

Structural Inspection Report
for

Lower Coates Farm

Silkstone

September 2020



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Revision History

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3	Revision 4
Remarks	Draft for comment				
Date	10.09.20				
Prepared by	S D Bell				
Checked by	M Brady				
Project number	2020L900				

1.0 Introduction

- 1.1 Roscoe were appointed by Mr Adam Richardson to undertake a structural inspection of the farmhouse and associated out-buildings at Lower Coates Farm, Silkstone.
- 1.2 It is understood that the out-buildings are to be converted into habitable space and that a structural inspection is required to support the planning application.
- 1.3 The survey was undertaken on 30th July 2020 by Stephen Bell BEng(Hons) CEng MStructE. The weather at the time of the survey was warm and overcast.

2.0 Executive Summary

- 2.1 The walls of the out-buildings were in generally reasonable condition, with limited areas requiring re-building due to excessive deflection at the head.
- 2.2 Roofs were generally stone slates on battens, rafters and purlins, with large trusses in several buildings. Water ingress had adversely affected some of the roof members and a full timer/damp survey should be undertaken to determine which can be re-used.
- 2.3 The timber first floors (where present) were uniformly in poor condition due to water ingress. It is anticipated that all will need to be removed, though some of the larger members may be salvageable.
- 2.4 Ground floors were mostly concrete, with small areas of stone flags in Building 1. It is likely that all existing ground floor slabs will need to be removed as part of the development proposals.
- 2.5 The extent of re-building is not considered to be excessive and it is considered that this would be compliant with the requirements of the local planning policy that states: "the building does not need major or complete reconstruction for the proposed new use".

3.0 Purpose of Report

3.1 The purpose of this report is to:

- Describe the form(s) of construction and the structural condition of the various out-buildings
- Identify any structural defects or areas of concern and describe suitable remedial measures
- Provide sufficient information to satisfy the requirements laid out in the Barnsley Local Plan Supplementary Planning Document: Barn Conversions, adopted May 2019

4.0 Building Descriptions and Survey Notes



The image above shows the general layout of buildings on the site and references to the descriptions used below.

BUILDING 1

- 4.1 Building 1 comprised of thick stone walls with narrow coursing and a pitched timber roof with stone slates. The floor slabs were a mix of stone flags and cast concrete.
- 4.2 The walls local to the main opening on the east elevation appeared to lean into the building significantly and were buttressed by newer internal brickwork walls. The wall to the west elevation appeared to lean outwards by a modest degree. The majority of the stonework to the outer faces of the walls on the east elevation appeared to be very heavily weathered, with little mortar pointing evident.
- 4.3 The roof structure was formed from three timber trusses supporting timber purlins and rafters. Two of the trusses were from rough cut timbers, the other appeared to be formed in square cut timbers. Stone slates were supported by timber battens spanning between the rafters. A number of holes were noted in the roof covering, from missing or displaced slates, and water ingress appeared to have adversely affected some of the timbers in the roof structure. When viewed externally, the ridge line was undulating along its whole length.
- 4.4 Where able to be inspected, stone flag floors appeared to be in relatively poor condition, as were the concrete floors.

BUILDING 2

- 4.5 Building 2 comprised of thick stone walls with a wider coursing than Building 1. The roof consisted of stone slates on battens on timber rafters and purlins spanning between gable and internal walls. The ground floor was a cast concrete slab which incorporated channels, presumably for drainage. A timber first floor was present, formed from boards, secondary joists and main beams.
- 4.6 The walls appeared to have been built after those of Building 1 as a butt joint was noted at the junction of the two buildings. In general, the walls were in better condition, with pointing generally being present and less lateral movement being present. A large timber lintel was noted to the east elevation, spanning over two openings and a central pier. The wall above this lintel appeared to be leaning outwards slightly.
- 4.7 The condition of the roof was similar to Building 1, with holes in the roof covering allowing water ingress. The ridge line was noted as being more undulating than that of Building 1.
- 4.8 The condition of the first floor and large timber lintel appeared to be generally poor, with water ingress having caused rot and decay. Evidence of damage caused by wood boring insect larvae was noted in the majority of the first-floor timbers.
- 4.9 Some cracking and indications of water penetration were noted to the ground floor slabs.

