Structural Appraisal
Of
Barns at grid Ref: TF190250
Leaves Lake Drove
West Pinchbeck
PE11 3QJ

Client: Pat Lewis & Sons
100 Star Lodge Drove
West Pinchbeck
Spalding

Date: November 2017

Engineer: STEVEN KIDD BSc,CEng,FIStructE

1.0 **Synopsis and Terms of Reference**

As part of the planning application for conversion of the barns to domestic accommodation, the following report was commissioned in order to gauge the structural integrity of the existing structures.

The report is therefore linked to structural matters only. Related issues such as damp penetration, timber rot and drainage are not covered here. Specialist advice should be sought where appropriate on these items.

Although existing foundations where exposed in four specific locations the report is based on a visual inspection only. No materials where tested or stress calculations carried out. However reasonable access to all sections was possible.

Finally this report should not be copied without the clients permission.

2.0 Survey

2.1 Introduction

As indicated by photographs given in the appendices the site comprises of a high barn with hay loft and two single storey brick buildings. In addition a single storey barn abuts the rear of the high barn. The majority of the enclosing wall has fallen down. The site is remote from any village being located in the middle of a typical fenland field; prevailing ground conditions here have been found to be heavy clay. The construction of the structures follows traditional lines with English bonded walls in lime mortar, supporting handmade timber roofs. The structures are of late Victorian origin.

2.2 Main Barn Appraisal

2.3 Roof

2.4 The two storey section has an asbestos roof supported by timber purlins. The roof timbers may have to be strengthened to carry new loads imposed by pantiled roof.

2.5 The ridge line of the two storey is running straight and the true indicating structure is satisfactory.

2.6 Walls

2.7 The walls are generally plumb and true, with no cracks. However the arches over the entrance and the area under the hay loft floor have cracked (see photo in appendices).

2.8 The external walls are in 1 ½ bricks in lime mortar. It is considered these barn walls are suitable for change of use to domestic purpose.

2.9 Internally the walls support a first floor hay loft. These are of similar construction and in good order.

2.10 **Floors and Foundations**

2.11 The Hay loft timber floor, both sections are 150 x 25 joists at 400mm centres supported mid span by a 250x150 splitter beam. This beam is suffering from dry rot and is not considered suitable for re-use, however the typical joists are satisfactory.

2.12 Foundations to the high level barn where exposed and recorded in the appendices to this report. These are traditional corbelled brick work footings founded on a good stiff clay 750mm below ground. A 200mm projection was measured here

2.13 The stiff clay underlying structure although giving a good bearing capacity is prone to change in volume due to changes in moisture content. This is a factory in the continued stability of the foundation - see conclusions and recommendations.

2.14 **Single Storey Section of Main Barn (rear)**

2.15 **Roof**

2.16 As indicated by photographs appended to this report the original lath and plaster for the most part is still in place and supported by a traditional arrangement of jack rafter purlins and collar tied principles.

2.17 The roof is in good order (except for large areas of plaster missing) with a straight ridge line.

2.18 **Walls**

2.19 The walls to this barn are also in good order being of similar construction to the high barn except 225mm thick. However the archway from this section into the high barn has settled and so cracked above the arch.

2.20 **Floors and Foundations**

2.21 The foundation exposed to the single storey section of the main barn is much less substantial than the high barn, being only 150mm below ground – see TH 2 in appendices.

2.22 A rough cast concrete ground floor slab is in place here.

2.23 **Two Separate Brick Outbuildings**

2.24 The two further structures and boundary wall may be classified as in a dilapidated state having numerous significant cracks and unstable roof structures. Photographs in the appendices show various aspects of these structures.

2.25 Whilst it is considered possible to reinstate the brick boundary wall reinstatement of the two outlying structures will require substantial re-building.

2.26 Both of these structures have shallow brick foundations very sensitive to changes in clay volume with moisture content.

3.0 **Conclusions and Recommendations**

3.1 From the evidence gained on site and with reference to the Institute of Sturctural Engineers report "Subsidence of Low Rise Buildings – 2nd Edition" The high barn may be said to be in a stable condition suitable for change of use for domestic accommodation.

