UNIT 3

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STRUCTURAL INSPECTION

OF

BARN BUILDINGS

AT

CLIFF HOUSE FARM

FOR

MR D DAWSON

Date of Inspection **13th February 2011**

Reference No. **11/101**

1.0 INTRODUCTION

1.1 General

1.1.1 The EPOC Group was appointed by Mr D. Dawson to carry out a structural appraisal of Barn Buildings at Cliff House Farm

1.1.2 The following report shall be for the sole use of Mr D Dawson this report should not be reproduced in whole or in part or relied upon by third parties for any use without the expressed written authority of The Epoc Group. This exclusion shall not apply to any party acting for Mr D. Dawson having a strictly professional interest in the specific matters to which this report relates.

1.1.3 This report relates only to the following barn buildings
a) Laith Barn (excluding block built structure to Southern elevation)
b) Eight Cattle Barn
c) Three Cattle Barn
d) Tractor Shed

1.1.4 This report is based on an inspection of visible, exposed and accessible parts of the structural fabric of the barn buildings under consideration.

1.1.5 The objective of this report is to establish the structural condition of the barn buildings and make recommendations for remedial works to convert into dwellings.

1.1.6 Cliff House Farm is located approximately 2.0kM South of Penistone in South Yorkshire.

1.1.7 Access to the site is via an unmade track off Mortimer Road

1.1.8 The inspection was carried out on 22nd February 2011. At the time of the inspection the buildings were being used to house livestock and store hay.

1.1.9 The site consists of four barn buildings and a farmhouse. The farmhouse was occupied at the time of the inspection and does not form part of this structural report.

1.1.10 To the clients knowledge neither the barns nor the farmhouse are listed.

1.1.11 The Cliff House Farm dates back to pre-1850.

4.0 THREE CATTLE BARN

4.1 OBSERVATIONS

4.1.1 General Observations

4.1.1.1 The barn building comprises brickwork walls supporting a timber roof. At the time of the survey the roof was covered with grey slate tiles.

4.1.1.2 The barn has a blockwork extension to the North elevation

4.1.1.3 The barn forms a complex of buildings on Cliff House Farm.

4.1.1.4 Ground is level to the South elevation but is higher than on the remaining three elevations making the South elevation a retaining wall.

4.1.1.5 There are many large trees surrounding the barn building within a 7.00m radius.

4.1.2 East Elevation

4.1.2.1 This is a gable wall and is constructed in red brickwork 225mm thick. The elevation is generally in good condition with no cracking or movement noted. **(Photograph 39)**

4.1.2.2 The pointing to this wall is in poor condition with mortar loss from joints of up to 25mm.

4.1.2.3 To the North East corner there is a 325mm x 100mm external pier to strengthen the wall.

4.1.2.4 At the North end of this elevation there is a block built lean-too section clad in timber. This section is in reasonable condition and is of more recent construction.

4.1.2.5 The verges are constructed in timber and are in reasonable condition.

4.1.2.6 There are three large trees located within 7.0 metres of this elevation one is only 2.0 metres away. **(Figure 5)**

4.1.2.7 A plastic rainwater pipe runs along this elevation picking up rainwater from a gutter to the North elevation.

4.1.3 West Elevation

4.1.3.1 This is a gable wall and is constructed in red brickwork 225mm thick. The elevation is generally in good condition with no cracking or movement noted. **(Photograph 40 & 41)**

4.1.3.2 The pointing to this wall is in poor condition with mortar loss from joints of up to 25mm

4.1.3.3 To the North East corner there is a 325mm x 100mm pier to strengthen the corner.

4.1.3.4 At the North end of this elevation there is a block built lean-too section. This is in reasonable condition and is of more recent construction.

4.1.3.5 The verges are constructed in timber and are in reasonable condition.

4.1.3.6 There are two large trees located within 5.0 metres of this elevation one is only 2.0 metres away. **(Figure 5)**

4.1.4 South Elevation

4.1.4.1 The South elevation constructed in red brickwork and is 225mm thick. This wall is in good condition with no signs of cracking, settlement or bulging. **(Photograph 42)**

4.1.4.2 The pointing to this wall is in poor condition with mortar loss from joints of up to 25mm

4.1.4.3 There are three piers measuring 225mm x 100mm at quarter point along this elevation acting to strengthen the wall.

