

STRUCTURAL REPORT (revision 25293-02d)

BARNs 4 AND 6
PICKER PALMER FARM, CAPP LANE, HEYWOOD
Prepared for:
Mr J Buck
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3rd August 2026

1. Introduction

1.1 Paul Dawson CEng MStructE MRICS was instructed by Mr J Buck of Acorn Architectural to undertake a structural inspection of the agricultural buildings known as Barns 4 and 6 at Picker Palmer Farm, Capp Lane, Heywood.

1.2 The purpose of this report is to provide a structural appraisal of the existing buildings, demonstrating their strong potential for conversion.

1.3 This report is limited to structural matters only. No comment is made on services, contamination, ecology, planning matters, or building regulations compliance.

1.4 All comments are based on visual observations made during the site inspection and trial holes to inspect the edge of the foundation and two trial holes in the slab.

1.5 This report has been prepared for the sole use of Mr J Buck and shall not be relied upon by any third party without written consent.

2. Survey

2.1 The site visit was undertaken on Tuesday 10th February 2026.

2.2 Weather conditions were clear and dry with no risk of rainfall during the inspection.

2.3 The inspection was undertaken at ground level and included visual examination of the structural elements of both barns.

3. Site and Ground Conditions

3.1 Published geological mapping indicates the site is underlain by the Kimmeridge Clay Formation - Mudstone at depth.

3.2 A trial hole was excavated against the rear south elevation of Barn 2 which revealed foundations extending to approximately 500mm depth bearing onto virgin clay.

3.3 No evidence of significant structural movement attributable to the foundations was observed, confirming that the foundations are performing well and remain sound.

4. Structural Description and Observations



Barn 4 Front (Northern) Elevation



Barn 4 Rear (Southern) Elevation

4.1 Barn 4 - General Arrangement

4.1.1 Barn 4 comprises a single-storey blockwork structure measuring approximately 9m x 3.3m in plan.

4.1.2 The building is constructed with single skin dense block external and internal walls.

4.1.3 The roof is of lean-to construction formed with timber purlins supporting single skin corrugated steel sheeting.

4.1.4 A concrete ground bearing slab is present throughout the building.

4.1.5 No significant signs of structural distress were observed during the inspection, confirming the building is in good structural condition.

4.1.6 While the roof covering, purlins and walls would benefit from some upgrading works as part of the conversion - typical of a building of this age and agricultural history - the core structure is sound and well suited for conversion.

4.2 Barn 6 - General Arrangement

4.2.1 Barn 6 comprises a single storey timber framed structure incorporating some steel posts.

4.2.2 The building measures approximately 20.5m x 15m on plan.

4.2.3 The external walls are formed with low level dense blockwork, with timber posts over and timber side rails supporting the corrugated steel cladding.

4.2.4 The internal walls are formed with low level dense blockwork, with timber posts over supporting the roof.

4.2.5 The roof is of duo pitch construction with a central ridge.

4.2.6 Internally the building is formed with regular timber frames supporting timber purlins as indicated on Acorn Architectural floor plan drawing 2645-601.

4.2.7 These frames incorporate knee braces (cruxes), a robust traditional detail which provides strong primary structural stability to the building.

4.2.8 The southern external wall has partially collapsed in one bay. Looks like it may have been struck with the top few courses coming off. Refer to Acorn Architectural drawing 2645-601 for location noted as “Partial wall collapsed”.



