

STRUCTURAL REPORT

Location	Knabbs Hall Farm, Silkstone Common, Nr Barnsley, S75 4RD
application	Re-development, Reinstatement of Dwelling and Conversion of Agricultural Buildings to form 4 dwellings
client/applicant	Knabbs Hall Farm
job number	16/372
date	May 2018

INTRODUCTION

This Structural Report forms part of the planning application for the Re-development, Reinstatement of Dwelling and Conversion of Agricultural Buildings to form 4 dwellings.

Qualifications of Building Surveyor

I, Paul Matthews, am qualified with a Building Surveyors Honours Degree from Sheffield Hallam University in 2003 and became a member of the Association of Building Engineers in March 2011, converting to a Chartered member in 2014 when the association was granted Royal Chartered status by Her Majesty the Queen.

I have worked in both private practice and Local Government since qualification and have built up vast construction industry knowledge and experience.

Paul Matthews Architectural Ltd was formed in 2015.

My overall experience leading to becoming a Chartered Building Engineer has been extensive in all areas of the profession. This includes the restoration and repair of listed buildings, boundary disputes, party wall matters, refurbishment and renovation of commercial, industrial, educational and residential properties, structural alterations, land surveying, extensions, conversions, housing developments, disabled adaptations, defect diagnosis and prognosis along with scheduled remedial works, building surveys, measured surveys, contract administration and feasibility studies.

Date of Inspection Survey

This report is based upon a site inspection on a site survey on Friday 20th April 2018, this followed many previous site visits to the site to gain a more detailed insight into the buildings.

At the time of the survey the weather was overcast but dry.

Purpose of Survey

The purpose of the inspection and this report is to comment upon the structural integrity of the existing buildings, focusing on defects requiring repair/maintenance and to confirm whether they are suitable for conversion into single family dwellings (4 properties).

Inspection Type

The inspection was of a visual nature with no opening up carried out. The site and buildings are in a neglected state with obvious dangers posed, access to some areas was not considered safe to enter.

General Description of Buildings

The application site is located directly adjacent to Knabbs Hall farmhouse, a grade II Listed Building of significant age having been re-built in 1644.

This report focuses on the three stone buildings referred to as units 1, 2 & 3.

The site has been neglected for a number of years, not used for agricultural purposes for the past 40 years. The land holding over the years has been disposed of leaving a small parcel of land immediately surrounding the site.

It appears there have been efforts to maintain and preserve the buildings but these have been limited (internal buttresses, repairs to trusses, propping , etc).

The buildings are all of similar construction with rubble filled coursed sandstone walls. Traditional roof structures with a Yorkshire stone slate covering (some being missing/fire damaged). For agricultural buildings they indicate many architectural features such as chamfered copings, kneelers, ornate openings, water tabling, etc)

UNIT 1

Unit one is a former agricultural building.

Unit 1 is also a Grade II listed building, listed in November 1987.

The building is single storey with a cat slide roof. This building is in a very dilapidated and dangerous condition. The building was not safe to enter but adequately visible from the perimeter also viewing through the large East facing openings.

The floor to this building is unknown due to the build-up of debris, taking into account the similarity of construction/age of the adjacent buildings it is assumed to be concrete.

This building out of the three is in the most dilapidated state. This, I consider, is due to the extensive fire the building suffered in 1992.

It appears the fire, whilst not isolated to the rear of the building, has caused most damage to this area with 95% of the roof (covering and structure) lost. The remaining rear half of the central truss is severely charred. The building has remained open to the elements since the fire with weather also taking its toll expediting the damage to the structure.

A rendered masonry pillar props the truss centrally within the building, below the defective render, brickwork is evident, which suggests this pillar is a non-original feature.

The remaining roof structure is beyond salvage and no longer fit for purpose. The fire and weather damage has resulted in these remaining timbers being incapable of supporting a new roof covering (in particular Yorkshire stone slate at 80-100Kg/sq m).

