

Structural Inspection

**Random Cottage
Beck Bank
West Pinchbeck**

January 2015



MK Design Associates
Consulting Structural and Civil Engineers

1.0 Introduction

- 1.01 Further to instructions received the Author undertook an inspection of Random Bank Cottage, located along Beck Bank in West Pinchbeck, on Friday 30th January 2015
- 1.02 This practice has been commissioned to inspect and comment on the structural condition of the front wall of the property which it is hoped can be retained
- 1.03 The scope of the investigation has been limited to a visual structural inspection of the premises from ground level and to give general conclusions regarding the structure rather than a list of defects.

2.0 Property Description

- 2.01 The property is located between the main Beck Bank road and Hammond Beck at the rear of the property, and is a semi-detached two storey dwelling.
- 2.02 The property is traditionally constructed with a cut timber pitched roof and solid brickwork external and internal walls and timber first floors
- 2.03 The site topography is flat. A large mature willow tree is present at the North end of the site.

3.0 Ground Conditions

- 3.01 Published ground conditions for the area indicate that the site is located on geographically recent drift deposits known as Terrington Beds. These are present all around the Spalding and Boston areas and consist mainly of soft clays and silts. This subsoil has poor loadbearing characteristics and can be affected by tree roots and leaking drains
- 3.02 Whilst published geological information and local knowledge are useful in assessing any given site, the precise geotechnical/geological conditions cannot be determined without undertaking such laboratory testing, trial holes and boreholes as directed by The Engineer, as necessary.

4.0 Defects/Comments/Discussion

- 4.01 We were originally commissioned to do a structural inspection of the property as a whole which we did in December 2014. The client at that time wanted to refurbish the existing structure rather than rebuild most of it. We were originally asked to produce recommendations for remedial work but after our inspection it became clear to us that there were too many issues regarding the existing structure to be able to practically and economically repair the existing building , and so we were unable to complete our report at that time. A copy of of our site survey notes are included in the appendix of this report.
- 4.02 In January 2015 partial demolition had commenced but the front wall of the cottage has been retained in accordance with the original planning consent. The builder had concerns about the stability of the front wall and we were called in to inspect it.
- 4.03 In the current situation the roof has been removed but the wall is partially braced at mid-height by the existing first floor which spans across to the rear wall which has been demolished down to first floor level.
- 4.04 The top of the front wall has been subjected to lateral forces due to inadequately tied roof construction (i.e. roof spread). The central first floor windows is a weakness so the area of the masonry either side of the windows has "bulged" out very significantly. (The photos do not really show this clearly), so that the top of the wall is leaning outwards as well as bulging. To a certain extent this movement is historical as the vertical cracking due to this spread is visible between the windows (plate 2) has been repointed and has not reopened. So although the movement is not ongoing/progressive the past movement has considerably weakened the wall.

- 4.05 It is clear from Plate 3 that in addition to lateral displacement due to roof spread a very significant amount of vertical displacement is present. The cause of this displacement is not clear but at least some of the movement can be attributed to initial settlement on the soft subsoil. There has obviously been some movement since but the absence of cracking internally on this wall suggests that little movement has occurred since the last redecoration. It is likely to be related to increasing moisture extraction from the trees on the other side of Beck Bank Road with the rate of increase of the extraction reducing as the trees have been matured. This movement has also resulted in a weakened structure where the wall is now completely divorced from its' return buttress as can be plainly seen on Plate 3.

The wall is built directly off the soft subsoil with no spread footing and so has very little resistance to any further disturbance and very little resistance to overturning

5.0 Summary of Conclusions & Recommendations

5.01 We can confirm that the property as a whole has suffered very severe structural movement which may be classified as Category 5 in accordance with BRE Digest 251 (See table 6.2). We were unable to make any recommendations in our original inspection for remedial work despite the owner wishing to refurbish rather than rebuild. The owner has now accepted that he needs to rebuild.

5.02 The original planning condition is based on retaining the left hand side of the elevation by underpinning it using a piled solution. We can confirm that in the Authors' opinion it is not a safe or practical option to do this for the following reasons:

- i) This part of the wall has suffered Category 5 movement in the past which has weakened the wall, removed it from its buttress returns, and resulted in a significant lean.
- ii) The cause of the movement is related to roof spread and ground subsidence exacerbated by the absence of proper foundation and poor ground conditions.

