



DHD STRUCTURES

Chartered Structural & Civil Engineers

Structural Appraisal of Existing Barn for Conversion to Residential Accommodation



Westbrook Barn, Evercreech,
Shepton Mallet BA4 6DS

1857

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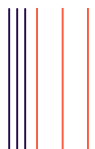
Director

17 October 2023

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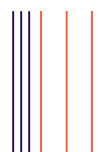
Executive Summary

A visual structural inspection of the steel portal framed Westbrook Barn has been undertaken. The form of construction has been determined and compared to proposals for converting the barn into domestic accommodation. The building structure of the barn has been found to be suitable for conversion to domestic accommodation without significant alternation, extension, or rebuilding.



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1.0 Introduction

The structural appraisal was commissioned by Ms J Randel and Mr T German to determine the structural condition of the barn to assess if it is suitable for the conversion to domestic use.

The report is based on visual examination of readily accessible areas of the structure, it was not possible to view all the structural elements, however the information obtained was adequate to give an overall structural appraisal of the barn.

Although there may be references to fabric of the buildings in this report, it should be pointed out that this report is concerned with the building structures only and that the advice of the specialist should be sought in regard to the condition of items of fabric of the buildings i.e., doors, windows, timber treatment, services, etc.

The method of appraisal is based on The Institution of Structural Engineers' *"Appraisal of existing structures"* dated October 2010.

Photos of the barn are included within figures 1-3 below.



Figure 1 Gable elevation



Figure 2 Side elevation

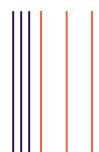




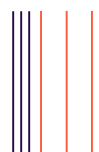
Figure 3 Main entrance to barn

2.0 Location of buildings and site details

The barn is located west of Old Westbrook Farm and other masonry barns on a site approximately 1km southwest of Evercreech, and approximately 5km south of Shepton Mallet. The OS map coordinates are approx. 363667,138646. The building consists of the main barn area with large barn doors on the west elevation, there are three smaller interconnecting cells bounding the east elevation. The barn is located at approximately 70m above ordinance datum.

For the purpose of wind design of the structures, the basic wind span (V_b) in the area is 21 metres per second (see Figure 6 in BS6399 Part 2 1995).

The location of the barn within the site is highlighted on figure 4 below.



