

Structural Report  
For the  
Existing Outbuildings  
At  
Broadmoor Farm  
Sherborne  
Cheltenham  
On behalf of  
Tyack Architects  
Project Ref: 21097



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## Contents

<b>1</b>	<b><i>Introduction</i></b> .....	<b>3</b>
<b>2</b>	<b><i>The Site</i></b> .....	<b>3</b>
<b>3</b>	<b><i>The Structures</i></b> .....	<b>3</b>
3.1	Stable Block .....	4
3.2	Piggery .....	5
3.3	Storage Barn.....	5
3.4	Discussion .....	5
<b>4</b>	<b><i>Conclusion</i></b> .....	<b>7</b>

## **1 Introduction**

This report has been prepared following a request from Tyack Architects to undertake inspections of a number of outbuildings at Broadmoor Farm, Sherborne, Cheltenham, Gloucestershire, with the view to convert the buildings into habitable accommodation.

This report records the result of the visual inspection of the three buildings, subsequently providing an assessment of the likely impact of the proposed conversion and the feasibility of retaining the existing structural fabric of the buildings with particular considerations to whether the elements are deemed perishable or non-perishable. The elements under consideration will include the existing roof structures, walls and floors to assess what remedial measures need to be put into place to ensure the stability of the buildings is maintained.

The report has been compiled without the benefit of a detailed ground investigation or desktop study of the geology of the area. The report does not consider the market value of the property, rights of access, tenure or the condition of adjoining outbuildings where these do not form part of the proposed development. Our instructions do not extend to undertaking any prior research of the property or review of historical records or geological maps. We have not had the opportunity to undertake any intrusive investigative work and the assessment is based on a simple visual inspection without having had the opportunity to study the structure over a prolonged period of time.

## **2 The Site**

Broadmoor Farm is located approximately 4.0km South of the village of Bourton-on-the-Water (SP173171). The outbuildings fall under the curtilage listing of the Grade II listed Farmhouse with listing entry number 130588. The outbuildings comprise a stable block, piggery and storage barn and are located on an area of land in front of the house and are encapsulated by arable land to all elevations.

## **3 The Structures**

A brief description of each of the structures is given below together with observations made during the visual assessment of each building.

## 3.1 Stable Block

### 3.1.1 The Structure

The single storey stable block consists of a Cotswold stone tiled roof to all faces other than the Eastern face where concrete tiles can be found, on rafters supported by purlins which span between the tied 'A' frames which are positioned at regular intervals. The roof structure is supported on natural Cotswold stone walls which transfer load down into the foundations which are believed to be traditional stone footings although investigations have not been completed to confirm this. Between the stables, stone piers provide support to the main frames and lintels.

### 3.1.2 Site Observations

- Cotswold stone tiled roof to all elevations except the East where concrete tiles have been placed
- The eastern elevation has two flying buttresses propping the wall
- Eastern elevation extends down approximately 1 m relative to floor level due to the change in ground level and is therefore retaining
- Stepped cracking to the west elevation stonework
- Loss of mortar and deterioration of some of the stonework, although localised
- Deflection apparent in the roof line at Northern corner correlating with stepped cracking on the line of hip frame
- Rafters, purlins and wall plate have localised areas of deterioration and need to be assessed further
- Floor slabs throughout most of the unit appear to be modern concrete construction with the exception of the Southern section of the building
- Evidence of some lateral roof spread throughout
- Rafters over sail the purlins with no notching
- Timber beams spanning between stone columns have deteriorated, deflected and cracked and are in need of repair/replacement in places
- Cracking between gable wall and rear wall at eastern end indicating roof spread
- Evidence of water ingress in places

## 3.2 Piggery

### 3.2.1 The Structure

The single storey piggery building is of similar construction to the stable block with the exception that it has intermediate load-bearing walls which have been used in place of a tied 'A' frames.

### 3.2.2 Site Observations

- Intermediate load-bearing walls showing signs of distress with localised cracking
- Triangulation of roof is poor and resistance to spread is limited
- Purlins propped on loadbearing walls
- Rear (South) Cotswold stone wall is retaining and showing evidence of damp and deterioration
- Red brick infill to East elevation
- Stonework in need of re-pointing and replacement in places
- Floor slab is of a modern concrete construction and will need to be removed to form a new floor that can provide a level threshold
- Purlin appears to be unsupported other than on layboards at interaction with neighbouring barn

## 3.3 Storage Barn

### 3.3.1 The Structure

The storage barn is a single storey building with a hipped roof supported by purlins and hip beams transferring loads into the supporting stone walls and a central king post truss.