Knee Braced Timber Frames

Knee Braced Timber Frames

4.3 Roof Structure

4.3.1 The roof structure consists of with corrugated steel sheeting over timber purlins supported by the timber frames.

4.3.2 The existing roof sheeting would benefit from upgrading as part of the conversion works.

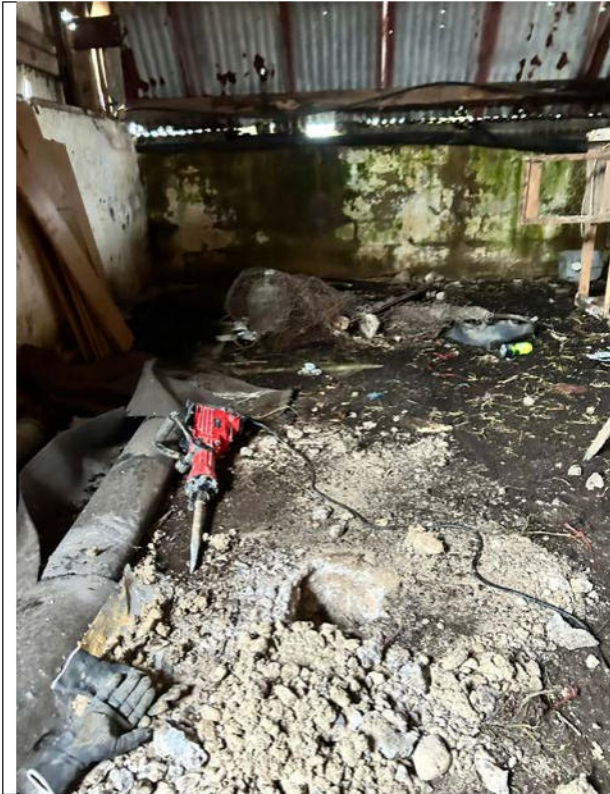
4.3.3 The timber frames are in good condition, structurally sound, and well suited for incorporation into the proposed conversion.

4.4 Ground Floor

4.4.1 The existing slab was locally drilled in two locations to determine its thickness.

4.4.2 The slab was recorded as being approximately 400-500mm thick. Further investigations show the slab extends beyond the face of the external walls.

4.4.3 The building has historically been used for agricultural purposes, and the existing slab is generously proportioned and considered more than adequate for the proposed domestic loading; wind & snow loading will remain the same as the building has already successfully withstood.



