

Heritage responds -
**Taking positive action
on climate change**

Case study

Victorian Townhouse Meets Passive House Standards in Zetland Road

Historic England

This project adapted a pair of typical 'hard to treat' Victorian townhouses in Manchester to meet the demanding PassivHaus standard, demonstrating that historic buildings can be made highly energy efficient.

This was accomplished without compromising the buildings' heritage and the houses have now been retrofitted to become Europe's first Passivhaus Enerphit Plus standard homes. The project was carried out by ecospheric.

Background

From the road the buildings keep their Victorian appearance with the original brickwork incorporated into the design to provide thermal mass. The technologies used enable the house to achieve the Enerphit Plus standard of generating 60 kilowatt hours of renewable energy each year for every square metre of floor area. This is produced by 60 square metres of photovoltaic cells on the roof. These are secreted away on the rear façade and use voltage optimisation technologies to make use of non-optimal roof pitches. The insulation and ventilation allow the house to maintain comfortable temperatures and air quality year-round without a central heating system.

The approach adopted by the developer, Ecospheric, was to use natural materials as far as possible and minimise the use of petrochemicals (all bulk fabric was organic). Internal insulation of the brickwork is achieved using timber 'I' joists with blown cellulose and wood fibre board. The original building footprints were kept, avoiding the need to add further embodied carbon by adding extensions.



The evaluation alongside occupant feedback has shown positive results for thermal comfort, air quality, ease of use and reduction in bills.

The backs of the buildings have been treated with an external cladding of 'Organowood', a novel approach to wood preservation using silica to partially fossilise timber without the

The Zetland Road PassivHaus project was always intended as a valuable case study that would not only inspire others to follow suit, but also to share information on how it can be achieved.

The push to meet the world's highest standards has led to the creation of techniques, details and products that can be shared with the construction community.

use of biocides and resisting rot and ultraviolet degradation for 30 years. Windows are angled towards the sun, within the insulation layer, to maximise passive solar gain. Each layer of the walls, roof and floors is highly breathable to allow drying both inside and out should moisture get in in the future.

Treatment of the sides of the buildings reverses the approach used on the street face, with the insulation on the outside of the brickwork. Sustainably sourced timber 'I' joists support cellulose insulation covered in wood fibre with a lime-based finish. Lime has been a critical material in the project, providing the breathability that is central to the project's design philosophy.

Next steps

The developer has installed some post occupancy monitoring devices measuring 9 air quality metrics which will run for 2 years. They are also working with the university of Liverpool to perform a full embodied carbon analysis. This research will understand the effects of decarbonisation over the life of the building due to the PH conversion. It will also understand the embodied carbon impact of selecting an all-organic retrofit Vs an all-petrochemical retrofit.

Images:

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