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STRUCTURAL APPRAISAL REPORT

**Existing Agricultural Building at;-
Reedsbeck Farm,
Monument Road,
Woodhall Spa,
Lincolnshire**



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Property;-	Existing Agricultural Building at;- Reedsbeck Farm, Monument Road, Woodhall Spa, Lincolnshire	Instructed;- May 2015
Client:-	Woodland Estate Farming Ltd 15 Newland, Lincoln, Lincolnshire LN1 1XG	Survey & Report by;- J. Ellington BSc. CEng MStructE J. Hicks BEng(Hons) MSc
Reference:-	JC/15/04/2408	Issued:- Jun 2015

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STRUCTURAL APPRAISAL REPORT,

Existing Agricultural Building at:-
Reedsbeck Farm,
Monument Road,
Woodhall Spa,
Lincolnshire

Our Ref;- JC/15/04/2408

SYNOPSIS

The report provides commentary of observations made during a structural appraisal survey, and identifies the defects witnessed within the fabric of the building.

The report concludes that the buildings have generally survived well considering their age and with a reasonable amount of intervention, they are suitable for conversion into a habitable use.

The report recommends and describes various strengthening and remedial details to the roof, walls and floors that should be conducted to each element as part of any conversion process.

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1.0 BRIEF

1.1 JC Consultancy Limited was requested by Woodland Estates Ltd, to assess and comment on the structural condition of an existing Agricultural building located at Reedsbeck Farm, Monument Road, Woodhall Spa, Lincolnshire.

2.0 INTRODUCTION & SCOPE

2.1 The existing Agricultural building is located within the grounds of Reedsbeck Farm off Monument Road, in a rural location adjacent to the B1191 Horncastle Road, Woodhall Spa.

2.2 The client owns the property and has instructed a structural appraisal report to be carried out in order to assess possible options for future development. This instruction was provided by the client's architect, Neil Dowlman Architecture.

2.3 This report should be read in-conjunction with documentation prepared and issued by the client's architect.

2.4 This report is solely for the purposes of the client and no other third parties.

2.5 JC Consultancy Limited visited the property on 15th May 2015 in order to carry out a structural appraisal survey.

2.6 Weather conditions at the time of the survey were cold and dry.

2.7 This report is limited to elements of the structural fabric of the property, i.e roof, walls and floors, and comments only upon their structural condition and performance.

2.8 The report does not contain observations, comments or recommendations to any non structural items including, but not limited to drainage, electrical, heating and plumbing services, timber work and decorative plasters.

2.9 Decay associated to damp, fungal attack, insect infestation or contamination is outside the scope of our appointment or report. Any reference to decay associated to damp, fungal attack, insect infestation or contamination to either structural or non-structural items are observations only. As such we recommend that further advice is sought from specialists in the fields of damp, fungal attack, insect infestation or contamination in order to guarantee peace of mind from these potential defects.

- 2.10 The inspection was of a visual nature only. There has been no opening up works involved in this investigation. Wall finishes or floor finishes, including carpets where applicable have not been removed or lifted during the inspection.
- 2.11 Any part of the structure that was hidden, covered or otherwise inaccessible, either by permanent finishes such as, but not limited to wallpaper, decorative plasters, suspended ceilings, or carpets, or by items of furniture, either fitted or freestanding, have not been inspected or commented upon. We therefore cannot guarantee that any such parts are free from defect. It should be noted that a percentage of the outbuilding is currently being used for storage, and as such some of the internal fabric was hidden, covered or otherwise inaccessible.
- 2.12 The performance of the existing foundations, ground strata and general ground conditions may be referred to within this report; however the existing foundations and ground conditions have not been inspected during our visual survey. Therefore comments made will be based on assumptions and analysis sought from indicative desktop sources including but not limited to the 'British Geological Society'. These sources generally provide sound interpretation, however local anomalies can occur, and as such we cannot guarantee their accuracy.
- 2.13 The observations and defects noted within this report should not be read as a comprehensive inventory of each and every single item witnessed during our survey. Instead the records should be taken as an indication of the condition of the property in general, and should demonstrate the likely defects that may be present elsewhere in areas of the fabric that have not been surveyed or recorded.

