Address: **The Barn, Mill Lane.**

Job Number: 18618
Date: 27th November 2018

Structural Appraisal of The Barn

at:

Mill Lane
Rushton Spencer
SK11 0RS

Client:

David Lockitt.

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1.0 INTRODUCTION

1.1 C2C Consulting Engineers Ltd were appointed to carry out a structural appraisal of this building, the survey was carried out on the 26th November 2018.

1.2 The building is a two storey barn, constructed with a pitched tiled roof and load bearing stone masonry walls.

1.3 The survey is to report on the current structural condition and comment on any requirements or limitations associated with conversion to a residential dwelling.

1.4 All observations are when viewed from the front roadside elevation.

2.0 EXTERNAL OBSERVATIONS

Front Elevation

2.1 At roof level the ridge line runs through reasonably straight for the right-hand section, and then undulations are noted in the central section where this dips by approximately 100mm.

2.2 Undulations are also noted in the front roof slope and isolated tiles are missing or dislodged.

2.3 The guttering drains to a central down pipe which discharges to ground level.

2.4 Within this elevation there is a doorway to the right of the centre, also small window openings to the right-hand corner.

2.5 Ventilation holes are also noted towards the central section and steel tie bars and pattress plates also present to the left- and right-hand sides.

2.6 It appears that the barn may have been extended previously with a step of approximately 50-75mm in the façade running vertically, and generally a straight butt joint.

2.7 The ground level slopes down from the left to the right-hand corner dropping approximately one metre overall.

2.8 The ground has been dug back on the left corner where the ground level is approximately elevated by 1.8 – 2 metres on the left side gable.

2.9 The stone masonry and mortar joints are generally in reasonable condition, although will require repointing in isolated arears.

2.10 There are some slight undulations noted within the front elevation with an outward push at eaves to the central section, although this is not excessive, measuring approximately 25-40mm.

2.11 There is no evidence of cracking to indicate foundation movement however the foundations would appear to be relatively shallow with the stone spreader block visible at ground level.

Right side Gable

2.12 This elevation contains no openings other than ventilation holes at first floor and up within the roof gable.

2.13 There are no visible defects to record within this elevation other than some isolated repointing being required.

2.14 The wall is also relatively plumb.

Rear Elevation

2.15 At roof level there are slight undulations noted to the central section which is consistent with those noted on the front.

2.16 The guttering at eaves level drains to a down pipe on the rear right corner, and a second down pipe which is not connected is located on the rear left corner.

2.17 The steel tie bars and pattress plates are evident to the same location which correspond with the front elevation.

2.18 Within this elevation there are a number of door and window openings. Centrally there is a full height double storey door opening, and at this location the wall line steps out from the left side to the right side by approximately 300mm. The timber lintel above extends across on the diagonal.

2.19 It is noted to the perimeter of the barn a trench has been dug down to foundation level which confirms the stone walls are constructed off a stone spreader block founding approximately 300-400mm below ground level.

2.20 Below the stone blocks is a firm compact silty clay mixed with cobbles and this steps from the left side down to the right dropping approximately one metre overall.

2.21 The rear elevation has an outward lean towards the centre of a maximum of 25mm over 600, this then returns to being plumb on the left and right sides, the outward lean is limited to approximately a 5 metre length from the left side of the double height door.

2.22 The walls to the barn are 450mm thick with the overall lean estimated to be approximately 125mm.

2.23 The window openings all generally have stone or concrete lintels above.

2.24 The smaller openings do not have a lintel visible externally and appear to be built off the timber frame window.

Left side gable elevation

2.25 This elevation appears to have been rebuilt sometime previously with stone work of different appearance, and the mortar joints are a cement mortar as apposed to the lime mortar in the other elevations.

2.26 There are two openings within this elevation, one at ground floor and one at first floor within the roof gable, both have a stone lintel above.

2.27 There is no evidence of any cracking or defects to this elevation, although the stone work on the front left corner is not fully bonded with the front elevation.

2.28 There is also noted some slight debonding on the rear left corner between the stone work to the gable and the rear elevation with a vertical crack of approximately 2mm extending to within one metre of the eaves from ground level.

2.29 The foundation is also noted to step at the corner position down by approximately half a metre and is likely to require some localized underpinning depending on the proposed internal floor levels.

3.0 INTERNAL OBSERVATIONS

Left Side Barn/ Shippon

3.1 Within the left side shippon there are three animal pens with a concrete floor slab which steps up onto a central concrete plinth.

3.2 Above the 1st floor joists are exposed and span between steel beams and what appears to be a section of steel rail track.

3.3 The left side gable has been rebuilt with blockwork added to the internal face.

3.4 The steel beams are all heavily corroded, although no evidence of laminations is noted.

3.5 The floor joists extend on to a steel beam adjacent to the gable with approximately a 25mm gap between the joists ends and the external gable wall.