Existing Slab investigation

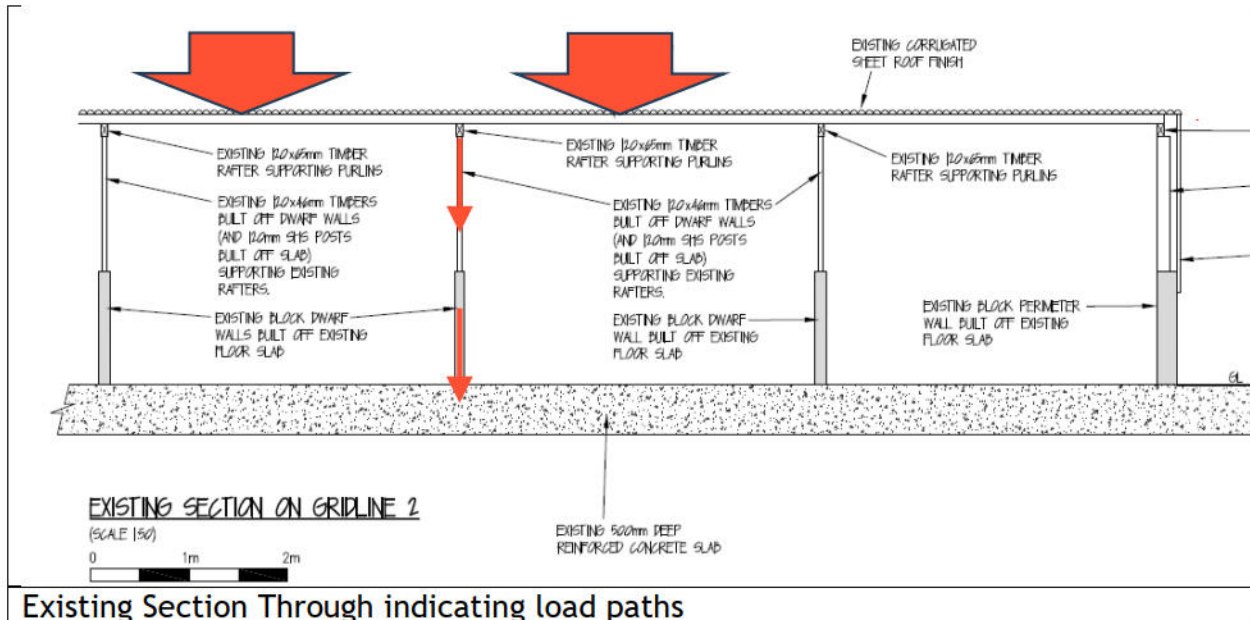


Ground Bearing Slab 400-500mm

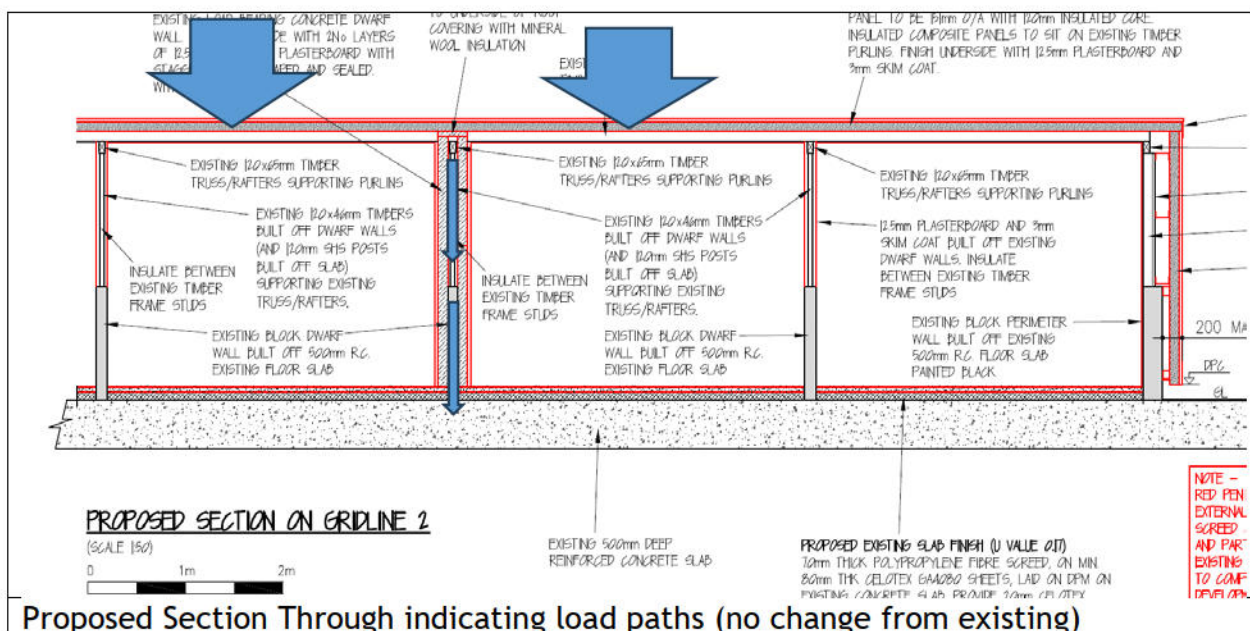
4.5 Foundations

4.5.1 A trial hole excavated adjacent to the rear south elevation revealed foundations extending to approximately 500mm depth onto virgin clay.

4.5.2 No evidence of significant movement or distress attributable to the foundations was observed, indicating that the foundations are performing well.



Existing Section Through indicating load paths



Proposed Section Through indicating load paths (no change from existing)

(Refer to Acorn Architectural drawing 2645-609 for existing and proposed sections)

5. Structural Comments

5.1 The roof sheeting is supported upon timber purlins at regular centres, these span onto the timber rafters. The rafters are supported along the dwarf wall lines by timber posts and diagonal struts, which form the timber frame. This timber frame is supported upon the existing dense block masonry dwarf walls. These masonry walls are supported by the existing 400-500mm thick reinforced concrete slab.

5.2 Calculations appended to the end of this report confirm that the existing timber posts are suitable and capable of supporting the proposed loads.

5.3 As is typical for conversion projects of this nature, the roof structures to both barns will benefit from upgrading works as part of the proposed conversion.

5.4 As part of the general upgrading works, any defective purlins and roof coverings should be replaced, further enhancing the building's long-term performance.

5.5 The existing timber frames within Barn 6 are structurally suitable and offer excellent potential to form part of the proposed redevelopment.

