

Our Ref: 12632



Twywell Barn - Cottages

The purpose of the inspection was to review the structural condition of the Cottages now that the buttressing, recommended in the report of May 2023, has been installed. For reference Cottage 2 is at the north eastern end nearest the collapsed barn and Cottage 1 is more intact at the south-western end.



The rafters from Cottage 2 have been removed as the wall-plate had displaced excessively as noted previously. The purlins are still built into the gable which is advantageous to aid restraint.



Partners

Clive Haywood, B.Eng(Hons), C.Eng., M.I.Struct.E
Paul S. Hobson, C.Eng., M.I.Struct.E
Company No. 4754817



At the junction with Cottage 1, the purlins span between trusses which are located in the middle of each property. The purlins should be propped off the central party wall so that the roofs of Cottage 1 and Cottage 2 are independently supported.

There is a scaffold erected on the northeast gable which it is recommended is upgraded so that it acts as a buttressing scaffold. The chimney is leaning and it is recommended that this is taken down if safe access cannot be provided to restrain it to the scaffold.



The first floor is currently propped but there is stonework from the south eastern window which has collapsed onto the floor where the lintol has failed. The reveal and wall head are also loose and likely to fall. The first floor should be fully propped by either supplementing the existing props or utilising the proposed bird cage which is required to be built.



The wall head should be cleared on both the north-west and south-eastern side from the scaffold, ensuring adequate protection/handrail on the inside face. The propped first floor can then be accessed and the fallen masonry cleared. The birdcage should then be continued up to prop the purlins and the truss of Cottage 2, it can also be used so both sides of the gable wall are propped.



The staircase leading up to the first floor is quite poor as the bottom treads have collapsed and these should either be removed or made good so that safe access can be provided.



The south-eastern wall has noticeably displaced from the junction of the barn back to the party wall with Cottage 1 and the wall requires rebuilding back to this point. The separation with the cross wall on the ground floor is some 60mm.



On the opposite side the ivy roots have caused noticeable damage and this will require removing and then repaired.



The methodology for removing the wall should be as per previous walls in that operatives should be above the area being taken down so they would be clear of loose masonry which could fall. On the south-eastern side the work should start at the end of the barn wall as this is noticeably leaning and it can be taken down working up towards the gable.



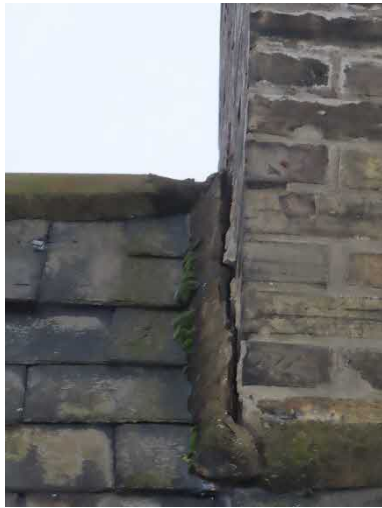
It is evident that the concrete buttress blocks are working as the wall is now leaning hard against them.



The wall can be taken down from the top for the first 1m and only for the height of the top concrete buttress block. Once the first section has been taken down then the concrete block can be removed and then the process repeated until the wall has been removed back to the party wall with Cottage 1. The wall can be rebuilt after the foundations are assessed and tied to all cross walls and the first floor. The rebuilt wall should extend past the end of the gable for additional stability in the interim period before the barn is rebuilt. The existing gable wall will require the end section to be rebuilt and tied into the new wall and the gable should be pointed and grouted once the wall has been rebuilt.



On Cottage 1, in the longer term, the roof will require recovering as there are many slipped slates and the roof has racked when the north-eastern area collapsed and there is now a gap at the chimney.



Internally in Cottage 1 the south eastern wall has displaced to a lesser degree and this will require tying at the cross wall positions and also the first floor utilised to hold the wall in place by adding restraint straps. During the re-roofing works then it can be ensured that the rafters are fully fixed to the ceiling joists and rafters are fixed to purlins. In the main rooms there is an occasional fracture but these can be stitched with helibar and repointed.

Externally the north western wall of the barn should be raked back and then the wall head should have a temporary mortar flaunching to add protection.



Set out below is a summary of a potential methodology for stabilising the Cottages.

- Allow for taking down chimney on gable.
- Upgrade north-eastern scaffold to buttress gable.
- Clear wall heads of loose stone.
- Remove or secure loose slates to Cottage 1.
- Introduce birdcage scaffold internally to ground floor or supplement existing propping, to support first floor.
- Introduce access stair to first floor as existing has failed.
- Clear collapsed stone from first floor.
- Prop purlins off party wall between Cottage 1 and Cottage 2.
- Introduce birdcage scaffold to prop roof structure to Cottage 2 and also to buttress inside face of gable.
- Take down end section of south-eastern barn wall up to Cottage 2.
- Take down top 1m x 1m section of stone (from above) of the south-eastern wall of Cottage 2.
- Remove top concrete buttress block.
- Take down next 1m x 1m section and repeat process.
- Take down south-eastern wall of Cottage 2 repeating the above process, back to Cottage 1.
- Inspect foundations to assess whether they require reforming.
- Rebuild south-eastern wall of Cottage 2 ensuring this is tied to the cross walls and the first floor.
- Rebuild end section of north eastern gable and tie to new wall and extend new wall 1m past gable.
- Rebuild chimney
- Repair internal cracks to Cottage 1 and Cottage 2 and tie all walls to the floors.
- Reform roof structure to Cottage 2 and re-roof Cottages 1 and 2

Clive Haywood

B.Eng(Hons), C.Eng., M.I.Struct.E.
Conservation Accredited Engineer