3.2 However to Improve the margin of safety against further movement it is recommended an internal foundation raft cast at ground floor level and positively connected into the main walls by dowels (refer to sketch in appendices).

3.3 Timber sections should be checked and where appropriate enhanced to carry new loadings imposed.

3.4 Cracked arches to the main barns should be repaired using Helibar methods of stitching cracks and repointing in a lime based mortar.

3.5 To improve the soil drainage and hense stability of the structure it is recommended a perimeter land- drain is installed located in a pea gravel trench.

3.6 The ancillary structures may be repaired in a similar way however new roofs are required here together with some re-building of the walls.

3.7 If after the repair work is carried out to a satisfactory standard a Structural Adequacy Certificate may be issued for a nominal fee.



STEVEN KIDD BSc,CEng,FIStructE

Appendices

1 **Photographs**

a. General View – High Barn
b. Cracked Entrance Arch
c. View of Hayloft timbers
d. Roof of single storey section to main barn
e. Trial Hole

2. Record of Trial Holes

3. Detail of Internal Raft.







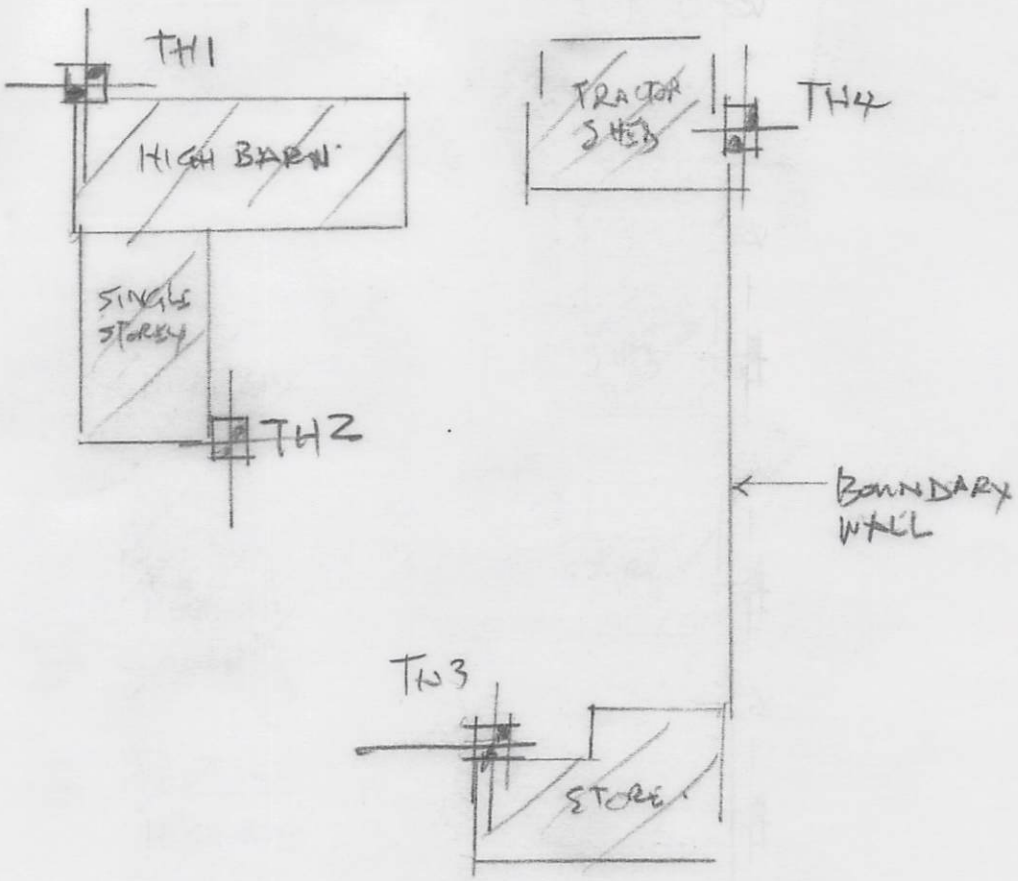




SOUTH LINCS CONSULTING©
10 Bear Lane
Pinchbeck
Spalding
Lincs.
PE11 3XA
T: 01775 769 563
F: 01775 710 758
E: enquiries@southlincsconsulting.com

Idty No.
DESCRIPTION
BARNS @ GRID
Ref TF190250
LEAVES LAKE DROVE.

