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Mr Guy Evans
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Dear Mr Evans

STRUCTURAL INSPECTION AND LETTER REPORT – GAMFORD FARM, ROSSETT

We thank you for instructing Woodbank Consulting Engineers Ltd (Woodbank) to carry out a visual survey of the barns and main property at Gamford Farm, Rossett, which are to form part of a planning application.

1.0 Introduction

1.1 Client Brief

We were commissioned by Mr Guy Evans of Cassidy + Ashton, to carry out a visual inspection of the barns and main property at Gamford Farm, and to comment on whether the structures are suitable for conversion to domestic dwellings.

We did not carry out any destructive works or trial hole excavations during our inspection.

Our inspection was carried out on Thursday 11th June 2015. The weather was bright and sunny.

1.2 Limitations to the report

This report is based entirely upon a visual examination of the property. No stored materials or fixtures and fittings were moved or removed during the course of the survey. We have not undertaken a survey of the garden, fences or the boundary walls.

The contents of this report are strictly confined to comments concerning the suitability of the main property and particular barns which are to be included in a planning application. It does not cover the condition of the damp proof course (dpc), possible damp penetration, condensation or the condition of the timber components with regard to rot and infestation, unless specifically highlighted as part of the inspection.

Our report does not cover asbestos or other deleterious materials. Specialist advice regarding asbestos should be obtained from a reputable, professional and licensed asbestos consultant.

Where cracking is visible, but unconnected to structural movement, this has not been commented upon.

No intrusive works were undertaken, no core samples of the slabs were taken and the existing foundations were not examined. Manhole covers were not lifted and drainage testing was not undertaken. We did not expose any other part of the structure that was covered, unexposed or inaccessible and we are therefore unable to report that any such part of the building is free from defect. Testing requiring the use of specialist equipment or training e.g. electrical systems, gas appliances, water systems, etc. has not been undertaken.

Detailed calculations to determine the adequacy of structural members has not been undertaken as these are outside the scope of this report. However, evidence of distress as a result of overloading or deterioration will be identified, so that provision for additional works can be made during future refurbishment schemes.

The following is not intended to be an exhaustive list of minor defects. They are purely comments concerning the structural defect noted to the rear of the property, apparent from our visual inspection. Further defects may be encountered upon more extensive investigation, involving exposure of structural elements etc.

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2.0 Observations and Discussion

All references to left and right are as if viewing the structure from the **front** elevation externally or as if facing the feature under discussion.

The survey comprised a visual inspection of those elements of the buildings readily visible from ground level.

2.1 Site Description

The property known as Gamford Farm, Rossett was originally a working pig farm; however, it not has not been used as a farm in approximately 10 years.

The farm comprises a main farm house which has undergone some extensions in the past, and a series of barns of various construction types. We have only been requested to review the structures which are to remain in the proposed planning scheme. These generally comprise the main property and the brick built barns.

2.2 Barn 1

2.2.1 General Description

The front elevation, for the purpose of the report is considered to be the long elevation containing the entrance doorways to the various barns along the structure. The barn has two storeys.

The roof is duo-pitched, spanning from front to rear. Generally the barns are finished with slates, supported by traditional purlins and rafters. Clay ridge tiles have been provided. The barn has been extended towards the right hand side and now abuts Barn 2. The roof to the extended part is approximately 750 mm lower than the original roof line. The purlins to the original barn are

supported by the gable walls and the wall between Rooms 2 and 3 at ground floor level, which has been continued up into the roof space.

We have numbered the rooms within the barn from 1 to 4. Please refer to the attached marked up plans for reference.

The first floors are suspended timbers spanning from left to right over rooms 1 and 2 and from front to rear over room 4. No access was available to room 3.

The rear elevation has no window openings and cannot be reached or viewed externally due to vegetation growth along the rear and the remains of an existing structure. The left hand side elevation is a brick gable with no openings; however, a single storey structure has been built up to the face of the gable and therefore a large part of the left hand side elevation is not visible. The right hand side elevation forms the side wall of barn 2.

The external walls are solid 215 mm thick brickwork walls punctured by windows and doors mainly on the front elevation. The window and door to room 1 has brick arched lintels. There is a timber lintel over the large opening to room 2. A concrete lintel has been used to form the opening to room 3 and we believe that standing soldier brick lintels have been used to form the opening on the left into room 4. A door opening with sliding door was noted on the right hand side of this elevation. Visual access was limited, but we believe a concrete lintel had been used.

The opening between room 4 and barn 2 has steel beams used as lintels.

The opening into the first floor above room 2 has a timber wall plate over. The access into the area over room 4 had a concrete lintel over. We were not able to gain access to this area due to the vegetation present. Safe access was not available.

A brick band formed a decorative embellishment to the front elevation of the original two storey barn. The barn appears to have been extended towards the right hand side. The roof line is lower and the brick type changes.

2.2.2 Front Elevation

It was noted that the roof was slightly uneven; however, the roof to the extended part of the Barn was more level, but a number of slates had slipped. Cast iron gutters and downpipes were noted.

Generally timber members formed the windows and doors, however a steel door had been provided to room 3.

A large tree was noted close to the left hand side elevation. A vertical 5 mm wide crack was noted between the window and the timber panel below and the side elevation wall. This appeared to be a historic defect.

The timber lintel appeared to have deflected and had weathered. We recommend that the condition of the timber should be investigated further. The mortar above the lintel was dislodging and should be repointed. The access into the floor above had a timber wall plate which supported a single course of brickwork. Some of the mortar appeared to be loose and it would benefit from repointing.

Some damage was noted to the concrete lintel over the steel door. We recommend that the concrete be repaired using a proprietary concrete repair system.

Vegetation was growing through the roof at eaves level, towards the right hand side of the original part of barn 1.

It was noted that a brick was missing from behind the rainwater hopper located where the new and original parts of Barn 1 abut.

Towards the right hand side of the elevation moss was noted growing behind the rainwater pipe.

Towards the right hand side of the elevation, the barn had been extended. This area was substantially covered by vegetation and therefore we are not able to comment further on this elevation; however, there were no obvious signs of structural movement where the elevation was visible. A caravan was also parked next to the elevation preventing full and unobstructed visual access.



Front elevation, right hand side.



Front elevation, left hand side.



Extended part of barn hidden by vegetation



Holes through roof. Slipped tiles.



Vegetation growing through the structure.



Holes through elevation.



Deflecting and weathered timber lintel.



Weathered timber lintel.



Cracking below window to Room 1.

2.2.3 Right Hand Side Elevation

The elevation abuts barn 2 and is therefore not visible externally.

The purlin ends of the original part of the barn were visible above the new roof line where the original and new parts of the barn abut; however, no visual signs of defects to the timbers were noted from ground level.



Single storey structure in front of elevation.



Vegetation in front of elevation.

2.2.4 Rear Elevation

There is evidence that a single storey brick structure was present in front of the elevation, but the roof has collapsed. The area within the perimeter walls of that structure is completely overgrown

with thick vegetation and trees and therefore there is practically no visual access to the rear of Barn 1.

The rear slope of the roof to Barn 1 was visible in a few locations. Holes were noted through the roof and slates had slipped or were missing. The roof line was slightly uneven and there was no rainwater gutter, so water was able to run down the face of the building. Roof repairs and replacement of rainwater goods is necessary.

It would appear that the lower portion of the wall originally has plaster or render on the face of the wall where the building, with no roof, abuts the elevation, but this has dislodged in places.

Many trees had grown close up to the elevation and these should be cleared. Vegetation was also noted growing through the elevation in places. This should be removed and localised brickwork repairs carried out.



Structure in front of rear elevation.



Vegetation in front of elevation.



Slipped tiles and hole through roof.

2.2.5 Left Hand Side Elevation

A single storey structure with a flat roof has been built in front of the elevation, preventing visual access to the majority of the elevation. Over hanging trees also cover the elevation and therefore a detailed inspection was not possible; however, there were no obvious signs of significant movement.

The purlin ends to the roof are visible, but not visual signs of defects to the timbers were noted from ground level.

A pattern of voids through the 215 mm thick brickwork elevation at high level had been formed to allow ventilation into the roof void.

No access into the single storey structure was available. We reviewed the elevation at low level through the windows and noted that the wall was finished with plaster and wall paper which was dislodging.

2.2.6 Internal Areas – Ground Floor Level

Room 1 was filled with stored materials which covered the majority of the walls and floor, therefore a detailed inspection was not possible. No significant structural defects were noted where visible. It is anticipated that the walls are 215 mm solid brick walls.

There were signs of previous infestation in the timber decking, but it is unclear whether this is still active. We recommend that a timber specialist inspect the all timbers. The floor joists were noted to span from left to right.

There were signs of damp penetration to the gable wall. This should be inspected by a damp specialist. There is a possibility that the timber joist ends spanning onto this wall have been affected by the moisture. This should be investigated further.

Brickwork has been used to form the floor finish. This was noted to be uneven, but is unlikely to have been constructed on a well compacted base. This is not considered to be structurally significant.

Room 2 is an open storeroom. Again, due to the volume of stored good, not all areas were visible; however, it is anticipated that the walls are 215 mm solid brick walls.

As in Room 1, there were signs of previous infestation in the timber decking, but it is unclear whether this is still active. We recommend that a timber specialist inspect the all timbers. The floor joists were noted to span from left to right.

The paint was peeling and some staining was noted which would suggest that water was able to ingress into the room from above. It was not clear whether the problem has been resolved, but as some holes were noted through the roof, we suspect that the water ingress is ongoing.

The mortar to the rear elevation wall was weathered and would benefit from repointing.

It was not possible to review the condition of the floor, due to the location of the stored materials.

No access was available to room 3.

It was noted that the timber floor joist over Room 4 spanned from front to rear. Some of the joists appeared to have over-deflected and some had rotted through, due to water ingress from above. It is anticipated that there is a hole in the roof above. Some of the timber joist ends appeared to have rotted. Some / or all of the floor joists will require replacement.

The mortar in the bed joints at low level on the rear wall has eroded, possibly due to the ingress of damp. The issues regarding damp should be inspected by a suitably qualified damp specialist and the wall should be repointed, following confirmation of the requirements regarding damp.

A hole was noted extending through the wall at low level, to the left hand side of the room. This will require localised re-building.

Many of the walls in Room 4 had been finished with plaster, but this had cracked and de-bonded due to age and damp / moisture ingress generally.

The external walls to Barns 1 and 2 abut one another. An opening had been formed through the right hand side wall of Barn 1 and the left hand wall of Barn 2, so that access could be afforded between the ground floor rooms. Two steel beams had been provided, but it would appear that some of the brickwork between was unsupported. We would recommend that additional steelwork is provided to ensure that all leaves of masonry are adequately supported. The walls below the beams appeared to have cracked along the junction between the two barns. We would recommend that the masonry leaves should be tied together.



Room 1.



Room 2.



Hole through wall in Room 4.



Hole through floor in Room 4.



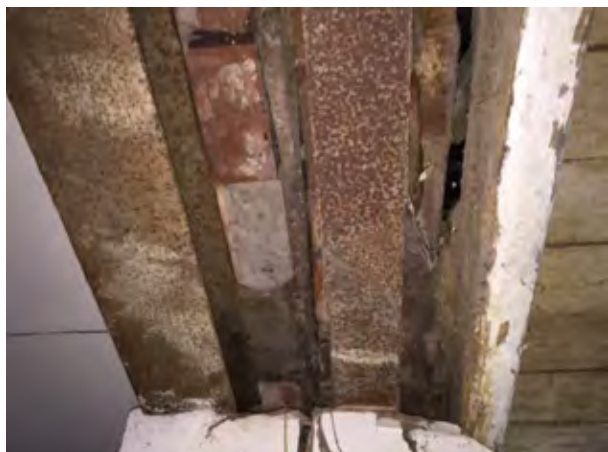
Hole through floor in Room 4.



