

## **OUTBUILDINGS AT WOOD FARM, WORLINGWORTH**

### **STRUCTURAL APPRAISAL**

JA/R/19/181  
10<sup>th</sup> September 2019

#### **General Description**

The property comprises a complex of single storey outbuildings of moderate age, two of which are proposed for conversion, 'Building 1' to the North of the property, and 'Building 2' to the West. There are several other nearby structures which have fallen into disrepair and are not proposed for conversion, therefore did not form part of the survey.

Building 1 comprises a profiled steel-clad timber framed structure of approximate internal plan area 24m x 6m, with a duo-pitched profiled cement-sheeted roof. The building is open plan throughout and presently empty, with the exception of a small number of miscellaneous agricultural items in storage.

Building 2 comprises a profiled steel-clad timber framed structure of approximate internal plan area 6m x 6m, with a duo-pitched profiled steel-sheeted roof. The building is also open plan and empty, with the exception of a small quantity of logs in storage.

Set on relatively level ground, the North elevation faces onto the adjacent public road, offset by a small area of grassland. The East elevation faces onto the main access track, the West elevation faces onto a large area of agricultural grassland. The South elevation to Building 1 and East elevation to Building 2 face into the complex's courtyard, presently an access track overgrown with vegetation. The South elevation to Building 2 faces onto a large area of agricultural grassland. There is a significant amount of vegetation growth across the site on both buildings, particularly Building 2, there are no significant trees nearby.

This report should be read in conjunction with APA drawing 'SK-01'.

Element	Description	Recommendations
<p><b>Roof Structure – Building 1</b></p>	<p>The profiled cement roof covering is supported on rows of 3" x 3" purlins, spaced at approximately 700mm centres. The purlins span between the gables, taking intermediate support from nine principal trusses across the roof. Six of the trusses are a traditional 'King Post' arrangement, three comprise a principal rafter and bottom chord, fixed together with exposed timber stud hangers spaced at regular intervals.</p> <p>The wall plates are restrained by steel straps onto the principal truss ties across the building. At the gables they are restrained by gable tie beams.</p>	<p>The roof is well proportioned and generally in good condition where visible. The ridge line is level, the principal trusses are well structured and in good condition and there are no signs of any notable roof spread.</p> <p>Preliminary calculations indicate the purlins and king post trusses are capable of accommodating the additional loads imposed from ceiling finishes as part of a domestic conversion without any strengthening works being necessary. The principal rafters to the three trusses without a king post are over spanned, resulting in a sagging of the bottom chords. These should be improved, this could be achieved by either improving the existing rafter or altering the configuration to a more traditional king post arrangement, similar to the other trusses. Eaves tie straps should also be provided at their wall plate bearings, similar to the existing king post trusses. One truss has moved slightly off its bearing onto a principal post adjacent to the main opening in the South elevation, this should be realigned and refixed.</p> <p>The visible splice joints in the purlins comprise a crude butt-joint and should be improved with steel splice plates (detail 1). The steel eaves tie straps appear to be missing on the second king post principal truss in from the West gable, these should be reinstated.</p> <p>All concealed areas should be exposed and verified, including stripping out all internal roof finishes. Any damaged or decayed timbers should be repaired by splice jointing in 'like for like' sections. Improve all purlin splices as detail 1. Check all guttering for any vegetation or</p>

Element	Description	Recommendations
<p><b>Superstructure – Building 1</b></p>	<p>The external walls to the building comprise timber frame studwork, clad externally in profiled steel sheeting. A number of principal roof trusses are supported off partially exposed principal timber posts, two trusses bear onto the lintels over the openings in the South elevation.</p>	<p>The general timber frame is concealed by cladding internally and externally so its condition could not be assessed, however the building is straight and plumb, and there are no signs of any structural defects presenting throughout the building or its finishes, and therefore does not present any concern. Cladding should be stripped out internally and the condition of the frame assessed, any localised areas of damage or decay should be repaired by splice jointing in 'like for like' sections.</p> <p>The feet of the principal posts to the easternmost opening in the south elevation are decayed, splice in similar sections and fix off the footing using proprietary galvanised steel shoes. The 3" x 4" wall plate acts as a lintel over the 3 meter wide opening in the South elevation and is over spanned, this should be improved. Racking stability will need to be improved to the eaves wall lines, this could be achieved by ply-sheathing new internal timber partitions.</p> <p>There is evidence of woodworm throughout the building internally. Arrange for inspection of timber frame by treatment specialist (eg. Rentokil) to ensure that all attack is no longer live. Treat as necessary/recommended by specialist.</p> <p>Large areas of the external elevations are concealed by vegetation, this should all be cleared and the condition of all concealed structure verified.</p>
<p><b>Superstructure – Building 2</b></p>	<p>The external walls to the outbuilding comprise timber frame studwork, clad externally in profiled steel sheeting.</p>	<p>The timber frame has suffered localised decay at points corresponding with the roof decay. Strip out all internal cladding and verify condition of existing timbers.</p>

