



Red House Farm  
Lavenham Road  
Great Waldingfield  
Sudbury  
Suffolk  
CO10 0TQ

## Structural Survey of Existing Agricultural Building for Proposed Conversion to Residential Use

EPA Job Reference: 14750

On Behalf of Bidwells

Date: 9<sup>th</sup> February 2024



## 1.0 - Site Brief -

1.01 - Edward Parsley Associates have been instructed to assess the structural condition of the above existing agricultural building to determine its suitability for its proposed conversion to residential use. As part of our brief, we visited site on 5<sup>th</sup> February 2024 to undertake a structural condition survey of the existing building. This report highlights our initial findings and details where further investigation works may be required at a later stage.

1.02 - At the time of our survey, the weather was clear, with no winds. The building was fully accessible, and we can therefore confirm that there were no restrictions that would impact the contents of this report.

1.03 - The agricultural building in question is located to the south of the current residential dwelling @ Red House Farm and is accessible via its own private track road to the southeast corner of the building.

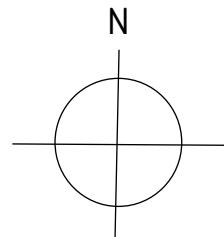
1.04 – It is Edward Parsley Associates' understanding that the purpose of this report is to support a proposed planning application for residential conversion whereby the proposal is to retain all the existing floor area and to convert within its current parameters.



Image 1: Site Plan (nts)



Image 2: Block Plan (nts)





## 2.0 – General Description -

2.01 – The barn is a rectangular single storey building approximately 10.9m wide x 16.5m long externally, forming one single open space. The building is formed by a duo pitch roof construction from 'eaves' to ridge apex with a pitch of approximately 25°. The roof is finished externally with a corrugated sheet finish throughout. The buildings roof comprises of 4No equal sections, separated by high level timber trusses spanning north to south across its width @ approximately 4.0m centres. The overall height of the building, from ground slab to apex of ridge, is approximately 6.2m internally.

2.02 – The perimeter of the building is formed by a mix of material and construction details, consisting of full height masonry brickwork wall sections and timber frame clad externally with low level masonry plinth work.



Image 3: External View of Southwest corner



Image 4: External View of Southeast corner

## 3.0 – Structural Condition –

### 3.1 - Roof:

3.11 - The existing roof finish to the structure is a corrugated sheeting. The sheeting is supported internally by timber purlins each side of ridge line, spanning between existing timber truss sections. The purlins are consistent in size and spacing and show no signs of notable deflection or stress and appear to be working adequately under current and historic loading conditions.

3.12 - The existing roof purlins are supported by timber trusses spaced equally throughout the building. The trusses comprise a girder configuration, consisting of internal strut & hanger members between the rafter and bottom chord members. Strut and hanger members are sandwiched and fixed through all rafter and bottom chord members. Rafter members are made up of a double 50 X 100mm spanning eaves to ridge, bottom chord members are made up of double 50 X 75mm members, with struts and hanger members sandwiched between. All members are fixed via single bolt and washer connections. All members and fixings appear to be acting adequately under current loading conditions and show no sign of stress or distortion.



3.13 - It is to be noted that the assumed weight of the existing corrugated sheeting will be approximately 20-25Kg/m<sup>2</sup> and that as part of the residential conversion, it will be proposed to install internal finishings, i.e. plasterboard & insulation. An internal light-weight load-bearing system can be introduced to withstand any additional loadings from proposed finishings because of the proposed conversion works. Alternatively, the corrugated sheets can be analysed to determine their capability to withstand any additional loadings. It is likely, as part of the proposed conversion works, that a new modern external sheet finish will be proposed to be installed. This will likely be less than that of the original corrugated sheet finish. This offset in weight may allocate for the above noted finishings and prevent additional weight being exerted when compared to its current condition.



Image 5: View of Existing Timber Roof Trusses

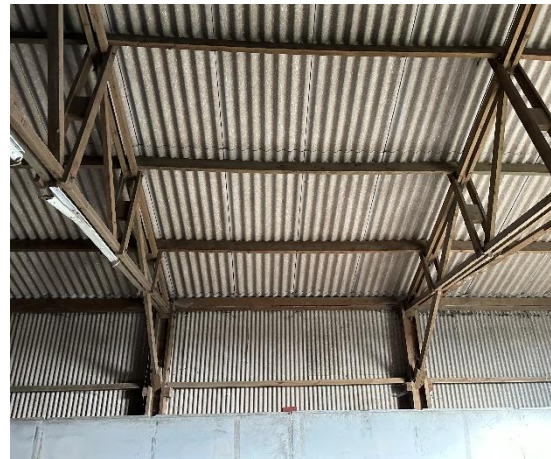


Image 6: Internal view of timber roof purlins

### 3.2 - Walls:

3.21 - The external walls are formed with a mix of material and construction details. For the purposes of this report, the external wall details are referenced as Wall Type 1 & Wall Type 2 as below.

