w www.jcconsultancyltd.com
e info@jcconsultancyltd.com

Boston Office: 01205 317540
Morgan House, Gilbert Drive,
Boston, Lincolnshire, PE21 7TQ

Louth Office: 01507 601214
Meridian House, 41 Eastgate,
Louth, Lincolnshire, LN11 9NH

j c consultancy ltd
consulting structural & civil engineers

STRUCTURAL APPRAISAL REPORT

Existing Farm Buildings at;-
Crown Farm,
4 Stockwell Gate West,
Whaplode,
Lincolnshire



Copyright: JC Consultancy Ltd (2017)

Property;-	**Existing Farm Buildings at;-** Crown Farm, Stockwell Gate West, Whaplode, Lincolnshire	**Instructed**;- Nov 2017
Client:-	**F Dring & Son** Crown Farm, 4 Stockwell Gate West, Whaplode, Lincolnshire PE12 6UE	**Survey & Report by**;- J. Ellington BSc. CEng MIStructE MIoD J. Hicks BEng(Hons) MSc, PgDip.CHE, MIoD
Reference:-	JC/17/11/4158	**Issued**:- Jan 2018

Directors
J C Ellington BSc. CEng MIStructE FRSA MIoD
J L Hicks BEng(Hons) MSc. PgDipCHE, MIoD

J C Consultancy is a trading style of **J C Consultancy Limited**
Registered in England 05973101
Trading Address Morgan House Gilbert Drive Boston Lincolnshire PE21 7TQ
Registered Office 75 High Street Boston Lincolnshire. PE21 8SX
VAT Reg. No. 895 1511 07

The Institution of Structural Engineers

STRUCTURAL APPRAISAL REPORT,

Existing Farm Buildings at;-
Crown Farm,
Stockwell Gate West,
Whaplode,
Lincolnshire

Our Ref;- JC/17/11/4158

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 building has survived well considering its age and previous use and is ideal for sensitive restoration and conversion into a habitable dwelling.

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

CONTENTS

1.0 BRIEF

2.0 INTRODUCTION & SCOPE

3.0 GENERAL DESCRIPTION

4.0 OBSERVATIONS AND DEFECTS LOG

5.0 CONCLUSIONS & RECOMMENDATIONS

6.0 PHOTOGRAPHS

1.0 BRIEF

1.1 JC Consultancy Limited was requested by F Dring & Son, to assess and comment on the structural condition of an existing range of barns located at Crown Farm, Stockwell Gate West, Whaplode, Lincolnshire.

2.0 INTRODUCTION & SCOPE

2.1 The barns are located within the grounds of Crown Farm, in a rural location off Stockwell Gate West, in the village of Whaplode.

2.2 The clients own the property and have 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, G R Merchant Ltd.

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 5th December 2017 in order to carry out a structural appraisal survey.

2.6 Weather conditions at the time of the survey were cool 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.

2.12 The performance of foundations may be referred to within this report; however the existing foundation system has only been expected via a single hand excavated trial hole, and as such we cannot guarantee that the foundation system is free from defect throughout.

2.13 The performance of the existing ground strata and general ground conditions may be referred to within this report; however the existing ground conditions have not been inspected therefore comments made will be based on 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.

2.14 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 barns are located within the grounds of Crown Farm, in a rural location off Stockwell Gate West, in the village of Whaplode. The barns are single storey, located in a typical U-shaped arrangement when viewed on plan. The barns are predominantly traditionally constructed, with timber fronted wall panels in part.

3.2 The construction date of the barns is unknown, but they are likely to have been constructed during the late 1800's to early 1900's. They appear to have formerly been used as general agriculture type buildings, for the keeping of livestock and general storage.

The buildings appear to be generally in their original format, however a later single storey Garage and a series of low level pen type structures have been crudely added / adjusted to the South facing elevation, using 'Common' type masonry units.

3.3 The general construction of the barns consist of; -

Duo-pitched Roofs

A cement fibre profiled sheet (Big Six) roof covering over a hand cut roof consisting of timber rafters, trusses, collars, purlins and ties.

External Walls

Predominantly 333mm / 215mm wide, traditional solid wall construction consisting of clay masonry units laid in a lime based mortar with integral piers at door openings. Later single storey Garage and low level pen type structures have been added / adjusted to the South facing elevation, using 'Common' type masonry units.

Internal walls

The internal cross walls are a combination of 215mm wide traditional solid walls consisting of clay masonry units laid in a lime based mortar and a series of braced timber stud partitions constructed off low lever plinth masonry.

Ground Floor

The ground floors were a combination of rough cast concrete floor slabs (specification unknown), brick set and earth floors.

