures 323 sq m. To the front there is an entrance hall, guest lavatory and living room on the ground floor, while on the first floor is a study, den and store room. Sliding doors open from the living room to the internal courtyard.

The back of the house is given over to a master bedroom, en suite bathroom and utility room at ground-floor level. There are two more bedrooms and a bathroom upstairs.

> **"The fact that we don't constantly have to turn boilers on or off or adjust thermostats is great**

The lack of solar gain meant extra insulation was needed to meet passive house targets for space-heating demand. "We are very interested in comfort levels. All the A-rated buildings perform very well, but they also have to be comfortable. It's important to get the balance right," says Morehead.

According to the client: "The biggest change for us is that there has been little forced heat or cooling input. The uniformity of temperature throughout the house is a pleasant surprise, and the fact that we don't constantly have to turn boilers on or off or adjust thermostats is great."

The architects are monitoring the house for its energy consumption, indoor humidity, carbon dioxide, temperature, and for the energy production of the solar panels. It is estimated that annual heating costs will amount to just €224.

"Our early monitoring in the autumn of last year, identified a shutdown in the ventilation system that had taken place after a power failure when the building was not occupied. Monitoring is extremely useful during the drying out, handover and commissioning periods," says Kenefick. The results of the property speak for themselves, but the icing on the cake was a commendation at this year's Royal Institute of the Architects of Ireland architecture awards, in the sustainability category.

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A more detailed version of this article appears in this month's copy of the sustainable building magazine Passive House Plus; passivehouseplus.ie