Water staining to rear wall, Room 4.



Cracking to bearing below steelwork in Room 4.



Unsupported brickwork requiring additional steel.



Over deflecting floor joists over Room 4.

2.2.7 Internal Areas – First Floor Level

We were able to gain access into the first floor area above Rooms 1 and 2; however, access was limited due to the volume of stored good. Although access should have been available over Room 3 the stored goods prevented access.

Some holes were noted through the roof which had allowed rainwater to enter the building. The holes should be repaired as part of the refurbishment scheme proposed.

A horizontal crack was noted extending across the left hand gable wall, at eaves level. There were no restraint ties between the gable wall and the roof. These should be provided during any future repair schemes. No vertical restraint straps were noted and these should also be provided.

Some brickwork was missing on the rear corner of the barn and this should be locally re-built.

Safe access into the area above Room 4 was no available as the build-up of vegetation made ladder access unsafe. We are therefore unable to comment on this area. It was noted from below that the floor joists had rotted through in places, therefore it would not be safe to access the room without propping the floors below.



Holes through roof over rooms 2 and 3.



Holes through roof over rooms 1 and 2.



Horizontal cracking at eaves level.



Cracking continues across gable wall.

2.3 Barn 2

2.3.1 General Description

The front elevation, for the purpose of the report is considered to be the short elevation, in line with the front elevation to Barn 1, which has the entrance doorways into the barn which is currently used as a garage. The barn has two storeys.

The roof is duo-pitched, spanning from left to right and is finished with slates, supported by steel purlins and steel trusses formed from steel angles. Clay ridge tiles have been provided, but these have slipped or are missing in places. The first floor appears to span from front to rear and is supported by beams spanning from left to right across the barn.

The external walls are solid 215 mm thick brickwork walls punctured by windows and doors. On the front elevation a central sliding door is present providing access into the barn, a sliding door and window opening are present at ground floor level at each side of the central door. Two windows and a door / access opening were noted at first floor level. We assume that originally a hoist would have been provided over the doorway.

The rear elevation has a number of windows at ground and first floor and a door / access opening at first floor level. We assume that originally a hoist would have been provided over the doorway.

The left hand side elevation abuts Barn 1 towards the front of the elevation; therefore there is no visual access of this elevation. Towards the rear the elevation, the masonry is hidden by the vegetation and the previous building with no roof which abuts the rear elevation of Barn 1.

The right hand side has window openings at ground floor level each with standing soldier brick lintels.

There appears to be a concrete ring beam running around the perimeter of the barn. There is a possibility that this is a concrete encased steel ring beam, but no destructive works were undertaken during our site visit. The ring beam forms the lintels to all ground floor windows and doors. At first floor level, concrete lintels have been provided over the doorways and standing soldier brick lintels over the windows.

2.3.2 Front Elevation

The steel purlins have been built into the front elevation. Steel angles have been used. A vertical crack was noted extending down from the second to top purlin in the right hand side elevation. It is likely that the end of the steel purlin has begun to corrode. As steel corrodes, it delaminates, increasing in size. As the steel size increased within the brittle masonry, the masonry cracks, as it is not able to dissipate the increased stresses within the masonry. It would be prudent to clean and treat the end of the purlins with a corrosion protection product. The brickwork should be stitched using a proprietary stitching product incorporating the installation of helical ties into the bed joints.

There appears to have been some upward movement of the top two courses of brickwork locally. This should be re-set once the purlin ends have been treated.

A pipe was also noted protruding through the elevation.

A steeped crack was noted extending from the right hand side of the concrete lintel over the central first floor opening towards one of the purlin ends. This is likely to be linked to corrosion of the steel in the masonry, or there may be some minor spreading to the roof structure.

A similar crack was noted extending down and to the right hand side from the central purlin on the left hand side slope.

The area to the left hand side of the elevation where there is a sliding door and a window was hidden by a tank and by vegetation.

There was some evidence of slight corrosion of the concrete lintel over the central opening and some minor cracking to the brickwork above. The concrete should be treated with a suitable corrosion repair system and the crack repointed.

There is evidence that timbers were originally built into the concrete ring beam, but these are now missing or rotting. This is not likely to be detrimental structurally.

A further crack was noted to the left hand side of the central opening at ground floor level, but this was not considered to be a significant structural defect.



Front elevation.



Holes through elevation for pipework.



Cracking to elevation where purlin end built into the external elevation.



Cracking and lifting brickwork where purlin end built into elevation.



Cracking and lifting brickwork where purlin end built into elevation.



Tank and vegetation hiding elevation to right hand side.



Concrete lintel cracked.

2.3.3 Right Hand Side Elevation

The roof line appeared to be fairly level, but some of the clay ridge tiles had slipped or were missing. At least one slate was missing from the roof slope visible.

It was noted that the gutter was damaged and not draining as required. Repairs / replacement should be undertaken as required. There is a possibility that the rain water goods may contain asbestos and this should be tested by a suitably qualified specialist.

At eaves level towards the left hand side of the elevation, a small number of bricks were missing and a rafter end was visible. The brickwork should be re-set and the rafter ends treated with a preservative, if they do not require local replacement.

A 2 mm to 3 mm wide stepped and horizontal crack was noted extending from the right hand side of the right hand window head, upwards and towards the right hand corner at lintel level and above. There is some vegetation growing adjacent to this corner and the rain water goods above the corner appeared to be ineffective. It is likely that some minor settlement has occurred in this location, but this appears to be historic in nature. It is likely that once the vegetation is removed and the rainwater good replaced or repaired, that no further movement may occur. It may be prudent to undertake a trial hole in this location to ascertain whether there is any other cause for the movement i.e. inadequate foundations to bearing strata.

At low level on the right hand corner of the elevation, the mortar in the brickwork joints had eroded. This is likely to be due to the age of the structure and should be repointed.

It was noted that generally the full length of the elevation had moss growing along the elevation at low level. We assume this will be dealt with during the refurbishment scheme involving the installation of a damp proof course.



Right hand side and rear elevation.



Right hand side elevation.



Slipped slates and ridge tiles.



Holes through elevation and damaged gutters which may contain asbestos.



Moss growth indicating possible damp.



Cracking to right hand, rear corner masonry.

2.3.4 Rear Elevation

The steel purlins have been built into the rear elevation. Steel angles have been used. The adjacent brickwork has cracked in places. It is likely that the end of the steels has begun to corrode. As steel corrodes, it delaminates, increasing in size. As the steel size increased within the brittle masonry, the masonry cracks, as it is not able to dissipate the increased stresses within the masonry. In this case, the cracking is only minimal. It would be prudent to clean and treat the end of the purlins with a corrosion protection product.

A stepped crack was noted extending from one of the purlin ends down to the right hand side of the concrete lintel over the central first floor opening. This is likely to be linked to corrosion of the steel in the masonry, or there may be some minor spreading to the roof structure. The brickwork

should be stitched using a proprietary stitching product incorporating the installation of helical ties into the bed joints.

The mortar in the verges is dislodging and should be repointed. At eaves level towards the right hand side of the elevation, a brick was missing and should be replaced.

There is evidence that timbers were originally built into the concrete ring beam, but these are now missing. This is not likely to be detrimental structurally.

A vertical 1 mm wide crack was noted extending downwards below the left hand first floor window. It is likely that this relates to some minor movement noted on the right hand side elevation.

The elevation at low level was hidden by vegetation. There are three windows at ground floor level; the central window was covered by a steel plate.



Rear elevation.



Left hand side elevation hidden by single storey building and vegetation.



Cracking to brickwork where steel purlins are built into the masonry.



Cracking to the right hand side of the central opening at first floor level.



Damage to eaves and verges.



Concrete ring beam with timbers built in.



Rotten timbers within concrete ring beam.

2.3.5 Left Hand Side Elevation

Visual access to the left hand side elevation is not available as Barn 1 abuts the elevation towards the front of the barn and the area to the rear is hidden by the vegetation, trees and previous structure built up against the elevation towards the rear.

2.3.6 Internal Areas – Ground Floor Level

The ground floor level internally is a single room, currently used as a garage. Two steel beams span across the garage to support the floors above. The ceilings have been under-plated, so the condition of the structure is not visible.

The ground floor has been formed using a concrete slab which appeared to be in satisfactory condition generally, but there are some cracks visible. These appear to be historic in nature.

Some green staining was noted on the left hand side wall towards the rear. A hole was noted through the wall and the plaster finishes were de-bonding. This area coincides with the side wall which is exposed externally, but has been hidden by the structure at the rear with no roof, and the vegetation and trees. It is likely that the wall has been affected by water / damp ingress due to the location of the vegetation and the fact that the wall is sheltered and does not have the opportunity to dry. We believe that once the vegetation is cleared, adequate rainwater goods provide, and a damp proof course provided, there should be no further issues with the wall.

The doorway to the sliding door closest to Barn 1 has been poorly infilled with blockwork which has not been adequately tied to the existing masonry and holes through the wall remain.

It would appear that the rear wall and the right hand side walls are leaning outwards slightly. Additional restraint should be provided by the installation of galvanised straps at floor level throughout and at rafter level, to both gables.

A steel staircase provided access to the first floor level.



Steel beams supporting the first floors.



Steel beams forming the opening between Barns 1 and 2.



Staining to left hand side wall.



Rear wall leaning outwards.

2.3.7 Internal Areas – First Floor Level

The first floor level is an open plan room with two steel trusses spanning across the width of the barn. Amendments to the trusses will be required to accommodate the use of this space in a domestic scheme, due to the height of the bottom chord of the truss.

A large number of stored goods meant that not all areas were visible and therefore we could not inspect and comment on all elements of structure.

Stepped cracking was noted on the front wall from the left hand side of the central opening when facing outwards, up towards the left hand side. This coincides with the crack noted externally in this location. Horizontal cracking was noted at the top of the wall between the second to top purlin and the top purlin. The brickwork appeared to have lifted by approximately 10 mm as noted externally. Restraint straps are required in this location, as noted above and the brickwork should be re-set, as noted externally.

As at ground floor level, some green staining was noted on the left hand wall towards the rear. This appears to be a continuation of the issue noted at ground floor level.

We were not able to get close up to the concrete lintel over the central opening on the rear elevation; we believe that there may be some corrosion of the concrete lintel. This should be investigated further. It is likely that if corrosion has occurred, then a traditional concrete repair would be suitable as the level of corrosion does not appear to be severe.

Some horizontal cracking was noted to the right hand side of the right hand window at lintel level. This is likely to be linked to the cracking noted on the right hand side wall toward the rear corner.

The timber floor was considered to be suitably level. Some of the timber rafters and battens would benefit from replacement.



First floor level.



Steel truss supporting roof structure.



Water staining to left hand side wall.



Cracking and brickwork lifting on front elevation, internally.

2.4 Barn 3

2.4.1 General Description

The front elevation, for the purpose of the report is considered to be the long elevation containing the entrance doorways to the various barns along the structure. The barn is single.

The rear elevation has a few of high level windows. The right hand side elevation is a brick gable with no openings and the left hand side is a brick gable with a window opening.

The roof is duo-pitched, spanning from front to rear. Generally the barns are finished with slates, supported by traditional rafters with ties at regular centres.