Foundations

Foundations to the original barn consist of a corbelled masonry foundation bearing at a reasonable depth onto a weak mix concrete spreader (specification unknown) cast onto the ground strata below. The foundation detail provides a distribution of foundation loads over a width in excess of 600mm.

3.4 Published Geological records show the building to be within an area where the soil sequence consists of a solid formation of West Walton Formation (Mudstone & Siltstone) overlain by Tidal Flat Deposits (Clays & Silts).

3.5 There are no significant mature trees in adjacent to, or in close proximity to the walls of the barns. A selection of small climber type species have been present on the East facing elevation that is located adjacent the driveway.

4.0 OBSERVATIONS AND DEFECTS LOG

(Read in conjunction with Section 2.14 of this report)

4.1 Roof

- A profiled sheet roof covering is present and appears to have performed well in order to protect the structure from excessive deterioration.
- The ridge did not display any noticeable distortion along its length.
- Rainwater discharge goods are missing in parts.
- When viewed internally, the majority of the purlins, rafters and ties are present and deflection appears minimal. Trusses present appear in reasonable condition.
- No evidence of significant roof spread was noted.
- We observed a small amount of localised decay to timbers around roof valley intersections which is a typical defect on buildings of this nature.

4.2 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 at the corners of the barn.
- Lower levels of masonry adjacent ground level were weathered in parts, presumably from continued wetting and splash back from surface water.
- Localised areas of weathered mortar joints and pointing was noted throughout the elevations.
- Minor cracking over brick arches to door openings was noted.
- A West facing elevation wall is formed using a timber infill panel structure with timber weatherboarding over. The timber panels are constructed off a roughcast concrete plinth at low level.

4.3 Ground Floors

- The floors have been used for the storage of goods, livestock and general agriculture use. As such the condition of the floors reflects this.
- The concrete floor slab had channels cast within and was of unknown construction, however there was no evidence of undue settlement.

4.4 **Foundations**

- The existing foundation was inspected via a single trial hole. Foundations consist of a corbelled masonry foundation bearing at a reasonable depth onto a weak mix concrete spreader (specification unknown) cast onto the ground strata below. The foundation detail provides a distribution of foundation loads over a width in excess of 600mm.
- The ground strata at foundation level appeared of reasonable bearing capacity.
- The superstructure is not displaying any signs that would suggest the foundation system is under excessive stress. The foundations appear to be performing satisfactorily.
- The single storey Garage and low level pen type structures that have been added / adjusted to the South facing elevation, using 'Common' type masonry units, have been constructed in a crude manner off unsuitable rough cast foundations. As such movement of these additions have occurred, and it is assumed within our commentary that these additions will be demolished as part of any proposed scheme.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 The range of barns have survived reasonably well considering their age and previous use and are ideal for sensitive restoration and conversion into a habitable dwelling.

5.2 The buildings basic, rectangular shape, together with the presence of braced cross walls, results in it being a robust structure which can be seen to have only lost a small amount of original fabric during its lifetime.

5.3 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 fabric 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.

5.4 Undoubtedly, there will be some loss of original fabric during any conversion process. This occurs in almost all conversions of this type, and generally cannot be avoided. The majority of loss is usually due to roof members being exposed to the elements during its period of non-use, or masonry walls accommodating significant levels of structural movement. However, having considered the existing arrangement, we feel the overall loss is envisaged to be reasonably low in this instance.

Based on initial visual observations conducted, we estimate that the likely loss of original fabric during the conversion will be as follows;-

Roof Structure – 10-15%	(predominately localised areas of decayed timbers – original roof finish is cement sheeting and has not been considered)
Masonry Walls – 10%-15%	(minor re-build around local deformation, fractures and loss of units during creation of proposed openings).

Note;- The single storey Garage and low level pen type structures that have been added to the South facing elevation, using ‘Common’ type masonry units, have been constructed in a crude manner off unsuitable rough cast foundations. As such movement of these additions have occurred, and it is assumed within our commentary that these additions will be demolished as part of any proposed scheme. As these elements are not original they have not been considered within the figures noted above .

5.5 Roof Structures

The roof structure appears generally sound and in a reasonable condition. The roof appears well tied with a combination of king post trusses and collar ties present.

The current roof covering is extremely lightweight, and we do anticipate that some strengthening works will be required in order to accommodate a heavier tile / slate finish. However, loss of original timbers is likely to be low and additional rafter / purlin timbers can be introduced to enhance the overall performance of the roof structure. New felt and insulations will need to be installed in accordance with the architect's requirements and roof specifications.

There is a lack of suitable rainwater discharge downpipes throughout which has resulted in the localised wetting of masonry. Rainwater goods should be repaired / installed throughout all areas of the barn complex to allow reliable discharge of rain water.

