

P9050/22/07

STRUCTURAL INSPECTION

AT

TEEWARD BARN, WADDINGTON



FOR

MARK HURST



The National Skills Academy
NUCLEAR



ISO 9001
ISO 14001
OHSAS 18001

Certificate Number 14272

REPORT VERIFICATION

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STRUCTURAL INSPECTION REPORT

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STRUCTURAL INSPECTION REPORT

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1 INTRODUCTION

Thomas Consulting have been commissioned by Mark Hurst, to carry out a full structural inspection of an existing barn structures to Teeward Barn, Slaidburn Road, Waddington, with a view to renovating the property for use as a domestic dwelling.

We have confined this inspection to those structural elements of the property which are typically associated with the structural fabric e.g. walls, floors and where exposed, footings.

The inspection is confined to a visual inspection of the property and we have not investigated woodwork or other parts of the structure which are covered, unexposed or inaccessible. We are therefore unable to report that any such part is free from defect.

The object of the report is to assess the effect of the reported defects on the structural integrity of the property. No assurances can be implied as to the effect that the reported defects may have on the current or future saleability of the property.

Defects identified in the report may not be sufficient to cause significant structural weakness of such an extent to prevent normal use of the property but could be unacceptable on aesthetic grounds. The client should therefore consider whether or not the defect is acceptable or desirable on these grounds and seek qualified advice as to the effect on the market value of the property.

There may be observations recorded under section 4.0 of the report which are highlighted by italics. These related to defects which fall outside of our brief but have nonetheless been included as part of the inspection. No further advice may be given in respect of these items but the Client should be aware that they may require further investigation or remedial action.

Please note the appended Conditions of Inspection.

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2 GENERAL

The property is formed from two stone masonry barns. Both are of two storey height and have feature trusses carrying slate covered timber purlin rafter roofs. The south East barn has timber floors supported by timber beams and a concrete ground floor. The North West barn has a partial 1st floor supported on a steel beam and a partial earth and part concrete ground floor slab. There is a masonry milking shed to the North side of the North West barn, which is scheduled for removal.

We estimate that the main property was constructed at least 150-200 years ago.

The Geological Survey for England and Wales, BGS website indicates that the property is situated upon bedrock geology of Bowland High Group And Craven Group (undifferentiated) - Mudstone, Siltstone And Sandstone. Sedimentary Bedrock formed approximately 313 to 359 million years ago in the Carboniferous Period. Surface deposits are recorded as Till, Devensian - Diamicton. Superficial Deposits formed up to 2 million years ago in the Quaternary Period.

Our inspection took place on Thursday 7th July 2022 the weather at the time of inspection was partly cloudy with sunny intervals, warm and dry. A follow up inspection of hand dug trial pits, undertaken to expose existing foundations, was undertaken on the 19th July.

3 SYNOPSIS

The report identifies the defects that are noted in Section 4 below. There is significant corrosion and associated cracking to South East barn. Minor cracking exists to North West barn.

There may be observations recorded under section 4.0 of the report which are highlighted by italics. These related to defects which fall outside of our brief but have nonetheless been included as part of the inspection. No further advice may be given in respect of these items, but the Client should be aware that they may require further investigation or remedial action.

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4 OBSERVATIONS

Notation: - The terms left, right, front and rear elevations are used in respect of an observer standing to the South West courtyard adjacent to both buildings and viewing the building under review.

The terms left and right when used in respect of other individual elements are made with respect to the observer's relative position when making the observation.

INSPECTION RESULTS

South East Barn:

EXTERNAL

4.1 West Elevation

- Large open joints over left hand ground floor window with evidence of 6mm wide vertical crack. Some repair over left access door evident.
- 1mm wide crack to left side of left door lintel crack extends up into repaired wall above and extends down door jamb to 0.5mm above base.
- Steel beam over timber and brick cladding panel to right end. Beam has heavy laminar corrosion and is sagging by up to 20mm.
- Evidence of some vertical settlement to right of left hand door. Door head slopes at 1 in 75 to right.
- Door jamb leans out by up to 1 in 60 to pier between doors.
- Wall is vertical at left end and leans out by 1 in 30 at right (at base).

