





Barn Conversion

Bedingfield

STRUCTURAL ENGINEER'S APPRAISAL REPORT

DOCUMENT CONTROL

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1.0 INTRODUCTION

1.1 J P Chick and Partners Limited was appointed to undertake a visual structural inspection of the subject barn at Hall Road, Bedingfield, Suffolk to assess its suitability for conversion to domestic use. We have therefore limited our inspection and report accordingly.

2.0 DATE OF INSPECTION

2.1 Our inspection was undertaken on Wednesday, 23rd February 2022 in fine dry weather with temperature in the region of 5°C to 10°C. There was a moderate wind during our inspection which was preceded by storm Eunice, with the area having been subject to an amber weather warning for wind the weekend prior to our attendance on site.

3.0 GENERAL DESCRIPTION

3.1 The subject building is orientated parallel to Hall Road with the ridgeline of the property running on a northwest to southeast axis. The subject property comprises two distinct elements, a two storey element towards the northwest, with a single storey structure to the southeast. We understand that the building has had a number of different agricultural uses in the past including chicken shed and grain store but is currently used for general storage.

3.2 The construction of the building is a mixture of blockwork and studwork with the latter being clad in shiplap boarding. Roof coverings comprise corrugated cement sheeting to the two storey element, and clay pantiles to the single storey section.

4.0 OBSERVATIONS

Northwest Gable Elevation

4.1 Photograph 1 shows a general view looking towards the northwest gable. This elevation comprises timber clad studwork above first floor level, with a predominantly block wall constructed from a

low level brick plinth enclosing the ground floor storey. Both the timber cladding and blockwork have been subject to a black pitch or similar painted finish.

- 4.2 Looking along the wall line, both the masonry and timber sections appear reasonably plumb, with little evidence of significant movement in the lower level blockwork. Of note, however, is that there are a number of hairline vertical cracks in the blockwork, an example is shown in photograph 2, but these generally seem to pre-date the painted finish and as such, are not thought to be structurally significant.
- 4.3 There is a degree of spalling of the low level brickwork, however, this is very minor and predominantly limited to the western corner of the building currently.
- 4.4 The condition of the timber cladding is variable with some loose and / or rotten boards in various locations across the elevation. (See photographs 3 and 4). The majority of cladding does, however, remain in situ.
- 4.5 To the centre of the elevation there is a first floor level door, we understand the previous access to the grain store above. There are three timber beams, which look as though they previously supported a small external deck outside the door, and these are suffering from various degrees of rot. The central one, in particular, is in poor condition. (See photograph 5).
- 4.6 The end grain of the purlins is visible to this elevation below the corrugated cement sheet roof. There is no vergeboard to this elevation.

Northeast Elevation (Two Storey Section)

- 4.7 Photograph 6 shows a general view of the northeast elevation of the two storey barn. To this elevation, the first floor is timber clad, whilst the ground floor comprises a series of openings, with 4 No. pairs double doors present. There is a short timber clad panel and a pedestrian door at the northern corner of the building.

- 4.8 To this elevation, the line and level of the corrugated cement sheet roof appears to be reasonably good, with no significant undulations or sagging, either along the ridgeline or in the plane of the rafters.
- 4.9 There is some distortion of the wall line at first floor level, with an inward bow evident to the right hand side of the elevation. (See photograph 7). Directly below this area there is some damage to the timber framing, in particular the studs to the side of the pedestrian door do not appear connected at the base, and the first post to which the double doors are fixed, from the northern end of the building, is also showing signs of decay at the base. (See photographs 8 and 9).
- 4.10 The remainder of the elevation appears to be in reasonably good condition, with no significant distortions evident towards the southern end.
- 4.11 There are again occasional defects to the timber cladding, but as the northwest elevation, this is predominantly in-tact.

