

10 Bucks Mills – Regenerative Design in Practice

ecological refurbishment, new build extension & landscape design

Completed 2008, North Devon Coast.

The project at 10 Bucks Mills demonstrates how ecological thinking can be applied to a Grade 2 Listed historic building and landscape in the heart of a designated Conservation Area and AONB (Area of Outstanding Natural Beauty) set on the fringes of the world famous UNESCO Biosphere Reserve.

This project is a template for environment specific, rural sustainable development.

The holistic ecological approach to developing the property for a family with young children is based on Permaculture principles and has been carried through from concept design right through to the fine detail implementation - from building construction to species selection.

The following key principles have been incorporated into the design at Number 10:

- Healthy - healthy building design has been incorporated using Building Biology (Bau Biologie) principals
- Materials - healthy, low embodied energy natural materials, ethically sourced, moisture permeable and locally sourced where possible were used internally and externally for both the refurbishment and new build elements
- Low energy - the buildings have been designed to be low energy via a fabric first approach supported by the use of renewable energies
- Abundant landscape - the landscape has been designed to create beneficial microclimates and mimic natural ecosystem processes in order to maximise useful produce such as food, companion planting, cleaning agents and pest control as well as to provide beautiful surroundings that are part of the ecology of the locality.

Renovation of Historic Building

The renovation of the existing building was undertaken as the first phase of the development.

Great care was taken to use materials that were healthy for people and sympathetic to the historic building both visually and functionally in order to maintain the building's historic integrity whilst allowing the building to continue to 'breathe' (moisture permeable).

Materials

- Lime wash to walls externally and internally
- Organic paints, stains and waxes to timber internally and externally
- Homotherm insulation - recycled newspaper insulation in batten/slab form - to internal solid walls and roof
- Solid floor insulation under new screed and granite ground floor (granite tested to ensure no radioactivity present)
- Local ash floor boards to first floor and ground floor ceiling with natural oil finish
- Reclaimed slate roof
- Reuse of excavated stone from the site as facing stonework to extension, retaining walls and external paving

Energy

- Insulation – internal wall insulation varies from 150mm to 200mm. Roof insulation 250mm - 300mm. Ground floor insulation 100mm.
- High performance triple glazed wooden windows and doors
- Air tight construction
- Natural passive stack ventilation design
- Biomass hot water, cooking and heating via wood burning Rayburn
- Low embodied energy materials
- Low energy lighting throughout

New Build Extension and Workshop

The building was extended by approximate 50% of the floor area as part of the second phase of the project and a new build workshop/garage/home office was constructed as a separate building forming an enclosed safe courtyard between the two buildings.

Key design features

- fabric first low energy design
- high thermal mass construction
- biomass space and hot water heating
- solar hot water heating (20 evacuated tubes)
- welsh slate floor to ground floor extension and first floor hall and bathrooms including bathroom walls

Materials

Similar materials to the existing building but used in a modern way

Energy

- Super-insulation to walls (300mm – 200mm internal Homotherm insulation with 100 EXP wall insulation either underground or cavity), roof (350mm) with internal Homotherm (newsprint in batten/slab form) insulation. 250mm EXP insulation to solid ground floor
- High performance triple glazed wooden windows and sliding doors
- Natural passive stack ventilation design
- Efficient wood burner with external air supply to new lounge
- Solar panels x 20 evacuated tubes and upgrading of thermal store
- Low energy lighting including cold cathode lighting & LED
- Acoustic break to first floor floor construction

Both Refurbishment and New build

Healthy building design features

- Non VOC materials - Natural materials including timber floors and stone floors, natural paints, stains and waxes
- Easily cleanable solid floors - no carpets
- Low EMF wiring including radial wiring with cut off switch to bedrooms
- Low energy lighting throughout

Water

- Low water use appliances
- Use of spring water planned for future implementation

Landscape Design

- Edible landscape design based on permaculture principles
- Raised beds – herb, salad and fruit production
- Use of stone excavated from site to form walled garden microclimate for food production
- Chickens – use as chicken tractor, eggs, fun

Future projects planned include:

- Use of spring water for food production aquaculture system and use as potable water to replace mains
- Solar conservatory
- Outside kitchen – for fish preparation, with wood burning cooker/smoker and bread oven
- Landscape design implementation to east of workshop

A number of articles in magazines have been written about this project and it also featured in a channel 4 programme.