4.1.4.4 There is a plastic gutter and rainwater downpipe to this elevation. Both are in good condition. The gutter is fixed to a timber fascia that is in fair condition.

4.1.4.5 A trial pit was dug on this elevation and extended down approximately 600mm below ground level (**Figure 3**). At the base of the trial pit a weak concrete footing to the brickwork wall was observed. This concrete was only 150mm thick and did not extend beyond the line of the wall. The ground encountered was gravelly weathered Sandstone with some clay content. The trial pit contained large amounts of tree roots some up to 50mm diameter. **(Photograph 43)**

4.1.5 North Elevation

4.1.5.1 The North elevation constructed in unfinished concrete block. This wall is in reasonable condition and showed no signs of cracking or movement. **(Photograph 44)**

4.1.5.2 This elevation is of a newer construction than the original brick built building.

4.1.5.3 There are two windows and two doors in this elevation that are in good condition

4.1.5.4 There is a plastic gutter to this elevation but no rainwater downpipes

4.1.6 Roof

4.1.6.1 The roof is a duo pitch with gables on the East and West elevations.

4.1.6.2 The roof is covered in slate tiles with clay ridge tiles which are in good condition and intact over it whole length except a small patch in the South East corner. There is no under felt to the roof. **(Photograph 44 & 45)**

4.1.6.3 The ridge line is level with no missing or loose tiles.

4.1.6.4 The roof slopes are also linear with no sagging or undulations.

4.1.6.5 On the North elevation the roof to the blockwork extension is formed in light gauge steel sheeting and is in good condition. **(Photograph 44)**

4.1.6.6 The roof structure consists of timber trusses at quarter points span between the North and South elevations. The trusses support purlins located a midpoint of the roof slope which in turn support timber rafters. All the timbers are in good condition and are free from signs of insect infestation or rot. **(Photograph 46 & 47)**

4.1.7 Internal Observations

4.1.7.1 The walls internally are constructed in coursed red brickwork. Where visible they are in good condition and showed no signs of cracking or movement. **(Photograph 47)**

4.1.7.2 Large section timber columns support the bearings of the main timber trusses along the North side of the barn. These are in good condition with no signs of insect infestation of rot.

4.1.7.3 Timber beams supported the ends of the rafters to the main barn and extension roof and were supported by the large section timber columns. The beams are in good condition with no signs of insect infestation of rot. **(Photograph 48)**

4.1.7.4 The floor of the barn was constructed in concrete. Floor levels in the barn where made up of additional layers of concrete placed on the main slab. The condition of the floor could not be fully assessed due to livestock bedding. Where it was visible no cracking or movement was observed.

4.1.7.5 Headroom to the underside of the trusses was approximately 2400mm.

4.2 DISCUSSION

4.2.1 Overall the barn is in good condition.

4.2.2 The external walls to all the elevations are in very good condition with no major settlement or movement. It must be noted that the concrete blockwork extension to the North Elevation is to be demolished as part of the barn refurbishment.

4.2.3 Generally, the pointing was in poor condition with large areas showing 25mm of mortar loss.

4.2.4 Rainwater gutters are in fair condition and carried rainwater to water butts.

4.2.5 The timber roof structure was generally in good condition with no insect infestation or root noted. The roof showed no signs of distress or permanent deformations.

4.2.6 The slate tiles were intact over the whole roof area and were in good condition except for a small patch of damage on the South East corner. No under felting was present.

4.2.7 Timber windows and doors were in good condition.

4.2.8 The trial pit that was dug on the South elevation revealed that the foundations were fairly shallow (600mm below ground level). It should be noted that at the location of the trial pit the ground level on the South elevation was higher than the North elevation. Excavation of a trial pit on the North elevation could not be undertaken to investigate this due to the presence of a concrete slab. The ground encountered was gravelly weathered Sandstone with some clay content. The trial pit contained large amounts of tree roots some up to 50mm diameter.

4.2.9 Although no movement was noted in may be prudent to carry out further investigations to determine the exact extent of the barn foundations.