Ref No.	17-0357
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By	SK
Ckd.	
Date	DEC 2017



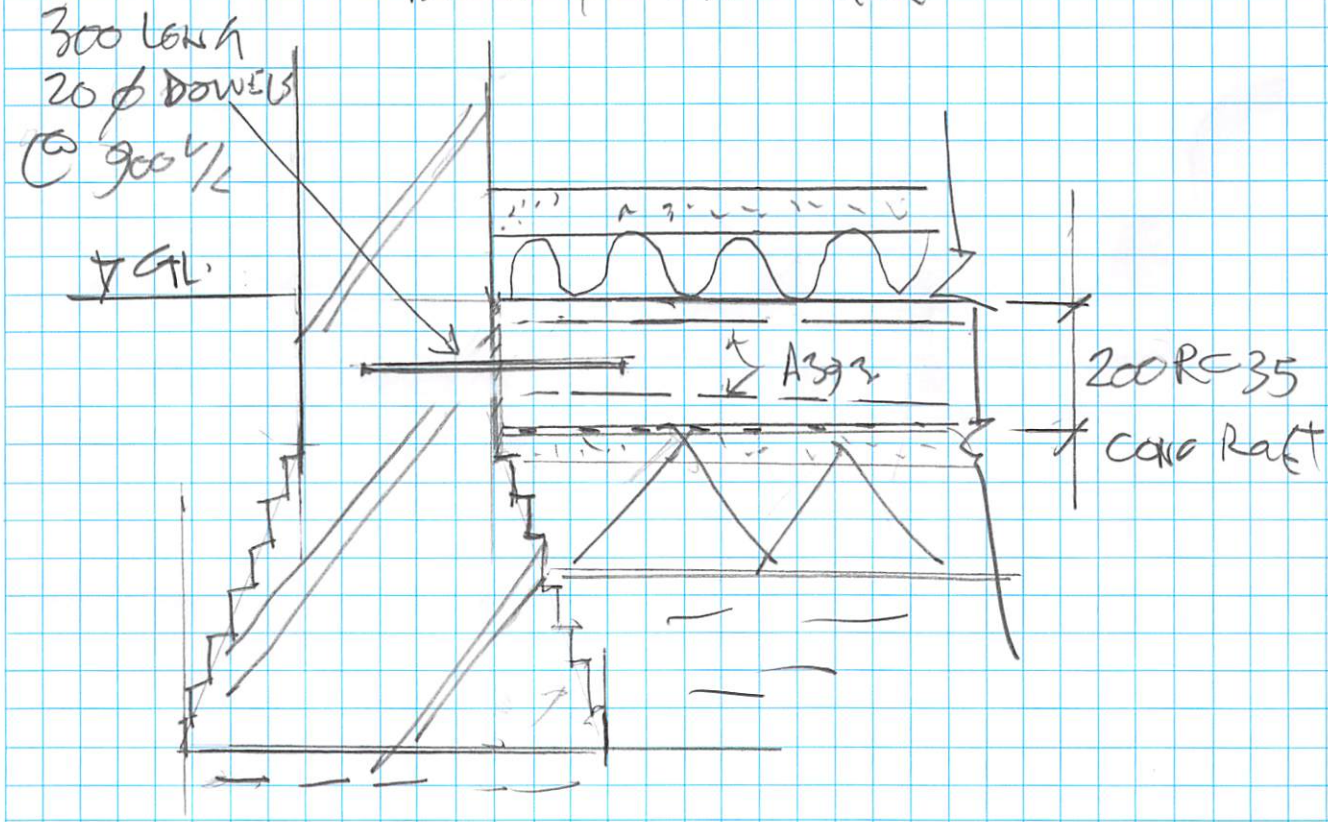
LOCATION PLAN FOR
TRIAL HOLES

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10 Bear Lane
Pinchbeck
Spalding
Lincs.
PE11 3XA
T: 01775 769 563
F: 01775 710 758
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BARN FOUNDATIONS
LEAVES LAKE DRIVE
WEST PINCHBECK

