

STRUCTURAL INSPECTION REPORT

Milking Shed, Yew Tree Farm, Farnley Tyas
For John Radcliffe and Sons

Date 05/11/2021

Ref **4011/SIR001**



Report Details

Client	John Radcliffe and Sons
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YEW TREE FARM, FARNLEY TYAS

STRUCTURAL INSPECTION REPORT – MILKING SHED (BUILDING 4)

Overview

Yew Tree Farm is a complex of original stone built and modern agricultural farm buildings situated in the centre of the village of Farnley Tyas near Huddersfield, West Yorkshire.

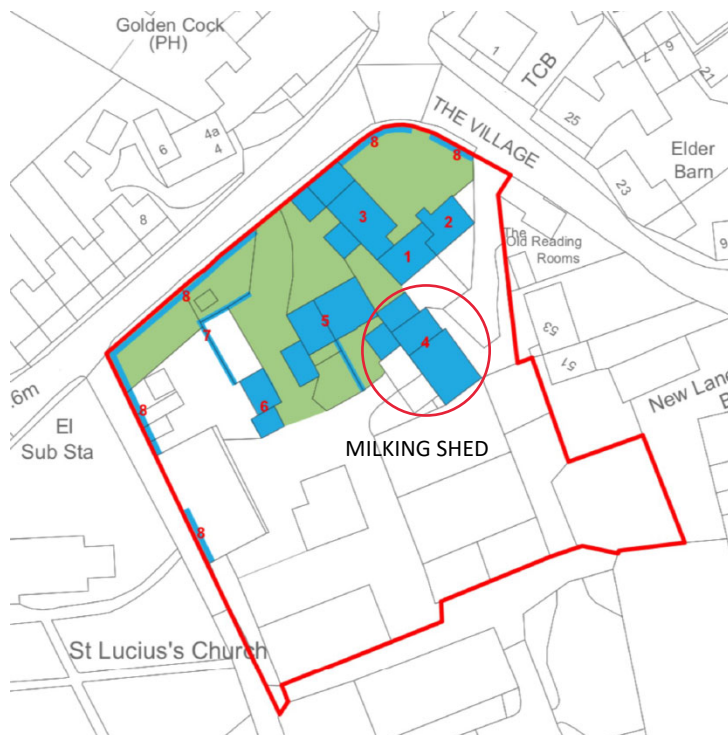
Buildings 1 to 5 are understood to be subject to Grade II listing (see key plan below).

Building 4 (Milking Shed) is the primary subject of this report.

The purpose of the inspection of building 4 was to assess the structural suitability of the retained building for conversion to several residential properties given its age, construction, and structural condition. The consideration of the historical or architectural value of the buildings is outside of the scope of this report.

The report is based on a visual inspection of the building structure from ground level without the benefit of high-level inspection techniques or intrusive opening-up of the building fabric. Timber and damp surveys have been carried out as separate exercises and do not form part of the scope of this report.

Building 4 is the most southerly of the farmstead buildings as identified on the key plan below.



General

Typically, with this type of historic development local to this area, external walls will be of coursed sandstone rubble with rubble and lime mortar infill. The more substantial buildings will have a good number of tie stones bridging between the inner and outer stonework and good quality quoins will be provided around major openings and on the corners of the buildings. These walls are intended to act as solid walls and with the rubble in place and quite compact they can be reasonably robust. However, this type of construction is also very susceptible to significant degradation over time particularly where water has been allowed to penetrate the rubble fill between leaves and as a result of impacts from normal use as farm buildings. Over time, heavy vibration tends to loosen the infill and the fines settle leaving large voids above. Bellying and bulging often occurs as a consequence.

When assessing the suitability of this type of building for conversion from farming use to residential use, appropriate consideration needs to be given to current building regulations standards and also the efficacy and longevity of common remedial solutions. For instance, whereas most walls can be suitably stabilised, with care, using remedial wall ties combined with bed-joint reinforcement, in some instances, particularly where existing mortar joints have been washed away by water ingress over many years, these techniques can fail, and rebuilding can prove the only suitable method of ensuring the restoration of structural stability.