4.2.10 Large trees were located within 5.0 metres of the barn. One in particular was located only 2.0 metres from the West elevation. This tree has large branches that reach over the barn and pose a safety risk if they fall. No major cracking or movement was noted the West elevation in the vicinity of the tree. Due to the granular nature of the subsoil the barn may not suffer movement due to seasonal moisture changes caused by the trees. In addition, the building is of more recent construction than the other barn buildings and may have been built after the trees matured.

4.2.11 Internally the walls were in good condition and showed no signs of movement. They are 225m thick and would require studding and insulating internally to comply with building regulations

4.3 CONCLUSIONS

4.3.1 The barn structure is generally in good condition and suitable to be converted to a dwelling. The walls are in good condition and there are no signs of any movement

4.3.2 All the external walls should be repointed in lime based mortar.

4.3.3 The timber roof structure is in good condition. The Structural adequacy of the roof timbers should be assessed for the new loading regime.

4.3.4 The existing slate tiled roof should be removed and new under felt installed. If serviceable the existing tiles can be reinstalled. New gutters and downpipes should also be installed.

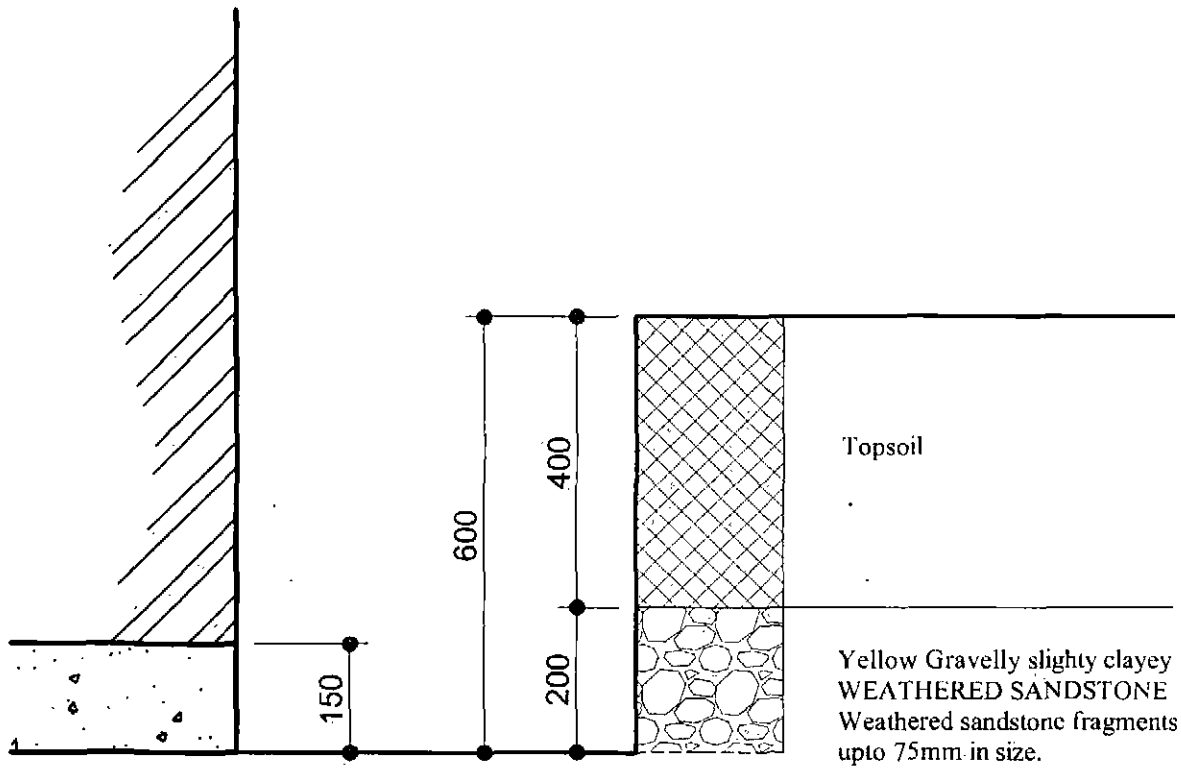
4.3.5 The foundations to the external walls to the North elevation are fairly shallow. At present the structure is stable and the foundations appear to be capable of withstand the existing loads. As the proposal is to convert this barn to a bungalow loading will not increase and the structure should be capable of withstanding the proposed loading regime. However, there is the possibility that the walls are built of the floor slab. This should be further investigated and if inadequate an underpinning solution designed.