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PROPOSED INTERNAL RAFT TO BE ADOPTED ON MAIN BARN & OUTRIGGER



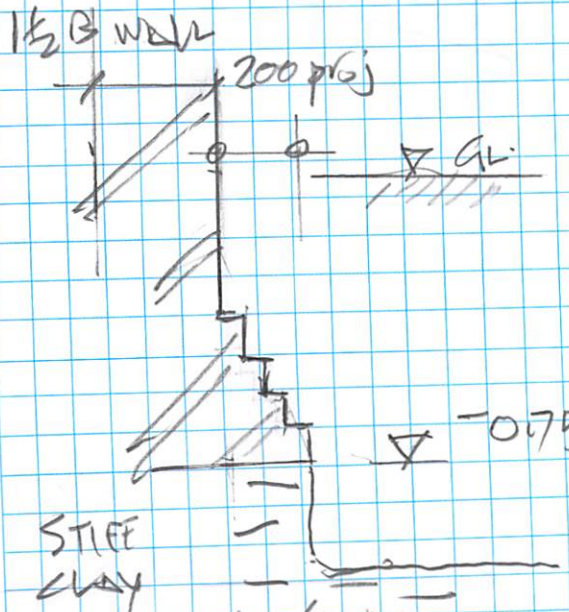
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10 Bear Lane
Pinchbeck
Spalding
Lincs.
PE11 3XA
T: 01775 769 563
F: 01775 710 758
E: enquiries@southlincsconsulting.com

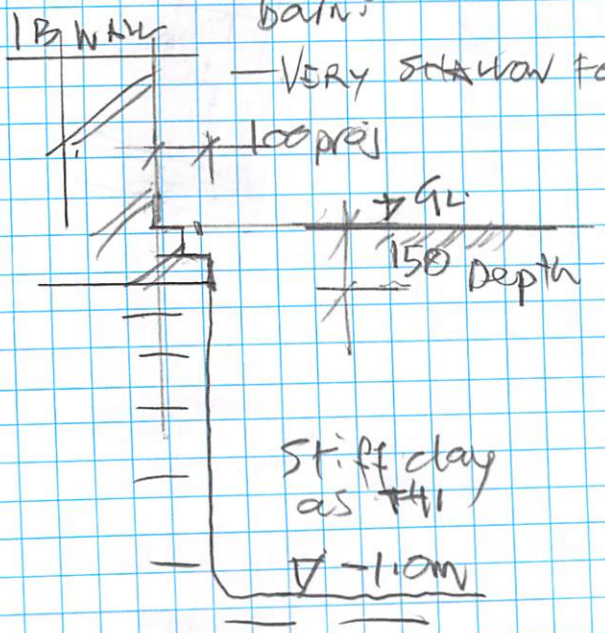
BARNS @
LEAVES LAKE DROVE
WEST PINCHBECK

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Date	DEC 2017

TH1 : MAIN BARN

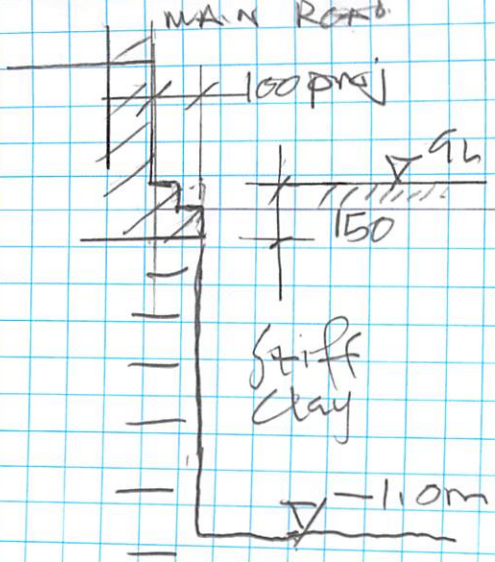


TH2 : outrigger to main barn.



TH3

Very shallow
BUILDING NEAREST MAIN ROAD.



TH4

Moderate found to implement shrub.

