Clegg Associates
CIVIL AND STRUCTURAL CONSULTING ENGINEERS

Newhurst Farm, Keevil
Trowbridge, Wiltshire, BA14 6NH

Feasibility Appraisal

For

Mr & Mrs Shaw

Document Version: 04

03/08/2023

Project Reference: 2018-138

Document Reference: FA01-A4

Clegg Associates Ltd

Bryer Ash Business Park
Trowbridge, Wiltshire, BA14 8HE

T: 01225 541088
www.cleggassociates.co.uk

Document Control

Purpose/Status	Date	Rev	Comments	Rev. By	Chk'd. By
Preliminary	Jun'18	P1	Prelim Issue	LH	JS
Approval	Jun'18	A2	Approval issue. Fenestration sizes noted	LH	JS
Approval	03.08.23	A3	Updated report	CW	MS
Approval	20.09.23	A4	Barns B and C removed	CW	MS

Prepared By:

Connor Wordley

Project Engineer

Approved By:

Martin Stekkinger

Associate

Disclaimer

This document has been prepared in accordance with the scope of Clegg Associates Ltd.'s appointment with its client and is subject to the terms of that appointment. It is confidential, addressed to and for the sole use and reliance of Clegg Associate Ltd.'s client. Clegg Associates Ltd. Accepts no liability for any use of this document other than by its client and only for the purposes, stated in the document, for which it was prepared and provided. No person other than the client may copy (in whole or in part) use or rely on the contents of this document, without the prior written permission of a Director of Clegg Associates Ltd. Any advice, opinions or recommendations within this document should be read and relied upon only in the context of the document as a whole. The contents of this document are not to be construed as providing legal, business or tax advice or opinion.

© Clegg Associates Ltd 2018

Executive Summary

Taking the above points into consideration, it is our opinion that the conversion of the existing main building into residential space is viable. However, no additional load should be directed onto the existing roof. The asbestos sheeting and guttering should be removed by an asbestos removal specialist and the roof can be re-clad in a material of similar weight, say 15kg/m^2. We would suggest introducing a standalone, single-storey, lightweight insulated structure supported on the existing ground bearing slab.

© Clegg Associates Ltd

Contents

1.0 Introduction 1

2.0 General 1

3. Site 2

3.1 Location 2

3.2 Topography 2

3.3 Historic Site Information 2

3.4 Geological Information 2

3.5 Drainage 2

3. Observations 3

3.1 Inspection 3

3.2 Overview 3

3.2 External Observations 4

3.3 Internal Observations 5

4. Discussion 5

5. Conclusions and Recommendations 6

6. Appendix A – Photographs 8

7. Appendix B – Photographs 10

© Clegg Associates Ltd

1.0 Introduction

Clegg Associates have been engaged by **Mr & Mrs Shaw** to conduct a structural feasibility study of the existing outbuilding at the above address. An assessment to determine the capability of the existing structure for a change of use to a residential property has been considered.

At the time of inspection, we have not undertaken any intrusive investigations with respect to structural elements or other parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the structure is free from defect.

Visual inspections were undertaken only, without the removal of any coverings unless where damage had exposed structure. External inspection was undertaken from ground level only.

Further assessment is advisable with regards to the serviceability and integrity of existing services, in particular foul and service water drainage.

A further inspection was carried out on the 17th July 2023 to assess if the structure was still viable to be converted into a residential dwelling and if any changes to the structure had occurred.

2.0 General

We have not inspected woodwork or other parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect.

This report letter is prepared for the sole use of you and your professional advisers. We accept responsibility to you alone for the stated purposes that the report will be prepared with the skill, care and diligence reasonably expected of a competent Chartered Engineer, but accept no responsibility whatsoever to any person other than you. Any other person relies on the report at his own risk.

© Clegg Associates Ltd

3. Site

3.1 Location

Newhurst Farm is located south of Keevil, a village approximately 4 miles east of Trowbridge, in Wiltshire.

3.2 Topography

The general topography is fairly level. An approximate elevation of ground is perceived to be in the region of 50m above datum. The site is not identified as being in a flood risk zone according to the Environment Agency map service. However, the nearest water course is 300m to the west and the building lies only 100m away from a location with a high probability of flooding, most likely to be a floodplain.

3.3 Historic Site Information

The outbuilding is likely to have been constructed in the mid-twentieth century, located within the grounds of Newhurst Farm. Reference to historic Ordnance Survey maps suggests the building was constructed adjacent to a stable block, on an un-developed, green-field site.

The property is not recognised as listed by English Heritage.

3.4 Geological Information

A detailed site investigation has not been undertaken or made available. Review of the British Geological Survey (BGS) data reveals that the site is located on mudstone, on the Kimmeridge Clay Formation.