Element	Description	Recommendations
		Clear external vegetation and verify concealed structure as Building 1.
<b>Ground floor – Building 1 and 2</b>	There are level concrete floor slabs throughout the buildings at ground level.	The slabs are in good condition, no improvement works necessary.
<b>Plinths and Foundations – Building 1 and 2</b>	The timber frame is constructed off a 600mm high 9” solid brickwork plinth, clad internally and externally in cement render. Five trial holes were excavated across both buildings, exposing brick footings at depths between 350mm and 850mm, founded off firm clay subsoil.	<p>The plinths are in good condition where visible and no improvements are necessary. There are localised areas of mortar bed erosion in Building 1 internally near the East gable, which should be repointed. There is minor vertical cracking in the plinth to Building 1 near the southeast corner, this should be repaired using ‘Helifix’ remedial tie bars (detail 3).</p> <p>Shallow foundations in clay subsoils are susceptible to movement through seasonal variations in moisture levels in the clay causing heave and shrinkage. There is a risk of movement of the existing foundations if prolonged drought conditions were to cause desiccation/shrinkage of the clay.</p> <p>The existing footings have clearly performed satisfactorily to date. <b>It is acceptable to leave the existing foundations as they are because they bear onto the clay subsoil, however there is a degree of risk to this as explained above, which would have to be accepted by the client.</b></p>

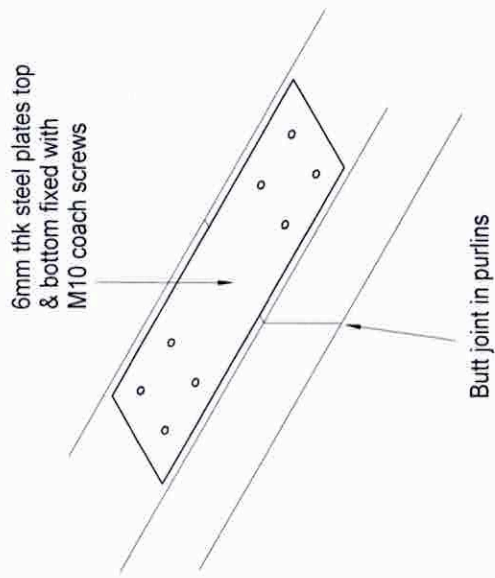
**Summary.**

The existing building structures are in good condition. Provided that the minor improvements detailed above are carried out carefully using skilled labour, repair methods and materials that are compatible with the existing, the buildings will be structurally sound and suitable for the proposed use. I trust that this is clear and sufficient for your immediate requirements, but please let me know if you have any queries, or require further advice.