### 3.3.2 Site Observations

- Evidence of water ingress and deterioration of timber at interaction with the piggery building
- Rear (South) Cotswold stone wall has deteriorated and is retaining
- Mortar and stone loss in places
- Rafters over sail purlins with no notching
- Roof covering has failed in localised places

## 3.4 Discussion

The overall condition of all three buildings is very good considering their age. The primary roof structure comprising the purlins and trusses appears to be in very good condition with no sign



of significant deterioration or insect attack. Some of the purlins have developed shakes which will require a localised repair to ensure their performance going forward. The rafters also appear to be in good condition with some evidence of insect attack and deterioration through wet rot water ingress, resulting in loss of the cross-section of the timber to varying degrees. Therefore given the listing of the building the rafters should be assessed on an individual basis with deteriorated sections repaired or replaced with reclaimed timber of similar section and species. Given the lack of triangulation throughout the roof of the building it would be advisable, as part of the remedial measures, to install a timber ridge beam to give additional support to the rafters and prevent a lateral thrust being exerted on the external stone walls. Further investigation will need to be completed in relation to the hip frame at the Northern end of the building as there appears to be movement in the Eastern & Northern elevation which is reflected in the line of the roof. As the roof covering will need to be removed to allow a new breather membrane to be installed, this presents an ideal opportunity to assess the roof as a whole and make any repairs while the load of the tiles has been removed.

The Eastern elevation is clearly showing signs of movement and this has been an ongoing issue and has resulted in the installation of flying buttresses in two locations along the length of wall. However there is evidence that the wall has moved around the buttress and could still be moving. As this movement is only evident at the Eastern end of the building it is possible that it is a result of a combination of roof spread, as a result of the lack of triangulation previously mentioned, or the ground floor slab placing a lateral thrust through the wall as a result of the higher internal ground level. As all of the floors are the modern construction and will need to be removed to allow screed and insulation to be installed to generate a level threshold, the opportunity presents itself for the new floor slab to be installed at a lower level and for measures to be taken to remove the lateral thrust on the Eastern wall by thickening a slab down locally so that loads are placed vertically on the ground and lateral load removed. Given that the ground levels fall away from the Eastern wall rapidly, it would be prudent to investigate the foundations of the wall to confirm whether underpinning is required to reduce the effects of frost heave. For the remaining buildings, including the piggery and adjoining barn, trial pits are required to confirm the depth of the existing wall and whether the installation of the ground floor slab, at a lower level to facilitate access, will undermine the wall. If proven then underpinning may be required.

Where cracking has formed between external walls as a result of lateral movement, a scheme of stitching will be required to re-establish the strength of the wall. This can be completed using two methods, depending on whether the stonework is to be exposed or hidden behind an internal lining. Where exposed the use of helical steel bars inserted into the bed joint, across the crack, at regular vertical centres would be sufficient and where the wall is to be hidden a series of precast concrete lintels could be installed into the wall as an alternative.

All wall plates and timber lintels will need to be investigated to confirm their condition through a specialist timber preservation company who can then make the necessary recommendations for treatment against insect and fungal attack. Lintels over the stable openings are suffering from shakes and deterioration and should be repaired if possible or replaced with a reclaimed timber of matching size and species.

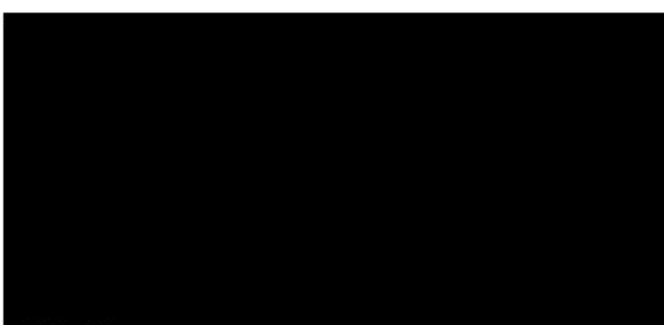
Specifically for the piggery and adjoining barn, ground levels to the Western Boundary will need to be reduced to remove the retaining forces that are currently exerted on the wall as well as allow the wall to dry out. Localised patches of stonework are missing and highly deteriorated which will need to be addressed through the replacement of the stone and re-pointing throughout to reinstate the weatherproof finish. The floor slabs throughout the two buildings also need to be removed and replaced and underpinning considered as previously outlined for the stable block.

Where support to the purlins is taken from load bearing walls, the proposed scheme indicates these walls to be removed to create an open plan dining room. In this instance a new frame will need to be introduced to allow the support to the purlins to be re-established.

The roof to the adjoining barn appears to be in good condition other than replacement of the roof covering to allow a new breather membrane to be installed. However, the piggery building requires stabilising due to the lack of triangulation and deteriorated structural timbers where it joins the barn. On this line timber appears to be in poor condition and the purlin end supported only on lay boards. This timber will need to be replaced with additional support introduced to allow loads from the purlin to be transferred into the structure in a robust manner.

## 4 Conclusion

The structures discussed are generally in good condition with localised repairs required to reinstate their stability and robustness. Once these repairs have been made as part of their general refurbishment, the structures will lend themselves towards the conversion into habitable accommodation.



Gary Patefield-Smith  
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