

24<sup>th</sup> October 2022

Ref: GH0191/AE

Mr. C. Jones  
Tynewydd  
Llanfechain  
Powys  
SY22 6XQ

Dear Mr. Jones,

**SUBJECT: TYNEWYDD, LLANFECHAIN –BEAM UNDER KITCHEN FLOOR**

We were asked to inspect the beam within the cellar which supports the floor to the proposed kitchen.

The beam was inspected from accessible cellar floor. It should be noted that:

- The contents of this letter are based solely on a visual examination of the visible areas during the site visit.
- No tests have been undertaken on the construction materials or load bearing capacity of walls or ground.
- No finishes, fittings or coverings have been removed or disturbed, and no responsibility can be accepted for concealed defects.
- This report shall be for the private and confidential use of Mr. C. Jones, to whom the letter is addressed and must not be reproduced in whole or part or relied upon by third parties without the express written permission of Grace and Howe Consulting Engineers Ltd.
- The inspection was visual only and made from accessible ground level.
- This letter is not a specification and it must not be used to prepare estimates.
- Whilst the survey was thorough, it was not possible, without doing damage, to inspect those parts of the property that were covered or unexposed at the time of the survey, and we are therefore unable to confirm that such parts are free of defects.
- This report is confined solely to the following area(s): exposed oak beam to the underside of the ground floor visible in the cellar.
- Although comments may be made on other areas, such comments must not be taken as a survey of those areas.

There is evident decay to the ends of the beam. The end supported on the external wall has a temporary acrow support prop in place. It can be seen that the timber bearing within the external wall is decayed and is structurally compromised. There is also evident decay to the existing timber padstone under the beam end. Green staining on the surrounding wall indicates ambient damp conditions.

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The other beam end bears on the brick partition wall between the cellar and the stairs up to ground floor. The beam end and timber bearer are also decayed at this end, compromising the structural functionality of the beam. Again, extensive staining indicates ambient damp conditions.

The options for repair which have been considered include:

1. Complete replacement,
2. End repair or
3. Supplementary structure.

Complete replacement would involve the removal of the existing beam and either a new timber or steel beam installed in its place. As the timber bearings are decayed these would also need to be replaced. Due to the ambient damp conditions and the precedent for timber decay, a steel beam on concrete padstones would be the more advisable out of the two. However, this would involve the complete loss of the substantial original timber beam, and would not be in accordance with conservation best practice which aims for minimum intervention.

End repair would either be by way of external steel splice plates on either side of the beam at the ends and continuing into the wall to bear on to a new sound bearing. This would need to be concrete padstones for longevity. Alternatively timber end repair could be undertaken where the decayed length is cut and a new timber end is spliced on. However, in order to accommodate the connection an amount of sound timber would need to be removed, leading to loss of original sound fabric. As there is a precedent for timber decay to the embedded ends, and there is no reason to believe that the ambient conditions will change, it would also be likely that eventually the new timber ends would also decay.

A new supplementary structure would comprise new steel beams either side of the existing beam to support the floor while retaining the existing beam in place with no loss of original fabric. This would make the existing beam structurally redundant and would therefore require no significant intervention to repair or strengthen the ends. The only intervention would be bolts through the timber to the beams either side so that the new beams could carry the weight of the original beam. Due to the decay of the existing timber bearers, new padstones would be required. A new timber bearing plate would likely decay in the wall in the same manner as previous plates (it can be seen under the beam end that successive plates have decayed). The higher stress concentrations under the ends of steel beams also makes concrete padstones more suitable and stable. As this option would provide minimal loss of existing original fabric and is a simple solution, it is recommended as the preferred solution to be adopted. C-section beams have been proposed to minimise the width of new bearing area, keeping the new padstone sizes down to a minimum. Although there are issues surrounding the use of concrete in traditional masonry walls and the lack of permeability of the concrete, the padstone does not surround any other masonry units (as opposed to pointing, where the water cannot permeate out of the joints surrounding the stone if done in a cement-based mortar), and as a proportion of the

area of the wall, the padstones are sufficiently small so as not to affect the wider permeability of the wall as a whole.

I hope you find this letter useful, however if you have any queries or require any further information, please do not hesitate to contact me.

Yours sincerely,



**Alex Evans – Chartered Structural Engineer**

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Cc: Nia Lewis.