

Our ref: 24154

Date: May 2024

STRUCTURAL INSPECTION REPORT

ON

THE DAIRY BUILDING, TILLHOUSE FARM, CRANBROOK

FOR

BARLEYWOOD HOMES LTD

1. INTRODUCTION

Barleywood Homes Ltd instructed NMDCE to carry out a structural inspection of the former 'Dairy Building', which was originally part of an old farmstead known as Tillhouse Farm.

This report comments on the primary structural elements of the above building, and the viability of converting the building into a residential dwelling and the extent of remedial/rebuilding works that would be required to bring it to a standard compliant with current building regulations and any 'warranty' providers.

The building was visited on the 2nd and 17th May 2024 and whilst the majority of the structural elements of the building are visible from ground floor, due to 'holes/voids' in the first floor, it was deemed to dangerous to access the first floor due to the poor condition of the first floor structure.

No intrusive 'opening up works' were undertaken as these were deemed not necessary for inclusion in this report.

2. DESCRIPTION OF BUILDING

It is understood the building was a former 'Dairy' and was part of 'Tillhouse Farm', a working farm until around 2005, when the planning of the new 'Cranbrook' town commenced.

The site has remained 'derelict' since then and the 'ancillary/agricultural building' forming the farmstead have since been demolished. The original listed 'Farmhouse' has been demolished following an 'arson' attack some years ago.

The building is 2 storey and 'L' shaped with approximate plan dimensions as **Appendix A**.

The roof is finished with 'corrugated tin' supported by timber rafters and purlins, hips, and valleys, which in turn are supported by primary timber "trusses".

The roof trusses are supported by the external masonry walls and in some places, 'propped' off the timber floor/beams below.

The first floor, where it exists is finished with timber boards supported by timber joists which in turn are supported by either masonry walls or timber beams. The timber beams in some locations are supported by steel and precast concrete posts, which appear to have been built off the ground floor slab.

The external walls are constructed in various materials including, brick, block, and random stone. There are numerous openings in all external walls including 2 'arched' openings in the gable ends.

Heavy vegetation growth is evident to some of the existing walls internally where the roof has leaked for a number of years.

Loadbearing internal walls are constructed from concrete blockwork.

The existing ground floor has numerous steps/changes in level throughout and is constructed in concrete.

There are numerous agricultural concrete/steel/timber sub-partitions and troughs throughout from its previous use as a dairy.

Lintels to the external walls have been formed in various materials including timber, precast concrete and brick 'arches'.

3. OBSERVATIONS

ROOF STRUCTURE

The roof generally, shows signs of 'undulation' at ridge level.

The roof structure to the return of the main building is in a state of partial collapse as the support walls have failed and the two storey gable wall is 'free standing' , and is only being partially restrained by a roof purlin

The primary timber roof trusses exhibit signs of 'distortion' due to the 'undersized' members and failure of the primary connections. It would also appear they have been affected by severe 'damp' over the years, particularly at the end bearings, where built into the wall.

The rafters are also in a similar condition and the majority appear to have been removed/cut/replaced over the years.

FIRST FLOOR STRUCTURE

The first-floor joists have 'sagged' significantly, as have the supporting timber beams, which is likely to be due to them being undersized to support the loads being imposed upon them from the previous 'agricultural' use.

It would appear the joists originally spanned 'clear' from external wall to internal wall and the timber beams were introduced to provide additional support, hence, why they are not 'built in' to the external wall but supported off small circular posts offset from the external walls in the main building.

Other areas are also supported off timber beams which are supported by either timber or precast concrete posts built off the ground floor slab.

The first floor does not appear to be tied to the external gable walls where they span parallel, thus making these walls 'unrestrained' over their full height.

GROUND FLOOR SLAB

The ground floor is likely to be 'ground bearing' and has numerous steps, changes in level and agricultural 'features' attached to it as well as supporting primary columns to the first floor.

EXTERNAL WALLS

Most of the external walls exhibit signs of 'movement' and cracks are clearly visible in a number of locations.

A Partial collapse of the gable and side wall has previously occurred to the rear building section and is currently considered 'dangerous'. It has also left the roof structure in a condition that collapse of the section of building cannot be discounted in the 'short term'.

INTERNAL WALLS

The internal concrete blockwork walls all appear to have been constructed off the ground floor slab and have been positioned to suit the previous use as a dairy.