4.3.6 The quality of the construction of the existing floor is unknown and should be replaced with a fully designed solution incorporating a damp proof membrane.

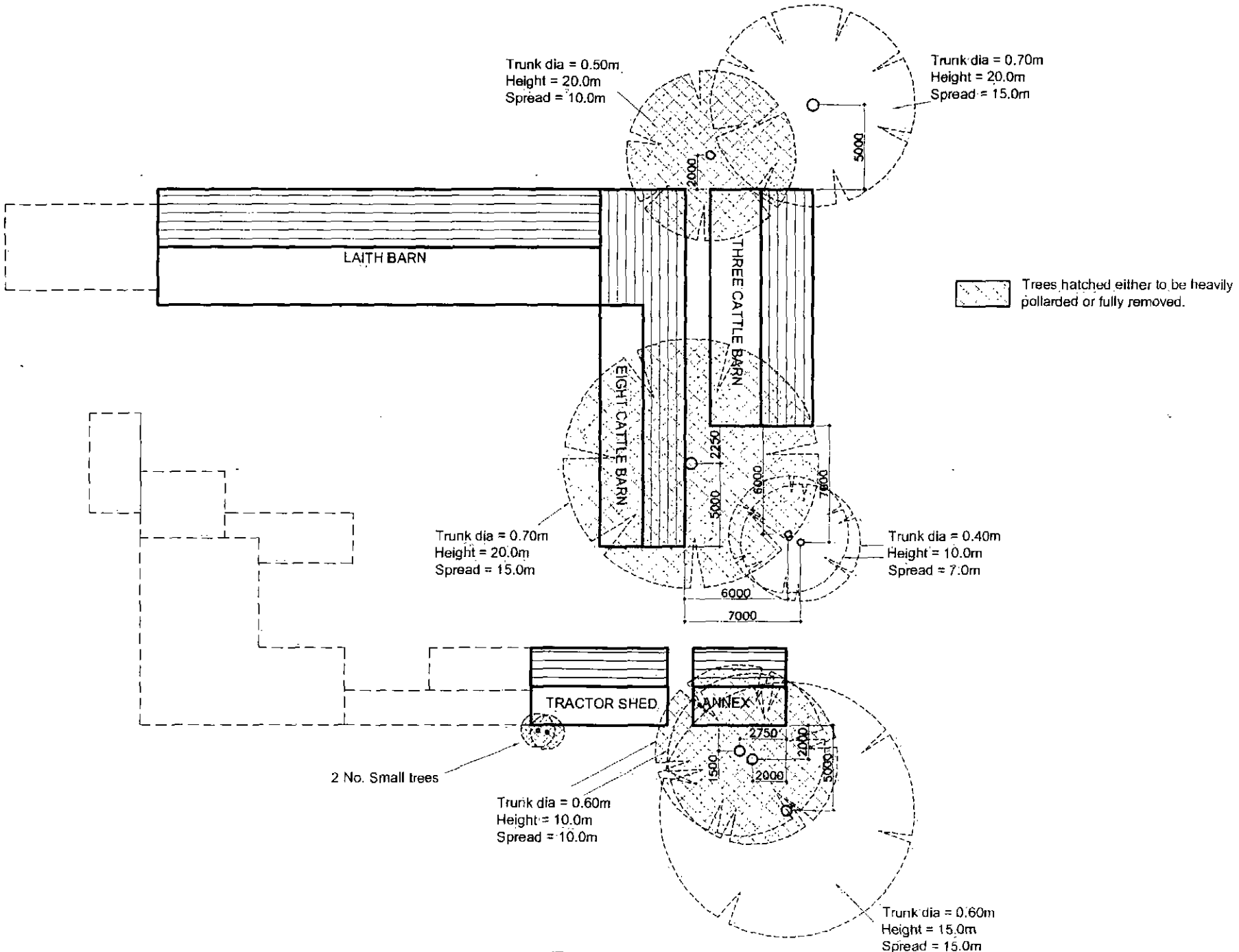
4.3.7 The three existing trees located within 5.0 metres of the barn should be pollarded. The trees located 2.0 metres from the barn should be cut back such that no branches extend over the barn for safety reasons. Removal of these trees is also considered an option. Advice should be sort from an arboriculturist on how to remove the tree to prevent distress and damage to the existing structure.