The external walls are solid 215 mm thick brickwork walls punctured by windows and doors mainly on the front elevation. Some window openings exist on the rear elevation and the right hand side elevation. Generally timber lintels have been provided over the door openings and on the front elevation standing soldier brick lintels have been used. Steel window frames have been used within the external leaf of brickwork on the right hand side elevation. We assume that the window frame supports the out leaf of masonry. We were unable to review the lintels on the rear elevation due to the vegetation obscuring the elevation.

2.4.2 Front Elevation

The roof line is undulating considerably, suggesting that the roof has spread substantially. It was noted that there were no ridge beams or purlins. Rafters were provided with ties across at regular centres, but not all rafters had ties across. Some of the ridge tiles and slated were missing or had slipped.

The gutters and downpipes are defective and missing in places across the elevation. These should be repaired or replaced.

Horizontal and some stepped cracking was noted in a number of places across the elevation. This had generally occurred where steelwork was embedded within the brickwork. It is anticipated that the steelwork has corroded and delaminated, opening up the bed joints. A similar crack had occurred where there was a pipe penetration through the elevation.

A pier / buttress had been constructed on the left hand end of the elevation. The brickwork at the top was loose. Steelwork in this location had corroded, lifting the masonry.



Left hand side of front elevation.



Central area of front elevation.



Right hand side of front elevation.



Undulating roof slope.



Right hand side elevation.



Slipped slated and ridge tiles.



Cracked brickwork due to corrosion of embedded steelwork.



Cracking and movement of pier / buttress.



Missing rain water goods.

2.4.3 Right Hand Side Elevation

The majority of the elevation was hidden by vegetation and therefore are unable to comment on all areas of the elevation.

Mortar has weathered and dislodges from the verges and should be repointed.



Right hand side elevation.

2.4.4 Rear Elevation

Visual access to the rear elevation was extremely limited and could only be viewed from a distance due to the height of the overgrowing vegetation at the rear of the barn. Vegetation was also growing up the elevation masking any possible defects.

The roof was visible and this was noted to be undulating, indicating that the roof is spreading.



Rear elevation hidden by vegetation. Close access not available.



Vegetation growing up the face of the structure.

2.4.5 Left Hand Side Elevation

The mortar had weathered across the whole elevation and therefore the full elevation should be repointed.

Penetrations through the elevation have damaged the integrity of the wall.

The pier / buttress on the right hand side had moved outward leaving a gap of approximately 10 mm. We suspect that the pier has an inadequate foundation. This should be exposed and confirmed. It may be necessary to install a single underpin to stabilise the pier. The pier should be re-built on a suitable base or at the very least it should be partially rebuilding or tied back to the structure.

Some bricks are missing from the elevation and these should be replaced.

As with the opposite gable elevation, the mortar in the verges has dislodged and should be replaced.

Some steel and timber has been built into the elevation. These should be removed and replaced with brickwork to prevent future issues with the steelwork corroding, cracking the brickwork or the timber rotting, leaving holes through the elevation.



Mortar weathered to left hand side elevation.



Movement of piers / buttress and damage to brickwork due to pipe penetration.

2.4.6 Internal Areas

For the purpose of the report, the barns have been numbered 1 to 5. Please refer to the marked up sketches.

There were not ridge beams or rafters. Rafters were provided with ties across at regular centres, but not all rafters had ties across. We would recommend that a ridge beam be provided for the full length of the barn.

No horizontal or vertical ties were noted. We recommend that these be provided throughout.

Generally solid concrete slabs formed the floors.

It would appear that Rooms 1 and 2 had been used as a site office or recreation room and store room. The walls had been finished with plaster and ceilings had been provided, also finished with plaster. A radiator and furniture had been provided within Room 1.

There was evidence that there were holes through the roof over Room 1.

Vertical cracking of approximately 2 mm width was noted at the junction of the cross wall between Rooms 1 and 2 and the rear wall. It is likely that the rear wall has moved outwards slightly as the roof has spread.

The walls and ceilings in Room 2 were similar to those in Room 1. The volume of stored goods prevented access into Room 2 and masked the walls and floors; therefore we are unable to give detailed comments on the condition of these areas.

The gap between the cross wall between Rooms 2 and 3 and the rear wall was wider, approximately 7 mm. A similar gap was noted between the same cross wall and the front elevation wall, although the width was approximately 5 mm wide. It was noted that the rafter ends were rotting.

Room 3 had exposed roof timbers. It was also noted that the wall plate acted as the lintel over the window opening on the rear elevation.

The gap between the cross wall between Rooms 2 and 3 was slightly larger on this face of the wall, it ranged from 7 mm to 10 mm. A further 10 mm wide gap was noted between the cross wall between Rooms 3 and 4 and the front wall.

Storage of some goods prevented full visual access to Room 3; however, it was noted that there were some signs of damp ingress at low level on the rear wall. This should be inspected by a damp specialist. We assume that during the proposed scheme of repairs, any issues regarding damp will be rectified.

It would appear that the masonry pier between the doorways serving Room 3, leans outward as there are no adjacent walls restraining the pier. Additional restraints will be required to tie the head of the pier to the roof structure.

The condition of the roof finishes in Rooms 3 and 4 is poor and we recommend that the roof finishes are replaced. This should be carried out at the same time as the introduction of a ridge beams and additional restraint ties.

In Room 4 some of the timbers have rotted and require replacement.

As in the previous rooms there is a lack of restraint between the cross walls and the front and rear walls and gaps of up to 10 mm were noted.

The wall forming the cross wall between Rooms 4 and 3 is partially finished with plaster, but this is cracking and dislodging due to age and moisture ingress.

An opening has been formed between Room 4 and 5. It is assumed that a timber lintel which has been provided over the opening has deflected / moved downwards by approximately 5 mm as a horizontal gap has opened up. A vertical crack was also noted to the left hand side of the opening. This was approximately 3 mm wide. A large hole has also been formed in the wall to allow the penetration of a pipe. We would recommend that the cracks are stitched using a proprietary stitching system involving installing helical reinforcement bars in the bed joints. A new lintel should also be provided for this opening is retained. The wall was checked on the opposite face and found to have a large steel bolt embedded in the masonry, it is possible that the embedded steelwork may have caused the cracking noted. Partial rebuilding of this wall may be necessary. The masonry should be fully keyed and bonded.

Room 1 is the largest of the rooms. The wall plate over the window openings on the rear elevation is over-deflecting and the roof has moved downward in this location. The roof is in poor condition and would benefit from replacement involving the installation of a new ridge beam. New lintels should also be provided. The rafters appeared to be over-deflecting and these may also require replacement or the installation of additional purlins.

The gable wall forming the left hand side elevation would benefit from repointing and additional restraints should be provided between the front and rear walls and the left hand side elevation wall.



Holes through roof within Room 1.



Holes through roof at eaves level on front elevation, Room 1.



Crack formed between cross wall and front elevation wall.



Rotten rafter ends visible.



Deflecting roof timbers.



Existing ties across roof. Hole through roof.



Holes through roof structure.



Crack formed between cross wall and front elevation wall.



Cracking over lintel in cross wall.



Crack formed between cross wall and front elevation wall.



Cracking over lintel in cross wall.



Typical roof configuration.



Over-deflection of rafters and wall plate which also acts as a lintel.



Crack formed between cross wall and front elevation wall.



Hole through left hand side gable wall.

2.5 Barn 4

2.5.1 General Description

The front elevation, for the purpose of the report is considered to be the long elevation containing a single entrance doorway toward the right hand side of the barn. The front elevation has the double storey height adjacent barn on the right hand side. A single storey structure abuts the front elevation and a large tank was also noted adjacent to the front elevation on the left hand side. The roof is duo-pitched, spanning from front to rear. Generally the barns are finished with corrugated sheeting which may contain asbestos fibres. The roof sheeting is supported by steel angle purlins and these are supported by steel trusses, formed from steel angles and the brickwork gable walls. The trusses are supported by the brick piers on the rear elevation.

The rear elevation to the barn is generally single leaf (100 mm) thick with brick piers and the two gabled, side elevations and the front elevation have been constructed using 215 mm thick solid brickwork.

The height of the barn is generally equivalent to one and a half to two storeys in height.

The rear elevation has a bricked up opening into Room 1 and a crudely widened opening into Room 2. The front elevation has a single door opening leading from Room 1. The left hand side gable has a door opening towards the rear corner of the barn and the right hand side has a large opening with steelwork provided to form the access. The original gable has been increased in height by the addition of new blockwork.

Generally the lintels to the rear and left hand side are of concrete construction. The widened opening through the left hand side gable has been formed using steel lintels and the opening through the front elevation appears to have a structural timber frame.

2.5.2 Front Elevation

The majority of the front elevation wall was not visible due to the location of a large tank, vegetation and a single storey structure and therefore we are not able to comment fully on our findings.

It was noted that moss was growing on the roof finishes, which can lead to damage of the sheeting used. We would anticipate that the roof sheets contain asbestos and this should be tested by a suitably qualified specialist. We expect that as part of the scheme of refurbishment, the roof finishes will be replaced.

No rain water gutter was visible towards the right hand side of the elevation and towards the left, the gutters were broken in places. Black staining was noted towards the right hand side of the elevation and this is likely to be due to the lack of adequate above ground drainage. New above ground drainage should be provided as part of the proposed scheme of repairs. Externally towards the left hand side of the elevation an open drain extended along the elevation externally. The drain was approximately 1.0 m deep.

There were no obvious signs of significant structural movement to the elevation.



Left hand side of front elevation



Right hand side of front elevation.



Single storey structure built up to the front elevation.



Water staining to front elevation brickwork.

2.5.3 Right Hand Side Elevation

Blockwork has been built above the original 215 mm thick gable brickwork to afford greater headroom to the adjacent barn. The blockwork appears to be 200 mm thick.

There is a significant amount of staining, moss growth and vegetation growing where rainwater is able to access the structure.

We would anticipate that as part of the proposed redevelopment of the site, the taller adjacent barn would be taken down and the blockwork removed, so that the original brickwork gable elevation was reinstated.

The steel beams provided to form the opening between the barn and the adjacent taller barn has corroded causing the masonry adjacent to the steelwork to crack. We recommend that the steelwork is cleaned and provided with a suitable corrosion protection product is applicable, or the steelwork should be replaced. The cracked masonry should be repointed.

There appears to have been some movement of the gable wall in the outwards direction at the base of the wall. This should be investigated further, but appears to be a historic defect which may not require any further repair works.



Large opening from through the right hand side gable wall. Blockwork constructed over original gable profile to increase height of adjacent barn.



Large opening from through the right hand side gable wall. Blockwork constructed over original gable profile to increase height of adjacent barn.



Large opening from through the right hand side gable wall. Blockwork constructed over original gable profile to increase height of adjacent barn.



Large opening from through the right hand side gable wall. Blockwork constructed over original gable profile to increase height of adjacent barn.



Tall barn adjacent to Barn 4.



Movement of brickwork outwards at low level.

2.5.4 Rear Elevation

The rear wall was 100 mm thick with brick piers provided at regular centres internally to support the steel trusses.

Visual access to the rear elevation was extremely limited due to the amount of vegetation and trees that had grown up to the face of the structure. Where vegetation masked the elevation we were unable to carry out an inspecting and therefore cannot comment on the condition of the masonry. In one location a mature tree was noted very close to the elevation. There is a possibility that this tree could damage the structure and therefore we would recommend that it be removed. Towards the left hand side of the elevation it was possible to review some areas.

A previous opening through the wall into Room 2 had been widened. The brickwork to the sides had been removed, but the lintel had not been replaced with an adequately sized lintel. The existing concrete lintel had been cut out or damaged by a possible impact. A new lintel should be provided and the door opening rebuilt with level sides to the cut out or the original opening size retaining and a new lintel provided. The brickwork would also benefit from being repointed.