5.6 Any proposed conversion will require a detailed structural design as part of the Building Regulations submission.

6. Conclusion

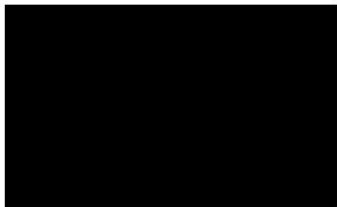
6.1 Based on the visual inspection undertaken, trial holes to show the existing slab and foundation, structural calculations and subject to the recommendations outlined above, the existing structures are robust, permanent and substantial, providing a strong basis for conversion.

6.2 The external cladding is proposed to be a lightweight panel system which is non-load bearing and can be readily supported by the existing structure. Although non-loadbearing, the proposed cladding will further assist with the diaphragm action and overall stability of the building.

6.3 The buildings are considered to be structurally well-suited for conversion into high-quality residential accommodation, subject only to the modest upgrading works identified.

Report prepared by

Paul Dawson CEng MStructE MRICS





David Edwards & Associates

E V E R Y D A Y E N G I N E E R I N G

PICKERS PALMERS

Structural Calculations

25293

Paul Dawson

June 2026

David Edwards & Associates E V E R Y D A Y E N G I N E E R I N G 28 Old Church Road Clevedon BS21 6LY	Project				Job no.	
	Pickers Palmers				25293	
	Calcs for Timber Post Justification				Start page no./Revision 1	
	Calcs by PD	Calcs date 11/06/2026	Checked by PH	Checked date 11/6/26	Approved by PH	Approved date 11/6/26

Timber Post.....	2
Timber column with biaxial bending and compression.....	2
Design section 1.....	2

Existing 120 x 47 timber posts indicated upon the drawing below. Most onerous area of roof supported by post 11m². Perimeter posts are at closer centres and support less load.