BUILDING 3

- 4.10 Building 3 comprised of solid 9" brickwork walls to the gables and east elevation, a stone outer wall to the west elevation and pitched timber roofs at two levels. The upper roof to the two-storey element was covered in slates whereas the lower roof to the single storey section had a covering of stone slates. The ground floor appeared to be finished with square tiles. A timber first floor was present to the two-storey element, formed from boards, secondary joists and main beams.
- 4.11 The west wall was toothed into that of Building 2 but included a butt joint where the wall changed from two-storey to single storey. All walls appeared to be reasonably plumb. Mortar joints were slightly weathered to all exposed wall elevations.
- 4.12 The condition of the slated roof appeared reasonable, with no open holes apparent, two slipped slates and a relatively level ridge line. Internally, the timber purlins, rafters and battens were noted to be in relatively

good condition, with no obvious indications of water ingress, rot, or insect damage, though a slight bow in the purlins was evident.

- 4.13 The condition of the first floor appeared to be generally poor in areas, due to water ingress through an opening in the gable above the single storey roof. Localised areas of rot and decay were evident from above but the floor soffit could not be inspected due to lack of access.
- 4.14 The floor finish was only evident local to the door in the east elevation due to the rest of the floor being covered in straw. Where exposed, the tiles were in reasonable condition.

BUILDING 4

- 4.15 Building 4 comprised of thick stone walls with coursing similar to Building 2 and a pitched timber roof with stone slates. The ground floor slab appeared to be cast concrete with a shallow channel. A timber first floor was present, formed from boards, secondary joists, and main beams.
- 4.16 The walls to all four elevations appeared to be reasonably plumb, but exhibited signs of weathering, both to mortar joints and the outer faces of individual stones. Severe cracking and spalling were noted to the stone surrounds to the first-floor window on the east elevation.
- 4.17 The roof structure was a single cut timber truss on the centre of the building, supporting timber purlins and rafters. Stone slates were supported by timber battens spanning between the rafters. A number of holes were noted in the roof covering at the ridge line, and water ingress appeared to have adversely affected some of the timbers in the roof structure. When viewed externally, the ridge line was undulating along its whole length.
- 4.18 The condition of the first floor appeared to be generally poor, with water ingress having caused rot and decay. Evidence of damage caused by wood boring insect larvae was noted in the majority of the first-floor timbers.
- 4.19 The areas of the ground floor slab that could be inspected exhibited some cracking and surface crazing.

BUILDING 5

- 4.20 This building comprised a brick-built lean-to on the north end of Building 4. The roof was a mono-pitch span of corrugated cement sheet (possibly asbestos containing) supported on two small timber purlins. The floor slab was cast concrete.
- 4.21 The walls to all three elevations appeared to be relatively plumb and indications of weathering, either to brickwork or mortar joints, were minimal. Lintels to door and window openings were cast stone items and appeared in good condition.
- 4.22 The roof structure appeared in reasonable condition, with no indications of structural distress or leakage noted.
- 4.23 The concrete ground floor slab appeared in reasonable condition.

5.0 Commentary & Discussion

BUILDING 1

- 5.1 The brick buttressing piers appeared to have been installed to prop up the leaning walls to the east elevation local to the main opening. It is not clear what has caused the outer walls to move so significantly, though a combination of foundation movement and a lack of head restraint was considered most likely. It was also thought possible that the opening had been enlarged at some point in the past and that this work had adversely affected the walls adjacent to the opening. The lean in the west wall was modest and considered likely to be the result of a loss of head restraint, most likely associated with the movement local to the opening in the east wall. The thickness of the wall was sufficient that, with the exception of the areas local to the main opening, the overall stability was not impaired.
- 5.2 The structural timbers to the roof appeared to be in generally poor condition due to water ingress, though a close inspection could not be undertaken due to access issues. The two trusses closest to the farmhouse were formed from rough cut timbers of significant size. Several of the timber members had notches and holes in them, suggesting they had been reclaimed from another roof truss. Due to the size of the timbers, it was considered possible that they could be re-used if the apparent damage were restricted to a thin layer on the surface. The third truss appeared to be in much better condition.
- 5.3 Although the areas of ground floor slabs that could be inspected appeared to be in poor condition, it was considered likely that the stone slabs could be recovered and re-used.