LINTELS

Timber lintels in the external wall openings show signs of distortion due to being undersized as well as evidence of damp and insect attack.

The natural brick arches appear to have performed satisfactorily to date.

The precast concrete lintels where used also appear satisfactory.

FOUNDATIONS

No intrusive investigations were undertaken but from a visual inspection no major signs of foundation failure were noted.

STRUCTURAL STABILITY

Currently, the building has no way of transferring both gravity and lateral loads safely into the ground due to the lack of roof and floor 'diaphragms' and 'tying in' of walls to the roof and floor structure.

4. COMMENTS

From the visual inspections undertaken, the following works would need to be undertaken to meet current Building Regulations and to be acceptable to a 'warranty' provider, should the building be considered for a conversion to a residential dwelling.

ROOF STRUCTURE

The entire roof structure will need to be replaced as currently the primary timber 'trusses' are considerably undersized and will not be able to support any increase in load.

The increase in load is likely to be around 100% due to increased weight of the roof covering, insulation and plaster board ceilings, that would be required to make it Building Regulation compliant, this also includes the batten, rafters and purlins.

FIRST FLOOR STRUCTURE

As above it is considered that the entire timber first floor including the support beams and posts will need to be replaced as they are considerably undersized to support loadings associated with a domestic dwelling.

Floor joists that are built into the external wall will need complete removal.

GROUND FLOOR SLAB

The existing ground floor slab would need to be removed in its entirety and 'lowered' to accommodate insulation and other finishes to make it Building Regulation compliant. The knock-on effect of 'lowering' the slab is likely to result in the exposing of the existing foundations.

EXTERNAL WALLS

Due to their current condition and varying materials, it is doubtful they could be retained to support the new constructions and the increase in load.

It is likely a new internal 'lining wall' would need to be constructed to provide long term structural support.

The new structural wall would need to be supported on new foundations. The existing external walls would then need to be tied to the new lining walls for restraint.

The external walls would also require extensive remedial works to ensure they can safely transfer lateral loads to the new internal lining wall.

INTERNAL WALLS

As the internal walls are built off the ground floor slab which would need to be removed, the original walls would also need to be taken down.

LINTELS

Due to their current condition and not being building regulation compliant all timber lintels bearing into the external walls will need to be removed in their entirety and replaced with suitable PCC lintels.

FOUNDATIONS

It is anticipated the existing foundations, if they exist, will require 'underpinning' to ensure they bear on suitable strata to provide long term support, meet building regulation requirements and to provide support to the new internal 'lining' skin.

5. RECOMMENDATIONS

To meet current building regulations and be acceptable to any 'warranty' providers the following works will need to be undertaken should it be considered the existing building be considered for conversion.

- Remove and replace the entire timber roof structure
- Remove and replace the entire timber first floor structure including all timber beams and support posts
- Remove sections of 'unstable' external walls and rebuild in modern materials to ensure compliance with the Building Regulations
- Remove and replace the entire concrete ground floors slab at a level to allow for new insulation/finishes etc
- Underpin all existing external walls in a 'hit & miss' sequence
- Construct new internal loadbearing walls and external 'lining' wall off new foundations to depths as required by Building Control
- Tie existing external walls to new internal lining walls. Insulate//dampproof/sheath as necessary
- Remove all timber lintels and any other timber elements that are currently built into the external wall and replace with PCC lintels
- Undertake 'remedial works' to the existing walls to be retained, likely to be in the form of 'stitching' using an appropriate/approved specialist contractor.

It should be noted that extensive 'Temporary Works/Support' will be required to undertake the above and care should be taken when excavating alongside/below the existing foundations.

6. CONCLUSION

It is our considered opinion the existing dairy building is in such a poor structural condition and general state of repair that none of the elements/members could safely be retained.

Whilst NMDCE are not party to costs, the building has many dangerous and unsafe features as it stands and to try and convert this building to a modern structure/dwelling is likely to have extremely serious and uneconomic financial implications.

In our opinion the building should be carefully demolished, and a new building erected in its place.

Signed:

N M Drew IEng IMIStructE, ACABE,
For and behalf of NMD Consulting Engineers

APPENDIX A

CALCULATION SHEET

Consulting Structural & Civil Engineers

Project: DAIRY BUILDING, TILTHOUSE PARK.

Job No.: 29159.

Section: APPENDIX A.

Sheet No./Rev: SH01.

Calcs by: NMD.

Checked by:

Date