Northeast Elevation (Single Storey Section)

- 4.12 Photograph 10 shows a general view of the northeast elevation of the single storey section. This section of the property comprises a clay pantiled roof over blockwork walls at ground floor level.
- 4.13 The roof, as can be seen in photograph 10, does undulate both along the ridgeline, as well as having a slight sag evident to the roof slope. The eaves line is reasonably consistent to the left hand side, but does slope upwards towards the two storey section of the building. This may be by intent to accommodate a taller door at this end. (See photograph 11).
- 4.14 The masonry line to this section of the building is not straight, but there is no obvious evidence of cracking, which suggests it may have been constructed as such, perhaps to replace an older distorted timber wall. (See photograph 12).
- 4.15 There is a single visible timber post embedded within the masonry and there is some decay evident at its base, where it terminates on a truncated cone shaped rendered plinth. (See photograph 13). Of note is that there is no guttering present to the single storey section to this elevation. To the

two storey section a gutter is present, although the rainwater pipe to the north corner of the building is missing.

Southeast Gable

- 4.16 Photograph 14 shows a general view of the southeast gable, which is clad in shiplap timber boarding over a masonry plinth. There are two large grates at this end of the building over drainage or possible a culvert, the water seemed to be running constantly.
- 4.17 The eastern gable wall does step in slightly above eaves level. (See photograph 15). Also visible in photograph 15 are a number of missing tiles along the roof verge. Both the northeast and southwest facing roof slopes are missing a number of tiles. The cladding to this elevation again is largely intact. There is a small section of missing board to the left hand side of the purlin to the rear roof slope (see photograph 16) and a slope to the boards at higher level, visible in photograph 14.

Southeast Gable (Two Storey Element)

- 4.18 Photograph 17 is a view of the rear section of the southeast gable to the two storey element. Again, the shiplap cladding is largely intact and a verge board is also in situ in this location, however, the cladding does appear to be suffering from more serious decay, particularly to the section just above the lower roof slope.
- 4.19 To the southeast side, the cladding is in better condition, although the flashing between the two sections of building is in poor condition. (See photograph 18).

Southwest Elevation

- 4.20 Photograph 19 shows a general view of the southwest elevation of the two storey element. Part of this elevation, and all of the single storey elevation, are largely obscured by the adjacent barn. This barn, which currently provides the subject building with some shelter from the prevailing winds, will be removed as parts of the proposals. There is a narrow, circa 600mm, gap between the buildings, with a concrete channel between the two. (See photograph 20). This is presumably to

allow for the fact that there are no rainwater goods on the single storey section of the building. However, at the present time the channel has largely silted up.

- 4.21 The southwest elevation comprises a timber frame and timber clad first floor, with a blockwork ground floor to both the two storey and single storey sections. The blockwork appears to be in fair condition, where visible. There is an external concrete stair to the first floor, which is showing signs of cracking to both sides but it is assumed that this will be removed as part of the conversation..
- 4.22 Whilst the two storey element does have rainwater goods present, the downpipe, presumably previously at the western corner of the building, is now missing.

Internal – Single Storey Section

- 4.23 The single storey section of internal dimensions approximately 13.7m x 8m has a series of modified scissors trusses supporting the roof construction via a central purlin to each roof slope. Rafters are not visible generally as the roof has been sheathed in plywood to the underside. The one exception to this is towards the north end of the southwestern elevation where a section of the rafters are exposed.
- 4.24 Photograph 21 shows an image of the typical modified scissor truss. In addition to the usual scissor configuration, there is also an eaves level tie beam around which, storage shelving has been constructed and additionally, two anti-sag timbers, which connects the apex of the truss to the bottom chord. These additional timbers are untreated round sections.
- 4.25 In terms of cross building stability, there is a central cross wall, approximately 5.5m from the northern end of the single storey section, although this does not directly buttress either of the external flank walls.
- 4.26 The truss timbers themselves generally appear to be in good condition, although some decay is evident to the trusses closest to the two storey element.
- 4.27 To the northeast elevation, the final truss bears over an existing lintel opening with some staining to the truss itself and a possible failure of the lintel and / or bearing evident. (See photograph 22).