BUILDING 2

- 5.4 The walls were in reasonable condition over most of the elevations, the exception being over the timber lintel on the east elevation. The lintel itself appeared in poor condition, with evidence of insect attack across the exposed surfaces. It was also noted that the timber had various unused holes and notches cut into it, suggesting it had been reclaimed from another building. The lean in the wall above the lintel was considered to be a combination of a lack of head restraint provided by the roof structure and movement in the lintel. Similar to Building 1, the thickness of the walls was sufficient that the overall stability was not impaired.
- 5.5 It was noted that the ridge timber was in very poor condition and that most of the defects in the roof covering were local to the ridge. Purlins and rafters further down the roof slope appeared to be in much better condition and potentially suitable for re-use. The rafters were from sawn timber while the purlins appeared to be rough cut timber.
- 5.6 The timber first floor was in uniformly poor condition with evidence of rot and infestation throughout. Several areas were noted where rotten boards had broken or fallen away and left voids in the floor. The two main floor beams were of significant cross-section and it was considered possible that they could be re-used if the apparent damage were restricted to a thin layer on the surface.
- 5.7 Whilst the ground floor slab appeared substantially sound, it was considered unlikely that it would be retained as part of a residential conversion, due to lack of DPM and insulation.

BUILDING 3

- 5.8 The brickwork walls were in reasonable condition and appeared relatively plumb, as did the stone walls to the west elevation.
- 5.9 The roof structure appeared to be in reasonable condition, with no obvious indications of rot or decay being evident. The slight bow in the purlins was not significant and all the timber elements were considered to be potentially suitable for re-use.

- 5.10 The timber first floor was in poor condition local to the gable window opening with evidence of rot and decay evident. Away from the gable opening, the floor appeared to be in better condition, but a lack of access prevented an inspection from below.
- 5.11 Whilst the ground floor slab appeared substantially sound, it was considered unlikely that it would be retained as part of a residential conversion, due to lack of DPM and insulation.

BUILDING 4

- 5.12 The stonework walls were reasonably plumb to all elevations and the weathering was not considered to be causing any structural issues. The cracking and loss of section evident in the stone window surrounds was not considered to be of particular concern as the lintel above the window was only supporting a small width of roof structure along with its own weight.
- 5.13 The single truss was formed from cut timber elements and appeared to be in reasonable condition. The purlins were also in reasonable condition, with occasional areas of dampness evident where water had run down individual rafters. Several of the purlins appeared to have areas of bark on their surfaces, suggesting they were formed from trees felled near the site. The appearance of the rafters suggested that they had been formed in a similar way. The intermediate purlin on the eastern roof pitch was noted to exhibit significant deflection local to its bearing on the wall shared with building 3. This was considered to be due to the fact that the purlin had a much smaller cross section near the bearing than over the rest of its length, perhaps due to loss of material from decay or rot. The lower purlin had notches cut into it at regular centres, suggesting it had been recovered from another building. It was also noted to contain a significant split near mid-span.
- 5.14 The timber first floor was in uniformly poor condition with evidence of rot and infestation throughout. Several areas were noted where rotten boards had broken or fallen away and left voids in the floor. The two main floor beams were of significant cross-section and it was considered possible that they could be re-used if the apparent damage were restricted to a thin layer on the surface.
- 5.15 The ground floor slab did not appear to be in good condition, and it was considered unlikely that it would be retained as part of a residential conversion, due to lack of DPM and insulation.

BUILDING 5

- 5.16 The walls and roof to the lean-to appeared to be in reasonable condition, with no indications of movement or structural distress. The corrugated roof sheet was considered likely to be made from asbestos cement.
- 5.17 Whilst the ground floor slab appeared substantially sound, it was considered unlikely that it would be retained as part of a residential conversion, due to lack of DPM and insulation.