Some purlins and rafters are still evident (refer to photos in Appendix A of this report).

The loss of the roof structure has taken away critical support and stability for the gable walls. Purlins, originally pocketed into the inner skin, have been left providing a cantilever effect due to the fire and loss of support at opposing ends.

The peaks of both gables have partly collapsed. Due to the excessive lean, the these gables they need to be taken down, by circa a further 900mm to be rebuilt. Cables from an adjacent building connect to the south gable of the Unit 1, these cables are tight and therefore effectively providing some restraint preventing further collapse.

The inner skin of the building also shows evidence of the fire where masonry is now red in colour. It appears this stone is still intact, but needs a closer examination when the building is stabilised prior to safe access being enabled.

The outer leaf indicates erosion of the sandstone to the North gable but the stone is still fit for purpose.

I suggest the walls are temporarily buttressed to provide a safe working environment and prevent further loss. An internal steel frame structure could provide the structure for new loading such as first floor level and the new/replacement roof structure. This steel frame could also provide stability to the remaining masonry to reduce the amount of rebuilding and promote retention.

Timber lintels need a closed inspection when the building is made safe to determine their capability to continue to provide structural support to the existing rubble fill walls above.

The small link building between unit 1 & 2 is in very poor condition. This appears to be a later addition and is not bonded in to either unit 1 or unit 2. The roof has 70% collapsed with damage to the masonry walls. This building has a mature tree growing from within that needs careful removal to prevent further damage, particularly to unit 1. This building is to be removed. It's considered beyond salvage, it is proposed to replace this building with a glazed link to connect unit 1 & 2.

Most of the timber spouting has been lost with only small areas of cracked cast iron rainwater fall pipes still intact. New rainwater goods will be required.

None of the roofs have any sarking membrane, all show signs of water ingress of differing levels. All the roofs need re-roofing incorporating a sarking membrane.

UNIT 2

Unit 2 is a former agricultural building that reportedly has been used as a dwelling.

Linked to Unit 1 via a small duo pitch single story addition, partly collapsed and beyond repair/salvage.

The south west corner of unit 2 adjoins but is not bonded into unit 3 (the long barn).

This building is generally in good structural condition. The most severe defect being caused by a small section of missing stone slates to the front (south) roof slope just off centre to the righthand side. This appears to be a longstanding loss of slates which has enabled water ingress and weather damage internally. To mitigate the damage a plastic sheet has been fixed to the underside of the first floor structure internally – this has resulted in further damage to the floor timbers as they have effectively been encapsulated and constantly in water.

The building has a concrete slab floor.

The timber lintel over the large front opening appears in good structural condition and capable of being retained. The timber lintel over the window to the left of the large front opening however shows evidence of weather and decay, this timber lintel needs to be replaced.

Internally the front right hand area of first floor (approximately a third of the overall first floor area) appears original. Some of these floor beams have fractured due to the water ingress with evident water staining. The remainder of the first floor is non-original, saw kerf marks are evident indicating a more modern and recent replacement.

These replaced areas have evidence of insect infestation – this does not appear too damaging but a more specialist survey is required of all buildings when safer access is afforded.

The first floor area of this building was inaccessible on safety grounds, a further inspection and assessment needs to be made when safety is ensured.

The rear of the building is densely screened by a number of young self-sown trees. These are within very close proximity to the building and should be removed to prevent root damage.

The rear eaves/gable abutment appears to have had impact damage and needs a small area of localised re-building.

The former timber spouting (guttering) has been lost with very sparse cast iron rainwater fall pipes still intact. New rainwater goods will be required.

UNIT 3

Unit 3 is a long barn formerly of agricultural use.

The building is now used to house large industrial machinery where large round brought in straw bales are processed, chopped and bagged into smaller bales. The remainder of the building is used for storage.

This building is attached to unit 2 but only abutted not bonded in.

There is a further more modern pole barn abutting the long barn (unit 3) to the front elevation projecting easterly (to be removed as part of this application).