As per usual in a conversion of this nature, allowance should be made for the repair of any decayed timbers, many of which may be hidden until works commence. Most fatigued timbers will occur where they have been exposed to continued wetting or are in contact with masonry elements. We observed a small amount of localised decay to timbers around roof valley intersections which is a typical defect on buildings of this nature.

Allowance should be made for localised repair of decayed valley timbers, together with more general inspection and repair of any decayed rafter feet, purlin and beam ends and wall-plates.

5.6 Walls

The walls to the original barn construction are predominantly sound and require little attention. The walls are single storey with low height to thickness ratios, and as such do not appear to have been subjected to any form of significant stress. Internal cross walls and robust braced timber partitions have assisted in the overall stability of the building over its lifetime.

Minor fractures require repair, and small areas of localised re-build may be required where individual brick units have failed.

The performance of any masonry panels suffering minor fractures, localised cracking etc. can be improved by low key stitching using the 'Helifix' masonry repair system, which involves installing remedial 'Heli-bar' rods into the bed joint of the masonry at regular vertical centres. We recommend that allowance is made for the application of this system to localised areas of all masonry panels.

This technique can be used to stitch cracks, tie any partitions that have become disconnected from flank walls and repair masonry arches. In addition, the system can also be used to provide restraint between masonry walls and timber floors. 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 areas of weathered masonry joints were prevalent amongst the elevations and should be repointed in a similar fashion. In this instance we do recommend that allowance is made for all elevations to be repointed at planning and tender stage, however, during works each panel can be considered in its entirety and may only require localised areas of repointing upon further investigation.

Any defective timber lintels and arch backing timbers should be replaced throughout. Any timber wall plates, and previous feed bin / troughs that are present within the walls should be removed and replaced with remedial brickwork infill.

A West facing elevation is formed using a timber infill panel structure with timber weatherboarding over. The timber panels are constructed off a roughcast concrete plinth at low level. If a timber panel arrangement is to be incorporated into any proposed scheme, allowance should be made for the removal of the existing concrete plinth and construction of a suitable plinth at low level, together with substructure walling off a suitable cast foundation.

5.7 Ground Floors

The existing ground floors are a combination of previously replaced concrete slabs, brick sets and earth. The floors are at varying levels throughout the range.

We recommend that allowance is made to replace all ground floors with a ground bearing, concrete ground floor slab that is suitable to accommodate loadings from the proposed use, including partitions. Slabs should be installed at levels to suit architects' requirements, and should incorporate suitable DPC, insulations and screeds to the architects' specification.

Whilst the new floor slabs will need to be placed upon a hardcore sub-base, we recommend care should be taken during any excavation and installation of sub-bases. The existing foundations should not be undermined or disturbed as part of the sub-base installation, and we recommend that the slabs are engineer designed in order to achieve suitable performance whilst keeping slab thickness and sub-base requirement to a minimum.

5.8 Foundations

The existing foundation was inspected via a single trial hole. Foundations consist of a corbelled masonry foundation bearing at a reasonable depth onto a weak mix concrete spreader (specification unknown) cast onto the ground strata below. The foundation detail provides a distribution of foundation loads over a width in excess of 600mm. Based on our initial observations of the foundation, we do not foresee that any form of underpinning or foundation enhancement is required to the majority of the existing barns, as long as additional load being placed upon them as part of any conversion is controlled to a minimum.

As discussed previously, one of the West facing elevations is formed using timber infill panels. Depending on the proposed scheme, allowance should be made for the introduction of a new concrete strip foundation at this location, in order to provide support for remedial substructure and plinth masonry.

5.9 Finally, whilst reference to damp is outside the scope of this report (see 2.9), it appears that the structure has suffered from a degree of water penetration over the years. In addition, due to the large quantities of timbers within the complex, the likelihood of insect / beetle attack on a small number of the timbers is high.

As such it is essential that advice and any required treatment from specialists in the field of damp and timber decay should be carried out in conjunction with the conversion, in order to ensure that damp and timber decay are not trapped within the fabric post completion.

JC Consultancy Limited
Consulting Structural Engineers

January 2018

6.0 PHOTOGRAPHS.



Photograph # 1
North Facing Elevation



Photograph # 2
North – West Facing Elevation



Photograph # 3
West Facing Elevation



Photograph # 4
South Facing Elevation



Photograph # 5
West Facing Elevation (timber Infill Wall Panels)



Photograph # 6
Low Level Pens – Adjusted Masonry – Later 'Common' Units



Photograph # 7
East Facing Elevation



Photograph # 8
East Facing Elevation – Later Garage constructed using 'Common' units



Photograph # 9
Typical Roof



Photograph # 10
Typical Roof – Decay at Valley Intersection.



Photograph # 11
Typical Ground Floor



Photograph # 12
Typical Foundation

END OF REPORT