The roof was visible and this was noted to be fairly level. The sheeting may contain asbestos and therefore we recommend that the sheets are tested by a suitably qualified specialist. The sheeting should not be disturbed or broken until the materials used in the sheeting are tested.

There was evidence that a previous structure had been built up against the elevation towards the right hand corner. Brickwork elevations remain, but the roof is missing. There is some evidence to suggest that the brickwork has moved inwards slightly where the roof had originally been. It may

be necessary to rebuild approximately 1.0 m² of the elevation as the brickwork is only 100 mm thick in this location.

At high level a horizontal crack was noted. It is anticipated that this has been caused by corrosion of the steel truss at the bearing. As the steel has corroded, it has expanded, cracking the adjacent brickwork.



Rear elevation hidden by trees and vegetation.



Left hand side of rear elevation.



Masonry moved inwards where previous roof structure abutted the elevation.



Trees built close up to the rear elevation.



Damage to lintel over poorly widened opening through rear wall.



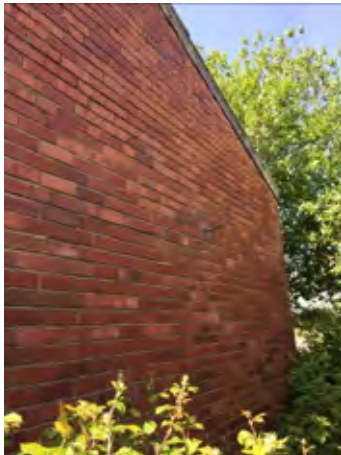
Trees and vegetation close to rear elevation.

2.5.5 Left Hand Side Elevation

The external elevation was 215 mm thick solid brickwork. An opening had been provided towards the rear elevation. This had a concrete lintel over. Some movement was noted at the bearing of the opening.

Due to the close proximity of the adjacent barn and the prevalence of vegetation, it was not possible to fully inspect all areas of the elevation.

At mid-height, to the left hand side of the door opening, a horizontal crack was noted. It is anticipated that this had been caused by corrosion of embedded steelwork. The steelwork should be removed and the brickwork repointed.



Left hand side elevation.



Movement of brickwork to bearing for lintel.

2.5.6 Internal Areas

A blockwork partition wall had been constructed approximately across the centre of the original barn to form two rooms. It is anticipated that the partition wall is 200 mm thick and has been stabilised by piers on within Room 2. Towards the apex, the blockwork thickness reduces to approximately 100 mm.

Both Room 1 and Room 2 were open for the full height of the structure. The steel trusses and purlin were visible and were noted to have corroded slightly.

As noted previously the roof is finished with sheeting and fragile roof lights which may contain asbestos materials. Some holes were noted through the roof and some of the sheeting had cracked. Staining, likely to be associated with the ingress of rainwater, was noted in Room 1. We recommend that the roof sheeting is tested for asbestos prior to removal and replacement. Over Room 1 vents and ducts were present over the roof.

Within Room 1 the front wall appeared to have moved outwards slightly, it was noted that the bottom chord of the truss had been removed and therefore the restraint afforded had been compromised. Additional restraint or a repair will be required to the truss to prevent further movement of the front wall.

The gable wall / right hand side elevation had a large opening formed through the wall towards the front elevation. Steel beams had been used to support the masonry above the opening. The masonry above was part original brickwork and part newer blockwork used to increase the height of the adjacent, attached barn. The steelwork appeared to be corroding and a section of the masonry above was missing.

A stepped crack was noted extending upwards and to the left hand side of the opening. The crack then extends horizontally towards the left hand side. The brickwork appears to have lifted in this location. It is anticipated that as the steel has corroded, it has increased in cross section and has lifted the adjacent masonry. The steelwork should be treated or replaced and the masonry repointed.

The floors to Room 1 were part concrete slab and part tiled. Within Room 2 they had been finished with concrete paving slabs generally.

A trough was noted to extend for the full length of the rear elevation.

We would recommend that an additional leaf of blockwork is built against the rear wall to enhance the stability of the rear wall for the full length of the barn. The piers currently stabilise the wall, but the proposed additional support would also improve the thermal characteristics of the barn.

A crack was noted within the rear wall of Room 1 towards the right hand side. A hole was present below the crack. A localised repair should be undertaken. A door was present through the rear wall towards the left hand side, but this had been infilled.



Internal face of left hand side elevation.



Blockwork partition wall built to separate the barn into two rooms.



Large opening formed through rear wall.



Internal face of front elevation wall.



Brick pier on rear wall.



Trusses supported by brick piers. Brickwork lifted.



Water staining on rear wall.



Blockwork partition wall between Room 1 and 2.



Bottom chord missing from steel truss.



Bottom chord missing from steel truss.



Steelwork installed to form large opening/



Cracking to right hand side wall.



Roof sheeting missing.



Trusses with bottom chords missing.

2.6 Barn 5

2.6.1 General Description

The front elevation, for the purpose of the report is considered to be the long elevation containing the entrance doorways to the various barns along the structure. The barn is both single and two storeys. The two storey part is towards the right hand side of the structure. The single storey part extends towards the left hand side.

The rear elevation has a number of high level windows. The left hand side elevation is a brick gable with no openings and the right hand side is a brick gable with a large opening.

The roof is duo-pitched, spanning from front to rear. Generally the barns are finished with slates, supported by traditional purlins and rafters. Clay ridge tiles have been provided. The two storey part has a steel ridge beam and steel purlins. The first floor appears to be hung from the roof structure.

The external walls are solid 215 mm thick brickwork walls punctured by windows and doors mainly on the front elevation. Some window openings exist on the rear elevation and the right hand side elevation has a large opening into the two storey structure. Concrete lintels have been provided over the openings into the single storey part on the front elevation. The two storey part had standing soldier brick lintels which we believe also gained support front the metal window frames. The rear elevation of the single storey part of the structure also had standing soldier brick lintels. On the front elevation doubled up steel beams had been provided to form the opening.

2.6.2 Front Elevation

The ridge line and roof slope was undulating across the elevation, indicating that the roof has spread in the past and / or that the roof timber sizes are inadequate or may have been affected by water reducing their structural capacity. It is likely that some roof timbers will require strengthening or replacement. It would be prudent to provide new ridge beams across the structure to prevent further roof spread. No ridge beam or ties were noted within the roof structure.

At least one hole had formed through the roof slope. A repair of the roof is required, if the roof is not replaced. Slates were missing or had slipped in a number of locations.

Gutters were missing and the slates at eaves level were damaged in a number of locations and rainwater was not adequately directed away from the brickwork elevations in a number of locations. This had generally occurred where vegetation was growing through the roof at eaves level.

Some movement of the brickwork and rafter ends had occurred over some of the concrete lintels and at eaves level, in a number of locations. This was generally due to roof spread, growth of vegetation through the structure or where gutters were missing. The rafters may require repair or replacement and the brickwork should be re-set. Slates had slipped, or were missing in these locations, and these should be repaired / replaced. New rainwater goods are required throughout.

In some locations the concrete lintels had cracked or were beginning to erode / spall. We would recommend that before the defects become more pronounced, concrete repairs should be undertaken using proprietary concrete repair systems.

The ends of the rafters were visible in a number of locations. The condition of the timbers varied and if the timbers are not replaced, we would recommend that the rafter ends were treated to increase their longevity.

Some brickwork was loose and isolated bricks were missing in a number of locations. At eaves level adjacent to the front corner brickwork was missing and damaged.

Mortar had weathered in a number of locations; however, this is expected in a barn of this age. Some mortar joints did not have any mortar in the joints. There weathered or missing, mortar should be re-pointed.

The window openings to the two storey structure had been boarded over on the front elevation, so visual access was not available.

Embedded steelwork was present within the elevations in various locations. Where the steelwork had corroded, the brickwork / mortar joints had opened up and cracked. When steel corrodes, it delaminates and increases in cross sectional area, i.e. it expands. As the steelwork expands, it causes an increase in stress in the brickwork and as the brickwork is brittle, it is not able to cope with the increased stress and therefore it cracks. Disused and corroded steelwork in the elevations should be removed and the masonry re-pointed.

Vegetation growing up the elevations masked the building condition in a number of areas; however in some locations, the presence of vegetation in the brickwork had caused the mortar joints to open up.

In some locations vegetation / shrubs were growing tight up to the face of the front elevation or within one of the doorways; however, there were no obvious signs of structural damage due to the location of the shrubs. The vegetation should be removed; this includes removal of the roots.

Moss growth was noted at low level. We anticipate that a new damp proof course would be provided during the scheme of refurbishment.



Front elevation of single storey part of the barn.



Front elevation of the two storey part of the barn.



Slates are missing; vegetation is growing within the masonry and cracked and loose brickwork.



Holes through roof, missing and slipped slates and missing rain water goods.



Vegetation obscuring the elevations and growing through the masonry.



Tree growing within the doorway.



Missing rain water goods, damaged eaves and missing slates.



Corroded embedded steelwork has caused a horizontal crack to form.

2.6.3 Right Hand Side Elevation

The gable elevation has a large opening which gives access to both the upper and lower floor level; doubled up steel beams extended across the opening. There was evidence that the opening was originally wider, but had been partially infilled. Corrosion of the steelwork has occurred. The steel appears to have originally been covered by chicken wire and rendered over; however, a large proportion of this has dislodged.

The ends of the steel ridge beam and purlins are visible in the face of the elevation. Some cracking was noted below the purlin bearings. This is likely to require installation of a padstone and treating of the ends of the steel to prevent further corrosion.

Cracks have formed in the mortar junctions between the original and infilled brickwork. This may be due to shrinkage or possibly an inadequate base to the infilled masonry; however, these appear to be an old, historic defect.

Some damage to the brickwork was noted at low level. This appeared to relate to impact damage and not structural movement.

At high level to the right hand side, a vertical crack was noted which appeared to be due to inadequate support to an isolated brick. Support should be provided as part of any repair scheme.

The mortar to the verges has dislodged and should be replaced.



Right hand side elevation.



Concrete dislodged from corroding steelwork.



Corroding steelwork.



Corroding steel purlins have caused cracks to form in the brickwork.

2.6.4 Rear Elevation

Also as noted on the front elevation, the roof ridge line and roof slopes were undulating. This is likely to be due to roof spread and / or inadequate or rotting timber roof members. The previously noted there are no ties across the roof and no ridge beam.

At least three location, holes were noted through the roof covering. The hole should be repaired as part of the scheme of repairs. Vegetation, also contributing to the defects noted to the roof, should also be removed.

The majority of the two storey part of the elevation was hidden by a large trailer. Where visible it was noted that the windows were boarded over and the gutters were missing. A slight bow in the wall was evident, however, this was considered to be within acceptable limits.

At low level, a small number of bricks were missing and a gap had opened up between original and more recent brickwork. Stitching of the brickwork should be considered.

As was noted on the front elevation, in a number of locations that the slates at eaves had slipped, rafter ends were exposed and gutters were missing. In some locations the top two or three courses had moved. These should be re-set, the roof coverings and timbers repaired and new gutters provided.

Some cracking was noted within the brick arch lintels in at least two locations. This had generally occurred whereas a nail had been inserted into the lintel and which had then corroded, expanded and therefore cracked the brickwork.

Some outward movement of the brickwork elevation of the single storey structure was noted at low level. The brickwork has slipped outwards along one of the bed joints. This appeared to be historic movement which had occurred along the majority of the elevation.