It is recommended that the following work is carried out to allow the barn to be converted to a dwelling

- **Carry out repointing to all the elevations using a suitable lime mortar.**
- **Check loadbearing capacity of existing walls and foundations and underpin if necessary.**
- **Install roofing felt and either new roof covering or reinstate existing tiles. Install new rainwater goods. (New materials to be agreed with Planning Authority)**
- **Check structural capacity of existing roof to carry new loads and strengthen if necessary.**
- **Construct a new concrete slab incorporation a damp proof membrane. The slab to be able to withstand any possible seasonal moisture changes in subsoil.**
- **Install restraints in accordance with building regulations to existing walls and roof.**
- **Carry out pollarding of three large trees within 5.0 metre radius of barn. Trees growing within 2.0 metres of the barn are to be pollarded such that no branches extend over the barn or fully removed without causing distress or damage to the barn.**
- **Remove blockwork extension to North elevation and construct new North elevation to match existing.**



SECTION THROUGH TRIAL PIT
ON
WEST ELEVATION OF THREE CATTLE BARN


Trunk dia = 0.50m
Height = 20.0m
Spread = 10.0m
Trunk dia = 0.70m
Height = 20.0m
Spread = 15.0m
5000
2000
LAITH BARN
THREE CATTLE BARN
EIGHT CATTLE BARN
Trees hatched either to be heavily pollarded or fully removed.
2250
5000
6000
Trunk dia = 0.70m
Height = 20.0m
Spread = 15.0m
Trunk dia = 0.40m
Height = 10.0m
Spread = 7.0m
6000
7000
TRACTOR SHED
ANNEX
2750
2000
1500
2000
5000
2 No. Small trees
Trunk dia = 0.60m
Height = 10.0m
Spread = 10.0m
Trunk dia = 0.60m
Height = 15.0m
Spread = 15.0m