Proposed loadings

Dead

Kingspan KS1000RW 151mm panels = 0.13kN/m²

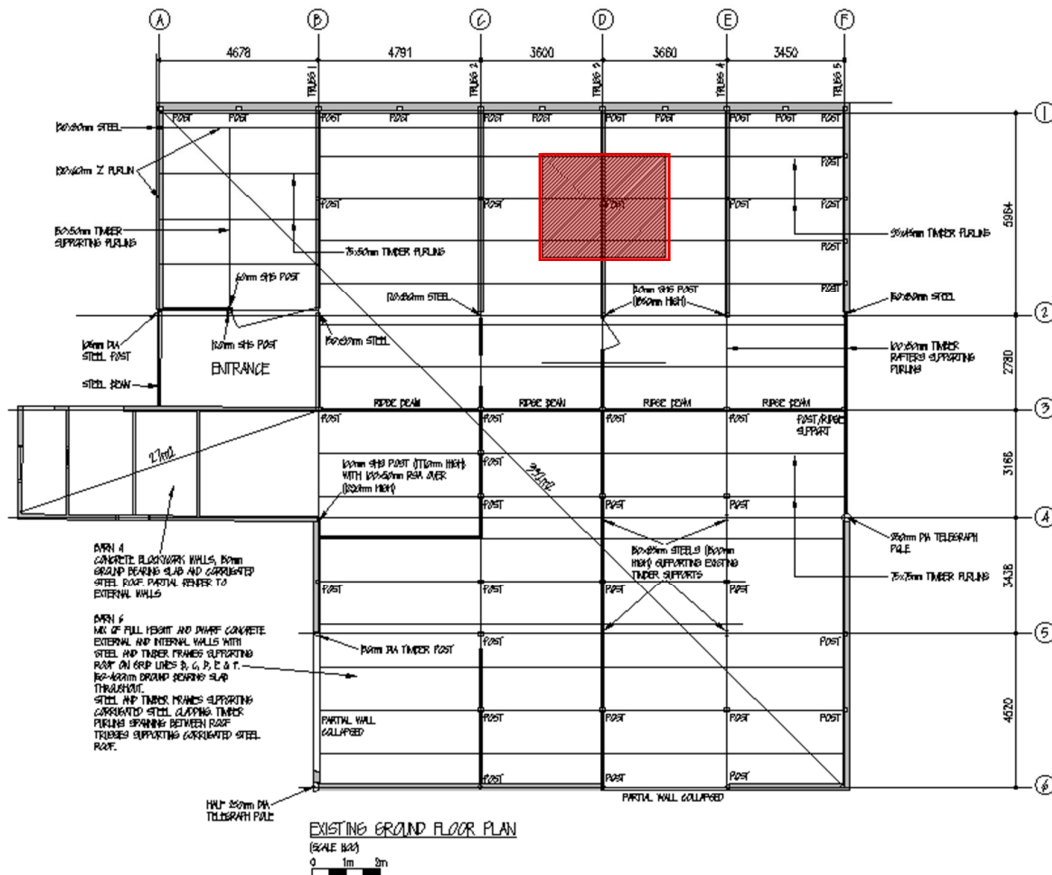
Supporting Purlins = 0.1 kN/m^2

Total Dead Load = 0.23kN/m²

Imposed Loading

Snow = 0.6k/m²

ULS on top of timber Post = $(0.23 \times 11 \times 1.35) + (0.6 \times 11 \times 1.5) = 13.32\text{kN}$



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	Calcs for Timber Post Justification				Start page no./Revision 2	
	Calcs by PD	Calcs date 11/06/2026	Checked by PH	Checked date 11/6/26	Approved by PH	Approved date 11/6/26

TIMBER POST

TIMBER COLUMN WITH BIAXIAL BENDING AND COMPRESSION

In accordance with EN1995-1-1:2004 + A2:2014 incorporating corrigendum June 2006 and the UK national annex

Tedds calculation version 2.2.28

Design section 1

User note: Check column at base

Partial factor for material properties and resistances

Partial factor for material properties - Table 2.3; $\gamma_M = 1.300$

Member details

Load duration - cl.2.3.1.2;

Long-term

Service class - cl.2.3.1.3;

1

Timber section details

Number of timber sections in member;

N = 1

Breadth of sections;

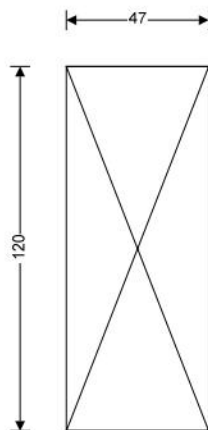
b = 47 mm

Depth of sections;

h = 120 mm

Timber strength class - EN 338:2016 Table 1;

C16



47x120 timber section

Cross-sectional area, A, 5640 mm²

Section modulus, W_y, 112800 mm³

Section modulus, W_z, 44180 mm³

Second moment of area, I_y, 6768000 mm⁴

Second moment of area, I_z, 1038230 mm⁴

Radius of gyration, i_y, 34.6 mm

Radius of gyration, i_z, 13.6 mm

Timber strength class C16

Characteristic bending strength, f_{m,k}, 16 N/mm²

Characteristic shear strength, f_{v,k}, 3.2 N/mm²

Characteristic compression strength parallel to grain, f_{c,0,k}, 17 N/mm²

Characteristic compression strength perpendicular to grain, f_{c,90,k}, 2.2 N/mm²

Characteristic tension strength parallel to grain, f_{t,0,k}, 8.5 N/mm²

Mean modulus of elasticity, E_{0,mean}, 8000 N/mm²

Fifth percentile modulus of elasticity, E_{0,05}, 5400 N/mm²

Shear modulus of elasticity, G_{mean}, 500 N/mm²

Characteristic density, ρ_k, 310 kg/m³

Mean density, ρ_{mean}, 370 kg/m³

Span details

Unbraced length - Major axis;

L_y = 1520 mm

Effective length - Major axis;

L_{e,y} = 0.9 × L_y = 1368 mm

Unbraced length - Minor axis;

L_z = 1520 mm

Effective length - Minor axis;

L_{e,z} = 0.9 × L_z = 1368 mm

Bearing length;

L_b = 100 mm

Analysis results

Design axial compression force;

