



**D20-ONE**  
STRUCTURAL DESIGN

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# **Structural Report for Proposed Conversion**

for

**Mr K Eckert**

At

**Barn at Dilhorne House**

**Caverswall Road**

**Dilhorne**

**ST10 2PH**

| DATE      | REVISION         | BY |
|-----------|------------------|----|
| 11-Apr-25 | C01- First issue | JL |

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Survey undertaken by:                      Jamie Ikin  
Qualifications:                                BEng (Hons), CEng, MIStructE  
Position:                                         Structural Engineer and Director  
Date of survey:                                14 March 2025  
  
Report checked and approved by:        Jamie Ikin

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## 1 INTRODUCTION

- 1.1 D20-one Structural Design were appointed by Hewitt and Carr Architects on behalf of Mr Eckert on 7<sup>th</sup> February 2025 to undertake the structural survey to support a planning application and provide comment on the structural requirements for conversion for residential use.
- 1.2 The brief was to confirm the current structural condition and report on any defects with conclusions and recommendations to confirm the ability of the existing building to be repurposed without significant rebuild or replacement of the existing structure.
- 1.3 The report has been prepared based upon observations at the time of survey of those areas that were readily accessible. No attempts were made to access restricted or unsafe areas which are assessed dynamically by the Engineer during the survey.
- 1.4 A visual survey was undertaken at the property on Thursday 18<sup>th</sup> September. Weather was overcast and drizzle.

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## 2 DESCRIPTION



Figure 1 - Plan indicating building extents and orientated North

|                                                                                   |                                                                            |                         |                         |
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- 2.1 The site is a mixture of agricultural buildings and a main house. As indicated in figure 1 above. This report only covers the building indicated, which is a single L shaped brick-built structure with a single storey section in green and a two-storey section noted in blue.
- 2.2 At the Northern extent of the building there is a lower ground area that was not accessed due to safety concerns.
- 2.3 For the purposes of this report elevations will be referenced against the cardinal direction they are facing.
- 2.4 The building is a brick-built barn with clay tiled roof supported on timber rafter and purlins. Purlins are supported on timber trusses and masonry partitions. Where the building increases in height a timber boarded first floor is present, supported on timber floor beams. Lintels are a mix of timber, brick and concrete.
- 2.5 External brickwork is noted as being 9 or 14 inch thick and had been painted. Internal was a mixture of whitewash and render.
- 2.6 Ground bearing floors are assumed to be concrete throughout.

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### 3 OBSERVATIONS

- 3.1.1 Brickwork elevations are in generally good condition with only minor, isolated areas of concern.
  - 3.1.1.1 Isolated hairline cracks to internal render.
  - 3.1.1.2 Some slight debonding of internal buttress walls.
  - 3.1.1.3 Minor cracking to masonry over some lintels.
  - 3.1.1.4 Evidence of rising damp.
  - 3.1.1.5 Slight bulge at eaves on the right hand part of the Western elevation.
- 3.1.2 Roof structure appears appropriate for type of structure and in fair condition.
  - 3.1.2.1 Access to fully inspect the two-storey roof was restricted due to safety concerns.
  - 3.1.2.2 Dip in the ridge line to the Southern extent of the ridge that aligns with bulge as noted previously.
  - 3.1.2.3 Purlin ends that are seated in brickwork appear to be suffering from degradation.
  - 3.1.2.4 Truss members appear to be repurposed timbers.
- 3.1.3 Timber lintels are noted on some openings.
- 3.1.4 First floor covering is in poor condition with widespread areas of structural distress and failure.
- 3.1.5 First floor joists appear to be repurposed timber although are in fair condition with only minor areas or distress especially in the Northern section. Props are noted.
- 3.1.6 Suspended timber ground floor is in poor condition with localised failures and evidence of significant distress.
- 3.1.7 Roof structure observed is generally in poor condition. Failures of structural timber elements was noted in areas accessible.
- 3.1.8 Timber lintels are noted on some openings.
- 3.1.9 First floors were not fully accessible although a head and shoulders visual did not raise any significant concerns.
- 3.1.10 Roof guttering is effective and fully working.