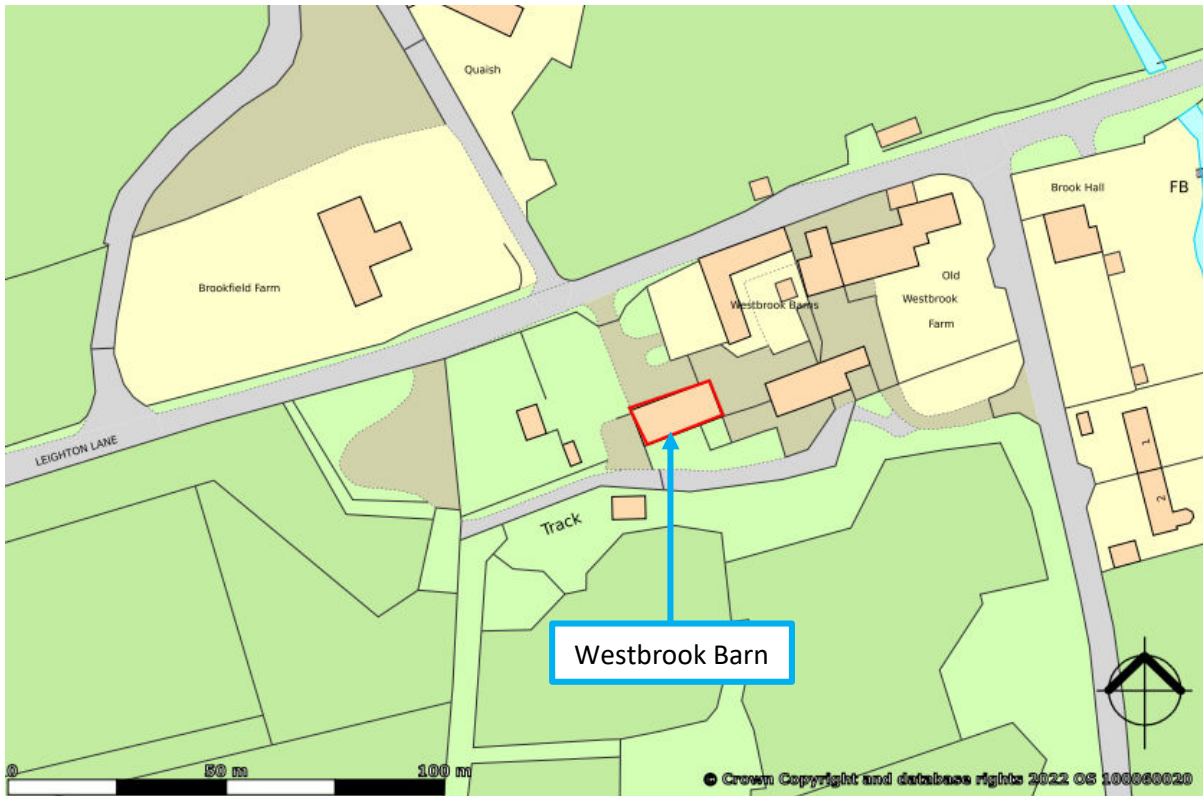


Figure 4 Plan highlighting location of barn

3.0 Ground Investigation

The British Geological Survey 1:50,000 geological map does not identify any superficial deposits at the site, the bedrock geology is recorded as follows:

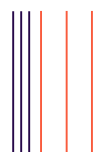
Langport Member, Blue Lias Formation and Charmouth Mudstone Formation - Mudstone and limestone, interbedded. Sedimentary bedrock formed between 209.5 and 182.7 million years ago during the Triassic and Jurassic periods.

There are nearby publicly available trial pits located approximately 1.2km northeast of the site on apparently similar geology which records variable levels of topsoil overlying compacted layers of firm clay and limestone slabs (LIAS). There is also a nearby publicly available borehole located approximately 1.4km south of the site on apparently similar geology which records 9m depth of mudstone (grey clay) overlying limestone with bands of mudstone to 54m below ground.

No ground investigations have been undertaken on site.

4.0 Desk Study

A brief archival search of historical mapping was carried out to develop an understanding of the site history and to determine if any major changes have taken place to the building envelope over the



years. Although old maps should be used with caution when interpreting structures, they can assist with understanding the site. If a more detailed understanding is required, we recommend that set of Ordnance Survey Maps are purchased to give a more detailed site history in the 20th century. The 1840s Tithe Map records Old Westbrook Farm and small adjacent barns with an open agricultural field where the current barn is located. The Ordnance Survey maps from 1894 and 1904 show the development of the adjacent masonry barns. The RAF aerial photos from 1946 show a building in the approximate location of the current barn, aerial photos from 2006 appear to show a building on the site.

5.0 Structural Investigation & Interpretation

Type of investigation

The barn was inspected on Wednesday 7th June 2023. Where possible a visual examination was carried out of the structural elements and their structural condition inspected. Sizes of the main elements of the structure were noted. Verticality of the walls was checked, and photographs were taken of the building. Due to problems of access, it was impossible to inspect every element of the structure however the results of the survey were adequate in assessing the overall structural integrity of the buildings.

Details of existing structures

There are no as-built drawings of the barn as far is known. As part of the development a topographical survey of the barn has been undertaken and existing and proposed drawings of the buildings have been prepared by Greenslade Taylor Hunt. The building structures are described as follows.

Vertical structure

The barn is supported by 178 x 102 x 19 Universal Beam section structural steelwork columns to the main portal frames. The main barn doors and timber cladding on the gable elevation are restrained by 125 x 65 PFC cantilever wind posts. Minor superficial corrosion was noted to the PFCs exposed to weathering; this should be repaired protected within the conversion works. The brickwork outer leaf steps out past column locations to form load brickwork piers and retain the cavity. The inner leaf is constructed with 140mm wide medium dense blockwork with stainless steel wall ties to the outer brickwork. The timber board cladding is restrained by timber side rails spanning between portal frames and fixed to the masonry walls.

Internal masonry walls support the lightweight ceiling and loft above but not the barn roof.

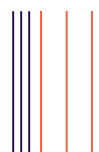




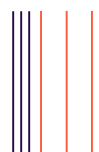
Figure 5 Perimeter wall construction

Roof Structure

Barn roof is covered with corrugated cementitious roof sheeting supported by 172mm depth light gauge cold formed steelwork purlins at 1.4m centres. The purlins are supported by portalised principal rafters, these are 178 x 102 x 19 UBs with haunches at eaves and apex. There is steelwork 50 x 50 square hollow section (SHS) plan bracing in the end bay transferring lateral load to the side walls. Perpendicular to the portal frames stability appears to be provided by the shear capacity of masonry walls built into the webs of steel columns.