A1.3 – Three Cattle Barn Photographs



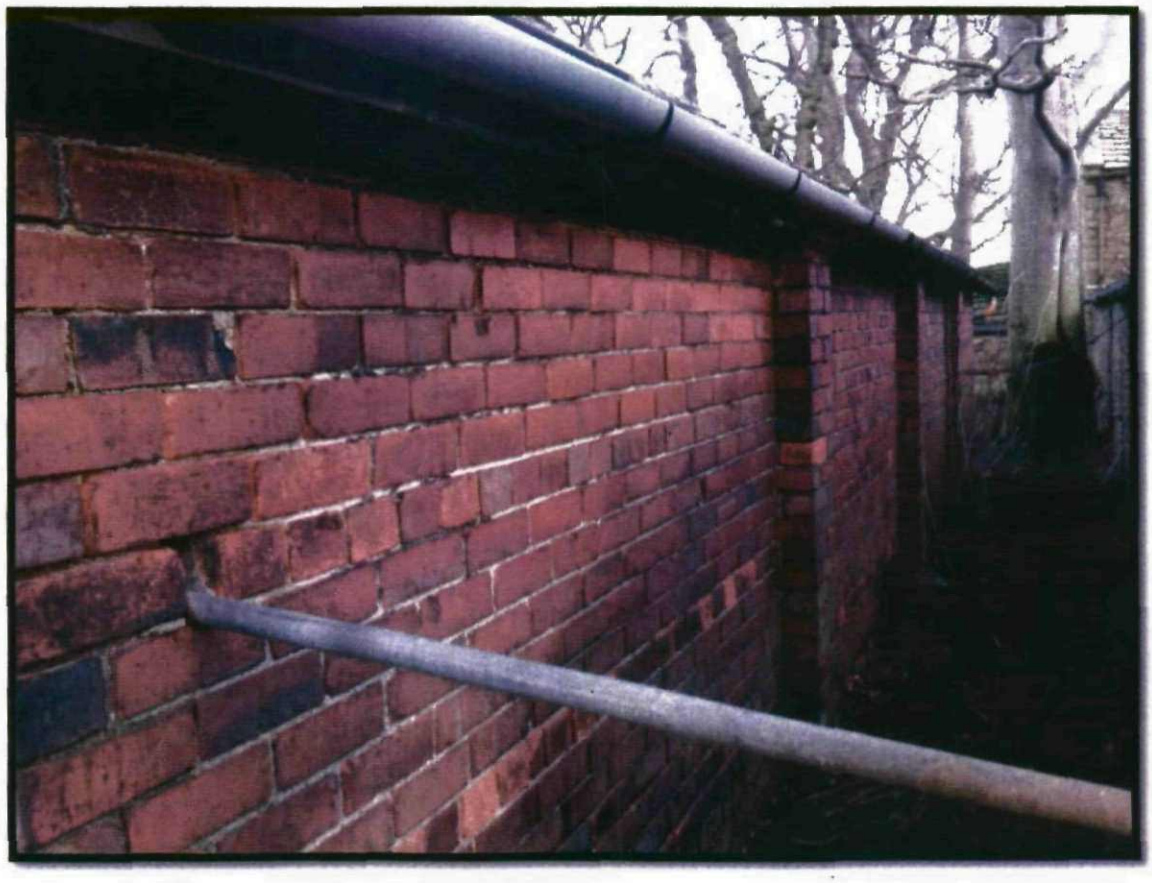
Photograph 39 – View of East Elevation



Photograph 40 – View of West Elevation



Photograph 41 – View showing deep loss of mortar from joints



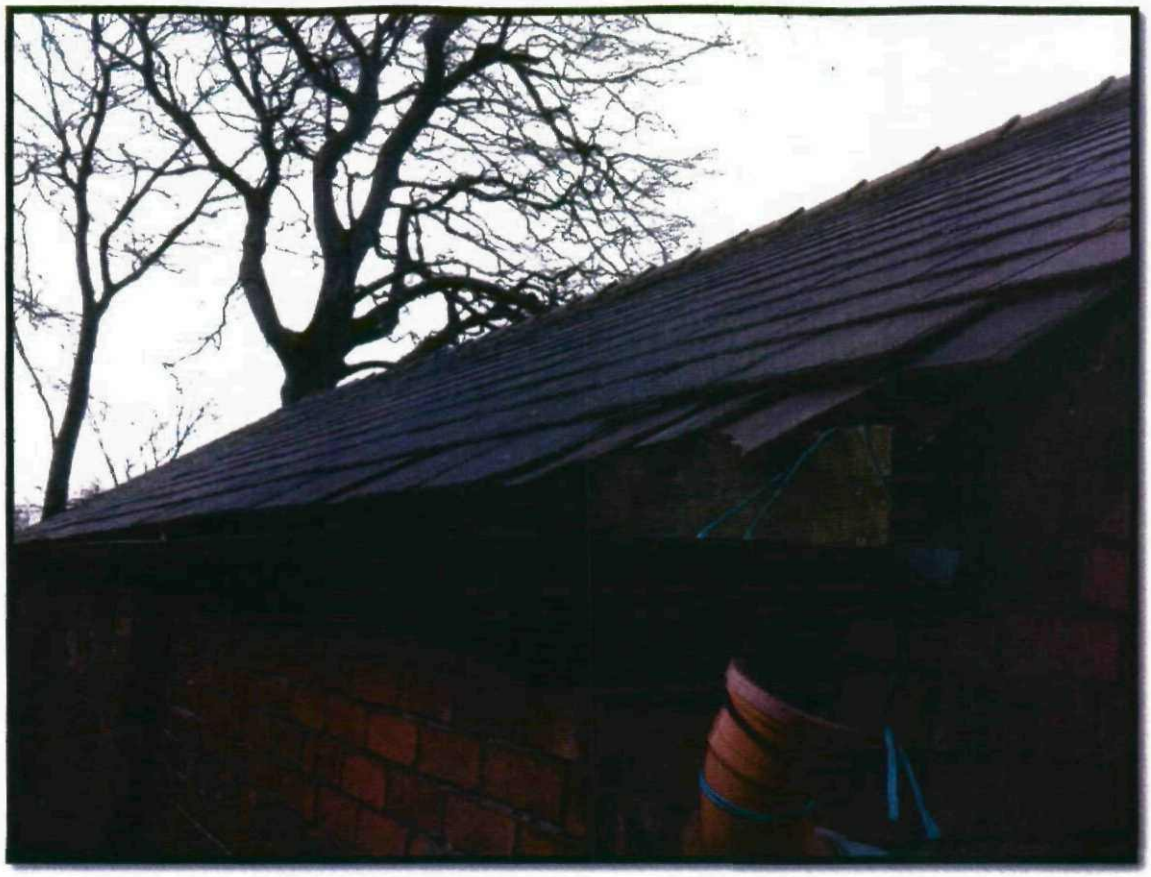
Photograph 42 – View of South Elevation



Photograph 43 – View of trial pit on South Elevation