Piling or any form of underpinning is likely to disturb the existing highly sensitive structure and the risk of collapse is very high.

In the Authors opinion the wall does not have sufficient horizontal stiffness (which the vertical cracking destroys) to span between temporary raking shores and the disturbance caused by erecting the shores may precipitate collapse .

We, therefore, recommend that the wall is demolished and rebuilt off a proper foundation with reclaimed material.

Signed: 

Mike Kirkham BSc (Hons.), C.Eng.M.I.Struct.E.

Date: 2 February 2015

MK Design Associates

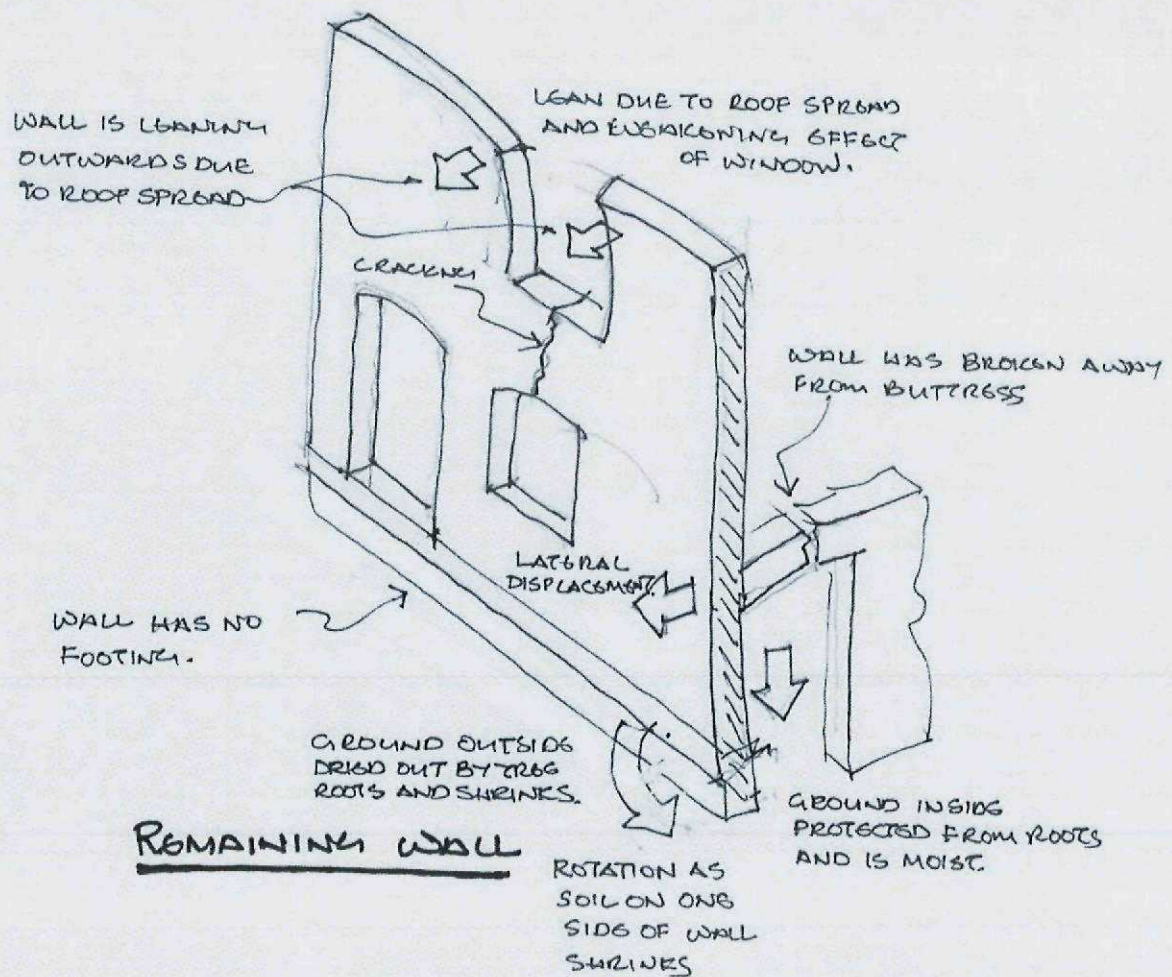
Consulting Structural and Civil Engineers
Telephone 01778 570117 Fax 01778 571507

Sketch Sheet

Job No
61118

Sheet No
SK02

Project-Random Cottage Pinchbeck



WALL IS BASICALLY FREE STANDING WEAKENED UNBUTTRESSED STRUCTURE
LEANING OUTWARDS BUILT DIRECTLY OFF SUBSOIL WITH NO
FOUNDATION OFF POOR F&N SOIL.



