

Derek LOFTY & Associates

Consulting Structural Engineers

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Job Number: 13931



Client: Mr & Mrs Procter

Project: Porters End Barns

Report on the Existing Barn Structure at

**Porters End House Barns
Porters End House
Porters End Lane
Kimpton
SG4 8ER**



1.0 Introduction

- 1.1. In accordance with instructions received from Mr & Mrs Procter on the 28th May 2024, Derek LOFTY & Associates carried out a specific structural inspection of the structure of the barns at Porters End House, Kimpton, SG4 8ER. The purpose of this report is to confirm or otherwise comment on the structural adequacy of the barn for conversion to habitable use.
- 1.2. The inspection was carried out on Monday 3rd of June 2024. The weather at time of survey was overcast but dry.
- 1.3. Comments are generally based on a single visual inspection and notes taken during a walk over survey from ground level. No intrusive investigation was deemed necessary for this exercise.
- 1.4. This report is limited to the structural elements of the property only and no comment is made on any part of the property which is not the subject of this report.
- 1.5. Where the terms “right hand” or “left hand” are used, they assume that the reader is facing the front or north elevation, fronting Porters End Lane.



2.0 Background Information

- 2.1 The project includes the proposed conversion of two adjoining barn structures, probably historically used for the storage of feeds and noted to be for the storage of grain or vegetables more recently. The barn is within the curtilage of Porters End House. The barns subject of this investigation and report are generally of prefabricated steel construction.
- 2.2 The barns subject of this investigation are situated on a mature, reasonably level plot, on the outskirts of Kimpton, approximately 3 miles north of Harpenden town centre and 8 miles south east of Luton town centre. The site is bounded to the north by Porters End Lane, east and south by 3rd Party residential gardens and to the south by the main dwelling, Porters End House. The barn buildings are situated within the curtilage of Porters End House, albeit separated by a fence and a mature tree line and hedging. The barns are currently not in use.
- 2.3 It is proposed to convert the barns for habitable use.
- 2.4 In order to understand the suitability of the existing structures for conversion, a walkover survey was carried out. The purpose of this report is to examine the main structural elements of the barn, commenting on the structural significance and condition together with overall suitability for conversion.
- 2.5 Refer to the appendix for an ariel view of the barns (Figure A1) and a structural layout (Figure A2).



3.0 The Existing Structures

- 3.1 The barns are both agricultural type buildings. Both are of prefabricated steel frame construction but of differing geometry in terms of height, profile and framing.
- 3.2 The barns are joined along a long side, forming a valley between the two buildings.
- 3.3 The north barn has a double barrel roof and is likely to be the older of the two structures.
- 3.4 The south barn is of a more modern portal frame construction and is thought to be a later addition to the original north barn.
- 3.5 The north barn is of lattice truss construction. The double barrelled roof rolls over the long sides of the barn. The barn is fully clad with a corrugated sheet cladding. A concrete retaining structure has been added in places to support the stored produce. The barn is constructed from an arrangement of double bay lattice frames. The frames are at regular centres of approximately 7m. The double barrelled form of the roof is constructed from lattice trusses. The trusses are supported on an arrangement of steel columns, tied below the eaves with lateral bracing. There is a row of columns in the middle of barn, supporting the valley of the double barrel.
- 3.6 The roof planes of the north barn remain reasonably even and uniform and the walls relatively vertical and true to line. Considering the age and style of building the condition is considered good, with only very localised areas of misalignment visually obvious at the time of our inspection.
- 3.7 The foundations of the north barn are likely to be mass concrete pad foundations, although these were not investigated or visible at the time of our inspection. Based on the condition of the above ground structure, the foundations appear to be performing adequately.
- 3.8 The floor slab of the north barn is in good condition, with minor cracks noted, possibly at construction joints. The floor slab remains reasonably level and free from significant structural defect. It is evident the floor slab has been cast around the steel columns after installation.



