

Structural Survey Report for Barn Outbuilding at The Old Bakehouse, Main Street, Flintham , Newark NG23 5LA

for:

Mr & Mrs Tapsell, The Old Bakehouse, Main Street, Flintham, Newark NG23 5LA

Date	Issued	Revision
24 April 2024	Planning	A

Reference: 82880-01

Prepared by:



Ian Baggott
BSc CEng MIStructE
Principal Engineer

1. **INTRODUCTION**

- 1.1. The survey was carried out at the instruction of Mr and Mrs Tapsell.
- 1.2. The purpose of the survey was to inspect the existing condition of the detached barn to the rear and to the right hand side of the main property and to make recommendations as to any necessary remedial measures required to maintain the integrity of the building should it be developed for residential use.
- 1.3. The survey was carried out on Wednesday 27 March 2024.
- 1.4. The weather during the survey was dry and bright.
- 1.5. The conditions stated in the appendix to this report were applied to this survey and the report is to be read and construed accordingly.
- 1.6. The references to the left and right are given as being viewed from the front, western (garden) side of the barn.

2. THE PROPERTY

- 2.1 The property was a detached barn building in the grounds of the main property. It was for the main part a single storey building but at the right hand end there was a two storey area which we believed would have functioned as a hayloft. It would appear that maintenance work has been undertaken at some point to strengthen certain elements and to maintain the integrity of the building.
- 2.2 The form of construction was of loadbearing masonry walls, with timber floors and a pitched timber roof. There was a smaller potting shed to the left hand end of the building which may have been formerly used as a stable.
- 2.3 The roof had a single ridge line running left to right and parallel with the longer front and rear walls. There was a single purlin in each roof slope which was supported at approximately mid point by a timber king post truss. The roof was covered by roofing felt and profiled clay tiles.
- 2.4 The roof to the right hand end of the barn had been strengthened by the introduction of two steel beams which were supported by the right hand gable wall and the internal wall separating the two areas. The original timber purlins remained but were largely supported by the new steel members. New timber rafters and timber props had also been introduced to strengthen the original construction.
- 2.5 The ground floor slab was ground bearing and formed using flag stones.
- 2.6 The first floor to the right hand end of the building was of timber boards and joists supported by timber beams at approximately third points along the length of the area. Steel ties had been introduced which passed through the external walls and fixed into the sides of the main timber beams.
- 2.7 The potting shed area to the left hand end of the barn was of similar construction to the main part of the barn but also had a mezzanine storage area of timber construction, supported by timber members spanning left to right, which are in turn supported by the left hand gable wall and the division wall between the two areas.

3. OBSERVATIONS AND DISCUSSION

- 3.1 Some of the original lintels had been replaced by modern pressed steel lintels presumably because of deterioration of the original members. The masonry above these openings appeared sound. The masonry was also arched over the main door and window openings (photograph 1).
- 3.2 Diagonal and vertical cracking was noted at the junctions between the front/rear walls and the left hand division wall. The cracks appear to have been repaired previously and have cracked again (photograph 2).
- 3.3 Steel tie bars had been introduced at approximately $\frac{3}{4}$ height of the front and rear walls in three locations in the main area. These passed through the walls and were finished with a pattress plate to the external wall face. The middle tie coincided with the timber truss position and the steel tie had been bent up to affix to the bottom chord of the truss (photograph 3).
- 3.4 There was some deterioration of the timber at the junction of the top and bottom chords to the rear of the middle roof truss. The depth of this was nominal and was not considered to be significant (photograph 4),
- 3.5 There was a significant bow and lean in the length of the rear wall between the two internal division walls. In the worst case, this was measured as 77mm over the length of a 2.0m straight edge. Pro-rata over the height of the wall, this would equate to the wall being out of plumb by approximately 126mm. The movement resulting in this bow may have occurred some time ago and may have been arrested to some extent by the introduction of the metal tie bars. However, the cracking in the masonry at the junctions with the internal divisions walls had been repaired at some point and has subsequently cracked again since repairs were undertaken and suggests that the movement may be ongoing. The extent to which the wall was out of plumb warrants the wall being rebuilt at least from above ground level on the neighbour's side. However, before preparing a detailed schedule of repairs a full plumb survey of the wall should be undertaken (photographs 5 and 6).
- 3.6 The front wall was also out of plumb to a lesser extent, measured as 62mm over the length of a 2.0m straight edge. This equated to approximately 102mm over the height of the wall (in the worst case). The comments made above also apply here and would warrant the wall being rebuilt.