Plate 1 – View from front elevation



Plate 2 – Close up showing repointed cracking on front elevation



Plate 3 – View on end of wall showing vertical and lateral displacement



Plate 4 – View from rear



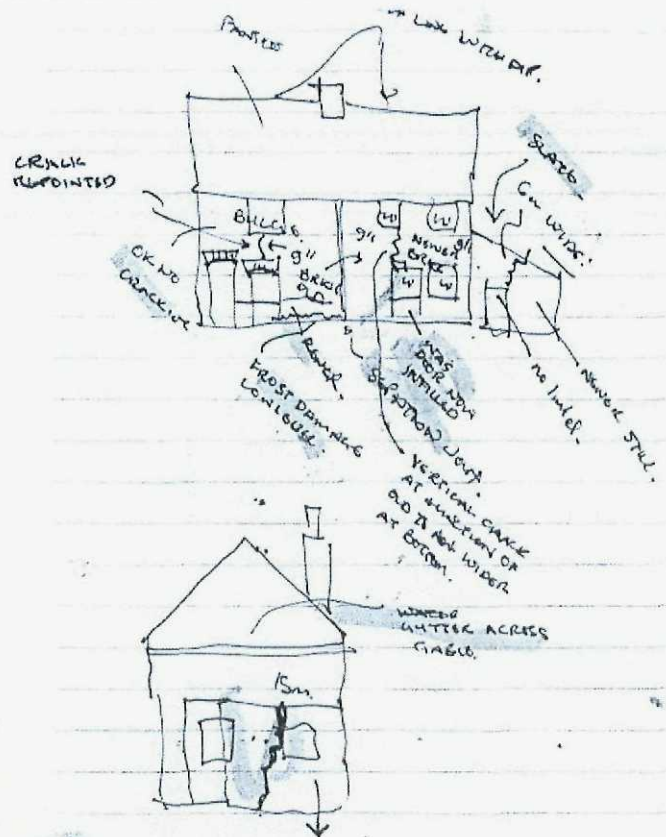
Plate 5 – Trial pit against front elevation

BRE Digest 251

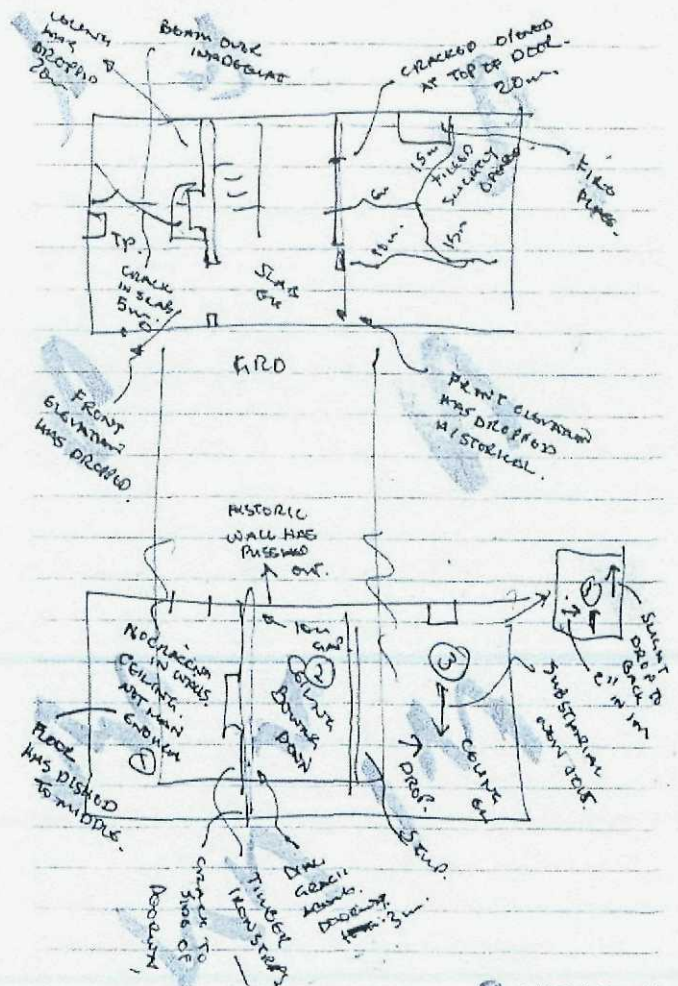
Table 6.2 Classification of visible damage to walls with particular reference to type of repair, and rectification considerations.