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## 4 CONCLUSIONS AND RECOMMENDATIONS

- 4.1 Although no drawings of the proposed alterations were reviewed, we confirm that conversion to residential dwellings is a viable option, subject to detailed design between the Architect and Structural Engineer, noting any recommendations that follow.
- 4.2 Isolated sections of masonry are to be replaced where bricks have failed, damaged or cracked and repointing carried out as necessary. The introduction of damp proofing and control of surface water should be considered to control damp ingress.
- 4.3 The cause of the rotational movement at eaves, combined with the ridge dip, suggests a failure or long-term creep deflection of timber roof supports that will require further investigation and repair or replacement as agreed with a suitably qualified Structural Engineer.
- 4.4 Due to the agricultural use and livestock accommodation, concrete ground floors are not considered suitable for repurpose and should be removed and replaced to current standards. Further underpinning may be required due to the required reduced dig potentially undermining foundations although this is subject to coordination with the Architectural requirements and detail.
- 4.5 Consideration to replacement or repair of timber purlins at their supports is required. It is recommended that the existing truss supports are assessed during detailed design, especially where these sit over doorways.
- 4.6 All failed or timber lintels are to be replaced.
- 4.7 Suspended ground floor over lower ground floor is to be replaced.
- 4.8 Due to the observed condition of the first floor, it is recommended that the covering is replaced where necessary. Existing floor joists are to be checked for capacity during detailed design with the appropriate loads considered. It is recommended that the first-floor structure is to be tied back to existing masonry walls to increase robustness.
- 4.9 Appropriate external works are required to complement the proposals. A new drainage network to service the properties would be required with the integration of SuDS features where possible.

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## 5 SURVEY PHOTOS



Truss support over doorway



Damp

|                                                                                   |                                                                        |                     |                     |
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Purlin ends



Repurposed truss



Truss support

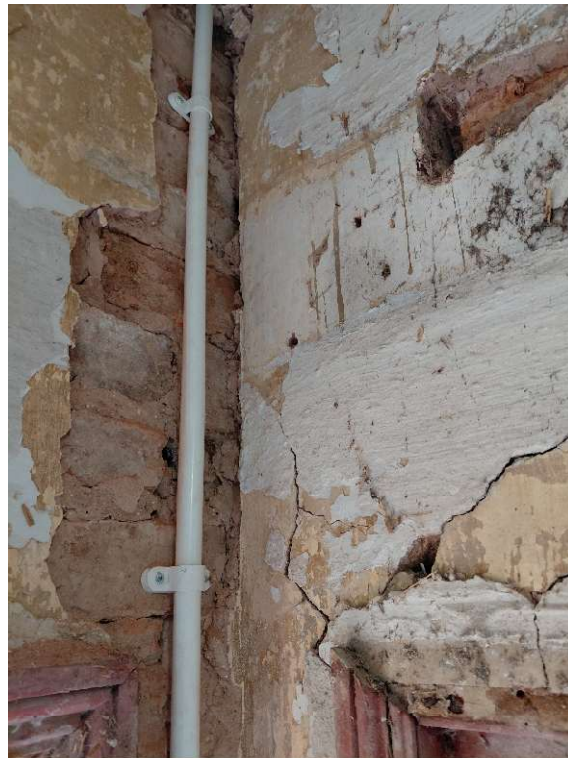


Damaged first floor

|                                                                                   |                                                                        |                      |                     |
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Damaged GF



Debonding of buttress walls

|                                                                                                                        |                                                                                   |                                 |                                |
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Timber lintels



Repurposed first floor with props

|                                                                                                                        |                                                                                   |                                 |                                |
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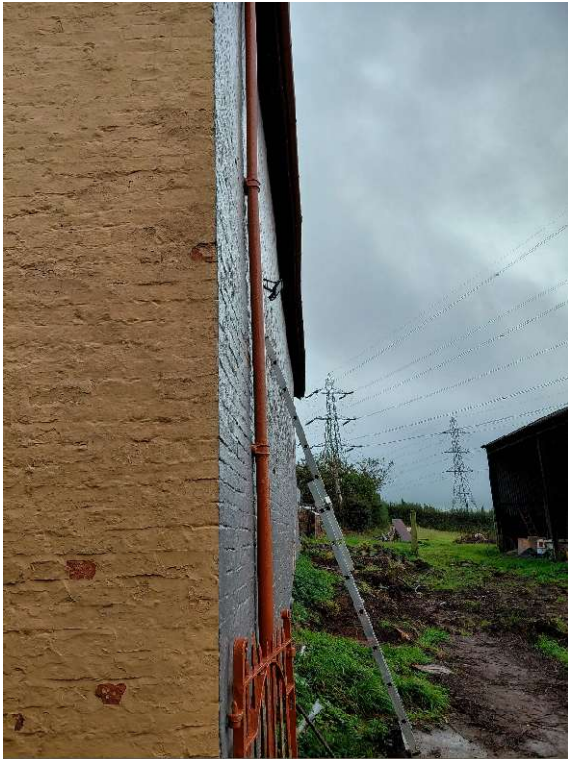
South East Elevations

|                                                                                   |                                                                                   |                                 |                                |
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South West Elevation

|                                                                                                                        |                                                                                   |                                 |                                |
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Bulge at eaves



Cracking from lintel