- 4.28 To the rear (southwest) elevation, the two trusses in closest proximity to the two storey section, have also suffered from decay. At the bearing location to the final truss a crude repair has been undertaken comprising the splicing of the bottom chord to a section of 'I' joist laid flat, which is in turn propped onto a circular column. (See photograph 23).
- 4.29 On the adjacent cross wall line the tie bar is propped at its end with a timber post. (See photograph 24).
- 4.30 With the exception of these three areas the truss timberwork generally appears to be in good condition, with little obvious evidence of staining in visible areas. Some staining is however evident to the purlins, notably to the southeast gable rear roof slope at the gable end. (See photograph 25).
- 4.31 To the front roof slope some remedial works have already been undertaken to the purlin. (See photograph 26). Whilst the roof structure is likely undersized by current standards, the trusses appear to be performing adequately, however, the purlins themselves do obviously sag between the points of support at the truss locations (also visible in photograph 26).
- 4.32 Adjacent to the northeast corner of the single storey section there is some decay of the wall plate, (see photograph 27), although this issue is relatively localised.

Ground Floor – Two Storey Element

- 4.33 The two storey section of the barn was in use at the time of inspection for miscellaneous storage. The area generally comprises five bays, with four intermediate lines of support to the first floor joists. The floor area internally is approximately 13.5m x 8m, with the common joists spanning longitudinally between the four lines of support. Common joists are typically 100 wide x 115 deep, but do vary, whilst the principal timbers are approximately 150 wide x 165 deep. These are in turn supported on two intermediate posts, leaving a maximum span between of approximately 3.5m.
- 4.34 Whilst there are some joists with a slight loss of section, the floor does appear to be largely intact with no obvious deflections or distortions evident. The post supports are a mixture of trimmed

rectangular timbers and untreated logs. The posts either bear on a truncated conical plinth or directly onto the internal floor. These are all considered to be of sufficiently substantial section to adequately support the vertical floor loads from above. Photograph 28 shows a general view looking across the ground floor store.

- 4.35 Whilst much of the walls in this area are obscured were noted. In particular, at least one of the internal columns seems to be suffering from significant decay at the base. (See photograph 29). Towards the northern corner of the building, the first of the timber posts, which supports one of the external doors has rotten and appears to have moved off its plinth. (See photograph 30) Some damp staining was evident to the internal walls, but there were no significant signs of structural movement.
- 4.36 One small anomaly that was noted was that the studs between the two and single storey elements do not seem to extend all the way up to the first floor beam. This does not appear to be having a detrimental impact on the structure at present.
- 4.37 There is little structure contributing to the stability of the building across its width. It is therefore likely relying on the diaphragm action of the first floor structure and the connections of the posts to the first floor principal floor beams.

First Floor Internal

- 4.38 Photograph 31 shows a general view of one of the first floor trusses (seemingly a combination of Fink and Howe type truss), with an additional diagonal strut connecting the rafter and bottom chord of the truss to the timber post (see photograph 32). The trusses have been formed in 50 x 125 deep timber with the rafter and tie beams doubled up. The connections all appear to be single bolts.
- 4.39 Four purlins to each roof slope support the corrugated cement roofing sheets. Both the trusses and the purlins generally appear to be in good condition, albeit very likely undersized by modern standards. It is probable that some decay will be evident when the roof covering is removed, particularly to the northwest facing gable, where the end grain of the purlin is visible externally due to the lack of verge board.

- 4.40 Similarly, the timber studwork is generally in good order throughout with very little decay visible internally. A degree of distortion was evident to the northern end of the north eastern facing flank wall where the undulation in the wall line was noted externally and where the damaged posts are present at ground floor level.