The barn overall is in reasonable condition with minor defects noted.

The building replicates the other buildings with its rubble fill masonry walls.

The barn has a duo pitch roof with 6 trusses at almost equal centres. The 2 most northern trusses are traditional queen post trusses with the remaining 4 being king post trusses yet without the central strut. The two queen posts trusses appear non-original, both these trusses have evidence of insect infestation, the most northern truss features steel plating where it is fractured. The sixth truss (LHS looking from front of barn) has its rear roof slope strut missing.

The insect infestation does not appear excessive, taking into account the sectional sizes of these timbers we anticipate all these trusses bar the most northern can be retained. The most northern roof truss replaced with a new truss to structural engineers detail/design.

The fifth purlin (from right to left looking to the front) has rotted away and currently has no bearing on the external wall (see photos in appendix A) this needs a new piece splicing to the bottom chord, (possibly a steel channel to both sides of the bottom chord to extend onto the external wall).

The floor of this building is concrete which steps down from North to South with a difference of circa 900mm.

From the current floor levels to the underside of the trusses ranges from 3380mm to 4440mm. It is anticipated the first floor transfer space between trusses will be within the trusses themselves, the division of the first floor space takes the truss locations into account with no structural alterations being made to the retained trusses.

The floor levels vary, the concrete slabs are non-original, unlikely to incorporate thermal insulation or appropriate damp proof membranes, it is anticipated these will be broken out with new floor slabs formed incorporating thermal insulation, drainage and damp proof membranes.

The principle opening to the front elevation (east) has a steel beam over, cement mortar is also evident indicating a structural alteration with the loss of the original head, most probably a timber beam.

As the photos in appendix A indicate, localised rebuilding to unit 3 is required in the following locations;

- Front elevation, just left of the principle opening
- Eaves level to front where tin roof covering abuts stone slate roof covering
- Masonry above opening to LHS of front elevation (far left hand side). The original timber lintel has dropped causing the masonry above to also dislodge. It may be the end bearing to this timber lintel has failed, this is currently covered by a stack of pallets that prop the roof of the adjacent/perpendicular building.
- Masonry above rear opening to LHS where current ducting passes through from wagon body into the barn.
- Masonry above RHS rear opening where outer lintel has been lost.
- Rear RHS corner where lateral movement has occurred full height. This movement is more or less equal (80mm at GL and 95mm at eaves level). It is difficult to tell if this movement is longstanding or ongoing given the straw strewn all around the rear of the barn. This movement may have been caused or contributed to, by the adjacent sycamore tree. Given the extent of movement it is considered prudent to carefully take down this rear corner and rebuild. Quoins could be numbered and laid out to ensure they are relaid the same as they are currently.

The sycamore tree located adjacent to the rear RHS corner of the barn is circa 20 years of age. This tree forks at ground level, a location prone for decay/rot. Taking this into account, and the proximity of the tree to the building, it should be removed.

The westerly one third (left hand side viewed from the front) of unit 3 has had its original roof covering removed at some point with corrugated sheeting replacing the stone slate. Additional timber purlins have been incorporated to support this more modern roof covering. This roof covering is to be removed with Yorkshire stone slate re-laid on the roof. It is acknowledged the original roof covering will most likely have been stone slate. The original roof structure is predominantly intact to this area so the reinstatement of a Yorkshire stone slate roof should not have cause for concern with regards to loading.

The proposed first floor structure can be supported from an internal steel frame with stanchions bearing onto a new thickened out reinforced floor slab with perimeter channels to seat joist ends within. Given the clear spans it is assumed TJI type floor joists would be incorporated. This arrangement has no detrimental effect on the existing structure and could be stripped out at a future date with no loss/damage caused to the original structure.

OVERALL OBSERVATIONS AND COMMENTS

All the buildings are in a dilapidated state, bordering dangerous. Several defects have been noted and reported on with unit 1 being the most dilapidated due to damage caused by a fire and the subsequent damage resulting from the building being open to the elements. It is expected, without immediate intervention, they will fall into further disrepair and require extensive works to reinstate them.