Adjacent to one of the trees, a 2 mm wide vertical crack was noted. It is anticipated that the cracking is due to the presence of the tree, which should be removed to prevent further defects from occurring. Vegetation was noted adjacent to the elevations in a number of locations. We recommend that all vegetation close to the elevations is removed to prevent future cracking of the elevations.

There is a possibility that the vertical cracks could be associated with thermal movement of the elevation, as there are no movement joints across the elevations. Vertical cracks were noted at approximately third points across the elevation. It would be prudent to install movement joints to prevent further thermal movement of the elevation.

Vegetation, stored equipment and stored tires prevented visual access of many parts of the elevation and therefore we cannot comment on the condition of the structure in these locations.

Towards the right hand side of the elevation an opening had been formed and no lintel was present. If retained, a lintel should be provided.

Moss growth was noted at low level. We assume a damp proof course will be installed. There is a possibility that damp has occurred to the elevation where the tires were stored. We could not check the wall as the tires formed an obstacle to that location.



Left hand side of rear elevation hidden by large trailer.



Undulating roof to rear elevation.



Undulating roof. Holes through roof at eaves level.



Vegetation masking the rear elevation.



Holes through the roof at eaves level. Rafter ends rotting.



Undulating roof slopes noted.



A fixing through the timber has caused the standing soldier lintel brickwork to crack.



Moss growth at low level indicating damp ingress. The brick elevation has moved outwards at low level.

2.6.5 Left Hand Side Elevation

The timber purlin ends were visible. Towards the right hand side the purlin end had rotted and the verges had collapsed. The top two courses of brickwork appeared to be loose and should be re-set. Some timber replacement will be necessary and the roof repaired. The verges will require repointing.

Some stepped cracking was noted towards the right hand side of the elevation where the boundary wall was built into the gable wall. It is likely that the boundary wall has less substantial foundations and the wall appears to have settled slightly.



Left hand side elevation.



Damage to brickwork and rotten roof timbers visible. Verge mortar missing.



Edge of roof damaged.



Wall plate rotting. Slate over hang missing.

2.6.6 Internal Areas – Two Storey Part

The internal areas have been given room numbers. Please refer to the attached sketches. Room 1 is the area within the two storey barn.

The internal elevations are generally exposed brickwork with render at low level. Some of the render was dislodging due to its age.

The ceilings were boarded, the boards being fixed to timber joists hung from the roof structure above. Some of the boards appeared to be dislodging, possibly due to the age of the fixings into the timbers.

Concrete lintels formed the openings on the front and rear elevations internally and the window frames were noted to be steel framed and were assumed to support the outer leaf of brickwork.

No sign of significant structural movement was noted.

The floors were finished with paving slabs. A trough was noted to one side of the room, close to the rear elevation.



Internal area at ground floor level with the two storey part of the barn.



Trough in floor.



Steel window frames supporting elevations.
Render dislodging.



Ceilings collapsing.



Water staining to timbers.



Holes through the roof.



Collapsed ceilings.



Concrete paving slabs and trough noted.



Cracking to cross wall.



Cracking to cross wall.

The floor / ceiling between the upper and lower level of the two storey part of the structure has been hung from the roof structure. A steel ridge beam and steel purlins have been provided to strengthen the roof and should prevent further splaying of the roof structure.

A slight deflection of the purlin supporting the rear elevation roof slope, to the right hand side was noted.

We would recommend that the first floor is supported independently of the roof structure.

Generally the roof timbers appear to be in satisfactory condition.



First floor.



Steel ridge beams and purlins.

2.6.7 Internal Areas – Single Storey Part

Ceilings have been provided in the remaining rooms. We have numbered these 2 to 8. We understand that the ceilings were provided to raise the temperature within the barns and are not structural i.e. they do not contribute to the lateral stability or spreading of the structure from front to rear. They are supported by the cross walls and hung from the roof structure, not by the front and rear elevation. In most room, these have collapsed. Due to the fact that the ceilings were collapsing or in the process of collapsing, access into some of the rooms was considered to be dangerous and the survey was carried out from the doorway only. Where possible access was made; however we would not recommend that anyone enters the barns without permission.

There is no ridge beam to any of the rooms within the single storey barns, but a purlin is present on each of the front and rear slopes, supporting the rafters.

A gap was noted between the lower roof to the single storey barns and the gable wall to the two storey barn. Repairs will be required to prevent ingress of water in the final scheme of repairs / refurbishment. Further holes were noted through the roof structure in a number of places within the barns.

We would recommend that the barn is re-roofed, replacing timbers as required and providing a ridge beam. This will prevent further spreading of the roof timbers and will repair holes etc.

A stepped crack was noted on the cross wall between rooms 3 and 4 and between rooms 6 and 7. A trough was present extending along the length of the wall in this location. The cracking appeared to be historic and is likely to be due to ingress of water below ground, affecting the foundations. It would be prudent to stitch the cracks using a proprietary stitching system using helical bars anchored into the masonry.

Concrete paving slabs had been provided over the floor areas and troughs had generally been provided along the cross walls.

A small tree / shrub was growing within the doorway to room 6; however, not significant structural defects were noted which would suggest that this movement of the structure had moved. We

would recommend that the tree be carefully removed. The timber purlin closest to the front elevation appears to have been affected by the ingress of water and should be replaced.

There was no ceiling within room 7 and a hole was visible through the roof close to the rear elevation. Some repairs will be necessary to the rafters.

Some stepped cracks were noted to the cross wall with room 8, close to the front elevation, the front wall appears to have moved away from the cross wall slightly. We recommend that the masonry be tied / strapped together and a ridge beam provided to prevent spreading of the roof structure.

Within room 8, a new opening has been formed in the rear wall which does not have a lintel. A lintel should be provided or the opening infilled with brickwork.

2.7 Barn 6

2.7.1 General Description

The front elevation, for the purpose of the report is considered to be the long elevation containing the entrance doorways to the various barns along the structure. The barn is single storey.

The rear elevation has no windows, but some piers were noted. Piers were also present on the front elevation. The left hand side elevation is a brick gable with a window opening. The elevation supports part of an open covered area. The right hand side is a brick gable also with a window opening.

The roof is duo-pitched, spanning from front to rear. Generally the barns are finished with slates, supported by traditional purlins and rafters. Clay ridge tiles have been provided.

The external walls are solid 215 mm thick brickwork walls punctured by doors openings on the front elevation and a window opening on each gable. Concrete lintels have been provided over the openings into the barns on the front elevation and the gable elevations.

2.7.2 Front Elevation

The ridge line and roof slope was undulating across the elevation, indicating that the roof has spread in the past and / or that the roof timber sizes are inadequate or may have been affected by water, reducing their structural capacity. It is likely that some roof timbers will require strengthening or replacement. It would be prudent to provide new ridge beams across the structure to prevent further roof spread. No ridge beam or ties were noted within the roof structure. At least one hole had formed through the roof slope. A repair of the roof is required, if the roof is not replaced. Slates were missing or had slipped in a number of locations.

Gutters were missing and the slates at eaves level were damaged in a number of locations and rainwater was not adequately directed away from the brickwork elevations in a number of locations. This had generally occurred where vegetation was growing through the roof at eaves level.

Some movement of the brickwork and rafter ends had occurred over some of the concrete lintels and at eaves level, in a number of locations. This was generally due to roof spread, growth of vegetation through the structure or where gutters were missing. The rafters may require repair or replacement and the brickwork should be re-set. Slates had slipped, or were missing in these locations, and these should be repaired / replaced. New rainwater goods are required throughout.

In some locations the concrete lintels had begun to erode / spall. We would recommend that before the defects become more pronounced, concrete repairs should be undertaken using proprietary concrete repair systems.

A 15 mm wide gap was noted to the left hand side of the lintel over the door to room 4. This movement appears to be a historic in nature and should be repointed. Some further 2 mm wide stepped cracks were noted to the right hand side of the lintel. This is considered to be due to slight spreading of the roof structure and should be alleviated by providing a ridge beam.

The ends of the rafters were visible in a number of locations. The condition of the timbers varied and if the timbers are not replaced, we would recommend that the rafter ends were treated to increase their longevity.

Mortar had weathered in a number of locations; however, this is expected in a barn of this age. Some mortar joints did not have any mortar in the joints. There weathered or missing, mortar should be re-pointed.

Vegetation growing up the elevations masked the building condition in a large number of areas; however in some locations, the presence of vegetation in the brickwork had caused the mortar joints to open up.

In some locations vegetation / shrubs were growing tight up to the face of the front elevation. Generally no obvious signs of structural damage due to the location of the shrubs; however, a stepped crack was noted adjacent to the door into room 2, which is likely to have been affected by the tree. The vegetation should be removed; this includes removal of the roots.

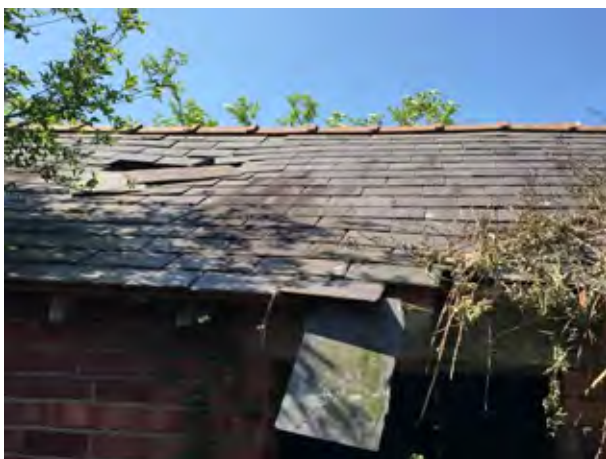
Moss growth was noted at low level and up the face of the wall adjacent to the doorway to room 2. We anticipate that a new damp proof course would be provided during the scheme of refurbishment. New rain water goods should also prevent water affecting the elevation and encouraging the growth of moss on the face of the wall.



Front elevation.



Front elevation.



Undulating roof with holes noted. Slipped slates and missing rain water goods.



Gaps adjacent to lintels. Vegetation growing through the structure.



Missing eaves structure.

2.7.3 Right Hand Side Elevation

The wall plates are visible on the gable elevation. These appear to have weathered.

The mortar to the verges had dislodged and requires repointing.



Right hand side elevation.



Mortar dislodged from verges.

2.7.4 Rear Elevation

Due to the presence of thick vegetation, it was not possible to clearly review the rear elevation. The area closest to the left hand side elevation was visible from a distance of approximately 20 m; however, towards the right hand side it was not possible to evaluate the elevation.

Some of the clay ridge tiles were missing and no rain water goods were visible.

A large part of the roof over room 1 had rafters and slates missing. Vegetation was growing through the roof.

A large tree was noted close to the rear elevation approximately at the position of the cross wall between rooms 2 and 3. It was not possible to see whether any defects associated with the position of the trees had occurred, but no obvious signs were visible.

A hole was noted through the wall forming the rear of room 2. No lintels were visible. If the hole is to remain, a lintel should be provided, or the wall should be infilled with brickwork.

It was not possible to adequately assess the full extent of the elevation; however, we anticipate that similar defects should be expected.



Rear elevation



Holes through roof and missing slates at eaves level.

2.7.5 Left Hand Side Elevation

The majority of the elevation is hidden by vegetation which would mask any defects.

The gabled elevation provides support to a cover area. Timbers have been bolted onto the elevation to support a lightweight corrugated metal steel roof which is at a higher level than the barn. Some timbers were bearing on top of the gable elevations, again to support the adjacent light weight roof.

Water staining was noted on the face of the elevation suggesting that the drainage from the upper roof is inadequate. We assume that the upper roof will be removed within any further refurbishment schemes.