Figure 6 Roof construction



Ground Floor

The ground floor is formed with an insitu concrete slab. On the south elevation the rainwater down pipe was noted to discharge to the ground which could result in undermining of the slab and also affect the foundations, we recommend that all surface water is discharged to a below ground drainage system designed by an infrastructure engineer.

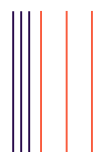
6.0 Proposed Conversions

It is intended to convert the barn into domestic use, we have been given preliminary plans of the proposed conversions by Greenslade Taylor Hunt. We understand that the conversion is proposed to be undertaken under Class Q of Part 3 (changes of use) of Schedule 2 to the Town and Country Planning (General Permitted Development) (England) Order 2015. The permitted development right is contingent upon the existing building being considered already suitable for conversion to residential use. We consider that Westbrook Barn is already suitable for conversion to domestic use for the following reasons:

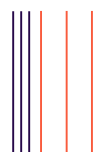
1. The barn is constructed with robust brickwork and blockwork cavity walls which are structurally stronger than two 100mm blockwork skins commonly used in domestic construction.
2. The barn appears in good condition, minor defects noted can be easily repaired, furthermore the condition of the barn is no worse than many dwellings which we are called upon to inspect where repairs are made without the occupants needing to vacate the property.
3. The main portal frames of the barn are in good condition.
4. As there were no diagonal cracks of note within the masonry walls, which would indicate foundation movement, we are of the opinion that the foundations are adequate to safely support the proposed change of use.

All conversion work will require a detailed structural design submission to satisfy and comply with Part A of the Building Regulations.

We confirm that structurally the barn building is suitable for the conversions to domestic accommodation without significant alternation, extension, or rebuilding.



APPENDIX 1 Terms & Conditions of Appointment



Definitions

'Client' is named above.

'Property' is the property to be surveyed by the Structural Engineer (which may or may not be the same as the Client's correspondence address)

'Structural Engineer' (SE) is DHD Structures Ltd.

Programme

We will complete our work promptly in line with timescales noted in our offer letter and email.

Fees

We will invoice upon issue of the written report to the client.

Payment terms are 7 days from date of invoice.

Late payment will accrue interest at 2% per month.

Documentation

The Structural Engineer's written report will be issued electronically.

Terms

All works will be undertaken with reasonable skill and care. The Scope and Fee proposal is valid for six months after its date and will be re-issued if not appointed within that time. Once appointed, we will add 5% to the fee for each year that we are involved with the project.

The SE will inform the Client promptly of any issue which could significantly affect the Scope, Fees, or programme.

Access to the Property

The SE will inspect as much of the relevant building structure and surroundings as possible given the access at the time of the inspection. The SE cannot comment on structural elements that were covered, unexposed or inaccessible, or where it is not safe for the SE to access.

It is expected that the SE will be given safe access to inspect the roof space.

Any areas that were not accessible during the inspection will be recorded in the written report. The SE will identify any areas that may require further investigation where access was insufficient at the time of the inspection.

Services

The SE will not inspect or comment on the existing services to the property, for example the condition of water supply pipes, gutters, and rainwater pipes, or drains, other than in relation to a structural issue.

Liability

Liability is limited to 10 x fee charged.

Contamination and hazardous materials

The SE will not comment upon the existence of contamination or hazardous building materials, including asbestos, as this can only be established by appropriate specialists. Where, from local knowledge or the inspection, the SE considers that either might be an issue, the SE may advise as to the importance of obtaining specialist advice.

Site Investigation (SI)

The SE will advise on the requirements for a more comprehensive SI, if necessary, which may require the appointment of a ground investigation or soil specialist.

Legal restrictions or Covenants

It is assumed that the Property is not subject to any unusual or especially onerous restrictions or covenants which apply to the structure or affect the reasonable enjoyment of the Property. If the purpose of this report is to inform the purchase of the Property, the Client is advised to appoint a legal advisor to carry out Local Searches in the usual manner.

It is assumed that the Client is either the owner of the Property or has obtained permission from the owner or owner's agent to gain access for the purposes of carrying out the structural survey.

Property valuation

The SE is engaged for the purposes of providing a structural report in relation to the building structure and will not provide an assessment of the market value of a property or budget costs for intended building works.

Restrictions on disclosure

The SE written report is for the sole use of the named Client and is confidential to the Client and his/her professional advisors. Any other parties rely upon the report at their own risk. The report must not be reproduced, in whole or in part, without the prior consent of the SE.

Confidentiality

DHD Structures Ltd will not without the Client's prior written consent disclose to any person any private or confidential information concerning the Client or the Property save in the proper course of our business or to our professional advisers or insurers or as required or permitted by UK law.