6.0 Conclusions & Recommendations

BUILDING 1

- 6.1 Due to the significant lean in the external stone walls local to the main opening on the east elevation, it is considered necessary that they be taken down and re-built. The extent of these works would be approximately 1.0m from the left-hand edge of the opening and 2.0m from the right-hand edge.
- 6.2 In general, the walls appeared to be lacking sufficient head restraint to prevent movement caused by lateral thrust from roof members supporting heavy stone slates. The conversion works proposed to the building will need to address this issue by providing additional buttressing walls, a ring beam at eaves level or a fully triangulated/tied roof structure.
- 6.3 It is considered unlikely that the existing timber trusses could be retained. Water ingress appears to have caused rot and decay in various members and damage from wood boring insect larvae is likely to be present, based on evidence seen elsewhere in the outbuildings. However, it may be possible to reclaim individual timber members from the trusses along with purlins and rafters for re-use in the conversion, subject to them being checked by a timber/damp specialist.
- 6.4 The existing ground floor slab will need to be removed so that a new damp-proofed and insulated slab can be cast, to suit the intended habitable usage.

BUILDING 2

- 6.5 Whilst the majority of the walls were in reasonable condition, the section above the large timber lintel on the east elevation is considered to need taking down and re-building. As with Building 1, additional lateral restraint will need to be introduced at the head of the perimeter walls.
- 6.6 Whilst the ridge beam and the ends of timbers connecting to it were in poor condition and would require replacing, the remainder of the timber members in the roof could be left in place, subject to an inspection by a timber/damp specialist.
- 6.7 The timber first floor would need to be completely removed due to rot and infestation being apparent throughout, though it may be possible to salvage and re-use some of the larger sections, subject to an inspection by a timber/damp specialist.
- 6.8 The existing ground floor slab will need to be removed so that a new damp-proofed and insulated slab can be cast, to suit the intended habitable usage.

BUILDING 3

- 6.9 The walls appeared sound and the only structural works considered necessary are the replacement of the timber lintel over the openings on the east elevation.
- 6.10 The timber roof structure was in reasonable condition and could be left insitu, subject to an inspection by a timber/damp specialist.
- 6.11 The timber first floor would need to be completely removed due to rot and infestation being apparent throughout, though it may be possible to salvage and re-use some of the larger sections, subject to an inspection by a timber/damp specialist
- 6.12 The existing ground floor slab will need to be removed so that a new damp-proofed and insulated slab can be cast, to suit the intended habitable usage.

BUILDING 4

- 6.13 The walls appeared generally sound and the only structural works considered necessary are the replacement of the stone window surrounds to the first-floor window on the east elevation.
- 6.14 It is possible that the timber truss could be re-used, subject to a specialist inspection to confirm it is free from decay and insect larvae. The purlins may also be salvageable but at least one of them appeared to have defects that would preclude re-use.
- 6.15 The timber first floor would need to be completely removed due to rot and infestation being apparent throughout, though it may be possible to salvage and re-use some of the larger sections, subject to an inspection by a timber/damp specialist.
- 6.16 The existing ground floor slab will need to be removed so that a new damp-proofed and insulated slab can be cast, to suit the intended habitable usage.

BUILDING 5

- 6.17 Both the walls and roof could remain insitu, with no structural works being considered necessary to either element. It is likely that the roof sheeting would be removed as part of any refurbishment works, and this should be tested for asbestos before being disposed of in an appropriate manner.
- 6.17 The existing ground floor slab will need to be removed so that a new damp-proofed and insulated slab can be cast, to suit the intended habitable usage.

GENERALLY

- 6.18 Whilst some areas of walling to the existing out-buildings will require dismantling and re-building, they represent a relatively small percentage of the total and it is considered that this would be compliant with the requirements of the local planning policy that states: "the building does not need major or complete reconstruction for the proposed new use".
- 6.19 It is recommended that a full survey be undertaken by a timber/damp specialist in order to determine which existing timber elements can be retained or re-used
- 6.20 Re-pointing will be required to the majority of external wall faces. This should be carried out using a lime-based mortar suitable for use on old sandstone walls.
- 6.21 No intrusive investigations have been undertaken to determine the foundation details of any of the out-buildings. This will be carried out at a later stage.

