

Subject: RE: The Cottage, Old Newton - Existing Beam Sizes
Date: Wednesday, 15 November 2023 at 09:00:39 Greenwich Mean Time
From: Josh Halton-Farrow
To: Jamie Cotterell, Henry Freeland
CC: Mark Frankis, Simonne Graells
Attachments: image001.png, image002.png, image003.jpg, image004.jpg, image005.png, image006.jpg

Good morning

Thanks for sending these through Jamie. Where your sketch notes 'split', is this a shake running along the beam or a break/joint in the timber?

Assuming that it is just a shake and using the dimensions noted, I have run through the analysis and have arrived at the following conclusions:

- 1) Two lines of new 125mm x 175mm (4.5m long) C24 timber purlins are to span between the loadbearing walls below. Purlins are to be located just above Attic Floor Level and halfway between ridge and ceiling (or located in a location that ensures the rafters have maximum spans of no more than 2m). The new upper purlin should be propped down to the central attic floor beam below with 125mm x 125mm C24 timber struts over loadbearing walls or directly onto gable walls with s/s masonry joist hangers. Intrusive investigations should be undertaken in the First Floor rooms to expose the gable construction below the purlin bearing locations to ensure the wall is in a good condition and will transfer loads to ground.
- 2) Where existing rafters are smaller than 125mm wide x 70mm deep or are defective (i.e. split, decayed, overdeflected, etc.), they should be supplemented with new roof rafters (75mm wide x 125mm deep) from ridge to the new lower purlin level (ceiling level). Rafters should be assumed to be bespoke cut to match the existing and introduced adjacent to existing in grade C24 softwood (or can be increased in height to allow for insulation?).
- 3) All connections from the existing rafters to ceiling joists and from ceiling joists to principal beams should be checked and if failed, loose or showing signs of spread, the S.E. should be notified and these connections will likely need to be strengthened.
- 4) ALTERNATIVELY - If the eaves plates are found to be in a good condition, they could be raised to allow new timber A-frame trusses to be installed above the existing roof/rafter line. The raising of the eaves plate would entail the installation of solid blocking pieces between the existing common rafters and a new continuous eaves plate fixed to the top of the blocking pieces.

In addition, I thought it would be prudent to note/reiterate the following proposed structural works that were discussed on site or recommended within our original specification documents:

- a. All eaves plates to be exposed and checked for decay. S.E. to be notified if defects are found to allow for a suitable repair to be specified.
- b. All ceiling joists to be inspected and if defects are found, they should be supplemented with new 50mm wide x 80mm deep C24 timber joists spanning from the adjacent rafter to the central principal beam.
- c. New high level C24 collars of the same size to match the originals (50mm x 150mm dp?) are to be installed. Either using the existing half-lap joint connections or using M12 through-bolts and 50mm x 50mm square washers (with double-sided tooth-plate connectors between).
- d. Strap the ends of the roof structure to the gable walls using 12 no. L shaped straps (6no each gable), to be built into the gable walls and secured over three common rafters on east and west elevations at 2m centres. Straps to be 30 x 5mm thick galvanised steel 1.2m long and fixed to 100 x 50mm timber blocking between the rafters and to the tops of the rafters.
- e. Allow to check and repeg any damaged tenoned connections where existing pegs may be lost or have snapped. Allow to use historic pegging techniques to match those used in the original construction.
- f. During our site visit, the chimney stacks were reviewed and the following repairs should be undertaken:
 - i. Due to what appears to be prolonged rainwater ingress, some of the chimney stack bricks and mortar joints have eroded. These bricks should be replaced on a like for like basis in a dentistry fashion and the eroded mortar joints should be repointed with an appropriate lime mortar.

- ii. The end roof trusses adjacent to the chimney stacks are currently independent. However, it is our recommendation that the trusses should be tied to the adjacent chimney stack. This should be undertaken by inserting timber packers between the end trusses and the chimney stacks (one block per rafter), then resin fix the truss to the chimney stack. Use 2no. 12mm diameter Hilti HIT-V rods (with 80mm embedment) and HIT-HY 70 resin to each rafter.
 - iii. Blockwork has been used to infill between the gables' timber framework and does not appear to be tied to the adjacent brick chimney stack. The blockwork should be tied to the chimney stack with 30 x 5mm thick (1.2m long) galvanised steel straps bent in the middle. The straps should be plugged and screwed to the masonry through each hole.
 - iv. Although not reviewed during our site visit, it is our recommendation that the condition of the chimney stacks' flaunchings be checked whilst access is present and that they be repaired if required.
- g. As originally outlined, the 3no. dormer windows have been constructed with plywood sheets fixed to an informal framework that sits on the existing rafters. No strengthening/trimming out has been undertaken and the existing rafters have been cut short and left hanging unsupported. The presence of historic infill materials (wattle and daub) between the rafters below attic level prevents the doubling up of the existing rafters to strengthen the dormer support condition. Therefore, it is our recommendation that new 125mm x 175mm dp C24 timber purlins/binders be installed just above Attic Floor Level to provide additional support the common rafters (as noted above in Item 1.). These binders should span in an East to West direction between the gables and loadbearing internal walls.

Let me know if you have any comments, queries or need any of the details sketched. Feel free to give me a call to talk through if helpful.

Kind Regards

Josh Halton-Farrow BEng (Hons) MEng CEng MStructE
Consulting Principal (Chartered) Engineer

Wright Consulting

Meeting House Farm
Oulton
Norwich
Norfolk
NR11 6NZ

Unit 8 Quay Court
Colliers Lane
Stow Cum Quy
Cambridge
CB25 9AU

M. 07912577085 : E. jhf@awce.co.uk

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