3.6 There is no evidence of any foundation movement in the perimeter walls.

3.7 Note that the tie bars to the left side are situated above the storage level, these need to be considered when setting the new first floor level.

Central Barn

3.8 Within the central section this space is double height with the roof construction visible above.

3.9 At roof level the roof is traditional construction with small rafters spanning from a ridge board onto two intermediate purlins and onto the perimeter wall plate.

3.10 The section of roof to the left side has had replacement rafters and purlins with a membrane installed beneath the battens.

3.11 The truss to this end of the building is different to the other three trusses which are queen post type trusses.

3.12 The original purlins have deflected along their length and would appear to be undersized for the span, these are likely to require replacement or strengthening when the new roof is installed with the additional load of the plaster board and insulation.

3.13 There is a storage area to the left side above the shippon below which is timber boarded on top of the joists noted from below.

3.14 A brickwork dividing wall running front to rear has been constructed to divide the shippon from the central storage area.

3.15 There is also a further brick wall running front to rear on the right side of the double height space. It is between these walls that the outward lean is noted in the rear elevation.

3.16 The three original trusses have visible evidence of infestation and rot. It is likely that the bottom chord will require strengthening to truss number two which shows some slight deflection in the bottom chord, a timber and damp specialist report will be required to confirm if any infestation is still active.

3.17 Some isolated cracking is evident to the right side of the double height doors, which extends up from the dividing wall between the central and right side shippon.

3.18 The purlins to this right side, span a shorter distance than the other two bays and therefore the purlins may be adequate for the proposed increased load.

3.19 The timber lintel to the front elevation, which supports the last truss, is noted to have a split running through its centre and is likely to require replacement with a steel or concrete lintel.

<u>Right Side Barn/ Shippon</u>

3.20 Within the right-side section there are three additional animal pens, again the timber floor above is supported onto a central steel beam running front to rear.

3.21 There is no evidence of any cracking to the perimeter walls to suggest foundation movement.

3.22 The steel tie bar is visible below the undersides of the floor joists, approximately level with the bottom of the steel beam.

3.23 The right-side floor level drops approximately half a metre relative to the central floor area.

3.24 The central area has no concreate slab just a hardcore finish.

3.25 The floor to the left-hand side steps up from this by approximately 300mm.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 The barn structure is in a reasonable structural condition with no significant structural issues.

4.2 The external elevations will generally require repointing throughout and isolated rebonding to the left gable front and rear corners.

4.3 Some isolated underpinning may be required to avoid undermining foundations. This is dependent on proposed slab levels although it is noted that steps are proposed between rooms which will limit the impact on foundations.

4.4 There is a noticeable outward lean to the left side of the double doors in the rear elevation. This corresponds with the most movement at ridge level. This is also adjacent diagonal section of the elevation across the doors.

4.5 The outward lean is on the limit for this thickness of wall. This section will remain open plan internally therefore unrestrained. We would recommend the upper section is rebuilt over a length of approximately 5m from the doors.

4.6 This will also allow the proposed glazed infill to the doors on the diagonal to close square to the wall.

4.7 Tie bars are present and will need to be maintained.

4.8 The 1st floor joists and beams will require a load assessment for the proposed use and isolated replacement where noted as defective.

4.9 The roof trusses generally appear to be in good condition with isolated infestation noted. A specialist timber and damp report should be obtained to confirm if this is active and also the extent of any rot.

4.10 The truss to the left side differs from the other three to the right. The bottom chord is a similar size although due to the configuration it will be carrying more load. It is recommended that this truss has a load capacity assessment for the proposed increase in loading from plasterboard and insulation.

4.11 The timber purlins to the left side appear over spanned and likely to need replacement or strengthening.

4.12 The perimeter timber lintels are recommended to be replaced especially beneath the point load from timber trusses.

Prepared by:



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S J Clarkson BEng CEng MIStructE
For and on behalf of C2C Consulting Engineers Ltd

Standard Scope and Limitations

This report has been prepared to provide guidance on the structural condition of the property.

We have only inspected and reported upon the defects within the property, as instructed by the client.

The report is based upon a visual inspection of those areas of the property that were readily accessible at the time of the inspection. It is not normal practice to remove internal finishes, lift carpets or move furniture etc. As such, comments cannot be made on those parts of the structure that were inaccessible or hidden from view at the time of the inspection.

We have limited our report to the most important aspects as stated in the text. The report does not provide a checklist of all repairs and improvements that might be desirable.

Our inspection did not include:-

1. The excavations of any trial holes to establish the depth of foundations and bearing strata.

2. Inspection of non-structural items such as doors, door frames, windows, floor, wall and ceiling finishes, other than where they are relevant to structural movement.

3. We have not inspected any services such as electric, gas, water and drainage.

4. We have not inspected those parts of the structure, which were covered, unexposed or inaccessible and we are therefore unable to report that such parts of the property are free from defect.

This report is for the private and confidential use of the client for whom it is prepared.

Appendix A – Photographs





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Alta
Gas



































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