

# PILGRIMS BARN

Our Pilgrimage to Sustainability

**The Chicken Shed – June 2018.**

**5,000 Free-Range chickens grazing near ten acres lived here!**

**We achieved Class Q consent for conversion to a five-bed residence in 2021, provided we retained the precise same size of footprint, height and general external appearance. This we have endeavoured to do.**



Just moved in –  
November 2022



**The Energy Powerhouse in the Garage.  
3 Tesla Powerwall Batteries hold total of 40.5 KWhs. Inverters above batteries and Gateway below by vertical Fuseboard on far left(54 fuses). These are energised by the 75 solar panels on the roof. Excess electricity sold to Octopus at 11.24 P per KWh and purchased back if required at 10.72P per KWh – both at any time through 24 hrs. So, exporting too much will not cost on re-purchase!**



**Reedbed Pond to 'polish' and remove nutrients from household sewage, already treated by two septic tanks set in tandem to treat effluent to Council standards (prior to Nutrient Neutrality challenges emerging in 2021). This reedbed of 20sq metres, once fully established (about two years) will remove all nutrients from this sizeable (5 double-bedrooms) house. The 'bund' to the right of pond was built from the 400cu metres of sub-soil from the floor foundations used to create a visual and wind protection from the north, planted up with several hundred trees and hedging shrubs.**



**Our non-potable water comes entirely from rainwater harvested from the roof and, after initial 'treatment' by collection in copper gutters and downpipes, it is stored in this underground 6,000 litre tank (with an overflow to a pond and land drains). It is pumped, filtered and fed into the house for all toilets, washing machine and all outside uses. All other outbuildings are also equipped with large capacity tanks, handy for other garden use, when draughts arise.**



**Raised Vegetable Beds made from unused roofing sheets and also recycled timbers from the old chicken shed. Half-filled with horse manure and retained top-soil, ready for 2023 planting. The Pole Barn (9 x 5 metres) beyond, apart from a few new 4 x 2inch timbers was completely constructed from recycled timbers (including wall cladding removed in 10ft sections) and roofing sheets also from the old chicken shed.**



Wall construction (to give a U value of 0.1) consists of the internal wall leaf of 100mm dense blockwork to hold heat in the building. This is built on the edge of the 300mm thick concrete floor. 300mm of vertical insulation rises from base of floor insulation (600mm below floor level) and upwards to bind into the 440mm roof insulation above (the roof has a 'U' value of 0.055). Outside the insulation is 100mm Thermalite blocks. To achieve Council visual requirements, the external face is studwork with vertical T&G boarding, painted black, to emulate the original building.

The 300mm concrete floor has a DPC sheeting beneath it, laid on 300mm Jablite insulation over 100mm crushed hardcore, all crushed on site from original floor from chicken shed, together with all other surplus concrete and dwarf walls.

To prevent heat bridging, no steel wall-ties are used and those pictured are made of epoxy-resin.

Underfloor heating is provided by special wiring closely attached to the concrete floor reinforcement mesh, which acts as a complete heat-spreader over the whole floor. It is laid in 5 phases over the area and each has its own thermostat system, smart controls etc to link directly into the electricity system.





Thanks to the highly-insulated construction, throughout the two week-long December freeze, when temperatures were frequently down to -6C by night and into the day, the floor temperature remained at 20.5 against a 19C target, so no heat or energy was used and at 16.35 hours that day, the air temperature after some sun rose to over 25C at midday; by dark the excess heat had gone into the internal masonry, hence the air was at 23.5C and only dropped to 23C the following morning after another extremely cold night.



# Midday House Temperature in December Freeze!

The Gym windows really harvested and held a lot of warmth. But, again, the excess went into the internal walls to maintain longer term temperature.