3.0 GENERAL DESCRIPTION

3.1 The property consists of essentially 3No. single storey, rectangular shaped elements, located on a predominantly level site. The building is located within the grounds of Reedsbeck Farm, Monument Road, Woodhall Spa, Lincolnshire.

3.2 The construction date of the buildings is unknown, but they are likely to have been constructed at various times during the early to mid 1900's.

3.3 The construction of the existing property consists of;-

3.3.1 **Element 1 – Large Open Plan Store (located closest to road)**

Duo-pitched Roof

A profiled corrugated roof covering over a series of steel purlins supported on steel angle trusses.

External Walls

Predominantly 215mm wide, traditional solid wall construction consisting of clay masonry units, with external projecting piers supporting roof trusses.

Ground Floor

The ground floor consisted of an existing concrete ground bearing slab, which included a series of raised concrete plinths.

3.3.2 **Element 2 – Workshop / Store (Containing 3No.Store Rooms)**

Duo-pitched Roof

A slate roof covering over a raised collar tied cut roof consisting of timber rafters, collars, purlins and ties. A dormer window arrangement is located on the front elevation.

External Walls

Predominantly 215mm wide, traditional solid wall construction consisting of clay masonry units, with internal projecting piers located in the larger room.

Internal walls

The internal cross walls are constructed of 215mm wide traditional solid walls consisting of clay masonry units.

Ground Floor

The ground floor consisted of an existing concrete ground bearing slab.

3.3.3 Element 3 –Open Fronted Store (located furthest from road)

Duo-pitched Roof

A clay pantile roof covering over a prefabricated timber roof truss system supported on external walls

External Walls

Predominantly 215mm wide, traditional solid wall construction consisting of clay masonry units, with internal projecting piers. The rear gable has a blockwork constructed inner leaf.

Ground Floor

The ground floor could not be seen due to storage materials, however it is assumed that a solid earth floor is present.

- 3.4 Published Geological records show the building to be within an area where the soil sequence consists of a solid formation of Ampthill Clay Formation (Mudstone) overlain by River Terrace deposits (Sands and Gravels).
- 3.5 There are no mature trees in adjacent to, or in close proximity to the walls of the existing buildings.

4.0 OBSERVATIONS AND DEFECTS LOG

(Read in conjunction with Section 2.13 of this report)

4.1 Element 1 – Large Open Plan Store (located closest to road)

4.1.1 Roof

- A profiled, corrugated roof covering is present. No broken elements were noted.
- Rainwater goods are missing throughout.
- When viewed internally, the slender angle trusses and purlins are present and appear in reasonable condition. No significant corrosion noted.

4.1.2 Walls

- The elevation walls are generally free from major structural defects. When viewed along their length, the walls appear reasonably plumb.
- Minor fractures and movement was noted over and around the concrete lintels that span over door openings.
- A large opening on the gable wall has been formerly in-filled. A number of fractures are located around the lintel of the in-filled opening.
- Vegetation was growing around the lower levels of masonry.
- Localised areas of weathered mortar joints and pointing was noted throughout the elevations.
- A number of isolated brick units were defaced.

4.1.3 Ground Floors

- The floors have been used for the storage of goods and general outbuilding use. As such the condition of the floors reflects this. It should be noted that the Store was full with cardboard boxes and only partial inspection of the floor slab could be made.
- In those areas observed, there was no evidence of significant fractures noted to the concrete.
- A number of raised concrete plinths are present within the floor slab.

4.1.4 Foundations

- It is likely that the foundations to this element consisted of either a shallow corbelled system or early concrete strip system that is typical of a building of this age and use. The superstructure is not displaying any signs that would suggest the foundation system is under excessive stress. The foundations appear to be performing satisfactorily.