Given the extent and probable costs of works required, given the current condition of the buildings, it is proposed to build a new dwelling to the west of unit 3 in order to make the overall project financially viable. I understand the client has no objection in this new dwelling being conditioned as the final part of the development therefore ensuring the repair and reinstatement of the older heritage assets are focussed on/completed first.

It is suggested a form of independent taking, wykamol cavity drain membrane is used internally to all buildings, therefore allowing the existing masonry to be retained and to be able to breathe. Internal walls lining the external walls can be formed using either timber stoothing or metal stud frames which will incorporate the required thermal insulation. This approach will ensure minimum intervention and disturbance the existing structure.

The proposed works are subject to a Building Regulations. Building Regulations approval is required for the works, part of this would also involve inspection of site works by building control officers. This process will ensure that the proposed dwelling will meet current regulations with specific regard to safety, health, welfare and convenience of people using the building. The Building Regulations also promote the conservation of fuel and power, protect and enhance the Environment and promote sustainable development.

CONCLUSIONS AND RECOMMENDATIONS

My structural inspection of the existing buildings has confirmed that despite numerous defects and repairs required they are, bar unit 1, in a sound and stable structural condition. Unit 1 being a heritage asset and therefore having significant importance is worthy of extensive works to ensure its continued existence.

In my professional opinion, the existing structures (unit 2 and 3) are suitable and adequate to sustain the additional loads from the new/replacement first floors and reinstatement of stone slate roofs to create the proposed dwellings.

Given the dilapidated and dangerous condition it is recommended appropriate risk assessments and method statements are prepared for the works prior to formal commencement. This should be completed with the input of an appropriate structural engineer to ensure the buildings are safeguarded and retained. Attention needs to be drawn to the public footpath passing through the site, this should be kept open, unobstructed, yet protected from construction vehicles, materials, and operations.

The cost of works to repair and retain these buildings will increase further as time passes and weather (rain, snow, wind and freezing conditions) takes its toll further. Urgent repair works and stabilisation is now essential to ensure the continued existence of the buildings. The proposed re-use of these buildings will provide a functional, purposeful and worthwhile use to ensure their long term future.

LIMITATIONS

I have not inspected woodwork, damp proof membranes or other parts of the structure which are covered, unexposed or inaccessible and therefore I am unable to report that any such part is free from defect. At this present time I have not conducted any intrusive or destructive testing of the fabric of the property and in particular I cannot confirm that the property is free from asbestos or high alumina cement construction. This report has been prepared for the sole benefit of Mr. P Graydon, his advisors, Barnsley Council Planning Officers & Historic England.

The liability of Paul Matthews Architectural Ltd and their employees shall not extend to any third party.

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Yours faithfully,

Paul Matthews Bsc (Hons) C.Build E MCABE

APPENDIX A
PHOTOS



Unit 1 front (East) 50% of front roof slope lost due to fire



Water tabling to south gable of Unit 1. Note service cables providing stability to leaning gable peak.