Roof structures will generally comprise of king or queen post trusses at regular intervals supporting square section purlins organised on slope with timber rafters supporting Yorkshire stone roofing. In this instance however, the roofing material is asbestos cement sheeting on timber purlins. Generally, original roof structures rarely survive fully intact, and replacement timbers can often be undersized and poorly organised for the support of the substantial weight of Yorkshire stone roof constructions. In addition, structural timbers are often found to be distressed due to damp penetration and timber infestation.

Localised foundation settlements are also a common feature of this type of building due to poor quality or absent foundations.

To ensure the integrity of traditionally constructed buildings of this type, lateral restraint to the external walls is required to be provided by the roof structure, floor structure and internal masonry walls. In large open space farm buildings restraint from internal walls is often lacking and commonly not sufficient to meet current building regulations standards. As the buildings age and become open to the elements due to failures in the building fabric, restraint systems from roof and floor structures can commonly degrade to a point where the structural stability of the building is severely compromised.

Building Description

The miking shed building is a single storey (with localised mezzanine platform) stone-built structure with a dual pitch roof comprising timber purlins at approximately 1.2m centres spanning between internal queen post trusses and external gable walls supporting asbestos cement roof sheeting.

The overall building is approximately 22m long by 10m wide on plan and approximately 2.5m to eaves. The roof pitch is approximately 27 degrees.

The northern portion of the building incorporates some internal walls and considered with the elevations appears to be the original portion of the structure.

The western elevation (elevation 1) is abutted by secondary external lean-to open structures. These structures have not been considered as part of this report and are assumed to be of no value either in architectural or conservation terms.

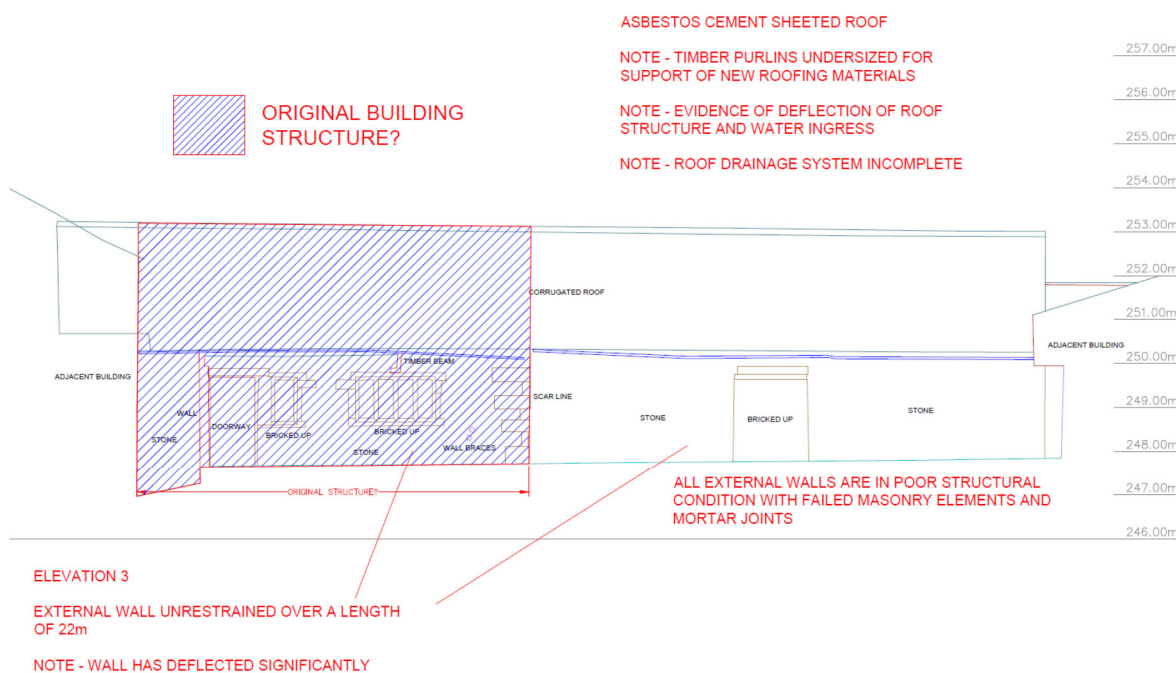


Structural Defects

The general structural condition of the building may be characterised as very poor due to a complete lack of suitable maintenance, even allowing for its former use as a farm building. There is considerable evidence of structural deterioration in the building fabric and there is a significant lack of overall structural stability.