**The Hot Water System is typical Hockerton super-energy-saving! The 450 litre tank heats the water by one of two (1 is spare) 3KW immersion heaters. The water is heated on demand so does not need to be heated in excess of 60C to prevent Legionella. Instead, first saving comes from heating to only 45 to 50C. Having installed it in an already insulated cupboard, it is then super-insulated and packed solid all around with insulation. This secondary insulation then saves a further 43% of the normal energy required to heat the tank to 45C. On monitoring the system, which delivers piping hot water within seconds, the single immersion seems to come on every hour or two for a matter of ten to twelve minutes.**

**Full fresh-air ventilation, to this incredibly air-tight house, is provided by a Mechanical Ventilation Heat Recovery System (MVHR).**

**Every living room has a delivery pipe bringing in fresh air. Every 'wet room' – bathrooms, kitchen, utility room etc – has an extraction pipe. The overall air-exchange for the whole house is approx once every four hours. The two pipes (input and extraction) pass through the virtually silent, fan-driven system (as shown), passing through a heat exchanger. This is heated by the extraction air on one half of the exchanger and then on the other half, it heats up the incoming air. The effectiveness of this system has been researched and tested by Hockerton. Their findings show that the incoming air gains approx 80% of the air temperature difference between the outside air temperature (on the north side of the house) and the internal temperature. Thus, for example, if the internal temperature is 20C and externally it is 10C, then 80% of the difference is 8C, thus the incoming air enters the house after passing through the heat exchanger at approx 18C. If it is 0C outside, then it enters the house at approx 16C.**



**The initial Drawing room fit-out before arrival of more sofas! Some of the fifteen wall lights turned and made by Nick from beautiful Yew wood of around 15 to 20cms pollarded tree tops from Freckenham woods. All sound timber from the old chicken shed was carefully stacked, de-nailed and retained to be re-used both structurally and decoratively in the conversion, to retain some of the character of the original, all in the original locations (on a 3metre module), as for the original.**



**The Hallway from the drawing room end looking towards the eastern front door. The brickwork has a gentle 'S' shaped curve, to create a more interesting line; the brickwork also provides a welcome change in colour and texture. Nine Velux windows provide excellent extra light and have smart controls. These open the windows in the unlikely event in summer of the house over-heating though not needed in 2022!; when sufficiently cool they close, as also if it starts to rain!**

**The Floor throughout is a water-based epoxy-resin floor, 3mm thick trowel-laid in 7 layers to form an attractive textured finish, which is more hard-wearing than concrete and far more attractive. The colour is the same throughout, apart from the bedroom bathrooms where it takes on the predominant room colour and is continued up the walls to the ceiling to form a completely water-proof seal and obviates the need for any tiling.**



**The Kitchen - with the island worktop and seating formed from most unusually figured (thanks to Ganoderma diseased beechwood), from Freckenham woods, made by the chief joiner, but entirely polished by Nick who has been using this particular polishing technique on his furniture for twenty-five years.**



**The Drawing room windowsill, made from Freckenham Yew wood and, like all windowsills, polished by Nick. All five windowsills in the house are from Freckenham timber, this one from Yew, the three north bedrooms from Ash and the workshop windowsill from Acacia.**





**The Blue Bedroom  
windowsill of Ash.**



The Red Bedroom.



**The Red Bedroom, ensuite and shower room. The red theme follows the main bedroom and the red, epoxy-resin floor continues seamlessly up the walls to form a water-tight chamber. The small recessed wall behind the mirror and also the rear wall of the shower incorporate gold flaking in the basic red resin coating.**



**The Master bedroom on the south side of the house.**



**The south view from the Master bedroom across the three-acre paddock, yet to be landscaped. This will form a conservation area, based upon a wildflower meadow, planted with groups of indigenous, colourful wild shrubs and small tree groups, with a meandering wide path running through it. Much work to create, but in the longer-term low-maintenance, beautiful and great for biodiversity.**



**A sunny December morning, after the great freeze with the new, chain-hung lights in place.**



**The Drawing room and Dining area by night. This end of the house has used Yew wood from Freckenham for the windowsill, wall lights and these heavy, thick slabs of timber for overhead lighting. All the light fittings have been designed, made and polished by Nick in his new workshop. Now, he has to make one final large, turned, yew light fitting for the drawing room and then, ash and yew bookshelves for the library!**

