

Sustainable Building

In the renovation of old farm buildings as Mucknell Abbey, sustainability was a key criterion in the design of the buildings and specification of the building materials.

Building Specifications

The Community Building was designed to incorporate the highest possible standards of insulation. Within the barns, the existing fabric will be improved to match the new build, subject to space requirements. There were also stringent criteria for air leakage rate (i.e. draughts) in the new buildings.

Component	Building Regulation U Value	Target U Value
Floor	0.25 W / m ² °C	0.15 W / m ² °C
Walls	0.35 W / m ² °C	0.15 W / m ² °C
Roof	0.25 W / m ² °C	0.15 W / m ² °C
Windows	2.20 W / m ² °C	1.80 W / m ² °C
Roof Glazing	2.20 W / m ² °C	1.80 W / m ² °C

The heating systems were designed to meet the internal temperatures in the table on the right ±1 °C against an external temperature of -4 °C. The building is naturally ventilated (no cooling).

Cells, studios, offices and meeting rooms	21 °C
Oratory, reception, library and refectory	18 °C
Laundry and utility rooms	18 °C
Corridors	15 °C

External lighting used energy-efficient luminaires, which use reflectors to minimise light pollution.

Internal lighting was designed to meet the levels in the table on the right, using energy-efficient sources and in conjunction with available natural daylight. Passive infra-red detectors were considered as a means of ensuring artificial lighting is provided only when spaces are occupied, but not used.

Cells, corridors and store rooms	100 lux
Community room	250 lux
Offices, reception and refectory	300-350 lux
Kitchen, library and chapter (reading) room	500 lux

Material Selection

The building engineering scheme design report listed the following principles to be used in evaluating the materials choices:

- No PVC shall be used where viable alternatives are available.
- Only non-VOC or low-VOC paints shall be used.
- Material containing CFCs or HCFCs, or materials and components whose manufacture involves the use of CFCs or HCFCs, shall not be used.
- No demolition waste or material excavated from the site will be sent to landfill.
- Any fill material used on the site will be crushed masonry or crushed concrete (recycled aggregate).
- Apart from the use of crushed (recycled) masonry or concrete, the building should incorporate at least two significant instances of using products made from recycled materials, re-refined mineral oils or re-used components.

Materials were further evaluated for suitability using the [BRE Green Guide](#) to building. This is one example of an environmental preference method, which collates data on the environmental impacts of the extraction, processing, transportation, use and de-commissioning of common building materials, considering health impacts and toxicology in addition to the external environment.

With respect to timber products, the criteria were:

- Timber (including timber for wood-based products) to be obtained from well-managed forests/plantations in accordance with: laws governing forest management in producer country/s; international agreements such as the [Convention on International Trade in Endangered Species](#).
- Documentation to be provided: documentary evidence (which has been / can be independently verified) regarding the provenance of all timber supplied; evidence that suppliers have adopted and are implementing formal environmental purchasing policy for timber and wood based products.

Example materials

Concrete Common Blockwork

Enviroblock EV13 (86% secondary aggregates), EV11 (93% recycled aggregates), EV1 (92% recycled aggregates); supplied by [Masterblock](#); manufactured in ISO 14001 compliant factories and certified by the BRE Environmental Profile Scheme.

Windows and External Doors

Supplied by [Rational Windows](#) made from *Pinus Sylvestris* softwood, minimum 2 laminations, finished with water-based coating system Gori-system 890.

Paving

EcoPave, supplied by [Charcon](#); containing 82% recycled or reclaimed materials, including copper slag and china clay stent (by-products from copper smelting and the china clay industry), and recycled water; given "BREEAM responsible sourcing" mark.

The Oratory

The main structure is glulam frames in cruck form. The infill to the glulam above the eaves is highly-insulated timber framing with decorative birch ply inner lining (with hard wax-oil finish) and a roof of western red cedar shingle (with typical service life of 35-50 years). Below the eaves and to the gables is roughcast through-pigmented lime render over blockwork outside, and unpigmented lime plaster inside. The windows are oak.

The bell tower is a painted steel frame. The bell is re-used, and formerly hung in All Saints Wokingham. It weighs 9 cwt, and is tuned to F.



About Mucknell

Mucknell Abbey is a contemplative monastic community of nuns and monks living under the [Rule of St Benedict](#) and part of the [Church of England](#).

More information on [sustainability at Mucknell](#), and further factsheets on the renewable technologies and grounds are available at www.mucknellabbey.org.uk.