Leaning south
gable of Unit 1



Partly collapsed
North gable peak
of Unit 1



Gable and verge
collapse of Unit 1



Gable and verge
collapse of Unit 1



Closer view of gable
and verge collapse to
Unit 1



Leaning peak of
partly collapse gable
peak to Unit 1



Sandstone walling
to Unit 1 eroded at
low level



Close up of eroded
sandstone to Unit 1



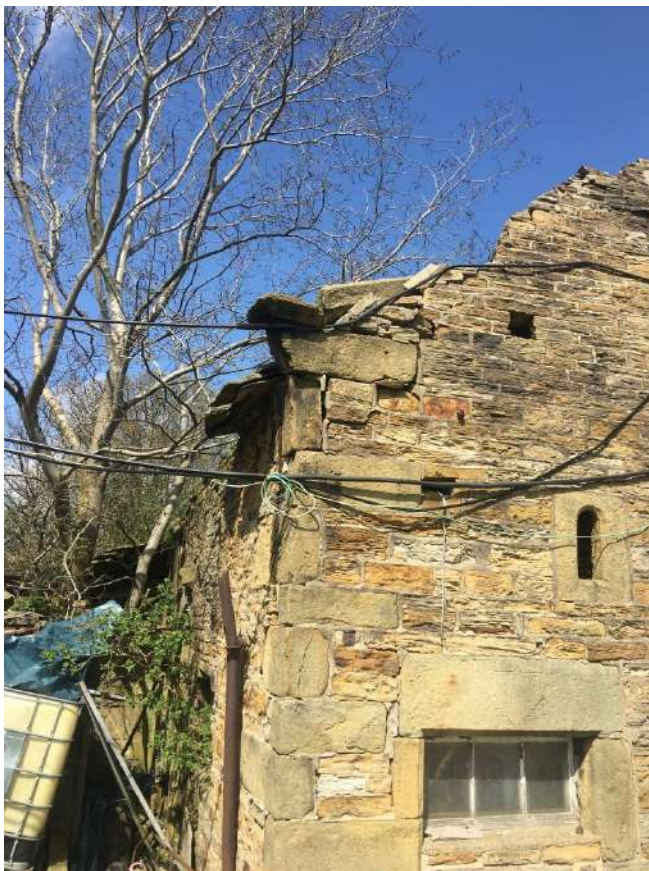
Remains of collapsed
duo pitch building
between Unit 1 & Unit
2 (viewed from North)



Close up of collapsed
duo pitch building
between Unit 1 &
Unit 2 (viewed from
North)



Remains of collapsed duo pitch
building between Unit 1 & Unit 2
(viewed from South)



South west eaves
displacement to Unit 1



South gable to Unit 1
showing collapsed
peak



Front roof slope to Unit 1



Charred front roof slope
timbers to Unit 1



Internal photo of Unit 1.
Masonry prop to remains of
fire damaged truss



Internal shot of Unit 1 note red coloured masonry showing effects of fire



Fractured purlin to Unit 1



Sparse remaining
roof to Unit 1



Gable of Unit 1 &
front of Unit 2



Purlin to Unit 1
showing signs of
damage due to
elongated
exposure to
weather



Internal south
gable to Unit 1



Internal north
gable to Unit 1



Unit 1 view from
south east



Unit 2 viewed from
North East – note
self-sown trees



Unit 1, 2 & 3 viewed
from North West



Panoramic view of
Unit 1, 2 & 3



Unit 2 viewed from
North West



Unit 2 viewed from
North West



Unit 2 East gable



Unit 2 gable viewed
from North West



Unit 2 viewed from
North East



Unit 2 gable viewed
from North



Unit 2 gable viewed
from North



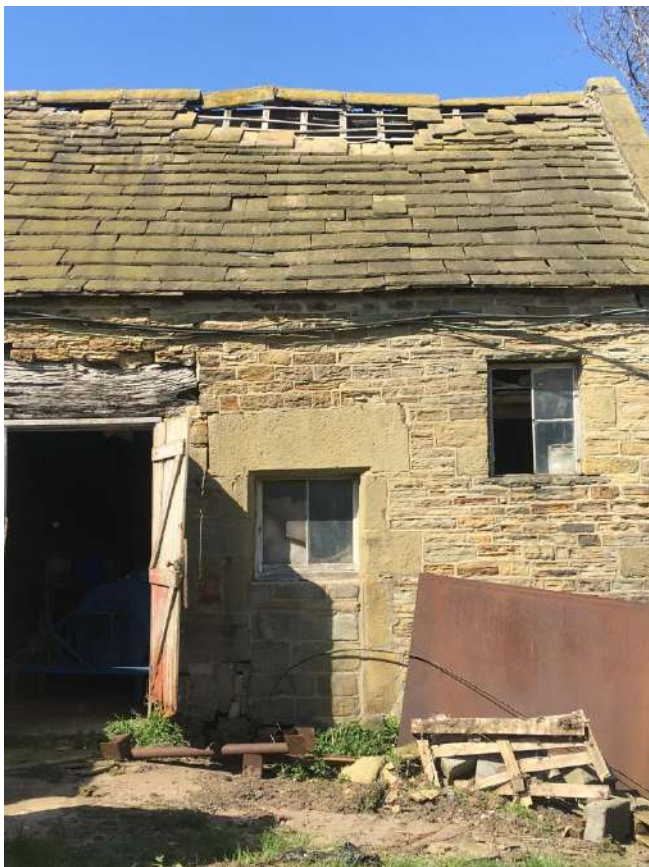
Unit 2 gable/eaves close
up viewed from West



