

**Design brief**

A young family decided to settle in a rural area outside of London, and to start their building project around the walls of an old cow shed. Interested in a holistic approach to environmental architecture, their brief was that the house should fit harmoniously in its context, use locally harvested and reused materials where possible and be an exemplar in terms of environmental performance.

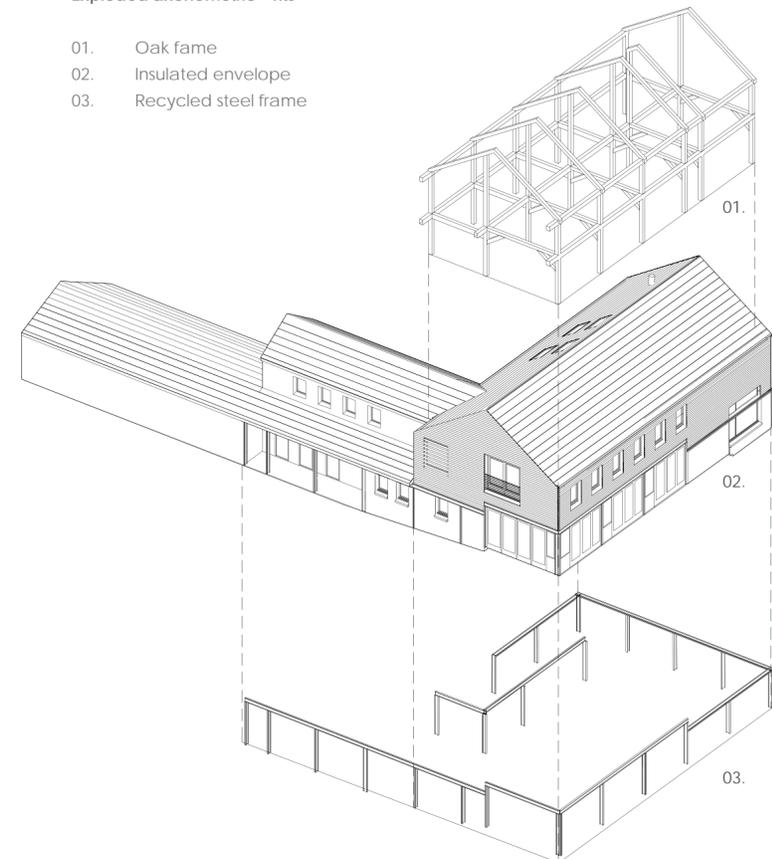
**Site strategy**

The original organisation of the farm provided good views to the south and a sheltered courtyard to the north. The new house works within this arrangement, glazed to the south for passive gains to the main living / dining area, and accessed via the north, away from prevailing winds. The footprint of the new house occupied two thirds of the original barn footprint, the remaining third left as a sheltered courtyard to the north. The only parts of the original cow-barn which were left in situ were the perimeter 2m high walls, which function as a rain-screen to the new house, and partly enclose the sheltered courtyard. To the west, a 'banjo terrace' is provided, on the off-chance that the owner decides to take up the banjo and acquire a rocking chair in his later years.



**Exploded axonometric - nts**

- 01. Oak frame
- 02. Insulated envelope
- 03. Recycled steel frame



TIMBER FRAME HOUSE

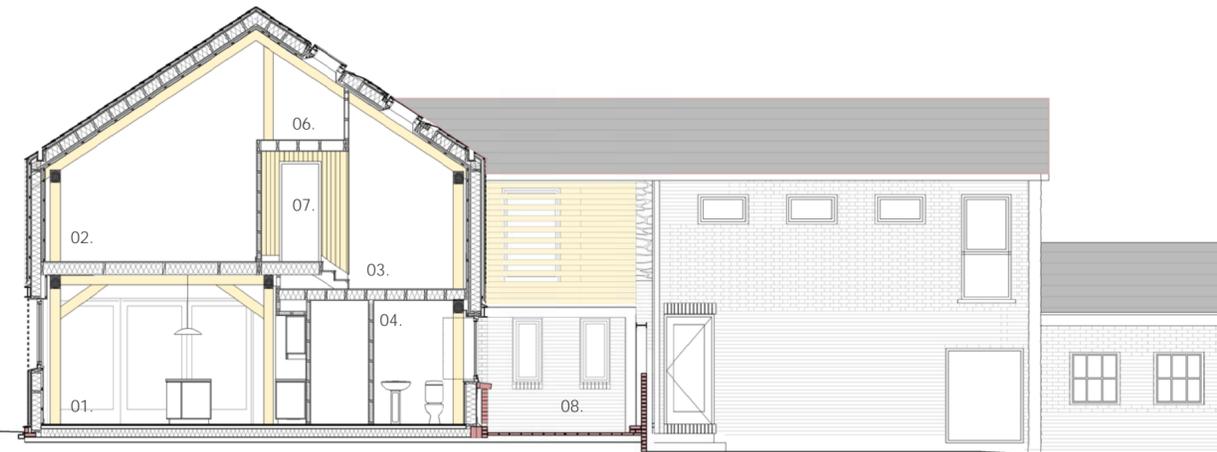


**Materials**

The idea of an oak frame building was identified as a key design aspiration, but presented potential issues in terms of maintaining air tightness with inevitable shrinkage of the frame over time. The solution was a hybrid structure, with a fully internalised oak frame providing strength, and a highly insulated air tight envelope externally providing stiffness. The new oak frame and the reused steel frame are offset relative to each other providing small openings for natural ventilation at ground level.

The building is clad with locally sourced British larch, which extends over certain windows where privacy is required. Integrated guttering limit the overhang of the eaves, and ensure minimum discolouration of the larch over its life. Many of the materials of the original cow barn were reused, including 90% of the steel frame. The existing slab was left in-situ, which not only reduced the cost of pouring a new slab and foundations, it also minimised the amount of spoil that had to be removed from the site. What was excavated was redistributed around the site as a part of the landscaping strategy. This meant there was no net removal of material from the site.

- 01. South facing living / dining space
- 02. Bedroom
- 03. Landing
- 04. WC / bathroom
- 05. First Floor landing
- 06. Storage deck
- 07. Larch clad bedroom lobby
- 08. Protected entrance courtyard



Short section - 1:100



First Floor Plan - 1:100

The first floor of the house is split level, which allows the ground level to benefit higher floor to ceiling levels, and greater areas of glazing for views and solar gains. The change in level to each bedroom is via a curved larch clad vestibule. The bedrooms have high level play decks and north facing roof-lighting.

In order to minimise energy consumption, particularly for space heating, the building fabric achieves U-values of 0.13W/m<sup>2</sup>, and all windows are triple glazed. Air permeability was tightly controlled throughout the construction process, and mechanical ventilation heat recovery provided to all spaces. Heating is provided from ground collectors below the field in front of the house, in combination with a ground source heat pump delivering heat via underfloor heating. Based on this design the house is estimated to have an estimated annual energy consumption of 9.1 kgCO<sub>2</sub>/m<sup>2</sup>/annum, equivalent to an Energy Rating of 89 (100 being the best).

View from the first floor landing

View from the Living / Dining Space