Appendix A



1. East Elevation, Buildings 1, 2 and 3



2. East Elevation of Buildings 2, 3, 4 and 5



3. West Elevation of Buildings 1 and 2



4. West Elevation of Building 3



5. West Elevation of Building 4



6. North Elevation on Buildings 4 & 5



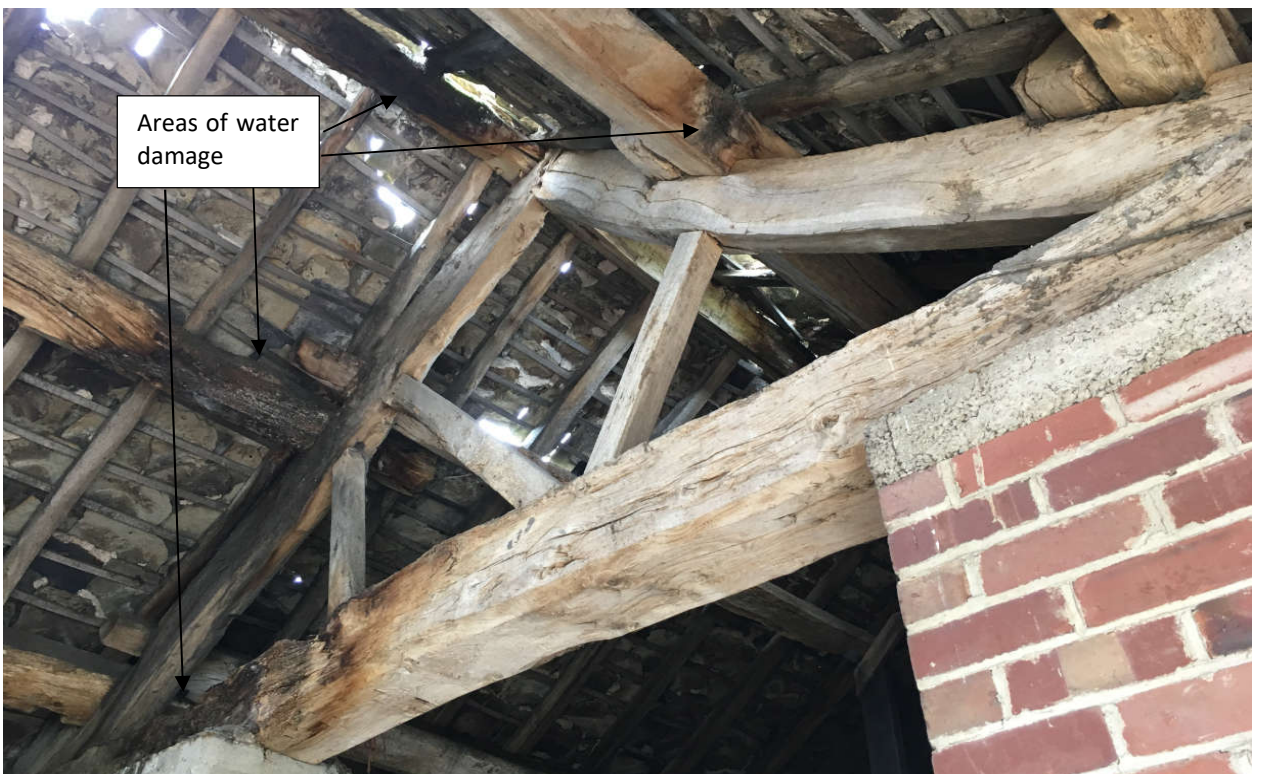
7. Leaning Wall to Building 1 (LHS of opening)



8. Leaning Wall to Building 1 (RHS of opening)



9. Leaning Wall and Timber Lintel to Building 3



10. Timber Truss in Building 1



Previous connection,
suggesting timber is
reclaimed

11. Timber Truss in Building 1



12. Timber Truss in Building 1



13. Roof Structure to Building 2



14. Roof Structure to Building 2



15. Purlin in Building 3 (Two storey part)



16. Purlin in Building 3 (Two storey part)



17. Roof Structure to Building 3 (Single storey part)



18. Damaged Window Surrounds to Building 4



19. Roof Structure to Building 4



20. Purlins to Building 4



21. Roof Structure to Building 5



22. Floor Structure to Building 2



23. Floor Structure to Building 2



24. Floor Structure to Building 4



25. Stone Flags to Floor of Building 1



26. Floor to Building 2



27. Floor to Building 3



28. Floor to Building 4



29. Floor to Building 5



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