- 3.7 Some remedial work had previously been undertaken in the area above and below the mezzanine floor. New brick piers had been constructed at ground floor level at the bearings of the timber floor beams and steel ties introduced. The ties were coach bolted to the sides of the timber floor beams, passed through the front and rear walls and finished on the outer face of the masonry with a pattress plate (photograph 7).
- 3.8 There were indications of beetle infestation in the floor joists forming the mezzanine floor and loss of timber section in some instances as a result of decay. It would be prudent for all timber that is to be retained to be treated by a specialist in timber preservation for both beetle infestation and wet rot (photograph 8). Should the building be brought in to residential use, the timbers forming this floor should be checked by calculation to assess if they are capable of sustaining the proposed loads.
- 3.9 The ground floor slab was currently formed using flag stones. If the building were to be brought into residential use, it was likely the floor would need to be replaced with a concrete slab with insulation either above or below. The overall slab construction depth would be greater. The depth of the foundations needs to be determined and considered to avoid undermining the foundations when constructing the new slab.
- 3.10 Should the building be brought into residential use, insulation to the roof would need to be provided. Any increase in roof loading due to the addition of services, such as solar panels, and insulation should be carefully considered and calculation checks undertaken on the rafters, purlins and timber trusses to ensure they have sufficient capacity to sustain the additional loading.

4. **RECOMMENDATIONS**

- 4.1 Any timber lintels which remain over openings should be taken out and replaced with steel or concrete lintels as a matter of good practice. This is to mitigate deterioration of the timber at a later date.
- 4.2 The front and rear walls are out of plumb by a considerable amount. There are indications that movement of these walls has not been fully arrested by the introduction of steel ties. The walls should be monitored at regular intervals for indications of further deterioration. However, any conversion of the building to residential use should include for either full or partial demolition of these walls, the extent of which is subject to further detailed measured survey of both walls.
- 4.3 The bond between the front and rear walls and internal division walls needs to be improved. This could be by better brick bonding as part of works undertaken as outlined in 4.2 above or by introducing bed joint reinforcement drilled from the outer face and fixed with resin.
- 4.4 Comprehensive survey and treatment should be undertaken by a specialist in timber preservation to treat infestation and rot.
- 4.5 The depth of the foundations should be determined by intrusive investigation. A redevelopment of the building and the introduction of insulation to the floor structure should avoid undermining the foundations. Otherwise, underpinning may be required.
- 4.6 Design checks of the rafters, purlins and roof trusses should be undertaken by calculation to ensure that any increases in loading, as a result of change of use, can be safely sustained.

