

T5870/jct/krrt



**Structural assessment**

In respect of proposed

**Prior approval for conversion under Class Q**

of



**Barn at Church Farm**

Pound Lane

Hardwicke

Gloucester

GL2 4RJ

On behalf of

**H Lloyd-Baker Esq**

Issue 1 – September 2022

**O'Brien & Price Stroud Ltd**

The Old Bakehouse

Monmouth Road

Tintern

Monmouthshire

NP16 6SE



## Brief

In accordance with an instruction issued via P D Carter Chartered Surveyors and Land Agents, I have inspected the subject building and given consideration to the suitability of the existing structure for conversion to residential use. This report is prepared in light of the specific requirements of permitted development under Class Q, and the associated legislation as it is currently being applied. The inspection took place on 27<sup>th</sup> July 2022 during dry weather conditions.

The inspection was undertaken by the author of this report John Topp IEng AMIStructE AssocRICS.

No intrusive investigation or specialist testing was undertaken.

## Location and setting

The subject building is located 95m SSW of St Nicholas Church, Hardwicke at OS map reference is SO 79318 12336. The barn is set within a relatively level yard area at an elevation of approximately 13m AOD.

The building ridge is aligned approximately ESE-WNW but for the purposes of reporting this will be described as SE-NW.

British Geological Survey mapping indicates the site to be underlain by bedrock of the Charmouth Mudstone Group (previously known as Lower Lias). No superficial deposits are recorded beneath the subject site, but the clay is overlain by gravel to the SW, between Church Farm and Hardwicke Court. This gravel is referred to in a report of a borehole which served Hardwicke Court with fresh water in the early C20th. The recorded bedrock tends to present as a firm silty clay in a natural state where weathered, near-surface. Although the

site has not been the subject of a specific geotechnical investigation, the known underlying geology represents competent founding strata.

## Description

The subject building is a two-storey brick-built barn of rectilinear plan form, having a pitched roof between gables. A three-bay mono-pitched lean-to enclosure is attached to the NE elevation in addition to the dilapidated remains of a further structure which is due to be removed as part of the proposed alteration works.

The ground floor of the main barn is divided into three parts. At the west end is a single workshop which is not internally linked to the remainder of the barn.

This has a different structural configuration, but limited access was available to the upper floor. The main part of the barn comprises five structural bays, with a partial cross-wall between bays 2 and 3 (numbered from W-E). The first floor has been largely removed from bay 1.

It is understood that the building is not listed.

The scope of works of the proposed change of use is depicted on Jackson Architects Ltd drawing 1025 002 (B).

## Class Q generally

This report is intended to deal with the structural suitability for conversion, which is only one of a number of conditions which need to be met in order for prior approval for change of use to be permitted.

The threshold for structural suitability has developed since the introduction of the legislation in 2015. Guidance has been updated, in addition to precedent being set by appeal decisions and case law. Paragraph 105 of the PPG was

updated in February 2018 to clarify that internal structural works could be carried out under permitted development under Section 55(2) of the Town and Country Planning Act 1990. It remains the case that the existing structural envelope of the building must be capable of sustaining the loads imposed by roofing, cladding, snow and wind actions etc. Additional internal structure is permitted to support new intermediate floors etc, but not to provide essential supplementary support to the existing envelope.

## Observations

### Internally

- The external walls comprise brickwork in English garden wall bond with 330mm nominal thickness.
- A tapered open joint is evident at the NE corner and to a lesser degree at the SE corner.
- The ground floor is modern in-situ concrete and a modern concrete block pier has been constructed to offer support to the decayed Southern end of beam 1 (numbered from E-W).
- First floor principal beams are nominally 300mm deep and 250mm wide, typically with 38mm stop end chamfers. Floor joists are 125 x 80 @ 375mm centres with a clear span of 2.52m between beams.
- A slight tapered crack is evident between the recently re-pointed cross-wall (bays 2-3) and the North elevation. The bed joints of this cross-wall also dip towards this junction.