The mortar within the verges has dislodged and should be replaced.

Some holes through the elevation had been provided for services; these should be infilled.



Left hand side elevation.



Majority of the elevation is hidden by vegetation.

2.7.6 Internal Areas

Ceilings have been provided in rooms 1 to 3. We understand that the ceilings were provided to raise the temperature within the barns and are not structural i.e. they do not contribute to the lateral stability or spreading of the structure from front to rear. They are supported by the cross walls and hung from the roof structure, not by the front and rear elevation. In rooms 1 and 2, these have collapsed. Due to the fact that the ceilings were collapsing or in the process of collapsing, access into some of the rooms was considered to be dangerous and the survey was carried out from the

doorway only. Where possible access was made; however we would not recommend that anyone enters the barns without permission.

The ceiling to room 3 was intact, but could collapse at any time, as it is likely to have been constructed at the same time as the collapsed and collapsing ceilings in the other rooms. Daylight was visible at high level indicating that there must be at least one hole through the roof. There was no ceiling to room 4 and it was noted that the right hand side elevation wall had been constructed so it was angled; i.e. not at 90 degrees to the front and rear walls.

There is no ridge beam to any of the rooms within the single storey barns, but a purlin is present on each of the front and rear slopes, supporting the rafters.

Generally where walls were visible in rooms 1 to 3, no significant defects were noted to the masonry; however, some holes had been provided through the walls for services.

Holes were also noted through the roof in a number of locations.

The floors were generally finished with concrete paving slabs.

Room 2 had a hole through the rear wall which did not have a lintel. The hole should be infilled or a new lintel provided to each masonry leaf if the opening is to be retained. Smaller holes were noted in the rear wall of room 3. These should be infilled.

The cross walls did not appear to be fully keyed in and slight gaps were noted in more than one room. We recommend that the cross walls are strapped to the external walls.

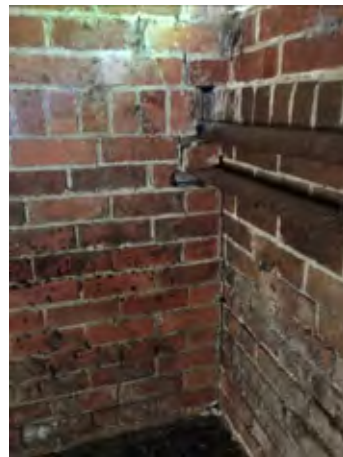
We would recommend that the barn is re-roofed, replacing timbers as required and providing a ridge beam. This will prevent further spreading of the roof timbers and will repair holes etc.

A stepped crack of approximate width 4 mm was noted on the right hand side elevation wall, under the window. This extended horizontally towards the front elevation approximately 1 m above slab level to the front elevation, where it continued up the face of the front elevation wall. The stepped crack on the front wall was approximately 3 mm wide. The brickwork had stepped within the plane of the wall by 15 mm. The pattern of cracking suggested that the front right hand corner had moved outwards to the side and slightly forwards. It is likely that this is due to lack of restraint of the corner. There was no ceiling ties, or a ridge beam. Provision of additional lateral restraint is required.

Concrete paving slabs had been provided over the floor areas.



Holes through roof and rear wall.



Separation between cross wall and rear wall.



Missing structure at eaves.



Stepped cracking to right hand side gable wall.



Horizontal cracking to right hand side gable wall.



Cracking continues onto front wall.



Ceilings collapsing.



Ceilings collapsing and holed noted through the roof structure.

2.8 Main Farm House

2.8.1 General Description

The farm house to Gamford Farm is a two storey detached domestic dwelling which has undergone a single and two storey extension at the rear and a single storey extension to the right hand side. A uPVC porch structure, supported by rendered external walls, has been provided at the front of the property. The porch has a slate covered roof.

The roof to the main property is duo-pitched, spanning from front to rear and is finished with slates which we assume are supported by traditional purlins and rafters. We were not able to gain access into the property, so a full investigation was not possible.

The original elevations have 215 mm thick solid brickwork externally with some decorative brick banding, generally at first floor and eaves level on the front elevation. Generally, stone sills have been provided at first floor level. The extensions have been finished with render and generally have flat roof profiles. We assume that the extensions at the rear are formed from cavity masonry with blockwork to the inner and outer leaves. The side extension appears to be 215 mm thick brickwork which has been finished with render.

Generally the external windows and doors were of timber framed glazed units, with aluminium frames used to the extension towards the right hand side.

At ground floor level on the front elevation, a large window opening has been provided to either side of a uPVC porch structure forming the main entrance. A proprietary lintel has been provided to form the opening. At first floor level, on the front elevation, there are three windows, each with brick arched lintels. It would appear that proprietary lintels have been provided in the majority of window opening, with brick arched windows using in the original structure at first floor level on the front elevation.

2.8.2 Front Elevation

Large trees and shrubs are present close to the front elevation. These prevented clear visual access of the full elevation. Ivy was growing up the face of the elevation and parts of the porch structure were also obscured by vegetation.

We were unable to inspect the roof slope due to the lack of available sight lines and therefore cannot comment on its condition.

Generally the brickwork elevations are in satisfactory condition, but the timber elements have weathered and rotted due to lack of maintenance.

A vertical crack was noted extending from the top right hand side of the left hand, ground floor window, to the sill level of the window above. This crack appears to be a historic defect which may be associated with the abundance of trees in the close to the elevation or may have been influenced by over-deflection of the lintel to the ground floor window. The trees should be removed and the cracks stitched using a proprietary crack stitching system involving the installation of helical ties in the mortar joints.

A vertical crack was noted to the right hand side of the arched lintel to the central window at first floor level. The cracking is likely to be due to movement of the brick arch. It would be prudent to repair and re-set or pin the original arch lintel to prevent future movement.

A stepped crack was noted extending from the left hand side of the right hand, first floor window, downward the left hand side. There were signs of movement of the brickwork panel between the ground and first floor window, which is likely to be due to deflection of the ground floor window lintel. It is likely that a lintel repair or replacement of the lintel will be required.

The decorative brickwork and gutter was damaged in places. It is considered that the movement of the masonry is likely to be due to weathering of the mortar joints due to the leaking gutters. Localised rebuilding / repointing should be undertaken.

Further cracking through the decorative banding was noted and water staining evident in other locations. Repairs to the above ground rain water goods should be undertaken and some localised repointing should be carried out.

The original entrance into the property is within the porch. An arched lintel forms the opening. Home hairline cracks were noted to the plaster finishes, but these were not considered to be of concern.

Vegetation was noted to be growing through the elevation in a number of locations. The vegetation should be removed and the elevations repointed as required.

The front of the extension toward the right hand side is substantially covered by vegetation.

The fascia boards had dislodged and the timber flat roof joist ends visible and appeared to be weathered and beginning to rot. The condition of these timbers should be investigated further.

The condition of the finish to the flat roof was not visible and we are therefore unable to comment further.



Front elevation hidden by vegetation.



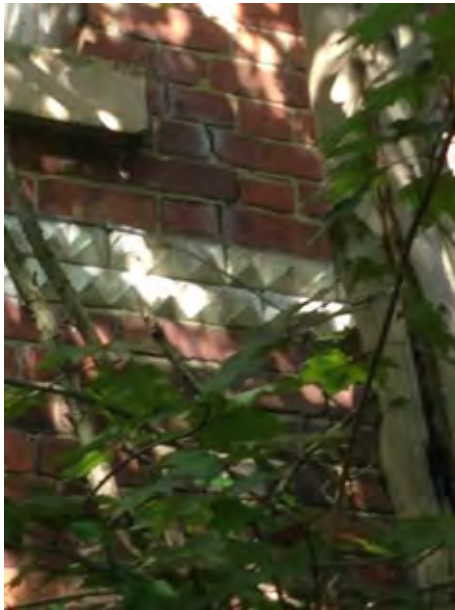
Porch structure. Trees close to front elevation.



Porch structure partially covered by vegetation.



Left hand side of front elevation.



Cracking between ground and first floor level to left hand side of the porch.



Vegetation growing through the decorative brickwork. Rain water goods appear to be leaking.



Fascia boards dislodging, exposing flat roof joist ends.

2.8.3 Right Hand Side Elevation

The right hand side was visible from ground level only. Generally the masonry to the original house was in satisfactory condition, however, the timber elements were in poor condition. It would appear that the timber purlin ends visible had suffered from rot due to exposure to water. The verges, eaves and fascia boards were rotten, missing and / or dislodging. The slates had also slipped or were missing and the mortar to the verges was missing. Generally the timbers and slates should be replaced and the verges repointed.

The right hand side of the side elevation has a steel beam over the large opening. The timber fascia over has rotten and dislodged. Vegetation is growing across the elevation from both sides. This should be cleared and repairs undertaken as required to the affected timbers.

A large window opening was noted at first floor level within the original gable elevation. It was not possible to assess whether a lintel had been used. We recommend that this should be investigated further.



Right hand side elevation generally.



Right hand side elevation of original dwelling.



Right hand side elevation of original dwelling.



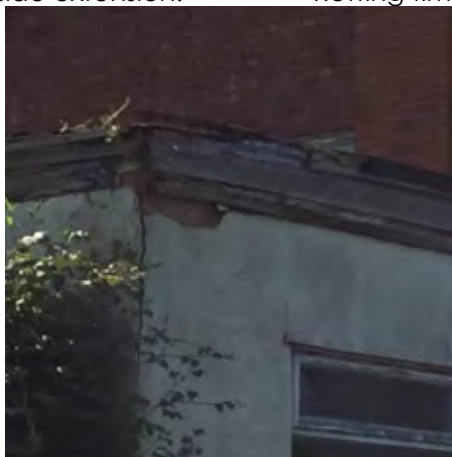
Right hand side elevation generally.



Right hand side elevation to side extension.



Rotting timber fascia to side extension.



Rotting timber fascia to side extension. Render cracking and de-bonding.

2.8.4 Rear Elevation

The roof appeared to be fairly level on the rear slope of the main property roof; however, some slates had slipped, particularly close to the ridge and gable verges. Repointing of the verges is required and we would recommend that the chimney stacks should be repointed. Vegetation and black water staining was noted on the chimney stack at the centre of the property.

We were not able to gain close access to the rear elevation due to the abundance of overgrown vegetation. Parts of the elevation were obscured by vegetation and could not be assessed.

A small area of the rear of the original house was visible from the left hand side. This revealed that the condition of the masonry was generally satisfactory, but the roof edge was in poor condition. Slates and roof timbers were missing and rotten.

Generally the rear extensions appeared to be in satisfactory condition; however a horizontal crack was noted at approximately mid-height of the two storey extension. This may be due to old and de-bonding render or could be associated with corroding wall ties if the wall is a cavity wall. This should be investigated further.

The rear elevation of the side extension was in poor condition. The timber fascia boards had rotted and were dislodging and the render was cracking and dislodging. We would recommend that timber repairs are carried and assume that some flat roof joist may require replacement.

Viewing the rear of the property from the left hand side revealed that the rear of the single storey extension housing the WC had cracked render and rotting fascia boards. Some timber window sills were also noted to be rotting.

Vegetation was growing in the rain water gutters and should be cleared.

It was not possible to assess the condition of the flat roof finishes, but it is assumed that felt finishes have been provided.



Rear elevation generally.



Rear elevation of rear extensions. Vegetation covering elevations.



Rear elevation of side extension



Rear of single storey rear extension.



Condition of verge considered to be poor.