4.2 Element 2 – Workshop / Store (Containing 3No.Store Rooms)

4.2.1 Roof

- A slate roof covering is present. There were a number of localised areas of missing slates noted.
- The ridge is slightly sagging along its length, between principal trusses and loadbearing walls.
- Slight roof dishing is apparent to both roof slopes.
- Rainwater goods are present, but there are large areas that are defective.
- When viewed internally, the majority of the purlins, rafters and ties are present, but they are slender and as such are deflecting between their supports.
- A small degree of roof spread has occurred at the eaves level.
- Significant levels of water ingress and staining was noted to a number of timbers.
- Heavily decayed timbers were noted around the valleys that form the dormer windows and in areas where missing roof finishes occur.

4.2.2 Walls

- The masonry elevation walls are generally free from major structural defects. When viewed along their length, the walls appear reasonably plumb.
- Minor displacement of masonry was noted over the door opening.
- Minor fractures and movement was noted throughout.
- Lower levels of masonry adjacent ground level were weathered in parts, presumably from continued wetting and splash back from surface water. Vegetation was growing around the lower levels of masonry.
- Fractures and cracking was noted over and around a number of the brick arches that are located over window openings.

4.2.3 Ground Floors

- The floors have been used for the storage of goods and general outbuilding use. As such the condition of the floors reflects this. There were no major fractures to the concrete slab.

4.2.4 Foundations

- It is likely that the foundation to this element consisted of a shallow corbelled system that is typical of a building of this age and use. The superstructure is not displaying any signs that would suggest the foundation system is under excessive stress. The foundations appear to be performing satisfactorily.

4.3 Element 3 –Open Fronted Store (located furthest from road)

4.3.1 Roof

- A tile roof covering is present. There were a number of localised areas of missing tiles noted.
- The ridge and roof slope appear reasonably level and true.
- Rainwater goods are present, but there are large areas that are defective.
- When viewed internally, a prefabricated roof truss system is present. This appears to be a replacement roof structure. Diagonal and longitudinal wind bracing appears to be lacking.
- Significant levels of water ingress and staining was noted to a number of timbers where missing roof finishes occur.

4.3.2 Walls

- The masonry elevation walls are generally free from major structural defects. When viewed along their length, the walls appear reasonably plumb.
- The upper levels of the walls appear to have been reconstructed / added. The gable wall has been partially reconstructed in blockwork.
- Minor fractures and movement was noted throughout.
- Lower levels of masonry adjacent ground level were weathered in parts. Vegetation was growing around the lower levels of masonry.
- The heights of the walls, which are predominantly unrestrained, appear excessive for their width, which could lead to vulnerability against wind loading.

4.3.3 Ground Floors

- The floors have been used for the storage of goods and general outbuilding use. No evidence of a robust floor structure could be identified.

4.3.4 Foundations

- It is likely that the foundation to this element consisted of a shallow corbelled system that is typical of a building of this age and use. The superstructure is not displaying any signs that would suggest the foundation system is under excessive stress. The foundations appear to be performing satisfactorily.

5.0 CONCLUSIONS AND RECOMMENDATIONS.

5.1 Element 1 – Large Open Plan Store (located closest to road)

- 5.1.1 This element has survived reasonably well considering its age and previous use. Its commercial appearance, open plan arrangement and roof construction will not enable it to be a typical outbuilding style conversion, however as a structure it is viable for restoration and conversion into habitable use.
- 5.1.2 Whilst the building is open plan, the presence of buttressing piers results in it being a robust structure which can be seen to have only lost a small amount of original wall fabric during its lifetime.
- 5.1.3 In structural terms many of the defects which have been highlighted within the Observations and Defects Log have little or no significance to the overall robustness of the building.
- 5.1.4 The roof structure of this element is a corrugated roof over steel trusses. The trusses appear to be performing adequately at present, however it needs to be considered that the roof structure as existing is lightweight. If any additional weight is to be placed upon the roof structure as part of a scheme, then it is likely that strengthening of the trusses or a replacement roof structure would be required.
- 5.1.5 The walls of this element are predominantly sound and require little attention. Ideally any proposed layout by the architect would introduce cross walls / partitions as these would increase the overall stability of the external walls. If the partitions could be placed under the line of the trusses overhead, then there is the potential to support the trusses via the partitions, or using posts within the line of the partitions, should the need arise.