- 3.9 The purlins supporting the cladding of the north barn appear even and true, with no evidence of structural defect noted during our inspection
- 3.10 The north barn is clad with corrugated metal sheeting. There are visible signs of wear and tear to the sheeting, with daylight penetrating in a number of locations.
- 3.11 The south barn is a more modern construction, built from an arrangement of steel portal frames. The portal frames are a regular arrangement of steel stanchions and shallow pitched steel rafters on a grid at approximately 6.0m centres. The frames span approximately 11.5m and are independent of the north barn, joined only at the eaves by the valley gutter.
- 3.12 The roof and walls of the south barn are fully clad, with a profiled single ply sheet cladding fixed to steel cladding rails and purlins set at regular centres between the frames.
- 3.13 At the time of our inspection the south barn is presented in good structural condition. The ridge line is reasonably level and the roof planes even.
- 3.14 The external walls of the south barn remain reasonably vertical and true to line, with no evidence of structural defect at the time of our inspection.
- 3.15 The concrete floor slab of the south barn is considered substantial, with no evidence of structural defect at the time of our inspection.
- 3.16 The foundations to the portal frames are likely to be mass concrete pads. Whilst these were not exposed as part of this investigation, the superstructure shows no evidence of structural defect and it is fair to assume the foundations are substantial and functioning adequately to support the steel framed building.



4.0 Ground Conditions

- 4.1 Geological maps indicate the ground conditions to be a bedrock of Lewes Nodular Chalk Formation and Seaford Chalk Formation. Superficial deposits over the bedrock are thought to be of the Clay with Flints Formation, which can be a mixture or combination of clay, silt, sand and gravel. The depth or type of superficial deposit is not known.
- 4.2 No further ground investigation has been carried out at this time. The existing barn buildings are substantial, the visible roof plains even and the ridge lines reasonably level. The external walls remain reasonably vertical and true to line. The concrete floor slab remains reasonably level and is performing adequately for its current purpose. Considering the above and reviewing the geological maps, there is no evidence of ground instability that might merit further investigation at this time.
- 4.3 There is substantial vegetation along the east boundary and within a range that might influence the foundations. Whilst there is no evidence of detrimental impact on the buildings from tree influence thus far, as part of the conversion works further site investigation work to confirm the underlying ground conditions should be undertaken as standard.



5.0 Project Summary

- 5.1 The proposals are to convert the existing barns into habitable accommodation. The development will include the renewal of the external cladding with a watertight and thermally efficient system.
- 5.2 Similarly, the existing corrugated and lightweight profiled sheet roofing will need to be replaced with a new, thermally efficient light weight roofing system.
- 5.3 The existing slabs can be reused, but levelled, repaired and grouted prior to a layer of insulation and screed being applied. This will add to form the required raised ground floor level, 150mm above the external ground level.
- 5.4 The elevations will be modified to accommodate window and door apertures to suit the proposed conversion. These new apertures will be formed through non-structural elements of the external building envelope and new trimming structure added as needed.
- 5.5 All the proposals will be of a light-weight construction, commensurate with the currently applied loadings.



6.0 Suitability of Existing Structure for Reuse

- 6.1 The existing roof and wall coverings cannot be retained due to the risk of thermal inefficiency. However, these are non-structural elements of the building and therefore are considered irrelevant as part of a structural appraisal.
- 6.2 Whilst it is possible the above ground sections of masonry wall could be retained, given that they are not structural, it is likely that these will be removed. The sheet cladding will need to be replaced with a thermally efficient walling system. The external finishes should be lightweight, as prescribed by the architect.
- 6.3 Whilst we have not seen the proposed layouts for the conversion, these will be set out to avoid the need to interfere with the above ground structures and negate the need for structural alteration of the existing framework.
- 6.4 The existing floor slabs are substantial and can be reused; however, should be upgraded with the introduction of a damp-proof membrane and the addition of thermal insulation and screed to bring the finished floor level 150mm above external ground level.



7.0 Conclusion

- 7.1 Based on the walk over survey, it is considered that the existing buildings are substantial, structurally sound and can readily be adapted to accommodate the proposed conversion proposals.
- 7.2 It is considered that the buildings can be readily converted without major reconstruction or demolition of any of the existing structural elements. However, the buildings will be subject to significant upgrading of other parts of the building the fabric as part of the conversion process to habitable accommodation.

Disclaimer

This report is based on a visual inspection of the property, together with an intrusive investigation of the ground locally. This report is copyright and is restricted to the sole use and benefit of the above-named Client and shall not extend to any third party. Furthermore, this report shall not be reproduced or copied without prior written permission from Derek Lofty & Associates. This report is further restricted to the general stability of the building; no other aspect of the property was inspected and cannot therefore be considered as part of this report. Finally, this report is only valid for a period of 6 months, after which its accuracy can only be fully relied on following a full re-inspection and revision.