Category of damage	Approximate crack width	Definition of cracks and repair types/considerations
0	Up to 0.1	Hairline – Internally cracks can be filled or covered by wall covering, and redecorated. Externally, cracks rarely visible and remedial works rarely justified
1	0.2 to 2	Fine – Internally cracks can be filled or covered by wall covering, and redecorated. Externally cracks may be visible, sometimes repairs required for weather tightness or aesthetics. Note: Plaster cracks may in time become visible again if not covered by a wall covering.
2	2 to 5	Moderate – Internal cracks are likely to need raking out and repairing to a recognised specification. May need to be chopped back and repaired with expanded metal/plaster then redecorated. The crack will inevitably become visible again in time if these measures are not carried out. External cracks will require raking out and repointing, cracked bricks may require replacement.
3	5 to 15	Serious – Internal cracks repaired as for moderate, plus perhaps reconstruction if seriously cracked. Rebonding will be required. External cracks may require reconstruction perhaps of panels of brickwork. Alternatively, specialist resin bonding techniques may need to be employed and/or joint reinforcement.
4	15 to 25	Severe – Major reconstruction works to both internal and external wall skins are likely to be required. Realignment of windows and doors may be necessary.
5	Greater than 25	Very severe – Major reconstruction works, plus possibly structural lifting or sectional demolition and rebuild may need to be considered. Replacement of windows and doors plus other structural elements, possibly necessary. Note: Building and CDM regulations will probably apply to this category of work.

West Finchbeck



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Conditions

No part of this report should be read in isolation, and in all cases the completed document including these conditions should be carefully examined before acting on this report. In particular Section 5 should be read in conjunction with Section 4.

The survey is based on a visual examination of the structural fabric of the property. Only structural faults that are exposed to view can be reasonably expected to be detected. No attempt has been made to remove or break away finishes or to remove vegetation or furniture that may be hiding defects. To do would constitute unreasonable intrusion.

Only significant structural defects will be noted. The intention of the survey is to identify these not to produce a long list of every blemish on the property. Advice on damp penetration into the structure does not form part of this survey.

Likewise a detailed examination of timbers for rot or beetle attack is beyond the scope of this report. The roof structure will usually be viewed from the loft hatch only as the presence of insulation makes the roofspace a hazardous environment.

Minor hairline cracking may not be mentioned in the report if it is not considered significant. In addition minor cracking that is obvious on a sunlit face may not be visible in overcast conditions.

Manhole covers would not normally be lifted unless it is suspected that the drains undermine the house foundations.

Internally cracking may be masked by recent redecoration. You are advised to check with the local authority to check if any underpinning work has been carried out and to ensure that any alterations or extensions made to the property have received building regulation and planning permission.

Visual examination of a defect can often enable an experienced Engineer to suggest a cause or possible causes of the defect. This diagnosis is made on the basis of limited visual evidence only and can only be truly verified by further Invasive examination.

Whilst every care is taken during the examination of the property, no responsibility is accepted if very badly damaged material breaks away on touch.

The contents of this survey are confidential. No third party should have access to the contents of this report without written permission from this company.

The survey can only comment on structural matters. No examination will be made of the heating system, the plumbing or the electrics. Outbuildings that are not attached to the main building will not be examined unless we are specifically asked to do so. Garden walls or boundary walls will not be examined and do not form part of this report.

No attempt will normally be made to gain access to a neighbour's property or to any fenced off area to view the building.

Older properties were often built to much lower standards than those that operate today and with foundations that are often shallow. Bulging walls and deflecting timbers that are often seen as part of the character of an older property would not be tolerated on a newer building. Cyclical movement with cracks opening and closing can often occur in this type of property and this form of movement is not usually considered to affect the structural stability of the building. If there is no evidence of recent progressive movement then older properties are given a sympathetic treatment on the strict understanding that a prospective purchaser should not expect the same level of performance they would get from a new property.

Conversion of an existing building or barn is a major undertaking very little of the existing structure will be suitable for a conversion without modification ie extra insulation etc. In many cases the cost of converting an existing building is equal to or more than the cost of new build.