



103A Church Road: New eco build family home embodying key passive design principles, low embodied carbon materials and technologies for the 21st century home.



Overview

Age/Period:	New build, 2022
Type:	Detached 4 bed
Years in residence:	1
No. Bedrooms:	4
Construction:	Derbyshire stone and British western red cedar clad timber frame
Area:	Combe Down
Status:	No Listings

Key Features

- Triple glazed windows and doors
- High performance building fabric
- Passive solar design
- Solar Photovoltaics
- Battery
- Mechanical Ventilation with Heat Recovery (MVHR)
- Air Source Heat Pump (ASHP)
- Energy efficient appliances and lighting
- Sedum roofs
- Rain water harvesting

Introduction

103A Church Road is a stunning example of what can be delivered on a tight spot when architect, client and contractor all sing of the same sheet. Conceived by [Hetreed Ross](#), 103A Church Road found a determined and principled driver in the form of Claire Byrne who purchased the site with planning permission for the scheme already in place, whilst living in Switzerland in 2019.

Covid-19 and the enforced travel restrictions that accompanied it may have slowed the delivery of the project, but it certainly hasn't diminished its quality and there is attention to detail in every aspect of this family home.

This is testament to the relationship between client and builder and taking time to find the right builder is the thing Claire would recommend most when undertaking a project. In [green heart sustainable construction](#) Claire found a company who shared her ethos and her vision and the results are spectacular.



Features

Passive Solar Design

The building design was centred around passive solar design principles. Bunkered against a sheer rock face the south facing aspect of the building maximises solar gain in the winter whilst overheating is minimised through the use of automated shading and internal blinds within the glazing.

High performance building fabric

Passiv Haus was a strong inspiration for the design and impressive u-values and levels of airtightness have been achieved through a combination of well-considered design, specification, and attention to detail in construction.

Thermal bridges were actively designed out of the construction by green heart and Claire's wholistic approach to delivering a sustainable building shows the level of performance achievable through incorporating natural insulation materials such as sheeps wool and warmcell recycled cellulose.

The builders attention to detail in the application and taping of the vapour control layer as well as high quality door and window seals show in the measured air permeability score of 0.69 m3/(h.m2) @ 50Pa, and more importantly Claire is delighted with how the space behaves and how efficient it is to run.

Windows and Doors

A big part of the performance of the building fabric is down to the windows and doors of the building and moving from Switzerland where triple glazing is the norm Claire had no hesitations in specifying Internorm high performance triple glazed windows and doors.

The integrated electric blinds within the fourth pane of the windows is impressive and Claire has been delighted with how well they work at reducing internal temperatures in the summer.

Air Source Heat Pump (ASHP)

The Valliant ASHP has proven to be more than sufficient to provide the heating and hotwater for the property despite its position in a cave to the rear of the property.

While the plant room it serves is a building services engineers delight with more than enough space to swing a cat between and around the hot water cylinder and MVHR.

Mechanical Ventilation and Heat Recovery (MVHR)

Central to the Passiv Haus design principle is the creation of a hermetically sealed space to reduce heat loss through infiltration, with fresh air provided through the use of an MVHR system. These MVHR systems such as Claire's typically recover around 95% of the heat from the exhausted air taken from wet rooms, kitchens and bathrooms to preheat incoming fresh air which is delivered to the living areas. This ensures a pleasant internal environment which minimises heat losses and eliminates cold draughts.

The difficulty as Claire discussed is convincing the occupants to adapt their behaviour.

Solar PV and Battery

7kWp of solar photovoltaics were installed on an east west 5degree inclined flat roof mounting system on the roof of the first floor of the property.

The use of this onsite generated electricity is then maximised through the application of a Tesla Powerwall installed at the rear of the property. Via her solar edge app, Claire is able to observe the flow of energy in this system, to note peaks in uses and to monitor generation, consumption and export.

Impressively, (despite the Powerwall only recently being installed), the house has consumed nearly 70% of the electricity generated onsite and has met over half its entire energy needs for the year.

Sedum roofs, rain water harvesting and natural planting

As previously mentioned this build does not wear its sustainable credentials it lives them and this wholistic approach is evident in the incorporation of sedum roofs, rainwater harvesting, permeable grass off street parking, and the natural planting scheme to mention just a few more of the wonderful features of this property.