4.2 South Elevation

- Very large crack behind quoins at left end. Crack up to 35mm wide at 1.5m above base. Crack tapers to 300 at 3.5m above base and is 10mm wide at bottom. Quoins are bellied out at bearing of steel beam from west elevation.
- Large vertical crack up to 25mm wide at 1.5m from west elevation, crack steps to left at 2m above base and extends down centre of wall.
- Wall is reasonably coursed.
- Old, repaired crack, at 1.2m from right end at base has not re-cracked.
- Boundary wall to right now acts as a retaining wall 1m high.
- Wall is uneven but reasonably vertical.

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4.3 East (Roadside) Elevation

- There is an evident bulge to centre of wall at 3m above base – bulge is estimated to be up to 50mm. There is an old vertical crack at this location up to 2mm wide.
- Wall is reasonably vertical at ends.

4.4 East Elevation

- Old crack at base of wall 2m from left end (open joints) is up to 15mm wide.
- Steel bracket corroding to north east corner of wall at 3m above base.
- No issues with slated roof alignment, ridge is reasonably horizontal.

INTERNAL

4.5 North Ground Floor Room

- Internal partition wall is uneven but reasonably vertical.
- No significant cracks to walls.
- Walls are reasonably vertical and free of significant cracks.
- Floor is rough – to be replaced.
- Timber floor joists are 75 x 120 spaced at 400 c/c and supported on 200 x 100 timber beam running front to rear.
- Joists are rotted through to rear left at front left.

4.6 South Ground Floor Room

- Rough concrete floor to be replaced.
- Very old crack to rear right corner.
- Large cracks to south wall also evident internally.
- 2No. steel beams to opening to front wall are heavily corroded.
- Floor above is as North room and has a slight evident sag to joists.
- Walls are vertical.
- Steel post supports steel beam to front wall at mid span. Post leans out by 1 in 50 and has surface corrosion.
- Large cracks up to 10mm wide to internal partition below bearing of steel beams.

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4.7 Large 1st Floor Room

- Not accessed due to poor floor coverings.
- No significant cracks evident from top of ladder at front wall.
- Timber truss and purlins in reasonable condition as are rafters.
- No sarking felt.

North West Barn:

EXTERNAL

4.8 South Elevation

- Large crack above and below right side of right hand window. Crack is up to 10mm wide below window and tapers to zero at 0.5m from top of wall.
- Timber beam over main access door is in poor condition.
- Rotting lintel and open joints to masonry above left hand window.
- Wall found to be reasonably vertical.

4.7 East Elevation

- Wall is uneven but found to be reasonably vertical.
- There is an open butt joint between main barn and northern lean to. Open joint is up to 15mm wide.
- Possible old vertical crack to lean to at 3m from right end – at location of evident wall structure (now removed).
- Roof alignment appears level, viewed from ground.

4.8 North Elevation

- Proposed to be removed.

INTERNAL

4.9 Lean-To Room at North East

- Floor, rear wall and partition wall to be removed.
- East external wall is very uneven. Vertical in places but leans out by 1 in 30 in areas and in by 1 in 60 to others. No cracks.
- Front partition is very uneven with an evident inward lean of up to 1 in 50 (1 in 30 in places).

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- No cracks to front partition.

4.10 Main Barn

- Room partly accessible due to screen.
- Earth floor to West side area and concrete profiled floor to East side (behind screen).
- 1st floor area to left is of timber supported by steel twin beams 305 x 65 supporting brick wall built around truss.
- No access to 1st floor room.
- Steel beams have heavy surface corrosion.
- No defects noted to in built truss.
- Roof trusses, purlins and rafters generally in reasonable condition.
- Purlins over entrance area are deflecting by up to 40mm.
- Ceiling over milking parlour to right side of room has significant sag.
- Cracks evident up to 5m wide over door to rear area.

General

4.11 Access area Proposed To Field At North

- Gentle slope up from gate estimated to be up to 0.5m in height by end of proposed ned driveway access. Land at this point falls approximately 0.7m towards rear of property.

4.12 Trial Pit Investigations

- Trial pits indicate that formation to both barns are at a depth of approximately 300mm below surface.
- Barn at the South East appears to have been formed without a foundation.
- Barn at North West has a 100mm footing outstand that is 100mm deep.
- Both barns are formed onto stiff clays.

