Coach Road
Washington, UK

Completion 2011

Project Type Residential

Client Gentoo Group

Main Contractor Gentoo Construction

Value £179,693

Area 80sqm per House

Retrofit Type
Deep Energy

The deep energy retrofit of two semi detached houses located in Washington, Tyne and Wear.

The houses were originally built of traditional cavity wall construction in the 1960s and had a high primary energy demand of 531kWh/sqm/yr.

Retrofit Strategy
The aim was to reduce the primary energy demand of the houses to 107kWh/sqm/yr. However this needed to be done without relocating the occupants and without a reduction in overall space.

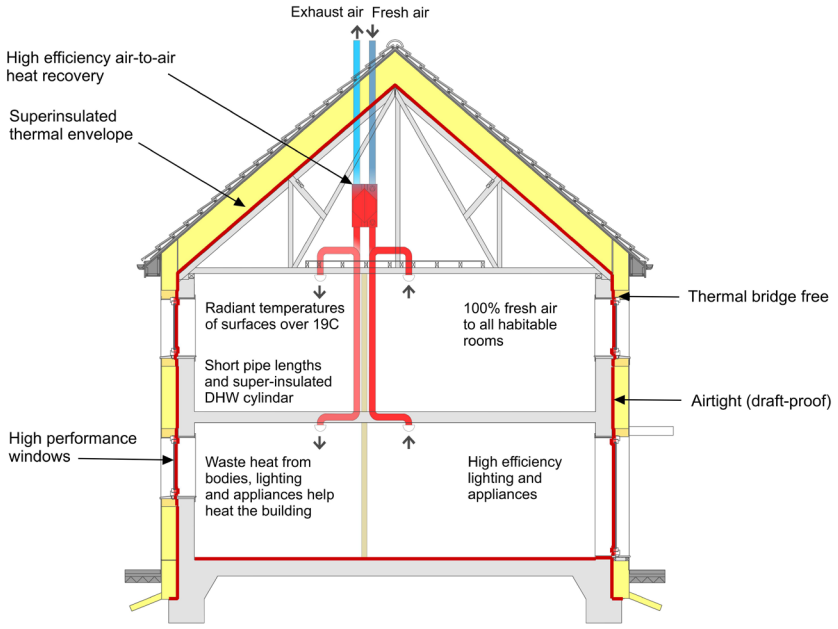
The design for each house adopted a 'fabric first' approach and followed the quality assurance tools and mechanisms associated with the Passive House Enerphit methodology.

The external wall intervention consisted of 270mm of rigid insulation extending 450mm below ground level. This reduced thermal bridging as well as increasing the internal surface area to prevent mould during the winter months.

Special focus was given to avoid party wall bypass and wind washing during design and installation.

A parge coat was applied to the external walls and a membrane with taped joints was fitted at roof level. I-beam timber rafters were installed on top of the existing rafters, with 350mm of mineral wool inserted between them.

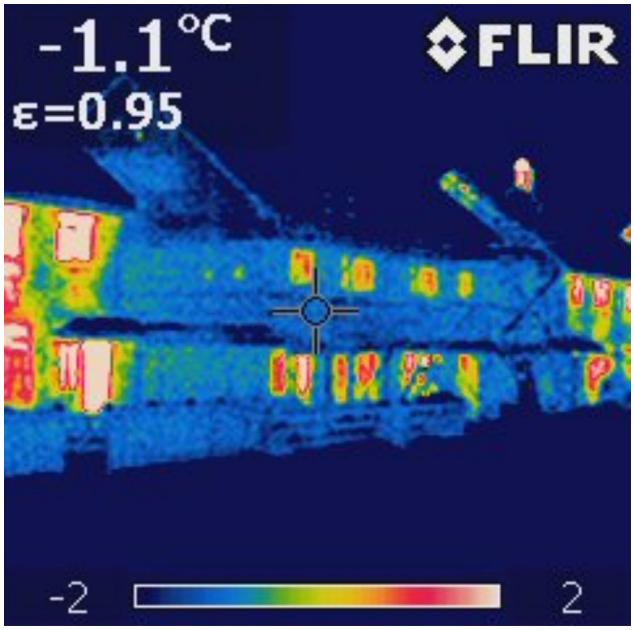
An external insulation skirt was installed to reduce heat loss from the ground floor without the need for disruptive intervention.



The existing windows were all replaced with new double glazing. The new windows were fitted in the same plane as the external insulation to prevent thermal bridging.

A Mechanical Ventilation Heat Recovery (MVHR) system was installed, as well as solar thermal panels fitted to the roof for water heating. The panels were connected to a highly insulated hot water storage tank that was also fed by a gas boiler.

The existing household appliances and lighting were replaced with more efficient alternatives to further reduce primary energy demand. Low flow taps and showers were also installed to reduce overall water consumption and water heating requirements.



Lessons Learnt

Detailed site visit log sheets were produced, as well as photographic reports which highlighted issues that arose during the installation of the external insulation. These acted as useful documents and lessons learnt for future projects.

The existing complex interfaces and service penetrations at roof level caused difficulties in improving airtightness. To resolve this, a reinforced membrane was fitted over the top of the existing roof and bonded to the external parging. This achieved a very successful airtightness result of 1m^3/m^2h@50Pa.

In the UK, there is an estimated 16 million homes of traditional cavity wall construction similar to those on Coach Road. The concepts underlying the retrofit works were therefore designed with the potential to be applied to a large proportion of these homes with their design and construction methods being highly replicable.