P_d = 13.32 kN

Modification factors

Duration of load and moisture content - Table 3.1; k_{mod} = 0.7

Deformation factor - Table 3.2; k_{def} = 0.6

Crack factor for shear resistance - cl.6.1.7(2); k_{cr} = 0.67

Check compression parallel to the grain - cl.6.1.4

Design axial compression;

P_d = 13.32 kN

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	Calcs by PD	Calcs date 11/06/2026	Checked by PH	Checked date 11/6/26	Approved by PH	Approved date 11/6/26

Design compressive stress;

$$\sigma_{c,0,d} = P_d / A = \mathbf{2.362 \text{ N/mm}^2}$$

Design compressive strength;

$$f_{c,0,d} = k_{mod} \times f_{c,0,k} / \gamma_M = \mathbf{9.154 \text{ N/mm}^2}$$

$$\sigma_{c,0,d} / f_{c,0,d} = \mathbf{0.258}$$

PASS - Design parallel compression strength exceeds design parallel compression stress

Check columns subjected to either compression or combined compression and bending - cl.6.3.2

Effective length for y-axis bending;

$$L_{e,y} = 0.9 \times L_y = \mathbf{1368 \text{ mm}}$$

Slenderness ratio;

$$\lambda_y = L_{e,y} / i_y = \mathbf{39.491}$$

Relative slenderness ratio - exp. 6.21;

$$\lambda_{rel,y} = \lambda_y / \pi \times \sqrt{(f_{c,0,k} / E_{0.05})} = \mathbf{0.705}$$

Effective length for z-axis bending;

$$L_{e,z} = 0.9 \times L_z = \mathbf{1368 \text{ mm}}$$

Slenderness ratio;

$$\lambda_z = L_{e,z} / i_z = \mathbf{100.827}$$

Relative slenderness ratio - exp. 6.22;

$$\lambda_{rel,z} = \lambda_z / \pi \times \sqrt{(f_{c,0,k} / E_{0.05})} = \mathbf{1.801}$$

Both $\lambda_{rel,y} > 0.3$ and $\lambda_{rel,z} > 0.3$, column stability check is required

Straightness factor;

$$\beta_c = \mathbf{0.2}$$

Instability factors - exp.6.25, 6.26, 6.27 & 6.28;

$$k_y = 0.5 \times (1 + \beta_c \times (\lambda_{rel,y} - 0.3) + \lambda_{rel,y}^2) = \mathbf{0.789}$$

$$k_z = 0.5 \times (1 + \beta_c \times (\lambda_{rel,z} - 0.3) + \lambda_{rel,z}^2) = \mathbf{2.271}$$

$$k_{c,y} = 1 / (k_y + \sqrt{(k_y^2 - \lambda_{rel,y}^2)}) = \mathbf{0.875}$$

$$k_{c,z} = 1 / (k_z + \sqrt{(k_z^2 - \lambda_{rel,z}^2)}) = \mathbf{0.274}$$

Column stability checks - exp.6.23 & 6.24;

$$\sigma_{c,0,d} / (k_{c,y} \times f_{c,0,d}) = \mathbf{0.295}$$

$$\sigma_{c,0,d} / (k_{c,z} \times f_{c,0,d}) = \mathbf{0.943}$$

PASS - Column stability is acceptable

Dimensions, Weight & Thermal Performance

×

Core Thickness (mm)	40	53	60	73	80	91	100	115	120	137	150	167
Overall Thickness (mm)	71	84	91	104	111	122	131	146	151	168	181	198
U-value (W/m²K)	0.47	0.35	0.31	0.25	0.23	0.20	0.18	0.16	0.15	0.13	0.12	0.11
Weight (kg/m²)	9.0	9.5	9.7	10.2	10.5	10.9	11.3	11.8	12.0	12.7	13.2	13.8

The QuadCore insulation used in QuadCore KS1000RW Roof Panels have a Thermal Conductivity (λ) of 0.018W/m.K

QuadCore KS1000RW Roof Panels have a Thermal Transmittance (U-Value), calculated using the method required by the Building Regulations Part L2 (England & Wales), Building Standards Section 6 (Scotland), Part L (Republic of Ireland) and Part F2 (Northern Ireland).

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