The cause of the localised area of cracking and movement to the majority of the elevations is likely to be failure / shrinkage of the concrete lintels that are present over the openings. Allowance should be made for lintel replacement throughout. The performance of masonry can be improved by low key stitching using the 'Helifix' masonry repair system, which involves installing remedial 'Heli-bar' reinforcing rods into the bed joint of the masonry at regular vertical centres. More information can be seen at www.helifix.co.uk.

Any areas of hard cement re-pointing previously carried out on the elevations should be carefully removed and replaced with a sympathetic soft lime based mortar. Other small areas of weathered masonry joints should be repointed in a similar fashion. There is not the requirement for all elevations to be repointed, and as such only the localised required areas should be addressed. Suitable damp-proofing systems should be installed to the walls in accordance with good building practices.

- 5.1.6 It is assumed that the ground floor will be replaced with a ground bearing, concrete ground floor slab as part of any development. We recommend that the slab should be engineered to ensure that that is suitable to accommodate loadings from the proposed use, including any partitions.
- 5.1.7 Existing foundations appear to be performing satisfactory, and we do not anticipate that there should be the requirement for any strengthening to existing foundations as part of a conversion.
- 5.1.8 Poor performing rainwater discharge gutters and downpipes will result in the continued wetting of masonry. Rainwater goods should be repaired / installed throughout all areas of the building to allow reliable discharge of rain water. The installation of a gravelled apron / French drain type arrangement around the external perimeter walls will assist in relieving the walls and foundations from decay.

5.2 Element 2 – Workshop / Store (Containing 3No.Store Rooms)

- 5.2.1 This element has survived reasonably well considering its age and previous use. It is beginning to show evidence of decay due to a poor performing roof structure; however it is viable for restoration and conversion into a habitable dwelling.
- 5.2.2 The buildings basic, rectangular shape, together with the presence of cross walls, results in it being a robust structure which can be seen to have only lost a small amount of original wall fabric during its lifetime.
- 5.2.3 In structural terms many of the defects which have been highlighted within the Observations and Defects Log have little or no significance to the overall robustness of the building. The majority of loss of the original is due to the materials being subjected to the elements. Ensuring the outbuildings are weather-tight should be addressed even if a full conversion or restoration is not going to take place. Failure to do so will accelerate the decay and deterioration of the remaining fabric.
- 5.2.4 The roof structure of this element is in a poor condition. A combination of slender timbers, excessive decay from water ingress, and a crude dormer construction has contributed towards its vulnerability. A replacement roof structure would greatly enhance the overall structural robustness of the building. By incorporating flat ceilings, which essentially tie the top of the walls together, into the scheme would prevent further roof spread. Alternatively if a vaulted/ sloping ceiling is required we recommend that the introduction of a ridge beam system, or a feature trussed arrangement utilising King/Queen Post trusses would also prevent additional stresses from being placed upon the walls.

The timber wall plates should be replaced and should be strapped to the walls in accordance with current building regulations. The existing roof slate finish could be reused and reinstated. A number of replacement slates will be required to replace missing areas.

5.2.5 The walls of the outbuilding are predominantly sound and require little attention.

Ideally any proposed layout by the architect should retain the cross walls as these are essentially tying the front and rear elevations together. The introduction of a new inner leaf of blockwork would greatly enhance the structural robustness of the building, however it is not deemed essential. If installed, we recommend the blockwork is used to support the new roof structure, in which case the existing masonry walls would essentially become a non-loadbearing cladding system. If the proposed scheme does not incorporate a new inner leaf, then strengthening of masonry panels with wind-posts maybe required depending on layout and opening requirements.

The cause of the localised area of cracking and movement is likely to have been contributed by a degree of minor roof spread, together with continued exposure to the elements from the missing roof coverings, and decaying of timber lintels. The performance of masonry can be improved by low key stitching using the 'Helifix' masonry repair system, which involves installing remedial 'Heli-bar' reinforcing rods into the bed joint of the masonry at regular vertical centres. More information can be seen at www.helifix.co.uk.

Any areas of hard cement re-pointing previously carried out on the elevations should be carefully removed and replaced with a sympathetic soft lime based mortar. Other small areas of weathered masonry joints should be repointed in a similar fashion. There is not the requirement for all elevations to be repointed, and as such only the localised required areas should be addressed.