We also reserve the right to amend our opinions in the event of additional information being made available at some future date.

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Appendix

Photographs Etc.

The Barns



Figure 1 - Aerial View of The Barns

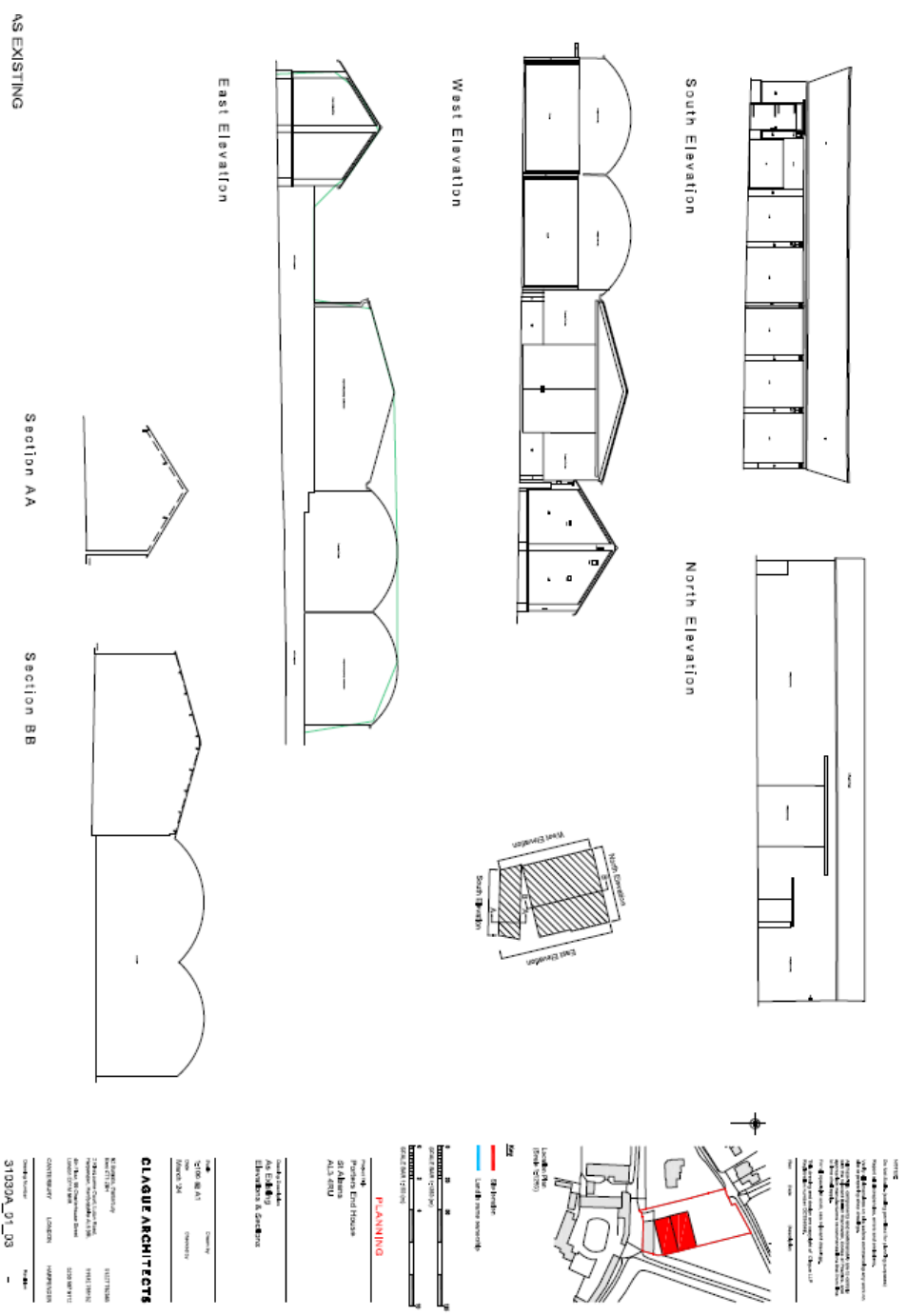


Figure 2 – Barn Layouts



Figure 3 - Front (North) Elevation



Figure 4 - Internal North Barn



Figure 5 – Internal South Barn



Figure 6 – Barn Doors and West Elevation



Figure 7 -Grain Storage Sign in North Barn