APPENDIX I

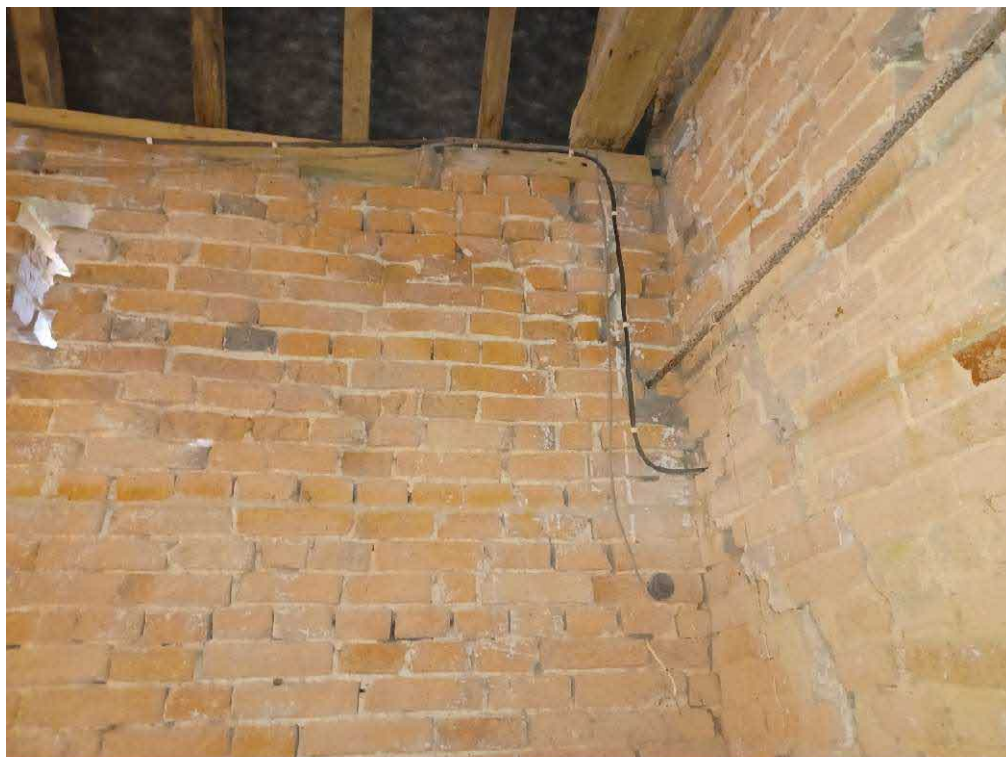
PHOTOGRAPHS



Photograph 1



Photograph 2



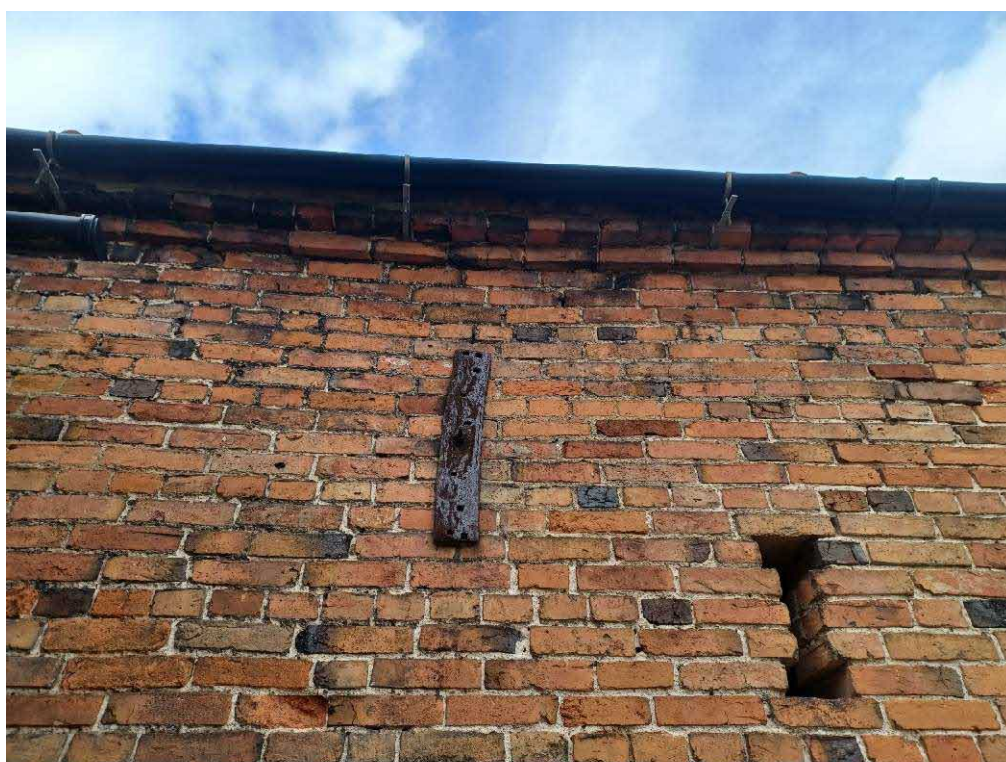
Photograph 3



Photograph 4



Photograph 5



Photograph 6



Photograph 7



Photograph 8

APPENDIX II

GENERAL CONDITIONS

1. EXTERNAL

- 1.1 Unless indicated otherwise the exterior has been inspected from ground level only supplemented where possible by observations from windows.
- 1.2 Flat or sloping areas of roof (including chimney stacks and flashings) to which direct access was not available have been inspected as closely as possible from suitable vantage points.
- 1.3 Internal roof spaces have only been inspected to the extent that reasonable access was available.
- 1.4 Depending on weather conditions during the inspection, leaks existing in gutters and downpipes may not have been detected.
- 1.5 The foundations have not been opened up for examination.
- 1.6 The condition of cavities and cavity ties in double-leaf walls has not been inspected.
- 1.7 External joinery has been inspected from ground level only.
- 1.8 Detached garages and outbuildings have only been inspected where indicated.

2. INTERNAL

- 2.1 Furniture and wall hangings have not been moved. Fixtures, fittings and surface finishes have not been disturbed. Where necessary and possible, accessible corners of fitted floor coverings have been lifted sufficiently to identify the structural material of the floor beneath. Fixed floorboards have not been lifted.
- 2.2 Ceilings, walls and partitions have been inspected from floor level only.
- 2.3 The internal condition of flues has not been inspected.
- 2.4 Woodwork and other parts of the structure which were covered, unexposed or inaccessible have not been inspected and it has, therefore, been impossible to report that any such part of the property was free from defect.

3. SERVICES

- 3.1 A visual inspection of drainage has been made where it was possible to locate and raise the covers of inspection chambers.
- 3.2 No inspections or tests have been carried out on any services.

4. GENERAL

- 4.1 No enquiries have been made concerning building regulations, town and country planning, roads or any statutory mining or environmental matters.
- 4.2 No enquiries have been made of any central or local government departments or any statutory undertakers.
- 4.3 No attempt has been made other than by visual examination to establish:
 - A. The presence in mortar or concrete of high alumina cement, calcium chloride or other deleterious substance.
 - B. The presence in mortar or concrete of active alkali-aggregate reaction; sulphate attack or other agency promoting the deterioration of such materials.
 - C. The presence in timber components of chemicals which would promote the corrosion of embedded or adjacent metal components.
- 4.4 A detailed dimensional survey was not carried out. Except to the extent that openings in walls allowed thicknesses to be noted approximately any comments on wall thicknesses are based purely on assumptions.
- 4.5 This report was prepared on the instructions of the client(s) named in the introduction to this report and is exclusively for his/her/their benefit. This benefit is not transferable to any third party except with the express agreement of the original client and the written agreement of PRP UK Limited. Such agreements may require the payment of additional fees.

- 4.6 The copyright in this report and other related plans and documents prepared by PRP UK Limited is owned by them and no such report, plan or document may be reproduced, published or adapted without their written consent. Complete copies of this report may, however, be made and distributed by the client as an expedient in dealing with matters related to its commission.