3.5 Drainage

Details of existing site drainage are unavailable.

© Clegg Associates Ltd

3. Observations

3.1 Inspection

Date of First Inspection: 29th May 2018

Time of Inspection 1pm

Weather Conditions Overcast, some rain

Date of Second Inspection: 17th July 2023

Time of Inspection 3pm

Weather Conditions Sunny, Clear

Photographs of the first site visit have been attached in Appendix A.

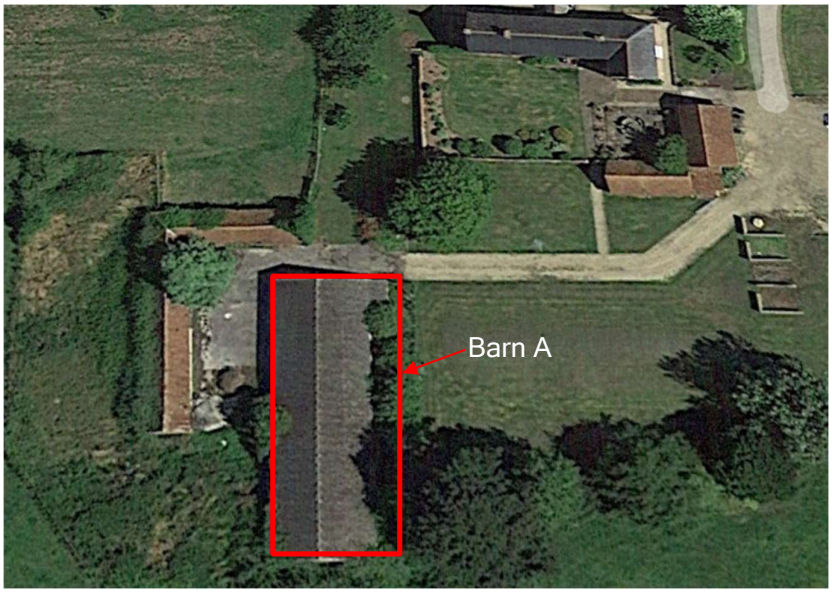
Photographs of the second site visit have been attached in Appendix B.

3.2 Overview

The single storey outbuilding (A) measures approx. 32m long x 10m wide and was previously used as a dairy. Concrete blockwork walls support cement-fibre roof sheeting on steel angle trusses at approx. 3.2m centres. A concrete ground bearing slab has been utilised throughout.

Access is provided to the front (north) elevation, a side door to the west elevation, and rear access to the south.

© Clegg Associates Ltd



3.2 External Observations

The building is constructed from a single skin of concrete blockwork, measuring approx. 150mm thick. A DPC was observed at 225mm above existing ground level. A small side extension has been added to the east, with the pitch of the roof continuing to a reduced eaves level. The floor level of the extension steps down 225mm as a result of the reduced eaves level.

Single glazed windows have been provided at approximately 3.2m centres to coincide with the centre of each bay. Asbestos gutters and rainwater pipes (RWP) were observed to the east and west elevation, although they are in poor condition. In some instances, gutters do not run continuously to receive rainwater from the roof and rainwater pipes do not extend to ground level, with water damage occurring to the blockwork.

To the gable ends, a continuous concrete lintel has been cast at approximately 2.1m above ground level, measuring 140mm wide x 215mm deep. Holes were observed in the south lintel. To the north gable elevation, a different shade of block was observed adjacent to an opening.

Vegetation obscured and restricted the external inspection of the southern end of the building, so inspection of this area of the building was not possible.

No movement joints were observed throughout the entire building.

© Clegg Associates Ltd

3.3 Internal Observations

The barn is vaulted to ridge with exposed steel trusses at approx. 3.2m centres supported on 440wd x 140thk blockwork piers at each end. Trusses comprise of steel angles and sections of flat plate bolted and/or welded together with steel gusset plates where required. Steel angle purlins span between trusses at approx. 1.2-1.3m centres. The steelwork is in fair condition for its age, exhibiting rusting throughout but did not appear to show signs of significant distress.

The internal space was dry, suggesting the roof sheeting was in reasonable to good condition, preventing water ingress.

A concrete ground bearing slab appears to be laid to fall to a central shallow trough to direct water out of the main entrance.

A series of cracks in the concrete blockwork were observed throughout the barn A. Vertical cracking was noted at window cill level through blockwork and vertical mortar joints down to DPC level. Cracking was also observed to the side elevation, adjacent to the rear entrance door.

A slight recess was observed in the blockwork on the south elevation, approx. 2.7m wide, up to the underside of the concrete lintel.