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5 DISCUSSION

The main barn walls and roofing have been found to be in reasonable condition, generally, however, laminar corrosion to the steel framing forming the front opening of the South East barn is causing significant cracking. The steel beam and post in this area will require removal and replacement as part of the proposed redevelopment. Any damaged masonry should be temporarily removed and reinstalled.

It is recommended that any 1st floor structures are removed. New 1st floors should be installed which are supported by a new structural inner liner wall. The structural liner walls should be founded on reinforced concrete structural raft slabs, which are designed to sustain the wall load, floors and also support the existing roof structures. The raft slab can also be utilised to support any internal walls that support 1st floors within the larger North West barn.

The existing foundations to both barns are formed at a shallow depth. Neither barn, however, appears to be affected by foundation movement. Any new footings will need to comply with building regulations and formed at depths of at least 750mm below ground. There is a proposed link structure which will run between barns. The footings where the new structure meets the barns will have footings that are beneath the existing barn footings, therefore, localised underpinning at the intersection is likely to be required.

As much of the existing Northern milking barn is proposed for removal, we have not inspected this element of the property.

There are some minor old worn vertical cracks to walls of both barns. These cracks should be made good using crack stitching using Helifix bars (or similar). Bed joints appears reasonably well coursed to allow this to be undertaken. The external walls should also be tied back to the proposed new internal liner walls, to provide stability.

We understand that a new drive access to the North side of the property is proposed. The drive access will provide access to the client's property and to other adjacent dwellings and will also be used for field access. It is suggested that the field is re-modelled with batter slopes of no steeper than 1 in 2.

Remodelling the access will remove the need for retaining walls to be constructed.

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6 CONCLUSIONS

Both barns at the site are suitable for renovation for domestic use.

There are no issues evident regarding foundation movement.

Some local underpinning of the barns may be required where the new link structure abuts the existing walls.

New internal structures should be constructed to support new internal floors and provide restraint to existing walls.

Corroding steel to South East barn should be removed.

Re-grading of land to North of barn could be undertaken to provide driveway access with no retaining wall requirement.

7 RECOMMENDATIONS

- Remove corroding steel frame from front of South East Barn.
- Make good the damaged masonry to South East barn to front and South elevations.
- Undertake crack stitching to areas of South East barn using proprietary techniques.
- Remove 1st floors to both barns.
- Install raft slabs internally to both barns to support new structural liner walls.
- New 1st floors to be installed to both barns supported on new liner walls and internal ground floor walls.
- New link to have strip foundations and ground bearing slabs.
- Walls to barns may require underpinning locally where new walls abut.
- Re-grade the field to the North of the barns, to form the new drive access, such that any slope does not exceed 1 in 2.