Unit 2 gable viewed
from West



Unit 2 Front.
Viewed from South



Missing roof slates
to Unit 2



Rotten window head
to front of Unit 2



Rotten window head
to front of Unit 2



Original First
Floor/Ceiling to right
hand side of Unit 2



Original First
Floor/Ceiling to right
hand side of Unit 2



Plastic sheeting to
underside of Unit 2
first floor



Fractured floor
joist to Unit 2



Plastic sheeting to
underside of Unit 2
first floor



Plastic sheeting to
underside of Unit 2 first
floor (Electric cables to
underside)



Non original timber
floor to Unit 2 (left
hand side)



Non-original timber
floor to Unit 2 (left
hand side)



Non-original timber floor to Unit 2. Note insect infestation



Insect infestation to non-original floor boards and joists Unit 2.



6th Truss to Unit 3.
Bearing onto non-
original brick pillar.
Note rear roof slope
strut missing



Rear photo of Unit 3.
Viewed from West



Rear photo of Unit 3.
Viewed from South
West



Rear photo of Unit 3.
Viewed from South
West



Sycamore tree and
masonry displacement to
South West corner of Unit 3



Missing rear lintel to
rear of Unit 3



Extent of profiled
sheeting to Unit 3



Unit 3 viewed from
North West



North gable of
Unit 3



Weathered date
stone (1633) within
gable of Unit 3



Front principle
opening to Unit 3



Front principle
opening to Unit 3



Front of Unit 3, viewed
from North East



Masonry displacement at
eaves level to LHS of
principle opening to Unit 3



Masonry displacement at
eaves level to LHS of
principle opening to Unit 3



Unit 3 Viewed from
North East



Unit 3 Viewed from
North East



Unit 3 Viewed from
East



Unit 3 Viewed from
North East



Underside of
profiled sheeted
roof to Unit 3



Strut missing to
6th truss in Unit 3



Underside of
profiled sheeted
roof to Unit 3



Pallets propping roof to dilapidated perpendicular agricultural pole building (to be removed) to East of Unit 3



Pallets propping roof to dilapidated perpendicular agricultural pole building (to be removed) to East of Unit 3



Abutment of stone
slate and profiled
sheeting to Unit 3



Masonry displacement to
Unit 3 above location of
adjacent pallet props



5th Truss with no
bearing onto front wall,
Unit 3



Perpendicular pole
building to East of Unit 3
(to be removed)



Perpendicular pole
building to East of Unit 3
(to be removed)



Insect infestation to
bottom chord of truss
within Unit 3



Insect infestation to
bottom chord of truss
within Unit 3



1st truss within Unit 3.
Note splicing over
fracture to bottom
chord



Insect infestation to
bottom chord of truss
within Unit 3



1st truss within Unit 3.



Underside of roof
to Unit 3.



High level opening
within Unit 3.



Roof trusses/straw
chopping plant within
Unit 3.



Roof trusses within Unit 3.



Roof trusses within
Unit 3.



Roof trusses within
Unit 3.



Purlins/Roof trusses
within Unit 3.



Concrete floor
slab/differing levels
to Unit 3.