External Walls

ELEVATION 1- Western Elevation



ELEVATION 1

The external wall to elevation 1 is effectively unrestrained over a length of over 22 metres with significant associated structural movement being observed along its length. This movement is sufficiently severe to require the rebuilding of this entire elevation to return the structure to a satisfactory structural standard.

It is therefore recommended that allowance be made for the reclamation of suitable stonework from the external walls for reuse in the rebuilding of the walls to a standard appropriate for residential use in accordance with current building regulations standards. This would include the replacement of any existing foundations along the full elevation.

The eastern elevation of the building has the benefit of a separating wall and a return in the external wall on plan, both of which add lateral stability. Consequently, the lateral restraint provided by the roof has undoubtedly diminished over time, lateral movement of this wall is less evident and is more within acceptable limits.

That said, mortar joints have been significantly eroded. Widespread damp penetration is evident (particularly at roof level) and localised settlement cracking suggests foundation issues.

Whilst it may not be necessary to rebuild all external walls, considerable work will be necessary to bring the structure up to suitable standards for residential development. Overall stability will also be a concern in the construction condition when the roof structure is removed and replaced.

Once again it is noted, whilst outside of the scope of this report, that the section of the elevation assumed to be from the original development will no doubt need to be treated with appropriate sensitivity from an architectural and building preservation perspective.



Photo of elevation 3



Photo of elevation 3

Where existing external wall can be retained, restoration works will include:

- The repair/replacement of failed lintels (as shown below).



Failed external wall lintel

- The replacement of failed and disintegrated masonry (as shown below)



- The installation of consolidation ties to ensure a suitable bond is established between the outer and inner external wall elements.

It should be noted however that an element of complete or partial rebuilding of both skins of masonry will be unavoidable in some instances and where insufficient integrity between masonry leaves remains, there is a real potential for an external 'unzipping' of wall constructions particularly at eaves level.

Roof

The roof is dual pitch with a roof angle of approximately 27 degrees, comprising timber purlins at approximately 1.2m centres spanning between internal queen post trusses and external gable walls supporting asbestos cement roof sheeting.

The roofing system has not been well maintained with roof drainage systems largely missing, and widespread evidence of water penetration into the building fabric.

Whilst a high-level inspection of roof timber was not possible, deterioration due to damp penetration is highly likely with potential structural deterioration of roof timbers.

The existing roof structure will not be suitable for the support of more substantial roofing materials to modern standards.



Ground floor slab

The existing ground floor construction is in poor condition with areas of cracking and evidence of ground heave. The potential for sulphates within the supporting ground cannot be discounted and will need to be addressed in the proposed works.



Conclusions & Recommendations

Externally the building has suffered from deterioration due to a complete lack of building maintenance over many years. Roof drainage systems are largely missing, and widespread evidence of water penetration into the building fabric is evident. Considerable structural movement in external stonework walls is evident, particularly along elevation 3, where the absence of suitable lateral support over a length of approximately 22m has led to eaves spread and rotation of the wall about its base.

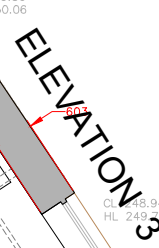
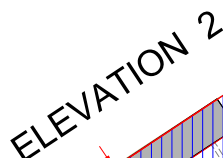
The existing roof structure will not be suitable for the support of more substantial roofing materials to modern standards and whilst a high-level inspection of roof timber was not possible, structural deterioration due to damp penetration is highly likely.

The existing ground floor construction shows signs of significant structural distress with evidence of heave which may suggest sulphate attack.