5.0 LIMITATIONS

- 5.1 The structural inspection is a specialist survey, whose purpose is to enquire into the structural stability of the building.
- 5.2 The work of a structural inspection consists of a visual inspection of all accessible parts of the building, assisted by a check for abnormal distortions where practicable. Reference may be made to local geological conditions, and to records of structural damage to other houses in the vicinity.
- 5.3 The limitations of structural inspections are similar to those of most other domestic surveys. We are not permitted to dig trial holes, lift floor coverings or remove decorations. We will therefore remain unaware of hidden defects or unusual construction details. In most cases, these limitations are not important, because structural problems are usually evident on the surface (walls, ceilings, door openings) before they become severe. But it does mean that we cannot detect problems that are latent or concealed. We always recommend, regardless of the structural condition of the building, that the owners maintain cover for all insurable perils, as these are never 100% predictable.
- 5.4 Except where specifically noted otherwise, our advice is concerned solely with current structural performance, and we do not report on the condition of finishes, waterproofing, damp penetration or timbers.
- 5.5 We recommend carrying out structural maintenance as part of good housekeeping, the most important tasks being:
- 5.5.1 Ensuring drains remain free flowing and watertight
 - 5.5.2 Ensuring vegetation does not grow uncontrolled close to the building
 - 5.5.3 Ensuring the building remains weatherproof

5.5.4 Repairing or replacing deteriorated materials

5.5.5 Taking professional advice on any proposed alterations or extensions

5.5 We can provide detailed advice on structural maintenance if requested. We are not able to detect the presence of asbestos materials. We can provide standard literature on the risks associated with asbestos, if requested. This report is for our client's personal use, and is confidential, non-assignable and carries no admission of liability to any third party.

6.0 CONCLUSIONS

6.1 Generally, the condition of the barn at Hall Lane which is being considered for conversion is good, with no obvious evidence of ground movement or significant distortions to the structure, even following the recent high winds.

6.2 Whilst there are inevitably areas where poor detailing or water ingress has led to decay, the vast majority of the structural elements appear to be in fair to good condition, and easily capable of reuse in a domestic setting. Where decay is noted, the affected area tends to be isolated and as such, a targeted repair would be suitable to facilitate reuse.

6.3 Some of the matters which should be considered in relation to the proposed conversion are as follows:-

- Trusses to the two storey element are very likely undersized by current codes of practice. Whilst these are adequately supporting the existing lightweight roof covering, some strengthening / augmentation cannot be ruled out to ensure that these are suitable to support alternative roof coverings or domestic finishes.
- To the two storey element, decay was noted to the base of at least two of the posts (not all could be inspected due to the stored materials) and it is essential that all post bases are exposed and inspected, with any remedial or revised detailing required being undertaken.
- To the single storey extension the roof structure needs to be exposed as there is some evidence of water ingress to the purlins and to the underside of the plywood generally. The main part of the structure i.e., the roof trusses appear to be in good condition, with the exception of the isolated areas noted within the body of this report; notably, the bearing to

the two trusses in closest proximity to the two storey element. These trusses will require a more suitable designed and sympathetic repair.

- It would be prudent to consider strengthening the purlins to the single storey section, which are visibly sagging . This level of deflection may cause damage to domestic internal finishes.
- Within the two storey section of the property, if the existing timber post positions need to be adjusted to suit proposed layout, new support on isolated pad or strip foundations may be necessary to address the loss of the existing support.
- Overall stability of the building will require some consideration particularly given the removal of the adjacent barn which is currently offering some shelter. We are yet to see proposals for the conversion, but assume that some compartmentalisation of the structure to form domestic scale rooms can be used to stiffen the structure over all.
- Whilst the vast majority of the structure appears to be in good condition, it is anticipated that there will be additional areas which require remedial works, or replacement of sections, which only come to light during the course of works on site, when more of the structure is exposed.
- It is also essential that new guttering is installed to the northeast and southwest flank walls, and properly connected, ideally below ground level, to facilitate disposal of the surface water away from the building.

6.4 In summary, subject to the considerations outlined above, we consider that the structure is eminently suitable for conversion to domestic use.

7.0 APPENDICES

Appendix A – Photographs



Photograph 1



Photograph 2



Photograph 3



Photograph 4



Photograph 5



Photograph 6



Photograph 7



Photograph 8



Photograph 9



Photograph 10



Photograph 11



Photograph 12



Photograph 13



Photograph 14



Photograph 15



Photograph 16



Photograph 17



Photograph 18



Photograph 19



Photograph 20



Photograph 21



Photograph 22



Photograph 23



Photograph 24



Photograph 25



Photograph 26



Photograph 27



Photograph 28



Photograph 29



Photograph 30



Photograph 31



Photograph 32