2.8.5 Left Hand Side Elevation

The left hand side elevation of the original farm house was constructed using solid 215 mm brickwork. A window was noted towards the front elevation at ground floor level and a further window at first floor level, again towards the front elevation. The first floor window has a brick arch lintel and a stone sill. Generally the condition of the brickwork was satisfactory; however, a penetration through the brickwork was noted at ground floor level. This should be infilled to prevent future issues with regard to the stability and ingress of water and vermin within the property. A vertical crack was noted above the penetration and some bricks were noted to have spalled. The spalled bricks are likely to be due to frost.

The verges to the main house were noted to be in very poor condition, particularly the rear slope. Slates have slipped and are missing and the mortar to the verges was missing.

Trees were present close to the elevation which may have masked some defects.

The left hand side of the two storey extension was rendered for the full height, but unpainted at first floor level.

The window head of the first floor window was not level and the timber frames were in poor condition.

A brick and timber framed porch had been constructed at ground floor level adjacent to the elevation. The majority of the timbers were severely rotten with some frames rotten through the full cross section of the timber. Some of the bricks had spalled due to freeze thaw action. The porch should re-built as a repairs is unlikely to be cost effective.

The main side wall had a vertical crack over the window and the render had cracked adjacent to the lintel. A brick arch lintel had been provided and it would appear that this has slipped slightly. A repair should be provided to minimise future movement of the elevation.



Timbers and fascia boards to eaves are rotten and the slates are missing or damaged.



Left hand side elevation at first floor level.



Left hand side elevation generally.



Rear porch on left hand side elevation.



Left hand side elevation generally.



Large window opening at ground floor level.



Left hand side elevation generally.



Left hand side of single storey extension at the rear of the property.



First floor timber window frame rotting.



Cracking to brick arch lintel to side elevation within the rear porch structure.



Rotting timbers to rear porch structure.



Rotting timber fascia to side extension.



Spalling bricks to rear porch structure.



Water staining to main chimney stack.

2.9 Drainage

No drainage surveys were undertaken and no manholes were lifted and therefore we cannot comment on the conditions of the drains.

2.10 Trial Holes

No internal or external trial holes were excavated and therefore we cannot comment on the condition, depth and size of foundations generally.

3.0 Conclusion and Recommendations

3.1 General Comments

Our visual survey of the barns we were requested to inspect revealed that in general the barns were in satisfactory condition and are suitable for conversion to residential usage; however, they had generally suffered from a lack of maintenance for a long period of time; at least 10 years. This also appeared to be the case for the main farm house.

Based on our observations of the materials used in the barns and the age of the house and its extension, we would recommend that an asbestos survey is carried out by a suitable qualified specialist. There were a number of locations where we believe some of the materials may contain asbestos fibres. This includes the ceilings and some above ground drainage.

There were signs of rot and infestation in a number of the structures and therefore we would recommend that a suitably qualified specialist investigate the condition of all the timbers within the buildings under investigation.

Moss and signs of damp and ingress of water was also noted in a number of the barns. For this reason we recommend that a damp specialist is employed to assess the properties.

We assume that all floors will be replaced. It is assumed that the required insulation and damp proof membranes will be installed in all cases and therefore we will not comment on this further.

We also assume that as part of the refurbishment works a suitable damp proof course will be provided and therefore we will not comment on this further.

We assume that all roof areas to the barns will be re-covered incorporating new under-tile felt, insulation, vapour control barriers and battens will be provided and therefore we will not comment further. Where the roof areas are finished with corrugated sheeting or fragile roof materials, we assume that a new roof sheeting system incorporating insulation will be used or a slate finish will be provided.

All of the properties have been affected by weathering of the masonry bed joints, some more severely than others. All structures should be fully or locally repointed, as required.

Where bricks are missing from the elevations, these should be replaced.

Many of the properties have concrete lintels forming openings through the external elevations. Where damage, corrosion, cracking or spalling of the lintel has been noted, this should be repaired using a proprietary concrete repair system.

We would recommend that new rainwater goods are provided to all of the structures.

We have provided comments regarding each individual structure below. Where assumptions have already been made these will not be repeated.

3.2 Barn 1

The barn is considered to be in fair to good condition and suitable for conversion to residential usage.

The roof is considered to be fairly level, but we recommend that a new ridge beam is provided to prevent roof spread in the future.

It is likely that some replacement timbers may be required due to the presence of holes through the roof.

Both vertical and horizontal restraints should be provided at roof, eaves and floor level to ensure that adequate restraint to the external walls is provided going forward.

Some of the first floor joists over Room 4 had rotted through. New floor joists are required in this location and no access should be made to the first floor until the floor has been adequately propped. We would recommend that the floor is propped immediately to prevent a possible collapse.

Holes through the external walls should be infilled with new brickwork. Loose / de-bonding plaster finishes should be removed.

The timber lintel over the entrance to room 2 may require replacement, as it has weathered considerable. Results from the timber specialist should be perused before a final decision on the removal and replacement is made.

Where bricks are loose or missing, these should be provided, re-set or repointed.

The internal opening between Barn 1 and 2 requires an additional steel beam to ensure that the unsupported brickwork cannot collapse. The brickwork below the steel beams has cracked. We would recommend that the brickwork is rebuilt or stitched / tied together.

Vegetation noted growing adjacent to, or within the building or the building fabric, should be removed. Any affected brickwork should be re-set or repointed as required.

Not all elevations or internal areas could be assessed as there were masked by vegetation, tanks or stored goods and therefore some additional defects may exist. In other locations safe access was not available to the upper floors or rooms were locked.

3.3 Barn 2

The barn is considered to be in good condition and suitable for conversion to residential usage.

The roof is considered to be fairly level. It is possible that some replacement timbers may be required due to the presence of a hole at eaves level, but generally the roof appears to be in good condition.

The steel trusses and purlins have corroded and would benefit from treatment with a suitable preservative, particularly at the purlin ends where they have been built into the external elevations. At these locations we believe that corrosion of the purlin ends have caused the external brickwork to crack. The purlin ends should be exposed, cleaned and treated, and the adjacent masonry which has cracked should be stitched using a proprietary brick stitching system, which involves the bonding of stainless steel helical bars into the bed joints at regular centres. The bars should extend to either side of the crack by at least 500 mm. The part of the front elevation where the brickwork has lifted should be locally rebuilt.

In order that the first floor can be used fully, some alterations to the existing steel trusses will be required, due to the head room available.

Generally where cracking has occurred throughout the structure the crack stitching as described above should be undertaken.

The ridge tiles will require reinstatement following re-covering of the roof finishes.

The mortar to the verges has dislodge and cracked and should be repointed

Both vertical and horizontal restraints should be provided at roof, eaves and floor level to ensure that adequate restraint to the external walls is provided going forward. Movement of the rear wall had been recorded and the restraints proposed should prevent further movement.

Rain water repairs / replacement should be undertaken. We believe that the above ground rain water good to this barn may contain asbestos materials and therefore testing is essential, before any works are undertaken.

Where bricks are loose or missing, these should be provided, re-set or repointed.

Holes through the external walls should be infilled with new brickwork. Loose / de-bonding plaster finishes should be removed.

Staining to the walls noted internally is likely to be associated with the presence of the trees close to the elevation externally. It is likely that the wall is damp and unable to adequately dry out, causing the staining noted. This should be inspected by the damp specialist, as noted previously.

Where disused steelwork, timber or services are embedded or penetrate the external walls, these should be removed and the brickwork locally rebuilt or repointed, as required.

Concrete repairs are to be undertaken to the ring beam at first floor level. We would recommend that the embedded timbers are removed and the holes left, infilled before the repair products are applied.

The internal opening between Barn 1 and 2 requires an additional steel beam to ensure that the unsupported brickwork cannot collapse. The brickwork below the steel beams has cracked. We would recommend that the brickwork is rebuilt or stitched / tied together.

Vegetation noted growing adjacent to, or within the building or the building fabric, should be removed. Any affected brickwork should be re-set or repointed as required. Moss was noted growing on the elevation at low level indicating the possibility of damp affecting the masonry.

There is a possibility that there has been some very minor settlement of the right hand rear corner of the structure. We recommend that a trial hole should be undertaken to investigate the foundations size and ground conditions and to check whether any other influence exist which may have allowed the downward movement of the structure to occur locally to that corner. It is possible that the corner may require underpinning locally, but this cannot be confirmed until the further investigations are undertaken. Once the repair has been undertaken the crack brickwork can be stitched as previously described and any repointing can be undertaken.

Not all elevations could be assessed as there were masked by vegetation, tanks or stored goods and therefore some additional defects may exist.

3.4 Barn 3

The barn is considered to be in fair condition and suitable for conversion to residential usage.

The roof is undulating significantly and we recommend that a new ridge beam is provided to prevent roof spread in the future. New lintels are also required where the wall plate is used as both a lintel and a wall plate. In many locations the lintel / wall plate has over-deflected, allowing the rafters to move downwards and outwards. The existing ties across the roof do not appear to have been effective in prevent the roof from spreading and the rafters appear to be over-deflecting.

The masonry panel between the doors to room 3 is leaning outwards slightly and is to be restrained to the new roof.

It is likely that some replacement timbers may be required due to the presence of holes through the roof. The majority of timber lintels required replacement.

Both vertical and horizontal restraints should be provided to the gables to ensure that adequate restraint to the external walls is provided going forward.

Additional straps are required where the cross wall abut the front and rear elevations walls, as separation has occurred. The straps are required so that restraint is provided between the front and rear walls.

The cross wall between Rooms 4 and 5 which has cracked and which has the opening through, should be infilled and the disused steel removed. If the opening is to be retained then a new lintel should be provided, but the disused steel should still be removed. The cracked masonry should be stitched as described previously.

Holes through the external walls should be infilled with new brickwork. Loose / de-bonding plaster finishes should be removed.

The majority of the external cracking noted to this barn is due to corrosion and expansion of embedded steelwork. The steelwork should be removed and the elevations repointed.

Where disused steel, timber or services are built in or penetrate through the elevations, then these should be removed and the masonry rebuilt or repointed, as required.

Where bricks are loose or missing, these should be provided, re-set or repointed. The pier on the left hand corner of the barn on the front elevation is to be rebuilt. It would be prudent to excavate a trial hole on this corner to check the adequacy of the foundations to the pier. We would anticipate that an underpin will be required to the pier. This can be fully assessed once the trial hole has been undertaken.

The mortar joints to the brickwork on the left hand side elevation is severely weathered and further movement was noted where the pier / buttress is located. We recommend that the full extent of this elevation is repointed. The verges to both gable elevations required re-pointing as the mortar has cracked and dislodged.

Vegetation noted growing adjacent to, or within the building or the building fabric, should be removed. Any affected brickwork should be re-set or repointed as required.

Not all elevations could be assessed as there where masked by vegetation or stored goods and therefore some additional defects may exist.

3.5 Barn 4

The barn is considered to be in fair to good condition and suitable for conversion to residential usage.

The roof is considered to be fairly level. We expect that the roof sheeting will be replaced. There is a possibility that the existing sheeting contains asbestos and therefore testing of the materials will be required prior to removal and replacement.

We would recommend that vertical and horizontal restraints should be incorporated into the roof and any proposed new floors to ensure that adequate restraint to the external walls is provided going forward.

The steel roof trusses have been cut in places and the missing chords will need to be reinstated. We recommend that as part of the truss repair works, the steel is cleaned and treated with a suitable corrosion protection product to increase the longevity of the steel members. We believe that treatment of at least one of the bearings onto the pier in Room 2 is required as the brickwork has lifted in this location. Local re-setting of the brickwork may be required.