Given the extent of the visible damage to the building, the majority of which is irreversible, it is recommended that most of the existing building structure should be taken down and rebuilt. Where elements of external wall constructions are considered to be of high architectural or conservation value (and where structurally this can be achieved without compromising the overall structural integrity of the building), care will be needed to retain these for reuse in the rebuilding works.

APPENDICES

Appendix A – Measured building survey extracts

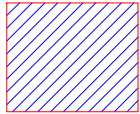


ASBESTOS CEMENT SHEETED ROOF

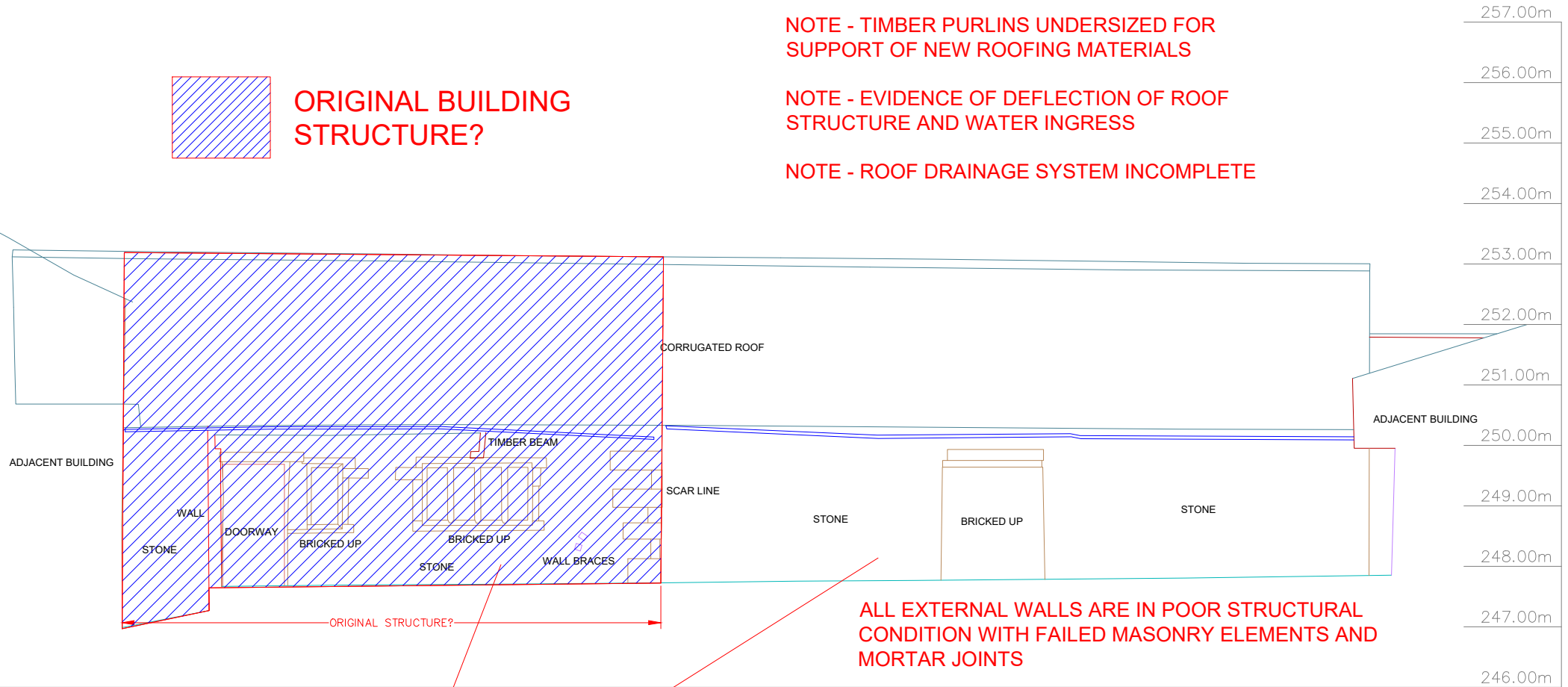
NOTE - TIMBER PURLINS UNDERSIZED FOR
SUPPORT OF NEW ROOFING MATERIALS

NOTE - EVIDENCE OF DEFLECTION OF ROOF
STRUCTURE AND WATER INGRESS

NOTE - ROOF DRAINAGE SYSTEM INCOMPLETE



ORIGINAL BUILDING
STRUCTURE?



