

**STRUCTURAL FEASIBILITY
REPORT**

AT

**THE HAYBARN
COLDHARBOUR FARM
ASHWELL**

REF: 222048 - MARCH 2022

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1. INTRODUCTION

- 1.1. MNP were instructed by Helen Flint to inspect the existing structure of the Grain Barn at Coldharbour Farm, Ashwell and confirm the feasibility of turning this unit into a habitable space under permitted development rights.
- 1.2. MNP inspected site on 7th January, when the weather was cold and sunny.
- 1.3. The survey was carried out from ground floor only.
- 1.4. It is our understanding that for permitted development the existing building structure must remain, where possible, but strengthening of the structure is allowed.

2. GENERAL CONSTRUCTON DETAILS

- 2.1 The Grain Barn was a single span steel portal frame, with a duo pitched roof, comprising 4No. bays and 5No. frames, with a lean-to at the side.
- 2.2 The frame was clad in lightweight metal sheeting at high level (see photographs 1 - 4).
- 2.3 At low level there was a precast concrete retaining wall, to take the horizontal load from the grain stored up against it (see photographs 1, 2, 5-7).
- 2.4 The steelwork was painted.
- 2.5 It was a single storey building with, what appeared to be, a ground bearing concrete floor slab (see photographs 5 & 6).
- 2.6 The barn was roughly 6m tall at eaves level and 7m tall at ridge level.
 - 2.6.1 It was generally in a good structural condition.

3. SURVEY NOTES

3.1 EXTERNAL INSPECTION

- 3.1.1 The cladding generally looked in an acceptable condition.
- 3.1.2 Some of the steelwork showed signs of rusting, most notably to the lean to section, but there was no sign of delamination or major corrosion.
- 3.1.3 There was no sign of any movement externally.
- 3.1.4 Generally the structure looked in a good condition externally.

3.2 INTERNAL INSPECTION

- 3.2.1 There was bracing in the first and last bay in the walls and roof, formed from circular hollow sections (see photographs 1, 5 & 8).
- 3.2.2 The beam/column connections were haunched, suggesting the frame was a moment frame (see photograph 6).
- 3.2.3 All of the steelwork portal frames appeared in a good structural condition, with no sign of deterioration.
- 3.2.4 The precast concrete retaining walls appeared in a good structural condition.
- 3.2.5 These appeared to be bolted to the main frame.

4. FEASIBILITY STUDY

- 4.1 Following the site visit, a high level review of the existing structure has been carried out.
- 4.2 A load assessment was carried out on the steel frame. There will be an increase in the load on the purlins and frames due to the change of finishes and addition of insulation etc.
- 4.3 It wasn't possible to confirm the purlin and member sizes, apart from the columns.
- 4.4 It is expected that the main frames will be able to support the increase in load, but the existing purlins will likely need replacing or the centres closed up.
- 4.5 Trial pitting will be required to confirm if there are strip footings present under the existing precast concrete walls. If not, new strip footings will be required to support the proposed external walls.
- 4.6 It is suggested that the mezzanine should be an independent structure, to prevent overloading the existing columns. This structure will either sit on the existing foundations or new local pad foundations.
- 4.7 Trial pitting will be required to confirm if any foundations where the load is being increased, can support the increase in load without strengthening.
- 4.8 It is suggested that the building is to be reduced in size, with the first portal frame removed and repositioned. We confirm this is structurally acceptable, but it is likely the frame will require new pad foundations under the new column positions.
- 4.9 It is assumed that the precast concrete retaining wall is not helping provide stability to the building.
- 4.10 The existing lean-to is to be removed and its removal is unlikely to affect the overall stability of the frame.
- 4.11 The vertical bracing in the walls and the bracing at roof level should remain in-situ so the stability of the building will not be affected by the proposals.
- 4.12 Where the first bay is to be reduced in size, the bracing will need to be altered to suit.

5. CONCLUSION & RECOMMENDATIONS

- 5.1 The Grain Barn can be converted to a dwelling whilst keeping the existing structure in-situ.
- 5.2 The mezzanine will be constructed using an independent steel frame to support either a beam and block or timber floor.
- 5.3 It is likely that the existing frame can support the proposed new roof structure, however the existing purlins will need to be strengthened or the centres closed up.
- 5.4 The existing bracing should remain in-situ, apart from where the first bay is being reduced in size, where the bracing should be amended to suit.
- 5.5 It would appear the precast concrete walls can be removed without causing a detrimental effect to the overall structure, however this will need to be reviewed at the design stage.
- 5.6 The existing foundations for the precast walls are to be confirmed by trial pitting to confirm if they can support the new external walls or if new strip footings are required.
- 5.7 The overall stability of the building will not be affected by the proposals if the existing bracing is left in-situ.

APPENDIX 1

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Project: The Grain Barn, Coldharbour Farm

Title: Survey Photographs



1. Front of Grain Barn.



2. Lean to, to right hand side of main barn.



3. Lean to, to right hand side of main barn.



4. Side of lean to.

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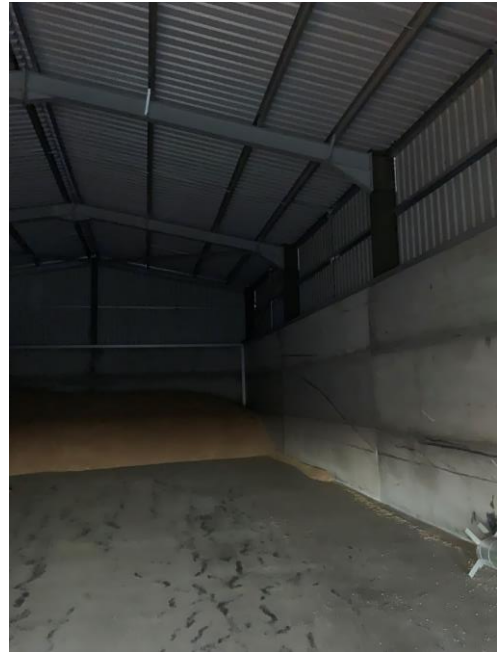
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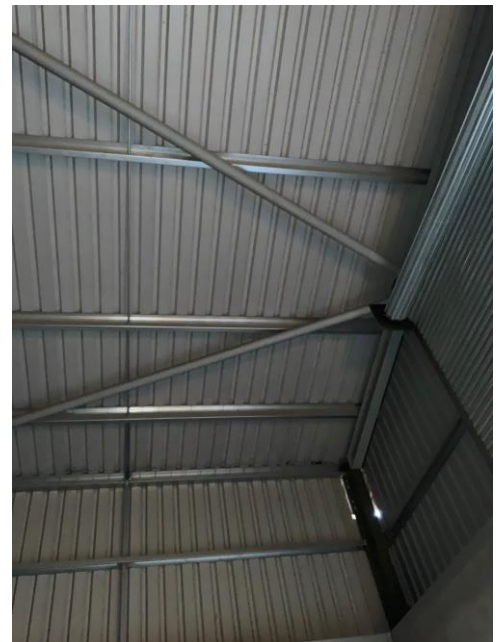
5. Front of Grain Barn from inside.
Note diagonal bracing in roof.



6. Internal view of barn, note haunched connections between beams & columns.



7. Roof - Steel purlins at wide centres spanning between steel frames.



8. Diagonal bracing in roof to front of barn.