APPENDIX A

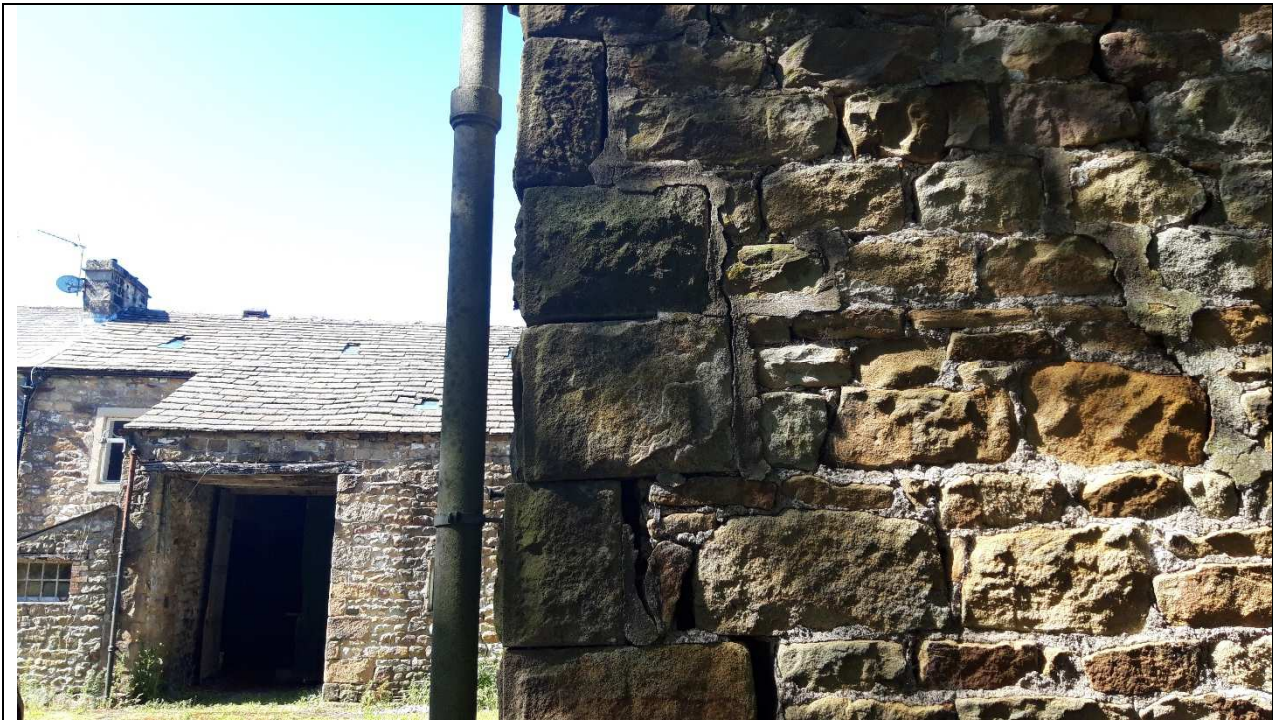
INSPECTION PHOTOGRAPHS



Cracking to Front Wall of South East Barn



Corroding Beam Over Opening to Front Wall of South East Barn



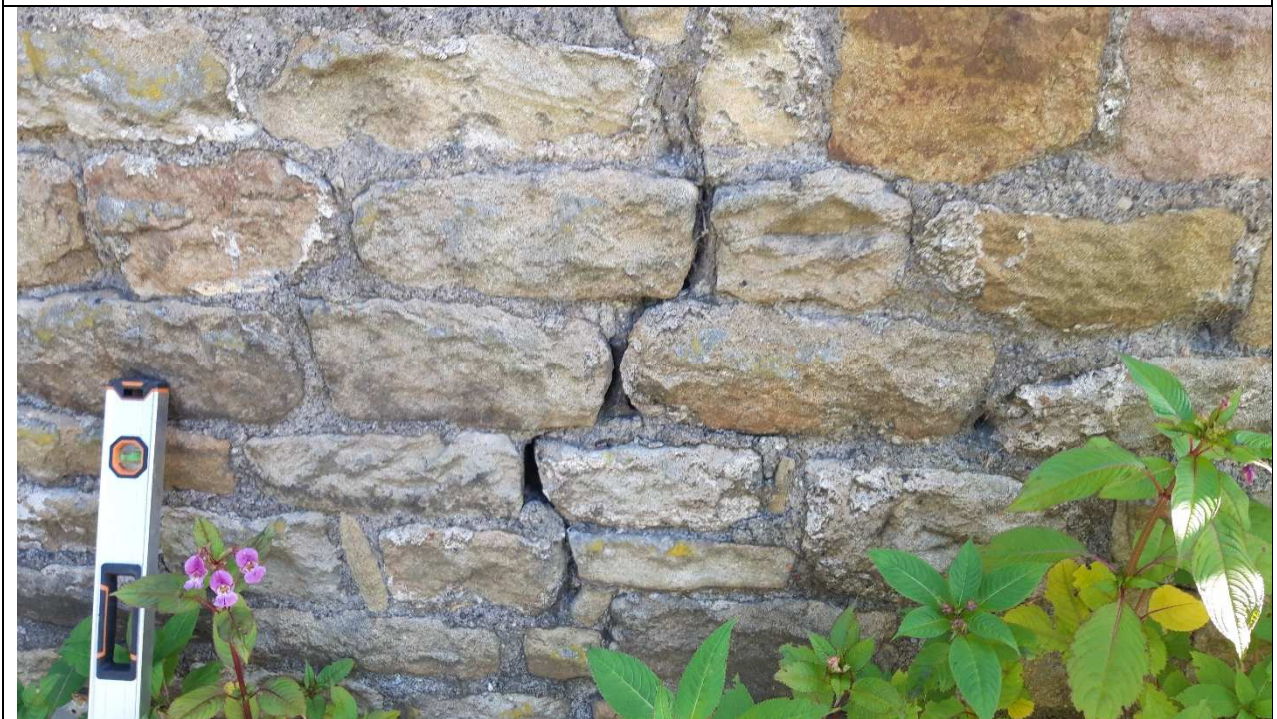
Cracking to Left End of South Elevation Wall of South East Barn Below Steel Bearing