ELEVATION 3

EXTERNAL WALL UNRESTRAINED OVER A LENGTH
OF 22m

NOTE - WALL HAS DEFLECTED SIGNIFICANTLY

ELEVATION 1

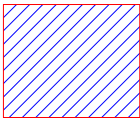
257.00m
256.00m
255.00m
254.00m
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248.00m
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246.00m

ASBESTOS CEMENT SHEETED ROOF

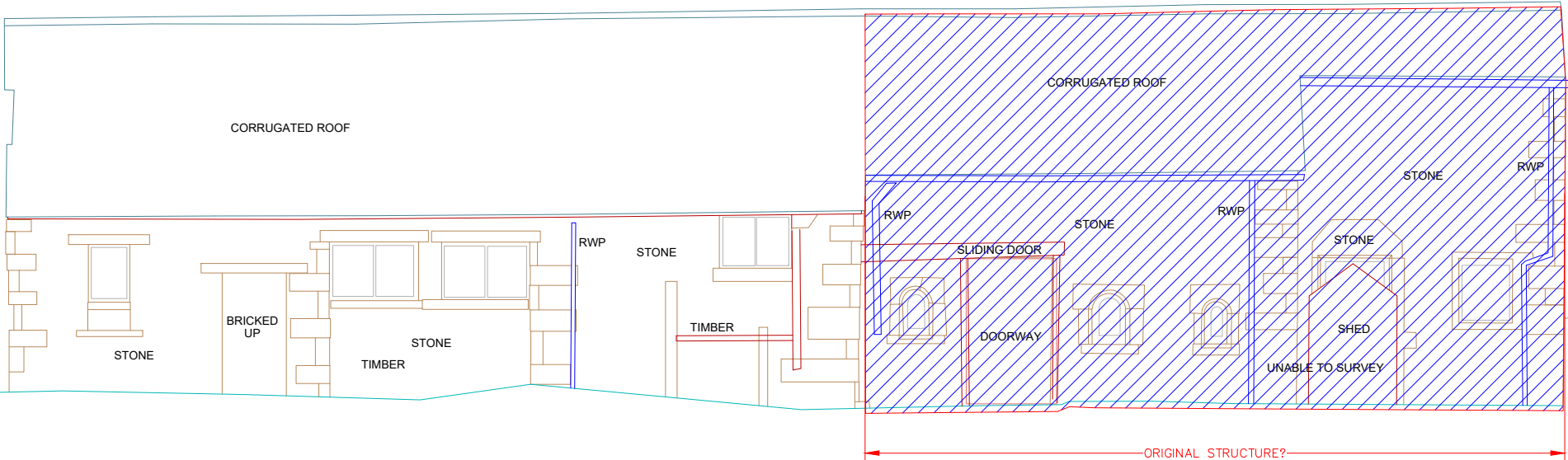
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STRUCTURE AND WATER INGRESS

NOTE - ROOF DRAINAGE SYSTEM INCOMPLETE



ORIGINAL BUILDING
STRUCTURE?



ALL EXTERNAL WALLS ARE IN POOR STRUCTURAL
CONDITION WITH FAILED MASONRY ELEMENTS AND
MORTAR JOINTS

ELEVATION 3

Appendix B – Limitations

The discussion, conclusions and recommendations contained in this Report are based on a single cursory visual inspection of the property from ground level, without the facilities for high level access and inspection. No opening up works to reveal the detailed nature and condition of the structural fabric was undertaken. The scope of the report does not include the consideration of damp and infestation issues.

The discussion, conclusions and recommendations contained in this Report represent the professional opinions of Bright Young Consulting Limited (BYC), based upon the information listed in the Report, exercising the duty of care required of an experienced Engineering Consultant. BYC does not warrant the accuracy of the information or data forming the basis of the report and will not be responsible for any opinions which BYC has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

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