3.22 – Wall Type 1 consists of a full height solid masonry brickwork wall construction from ground slab to eaves level and occurs along the entire length of the southern wall elevation as well as intermediate sections between a large sliding door opening to the eastern wall elevation. All areas of brickwork are in sound condition and show little signs of movement.

3.23 – Wall Type 2 consists of a high-level timber frame construction with a mix of weatherboarding and corrugated sheet finishing to their external face, finished by a low-level solid brickwork plinth detail at varying heights down to ground slab level. The western wall elevation consists of a mix of high level of corrugated sheeting and weatherboard as can be seen in Image 3 above, the northern wall elevation consists of corrugated sheet finish throughout.

3.24 - As part of the proposed conversion works, it will be necessary for insulation and finishes to be added to the internal face of all external wall areas. This will involve the removal of the existing boarding, introduction of insulation material between existing stud members, with the potential addition of timber batten members internally to achieve required U-Values and a modern plasterboard finish to Wall Type 2. Wall Type 1 will require introduction of a new light-weight timber framework internally to be insulated and finished with modern plasterboard finishings.

Signed: Thomas Lee BSc (Hons) Eng  
Director  
Edward Parsley Associates Ltd



3.25 – A modern concrete half-height walling has been added within the perimeter of the building’s footprint, assumed to be for agricultural storage/purposes, located inset of the north, west & south wall elevations. The walling is of a concrete construction and is propped via intermediate steelwork columns cast into the concrete ground slab. We note it is likely that as part of the conversion proposals that these sections of walls are removed and can confirm that at present they are not providing any form of structural buttress or support to the main building’s structural fabric.

3.26 –It is to be noted that internal and external finishings at the time of conversion, including plywood where required, will significantly increase the buildings overall stability.



Image 7: Wall Type 1 @ southern elevation



Image 8: Wall Type 1 @ eastern elevation



Image 9: Wall Type 2 @ western elevation



Image 10: Wall Type 2 @ northern elevation



### 3.3 – Foundations & Sub-Structure:

3.31 - At the time of our survey, EPA were not aware of any trial pits having been excavated to expose existing foundation conditions below ground level, however based on the age and nature of the building, it is assumed that the footing conditions consist of a continuation of brickwork forming a corbelled detail to a depth of 450-600mm below ground level. The ground floor is formed by a cast in-situ concrete slab. The slab appears to have been poured in one continuous section owing to the absence of movement joints, which, given its sound condition, suggests is robust in nature. It is assumed based on the structural condition of the building that all existing foundation and ground slab elements are performing adequately in their current condition and there are no signs of stress or distortion throughout.

3.32 – The overall loadings of the building, as part of the proposed conversion works to residential use, are likely to reduce in comparison to that of the building's existing use, with respect of the buildings current agricultural use and previous storage applications. A conversion to residential use will not exceed that of the existing loading conditions.



Image 11: Exposed concrete slab internally  
@ northeast corner



Image 12: Exposed concrete slab internally  
@ northwest corner

### 3.4 - Stability:

3.41 - The existing building has remained sound for the duration of its lifetime in its current bracing conditions. The external brickwork walling is providing sufficient lateral bracing along the flank walls accordingly. Timber braces are evident spanning from bottom chord of trusses to timber stud wall members. This is providing lateral bracing in opposite direction. It is to be noted that the existing roof is currently braced by diagonal timber braces to both end bays. The above bracing conditions have kept the building in sound condition under lateral stability for the duration of the building's lifetime and is working adequately.

3.42 - The conversion of the building to residential use will significantly increase the overall stability of the structure through the introduction of plasterboard internal finishings, light-weight studwork walls, as well as internal partitioning.



Image 13: Timber braces at truss locations



Image 14: Timber diagonal roof bracing

#### **4.0 - Summary:**

4.01 - The existing building is typical of its age and construction and the survey undertaken did not raise any structural issues of concern. The main external load-bearing elements are currently functioning as required and are suitable for conversion to residential use.

4.02 - It is advised that the addition of timber frame partitioning and finishings to internal faces of external walls, subject to final design, will aid the stability and overall structural performance of the current structure.

4.03 - Despite the existing foundation conditions not being exposed, the condition survey did not highlight any areas of concern regarding distortion or movement to this element. It is therefore assumed that the existing elements are performing adequately in their current condition.

4.04 - The building is in a good structural condition and is suitable for conversion to a residential use without the need for re-building.

4.05 - In conclusion, the conversion of the existing barn structure for domestic use is a viable option given the buildings existing conditions.

4.06 - This report has been created for the purpose to support a proposed planning application. Any use of this report beyond this remit is to be agreed in writing with EPA. Contents within this report are subject to additional Stage 4 calculations and are only recommendations until the point in which a finalised design concept is agreed.