4. Discussion

The main barn building appears to be in fair condition for its age and its current use as a store. It is likely to have been designed to cater for livestock, using an agricultural code such as BS5502 or similar. With this in mind, the structure is unlikely to have been designed to cater for loadings suited to a residential setting. Should the Client wish to undertake a conversion to a residential building, a number of factors should be considered during the design.

Firstly, the roof structure of the barn is unlikely to be able to cater for any additional roof load. Therefore, the weight of any replacement roof sheeting and accompanying materials at roof level should be of a weight no more than existing. With this in mind, a weight of roof sheeting within the region of 15kg/m^2 is likely to be appropriate. It is unlikely the roof space above eaves level will provide a usable space due to head restriction and truss configurations. Under no circumstances should trusses be cut or altered without prior discussion with a Structural Engineer. The site visit suggests the existing roof sheeting, gutter and rainwater pipes are made from asbestos and as such, any attempt to remove or alter this material should be conducted via an asbestos removal specialist.

© Clegg Associates Ltd

The existing concrete blockwork walls within barn A are in reasonable condition. However, no attempt to manage the build-up of thermal stresses in the blockwork was considered at design stage, and hence, vertical cracking will occur at areas of weakness. This cracking was observed adjacent to fenestrations, as described in Section 3.3. Consideration should be given as to how best to manage this defect, with the likely remediation involving introducing movement joints.

Access doors to the north and south elevation are located towards the edges of each gable end. As such, the masonry to the east and west elevations are not adequately buttressed at their ends. This design flaw has introduced cracking in the blockwork as a result of inadequate lateral buttressing. A minimum 665mm return should be provided at gable returns and doorways should be relocated, or additional means of restraint provided using steelwork.

The original building was unlikely to have any drainage provision. Hence, a new drainage strategy needs proposing to direct stormwater (and proposed foul water) away from the building. A percolation test could be conducted to determine whether a soakaway would provide a solution for stormwater. The site's location is suited to providing a septic tank for foul sewage as a public sewer is not likely to be located nearby.

5. Conclusions and Recommendations

Taking the above points into consideration, it is our opinion that the conversion of the existing main building into residential space is viable. However, no additional load should be directed onto the existing roof. The asbestos sheeting and guttering should be removed by an asbestos removal specialist and the roof can be re-clad in a material of similar weight, say 15kg/m^2.

The walls are exhibiting cracking as a result of the build-up of thermal stresses in the blockwork. A means to control this build-up of stresses should be provided and is likely to involve introducing movement joints at approx. 6.0m, with sleeved ties across the joint. The gable end entrances should be repositioned to provide adequate lateral restraint to the masonry on the east and west elevation. Should the size of existing fenestrations change to suit a proposed design, we would recommend the widths of new openings should not exceed the width of the existing bays.

With this in mind, we would suggest introducing a standalone, single-storey, lightweight insulated structure supported on the existing, internal ground-bearing slab.

© Clegg Associates Ltd

A new drainage strategy will be required for the building, including provision for stormwater and foul water sewerage, possibly by means of a soakaway and septic tank respectively.

These recommendations are to include for any associated permissions and approvals related to planning and Building Regulations where applicable.

All works should be carried out to current British Standards, Building Regulations, HSE legislation and general good practice guidelines.

© Clegg Associates Ltd

6. Appendix A – Photographs



Photo 01 – Front (North) Elevation barn A



Photo 02 – Side (West) Elevation Barn A



Photo 03 – Doors to edge of gable end



Photo 04 – Asbestos gutter and RWP, showing damage to blockwork



Photo 05 – Internal photo facing south



Photo 06 – Internal photo facing south

© Clegg Associates Ltd



Photo 07 - Typical cracking at fenestrations



Photo 08 - Recessed blockwork infilled assumed previous opening



Photo 09 - Cracking at corner adjacent to doorway on south elevation



Photo 10 - Truss connection and typical condition



Photo 11 - Concrete beam supporting sliding doors



Photo 12 - Internal photo facing north

© Clegg Associates Ltd

7. Appendix B – Photographs



Photo 01 – Front (North) Elevation



Photo 02 – Side (West) Elevation



Photo 03 – Doors to edge of gable end

Photo 04 – Asbestos gutter and RWP, showing damage to blockwork





Photo 05 – Internal photo damage to blockwork caused by gutter

Photo 06 – Internal photo facing north



Photo 07 - Typical cracking at fenestrations



Photo 08 - Recessed blockwork infilled assumed previous opening



Photo 09 - Cracking at corner adjacent to doorway on south elevation



Photo 10 - Truss connection and typical condition



Photo 11 - Additional cracking to fenestrations



Photo 12 - hedge overgrow into rear corner of structure with missing doorway

	
Photo 13 – Small side extension with steel truss and purlins	**Photo 14** – External crack in fenestration