Any timber arch backing timbers should be replaced. Any timber wall plates that are present within the walls should be removed and replaced with remedial brickwork infill.

Suitable damp-proofing systems should be installed to the walls in accordance with good building practices.

5.2.6 It is assumed that the ground floor will be replaced with a ground bearing, concrete ground floor slab as part of any development. We recommend that the slab should be engineered to ensure that it is suitable to accommodate loadings from the proposed use, including any partitions.

5.2.7 Existing foundations appear to be performing satisfactory, and we do not anticipate that there should be the requirement for any strengthening to existing foundations as part of a conversion.

- 5.2.8 Poor performing rainwater discharge gutters and downpipes will result in the continued wetting of masonry and localised areas of timbers. Rainwater goods should be repaired / installed throughout all areas of the building to allow reliable discharge of rain water. The installation of a gravelled apron / French drain type arrangement around the external perimeter walls will assist in relieving the walls and foundations from decay.

5.3 Element 3 –Open Fronted Store (located furthest from road)

- 5.3.1 This element appears to have structurally failed during its lifetime as there has been a number of areas of reconstructed masonry, and a replacement roof structure. It continues to display evidence of decay due mainly to its open fronted nature, and its arrangement does result in it being vulnerable to lateral wind loadings. There are elements that make it viable for restoration and conversion into part of a habitable dwelling, however its demolition and reconstruction of part of any proposed scheme may be in the best interest of the structure.
- 5.3.2 The replacement roof has been installed in rather an adhoc manner with little in the form of wind bracing present. The roof structure is providing little assistance to the overall stability of the building. Strengthening to the existing roof or a replacement roof structure would greatly enhance the overall structural robustness of the building.

The timber wall plates should be strapped to the walls in accordance with current building regulations. The existing roof tile finish could be reused and reinstated following the installation of suitable insulation and felt membrane.. A number of replacement tiles will be required to replace missing areas.

- 5.3.3 The walls of this element are vulnerable as their height to thickness ratio is increased to that of normal low rise buildings. The introduction of a new inner leaf of blockwork would greatly enhance the structural robustness of the building. If installed, we recommend the blockwork is used to support the roof structure, in which case the existing masonry walls would essentially become a non-loadbearing cladding system. The introduction of a first floor element into the scheme could be introduced as this would assist in restraining the walls.

The performance of the remaining masonry can be improved by low key stitching using the 'Helifix' masonry repair system, which involves installing remedial 'Heli-bar' reinforcing rods into the bed joint of the masonry at regular vertical centres. More information can be seen at www.helifix.co.uk.

Any areas of hard cement re-pointing previously carried out on the elevations should be carefully removed and replaced with a sympathetic soft lime based mortar. Other small areas of weathered masonry joints should be repointed in a similar fashion. There is not the requirement for all elevations to be repointed, and as such only the localised required areas should be addressed.

Suitable damp-proofing systems should be installed to the walls in accordance with good building practices.

- 5.3.4 It is assumed that the ground floor will be replaced with a ground bearing, concrete ground floor slab as part of any development. We recommend that the slab should be engineered to ensure that it is suitable to accommodate loadings from the proposed use, including the earlier recommended blockwork inner leaf, potential first floor and partitions. Once installed, the slab will act as a raft type slab system, which will minimise any additional loadings placed upon the existing foundations. This should assist in improving the overall structural performance of the building.
- 5.3.5 Existing foundations appear to be performing satisfactory. If the installation of an engineered slab is introduced as discussed in 5.3.4, there should not be the requirement for any strengthening to existing foundations as part of the proposed works.
- 5.3.6 Poor performing rainwater discharge gutters and downpipes will result in the continued wetting of masonry and localised areas of timbers. Rainwater goods should be repaired / installed throughout all areas of the building to allow reliable discharge of rain water. The installation of a gravelled apron / French drain type arrangement around the external perimeter walls will assist in relieving the walls and foundations from decay.

JC Consultancy Limited
Jun 2015

6.0 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

END OF REPORT