We anticipate that The taller barn adjacent to the right hand side elevation and which has been built off the gable wall, will be partially or fully taken down and the original gable reinstated. The existing steelwork forming the opening through this elevation has steelwork which appears to have corroded, causing the adjacent masonry to crack. If the opening is to remain, the steelwork is to be treated with a corrosion protection product and the cracks stitched and / or repointed. If the gable is to be reinstated, it would still be prudent to stitch and / or repoint the existing cracks.

Although the rear wall has been stabilised with piers, we believe that an additional inner leaf of masonry should be provided along the full length of the rear wall. This will also enhance the thermal characteristics of the barn as well as improve the general stability of the rear wall.

A small area of the rear wall is to be rebuilt, towards the right hand side of the rear wall, where some of the masonry has been pushed inwards.

The concrete lintel providing access into the rear of Room 2 should also be replaced as the concrete is damaged and the length, not suitable for the opening with currently provided.

The brickwork bearings to the concrete through the left hand side elevation require repointing.

Where disused embedded steelwork is present, this should be removed and the elevations repointed to prevent future structural damage.

Some of the first floor joists over Room 4 had rotted through. New floor joists are required in this location and no access should be made to the first floor until the floor has been adequately propped. We would recommend that the floor is propped immediately to prevent a possible collapse.

Holes through the external walls should be infilled with new brickwork.

It is clear that the rainwater goods are not functioning correctly as water staining is evident on the front elevation. New rainwater goods are to be provided,

Vegetation noted growing adjacent to, or within the building or the building fabric, should be removed. Any affected brickwork should be re-set or repointed as required.

Moss was noted growing on the elevation at low level indicating the possibility of damp affecting the masonry.

Not all elevations could be assessed as there were masked by vegetation, tanks or stored goods and therefore some additional defects may exist.

A drain was noted running along the front elevation, towards the left hand side. If this is to remain, it would be prudent to provide some protection measures to prevent falls into the trench.

3.6 Barn 5

The barn is considered to be in fair to good condition and suitable for conversion to residential usage.

The roof to the two storey part of the structure is considered to be fairly level; the single storey roof is undulating indicating that the roof has spread. We would therefore recommend that a new ridge beam is provided to the single storey part of the barn, to prevent roof spread in the future.

It is likely that some replacement timbers may be required due to the presence of holes through the roof and at eaves level. The verges and condition of the roof on the left hand gable is poor. The verges are to be rebuilt and repointed.

Both vertical and horizontal restraints should be provided at roof and eaves level to ensure that adequate restraint to the external walls is provided going forward. In the two storey part of the barn, restraints should also be provided at first floor level to prevent bowing of the walls.

All ceilings provided, were not contributing the stability of the structure and are not considered to be adequate for future use and therefore should be removed. The installation of the ridge beams should prevent further splaying of the roof which leads to the undulations seen. It is possible that asbestos materials could be present within the ceilings and this should be confirmed by testing prior to removal.

Based on the condition of the ceilings, we would not recommend that the barns are entered without permission or adequate safety measures in place, as the ceilings are in a precarious condition and could collapse at any time.

The first floor to the two storey part of the barn should be provided with its own support if retained unless it can be shown that the steelwork and roof structure has been designed to accommodate the load from the first floor.

The steel beams forming the large opening on the right hand side elevation have corroded and require replacement. The ridge beam and purlins which are built into the elevation appear to have corroded, causing the adjacent brickwork to crack. The steelwork built into the elevations should be exposed, cleared and treated with a corrosion protection product. Cracking noted to the elevation should be stitched as previously described.

The stepped cracking to the cross walls is considered to be due to movement due to water affecting the foundations to the cross walls. Troughs were present immediately adjacent to the cross walls and it is anticipated that water was able to seep through the troughs, softening the ground adjacent to the cross walls. The troughs and therefore the water source will not be present in the future proposals and therefore further cracking is unlikely to occur. We would recommend that the cracks are stitched as described previously.

Cracking noted within the brick lintels should be rectified by removing all fixings from the lintels, and repointing / packing the brickwork with slates, as required to prevent future movement.

Where disused embedded steelwork is present, this should be removed and the elevations repointed to prevent future structural damage.

Holes through the external walls should be infilled with new brickwork. Loose brickwork should be re-set / repointed. Loose / de-bonding plaster finishes should be removed.

Moss was noted growing on the elevation at low level indicating the possibility of damp affecting the masonry.

Concrete repairs are to be undertaken to some of the concrete lintels on the front elevation.

It is likely that some of the masonry is supported by the steel framed windows. Additional lintels may be required to accommodate replacement of the windows.

It would be prudent to provide a movement joint on the rear elevation where there is a long elevation, with no joints. The front elevation is broken up by doorways.

A movement joint should also be provided between the barn and the boundary wall towards the left hand side elevation. This is recommended as it is anticipated that the foundations to the boundary wall will not be as substantial as the barn foundations and differential settlement already appears to have occurred.

Vegetation noted growing adjacent to, or within the building or the building fabric, should be removed. Any affected brickwork should be re-set or repointed as required.

Not all elevations could be assessed as there were masked by vegetation, trailers or stored goods and therefore some additional defects may exist.

3.7 Barn 6

The barn is considered to be in fair condition and suitable for conversion to residential usage.

We anticipate that the light weight roof which is partially supported by the left hand side gable will be removed.

The single storey roof is undulating indicating that the roof has spread. We would therefore recommend that a new ridge beam is provided, to prevent roof spread in the future.

It is likely that some replacement timbers may be required due to the presence of holes through the roof and at eaves level.

The verges and condition of the roof is poor. The verges are to be rebuilt and repointed.

Both vertical and horizontal restraints should be provided at roof and eaves level to ensure that adequate restraint to the external walls is provided going forward.

All ceilings provided, were not contributing the stability of the structure and are not considered to be adequate for future use and therefore should be removed. The installation of the ridge beams should prevent further splaying of the roof which leads to the undulations seen. It is possible that asbestos materials could be present within the ceilings and this should be confirmed by testing prior to removal.

Based on the condition of the ceilings, we would not recommend that the barns are entered without permission or adequate safety measures in place, as the ceilings are in a precarious condition and could collapse at any time.

The steelwork built into the elevations should be exposed, cleared and treated with a corrosion protection product. Disused services penetrations should be removed and the masonry infilled and repointed and cracking noted to the elevation should be stitched as previously described.

Some of the cross walls did not appear to be keyed and bonded to the front and rear walls and therefore we would recommend that restraint straps are provided to tie the front and rear walls to the cross walls where separation has occurred.

The stepped and horizontal cracking was noted to the right hand gable wall and front wall in the corner. This is likely to be associated with downward movement of the corner of the structure and is also likely to have contributed to the opening of the gap to the side of the lintel. It would be prudent to excavate a trial hole on this corner to check the adequacy of the foundations in this location. We would anticipate that a short length of underpinning will be required to the gable and part of the front wall in this corner. This can be fully assessed once the trial hole has been undertaken.

Where disused embedded steelwork is present, this should be removed and the elevations repointed to prevent future structural damage.

Holes through the external walls should be infilled with new brickwork. Loose brickwork should be re-set / repointed.

Moss was noted growing on the elevation at low level indicating the possibility of damp affecting the masonry.

Concrete repairs are to be undertaken to some of the concrete lintels on the front elevation.

Repointing of the gaps to the sides of the lintels is to be undertaken, as the movement noted appears to be historic.

It is likely that some of the masonry is supported by the steel framed windows. Additional lintels may be required to accommodate replacement of the windows.

It would be prudent to provide a movement joint on the rear elevation where there is a long elevation, with no joints. The front elevation is broken up by doorways.

It may be prudent to install a movement joint between the barn and the boundary wall built into the right hand gable wall. This is recommended as it is anticipated that the foundations to the boundary wall will not be as substantial as the barn foundations and differential settlement may occur in the future.

Vegetation noted growing adjacent to, or within the building or the building fabric, should be removed. Any affected brickwork should be re-set or repointed as required.

Not all elevations could be assessed as there where masked by vegetation and stored goods and access to the rear of the barn was not available as the vegetation surrounding the barn was impassable, therefore some additional defects may exist.

3.8 Main Farm House

The house is considered to be in fair condition but lacks adequate maintenance.

Generally the main roof was adequately level, but the timber fascia boards, verges and slates at the verges were in very poor condition and require rebuilding, re-slating and repointing. It is likely that some replacement timbers may be required due to the presence of holes through the roof at the verges.

Both vertical and horizontal restraints should be provided at roof, eaves and floor level to ensure that adequate restraint to the external walls is provided going forward.

We were not able to assess the flat roof areas, but assume that the finishes will require re-covering and some flat roof joists may require replacement, particularly to the single storey side extension. It would be prudent to carry out additional inspections of these areas. All timber fascia boards and barge boards etc. should be replaced. An alternative to re-covering the roof areas is to provide new pitched roof slopes.

The timber elements to the structure, including the window, doors and rear porch structure are generally in poor condition and would benefit from replacement. The porch structure is not considered to be salvageable and should be replaced. Brick which have spalled to a depth of 25 mm or more should be carefully cut out and replaced.

The main chimney stack to the property has suffered from water staining and would benefit from repointing.

Cracking was noted on the front elevation in at least two locations, one to the left hand side of the front porch and the other between the ground and first floor windows to the right hand side of the porch. The lintels to the ground floor windows should be replaced, as it is assumed that the cracking noted has been influenced by over-deflection of the lintels. The cracks should also be stitched, as described previously, to prevent further defects from occurring.

There has been some movement of at least two of the brick arched lintels. We recommend that these be repointed, packed and / or pinned, to prevent future further movement.

It would be prudent to check for the presence of lintels throughout the property. Due to the lack of sight lines, it was not always possible to check.

Movement of the decorating brickwork was noted. This was considered to have been influenced by leaking rain water goods. The brickwork that has moved should be re-set and where mortar has weathered throughout the property, we would recommend that repointing is undertaken.

The conditions of the rainwater goods were variable and we would recommend that repairs or replacement of the drainage is undertaken.

Although the side elevation extension appeared to be 215 mm thick brickwork finished with render, it was not possible to check the rear extensions. Horizontal cracking was noted in one location at the rear. It is possible that if the wall is a cavity wall, then corrosion of the embedded wall ties could have caused the horizontal crack noted. This should be checked further. If the rear walls are 215 mm thick solid masonry, then the cracking is likely to be associated with old and de-bonding render, which should be removed and replaced.

It would be prudent to check the condition of the render generally, as little, to no maintenance has been carried out for a number of years. Replacement of the render may be required.

Holes through the external walls should be infilled with new brickwork. Loose / de-bonding render finishes should be removed.

Where bricks are loose or missing, these should be provided, re-set or repointed.

Vegetation noted growing adjacent to, or within the building or the building fabric, should be removed. Any affected brickwork should be re-set or repointed as required. Trees growing close to the front elevation should also be removed as there is a possibility that they have influenced the cracking noted to the left hand side of the front elevation.

Not all elevations could be assessed as there were masked by vegetation and stored goods and therefore some additional defects may exist.

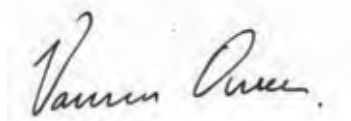
No internal inspections were undertaken, so we are not able to confirm whether further defects are present.

No trial holes were undertaken, so we are not able to comment on the adequacy of the foundations.

We did not undertake any inspections of the drainage. It would be prudent to map and CCTV survey the site drainage in preparation for the completion a scheme of refurbishment and redevelopment.

Should you wish to discuss any aspect of our report please feel free to call me.

Yours sincerely



Vanessa Owen BEng CEng MICE
For Woodbank Consulting Engineers Ltd