- The central section of the barn incorporates three structural bays with floor joists spanning between beams 3, 4 and the cross-wall to the workshop. This wall incorporates a bonding timber/plate.
- Apart from a limited number of localised defects the floor beams are in good order.
- A small number of floor joists in bay 3 are decayed and require replacement. In bay 4 there is significant deflection of joists adjacent to an un-trimmed aperture near the principal southern doorway and further failed/distorted joists at the north end.
- In bay 5 the joists display long term distortion (creep deflection) and joist bearings have been supplemented on both sides of beam 4. Some connections remain tenuous.
- A tapered crack is evident at the junction between the North wall and the cross-wall (bay 5 – workshop). This may be the case at the SW junction, but this is concealed by an oil tank.
- The workshop bay has a length of 4.4m and the floor joist direction is perpendicular to that in the remainder of the barn. There is a single floor support beam spanning across the middle of this bay with joists each side clear spanning 3.03m to the north and south.
- The west gable displays a tapered crack at the NW corner and modern repointing/repair work to brickwork supporting a lintel over the doorway at the SW corner.
- Planar distortion is evident on the north wall surrounding the door opening.

## Roof

- The roof is covered with clay tiles and no sarking felt is present. Between the east gable and the workshop cross-wall is a five bay roof formed by four intermediate trusses. The principal rafters are of cruck profile and are collared. There is a raised wall plate approximately 1.2m above floor level and then two intermediate purlins per slope. The purlins are set perpendicular to the roof and are 175 x 140 and are in good order where visible. Common rafters are typically 75mm deep x 100mm @ 400mm centres.
- Diagonal bracing is present in bays 1 and 2. This is set in the plane of the common rafters, with the rafters 'cut' into the braces. The floor displays distortion as expected in a building of this type, with a 'high' spot along the line of the cross-wall (bays 2-3).
- The base of the principal rafter on the south side of truss 1 does not appear to be connected to the floor as a result of decay in the beam end.
- The principal roof structure is well constructed and is generally in good order.
- The roof to the workshop bay was only partially accessible but contains no intermediate truss. The purlins span between the workshop cross-wall and the west gable, hence there is greater ridge deflection apparent in this area.
- Along the north eaves there is a raised pitch addition.

## Externally

- The upper part of the east gable is largely concealed by vegetation. A modern concrete lintel spans over the garage door with a horizontal crack above, some cracking above the bearings, and a sub-vertical crack to the right-hand reveal.
- The south elevation displays distortion, particularly to the eastern side of the door which is where truss 1 is located. There is a noticeable outward lean of

the upper 2.1m and diagonal cracking over the principal door opening on this elevation. The discontinuity created by the loft door into the workshop bay appears to have accentuated the movement in this area.

- A significant proportion of this SW corner has been reconstructed and there is extensive repointing in the distorted west gable. This gable is 330mm thick but may reduce in thickness above the loft door, in a similar manner to the workshop cross-wall. There is a significant inward lean on the gable apex and an apparent outward bulge at floor level. Some cracking is evident beneath the central loft door.
- Localised damage is apparent on the north wall, where cracking and outward rotation of the brickwork has been caused by historic truss failure and rotation. The plinth brickwork would benefit from consolidation.
- The lean-to comprises four mono-pitched trusses forming a three bay structure. Timber clad north elevation. The trusses are effectively sloping beams from which the purlins are diagonally propped. The addition of a further reverse diagonal from the upper purlin is recommended.

## Discussion

Buildings of traditional construction such as this are generally suitable for conversion to dwellings, as they are constructed in a similar manner to residential buildings, are fully enclosed, and of robust form. The roof structure, main floor beams and walls are all suitable for ongoing use subject to repair.

The required repairs will include:

- In-situ localised carpentry repairs to the roof structure and some supplementary timbers to compensate for age related distortion.
- Repair and addition of floor joists to supplement the existing.

- Crack stitching of cracked brickwork using stainless steel Heli-bar type repairs.
- Some localised re-building of high-level brickwork (eaves and gable apex) may be required when fully accessible for inspection.

It is important to recognise that the repairs, which are inevitable on buildings of this age/type, are not a consequence of the proposed change of use and will be required regardless of these proposals. These maintenance repairs do not constitute 'development'.

The development proposals are sensitive to the existing fabric and do not involve any significant structural intervention other than the upgrading of the first floor structure.

The existing building structure has clearly demonstrated the ability to resist loads applied by the mass of the roof material and self-weight, in addition to variable applied loads such as wind and snow, to which it has been subjected since construction.

As with all such conversions, a compliant ground floor construction will be required to provide damp resistance and thermal insulation to accord with current Building Regulations. Based upon my inspection of the ground floor slabs, these could be retained and utilised as the structural base for an insulated floor build-up subject to relative levels being appropriate. It should be borne in mind that the loading to which the ground slab has been subjected during agricultural operations is well in excess of the relatively modest imposed loads associated with residential use.



**Conclusion**

I am satisfied that the existing building, once repaired, is sufficiently robust and structurally suitable to support a conversion to residential use, under the provisions of prior approval (class Q).