Photograph 44 – View of North Elevation



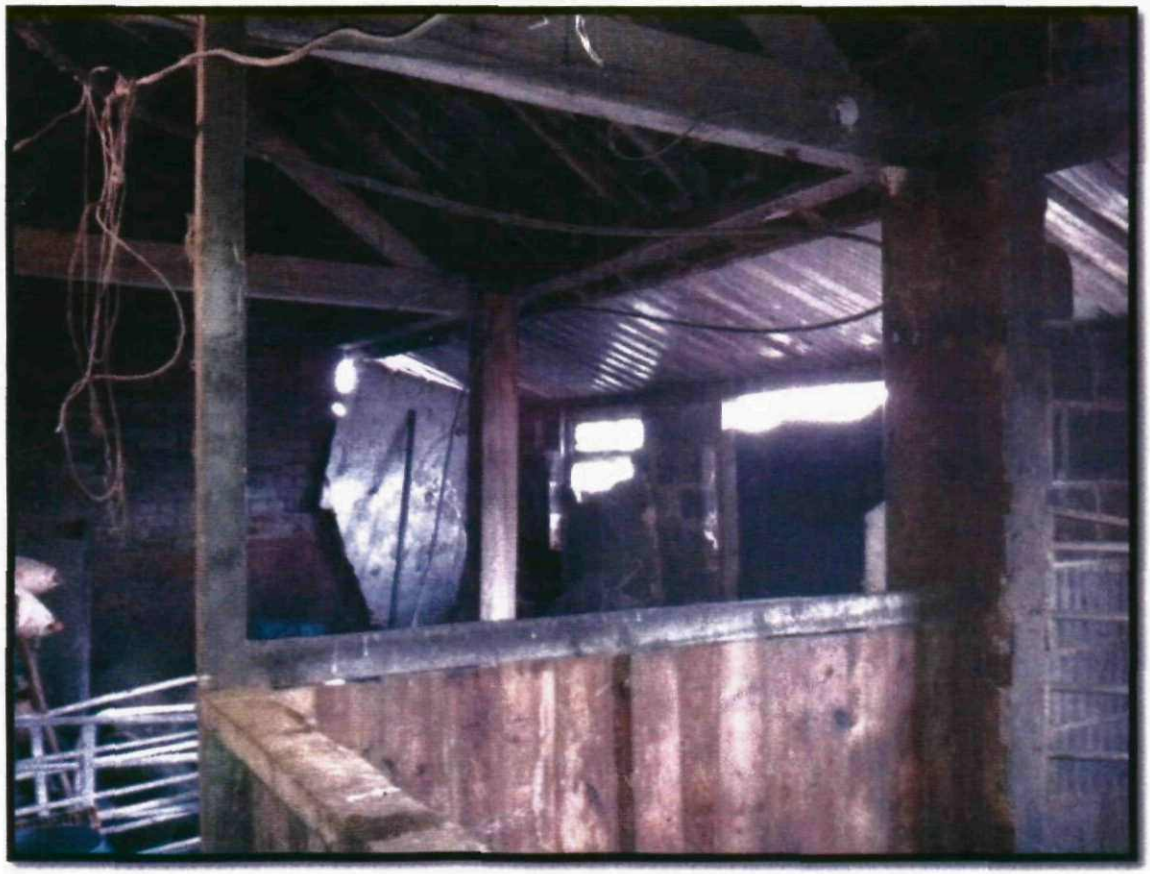
Photograph 45 – View of Roof showing damage to slate on South East corner



Photograph 46 – View showing roof structure



Photograph 47 – View showing internal walls



Photograph 48 – Showing timber columns and beams supporting North edge of roof