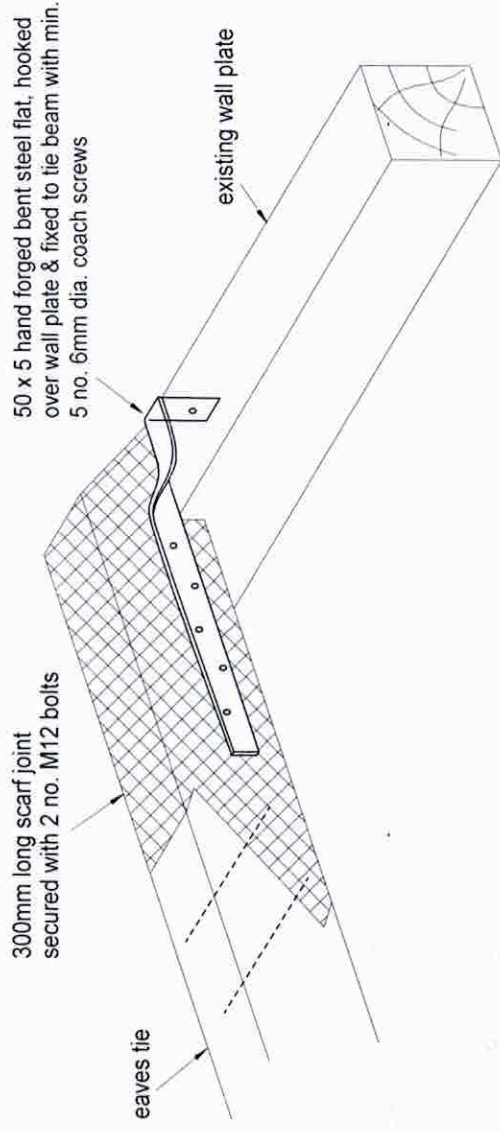


**Jason Albanie** BSc IEng MICE. Director

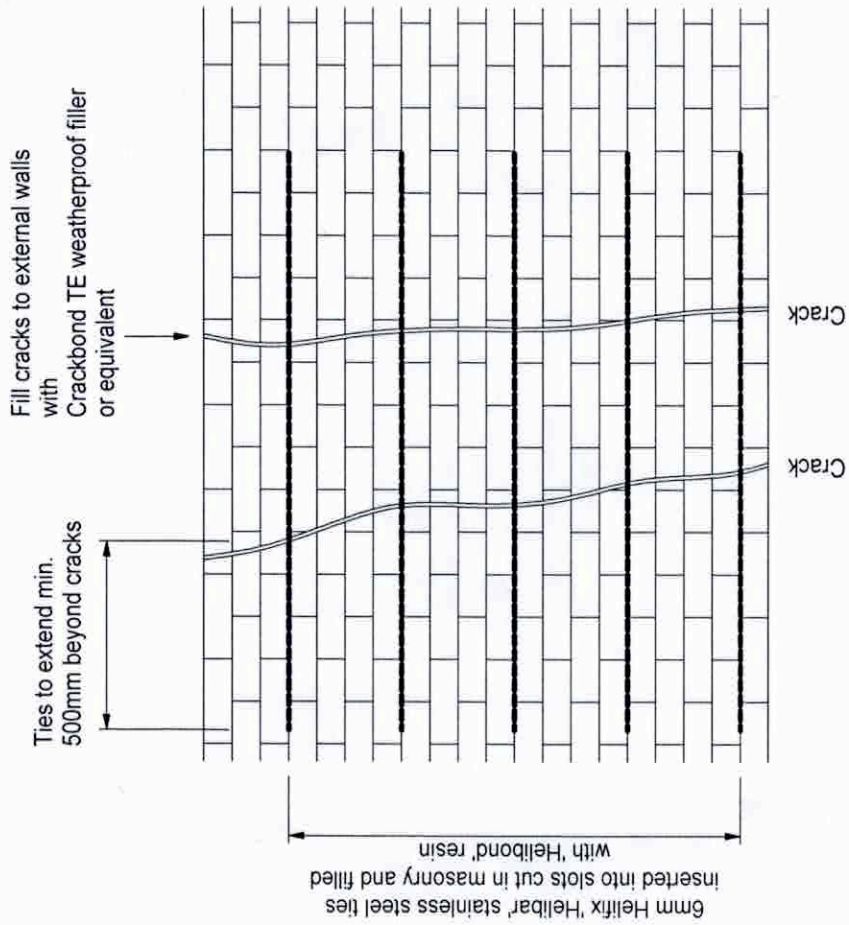
for Adam Power Associates Ltd.



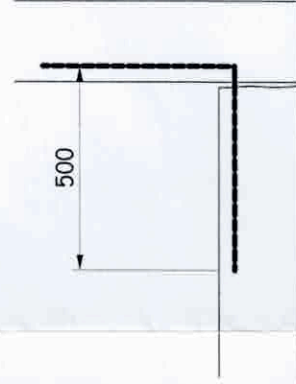
**Detail 1 - Purlin Splice**



**Detail 2 - Eaves Tie Repair (Barn 2)**



**NOTE** - Where cracks are less than 500mm from an external corner or an opening the bars should be bent at least 100mm round the corner and bonded into the return wall or bent and fixed into the reveal



**Detail for Re-Connecting Corners**

**Contact Details:**  
 Helifix Ltd.  
 Tel. 020 8735 5222  
 Fax. 020 8735 5223  
 www.helifix.co.uk

Tie bar vertical spacing 300mm  
 Depth of slot 40mm

Rev	Date	Details
<p>In the event of any queries please contact:            Jason Albanie BSc IEng MICE</p>		
<p><b>A D A M P O W E R</b>            ASSOCIATES            (RICKINGHALL)</p> <p><i>Consulting Civil / Structural Engineers</i>            The Old Chapel, The Street, Rickingham, Suffolk IP22 1BN            Tel 01953 668664            email: albanie@adampower.co.uk</p> <p><small>Adam Power Associates (Rickingham) is the trading name of Protek Consulting Ltd.</small></p>		
<p>For Mr Ashton</p>		<p>Date 10/9/19</p>
<p>Job No. R/19/181</p>	<p>Drg No. SK-01</p>	<p>CAD Plot Scale not to scale</p>
<p>Title OUTBUILDINGS AT WOOD FARM, WORLINGWORTH Structural Data</p>		<p>Rev</p>

**DO NOT SCALE DIMENSIONS FROM THIS DRAWING**