Cracking to Left End of South Elevation Wall of South East Barn at Base of Wall



Crack to Mid-Point of South Wall to South East Barn



Crack at Base of North Wall of South East Barn



Large Crack Internally to South Wall of South East Barn



Corroding Frame to South East Barn



Damaged 1st Floor to South East Barn



Roof Over South East Barn



Crack Below Front Wall (South) to North West Barn



Lintel in Poor Condition to Main Door Over North West Barn Opening



East Wall of North West Barn



Corroding Beam Supporting 1st Floor and Wall in North West Barn



Lightweight Ceiling Over East Side of North West Barn



Roof Over North West Barn



View into Field at North of Barns at Proposed Driveway Entrance



View Back to Proposed Drive Entrance to North Field

APPENDIX B

CONDITIONS OF INSPECTION

CONDITIONS OF INSPECTION

Instructions are in all cases (unless any variation is agreed in writing by the Company) accepted on the basis of the following conditions which shall govern the inspection and report, and any related matters.

The object of this Report is to assess the effect of the reported defect on the structural integrity of the property. No assurances can be given or can be implied as to the effect that the reported defect may have on the market value or saleability of the property.

- i) The Report is confined to an inspection of the clients specified structural elements of the property alone, i.e. foundations (if exposed), walls, floors, roof members (if accessible), and other such members providing structural support to the property, that may be deemed necessary for inspection by the Company. The report will not cover such items as damp proofing, heating and ventilation, plumbing and electrical circuits, doors, window frames, plasterwork, fitted furniture, decoration or items of general serviceability, unless expressly agreed with the Company before the inspection is undertaken.
- ii) We shall not investigate woodwork, or other parts of the structure, which are covered, unexposed or inaccessible. We are therefore unable to report that any such part is free from defects.
- iii) It must be clearly understood by the client that the degree of inspection referred to in (i) above will not reveal all defects. Defects in concealed parts such as foundations, under floor areas, and areas covered by wall coverings, plaster or render, will not be revealed. It is, of course, possible to make more detailed investigations and where there is evidence to warrant this, recommendations for further investigations will of course incur further costs and may require the lifting of floor boards, breaking out brick work or digging trial holes. When such detailed investigations are required, it is the responsibility of the client to:
 - a) give specific written instruction to this effect to the Company and
 - b) obtain the necessary permission of the owner and to indemnify the Company against liability for damage caused or rectification costs.
- iv) Externally the building will be inspected from ground level only, ladders will not be used to inspect roofs.
- v) Internally, where appropriate, exposed surfaces of rooms will be inspected as far as reasonably possible. The engineer will not move or disturb furnishings, fittings, fitted carpets or furniture, and no responsibility will be accepted for defects which are concealed.
- vi) If requested by the client or judged necessary by the Company and a trap door access exists, the roof spaces will be inspected so long as it is considered safe to do so and crawler boards, ladders etc, are available. Note that high or low confined parts of the roof space will not be inspected.
- vii) Readily visible parts of the drainage installations will be inspected, if requested by the client or judged necessary by the Company.
- viii) No inspection will be made of services such as gas, electricity and central heating. The client is advised to engage the services of a competent electrician and/or plumber if inspection is required.
- ix) Outbuildings, including detached garages, sheds, greenhouses and similar structures will not be inspected, unless expressly requested prior to the inspection.
- x) Easements, planning and other proposals by statutory authorities are outside the scope of this structural survey.
- xi) Should the client require advice upon any matter other than the structural survey, e.g. proposed additions and alterations, this must be subject of a further separate instruction.
- xii) The report is provided for the sole use of the named client and is confidential to the client and professional advisors. The Company accepts responsibility to the client alone and accepts no responsibility whatsoever to any person other than the client himself.

Thomas Consulting will consider re-issuing the report in its original format to a named third party within 3 months of the original report date provided:

 - a) We have the written permission of our original client to do so and
 - b) Upon payment of an administrative fee, currently set at 50% of the cost of the original report fee.

In any event the condition of the property is to be taken as that at the time of the inspection.