

HLS Structural Engineers Limited

25 Brownfields

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cc. Mr P. Atton, Weldon Beesly, paul.atton@weldonbeesly.com

Our Ref: 24403/JL/PL

Date: 25 October 2024

Dear Karen,

Re: Barn Conversion, Titmore Green Farm, Stevenage SG4 7JT

We visited the above property, at your request, on 30th September 2024 to undertake a structural review of the barns which are proposed for conversion.

The proposal is for both residential and office space.

Our inspection was visual only and no opening up works were undertaken.

Survey

The barn is formed of an unequal length double steel portal frame with mid height blockwork infill to the external walls, and along the central posts forming two barns. Above the blockwork vertical timber paneling forms the upper part of the external walls. Doors are located at each end of both spaces.

The left hand side barn is currently used for hay storage, the right hand side is used for machine storage and a workshop area. Refer to Photograph 1.

To the left hand side elevation additional steel framing has been provided to form an overhang. Refer to Photograph 2.

The steel portal frames support timber purlins which are supporting the profiled sheet, roof, refer to Photograph 3. As can be seen in the photograph the end bays of the structure have CHS cross bracing to the roof. Vertical bracing can also be noted to the end of the bay.

The main steel portal columns are 254 x 146 UB43 sections, gable steel posts at the doors are 178 x 102 UB19 sections. The blockwork, 215mm width, is set into the web of the 254UBs.

Photograph 4 shows the central post of the double portal. Haunches are evident to both portals and at the ridge.

Photograph 5 shows a view of the right hand side elevation.



Photograph 6 indicates the steel frame extension forming the overhang. To the left hand side elevation vertical hairline shrinkage cracks were noted to the blockwork at approximately 6m centres, refer to Photograph 7.

The blockwork wall is over 30m long with no movement joints to allow for thermal movement. In blockwork these are usually required every 6m.

To the front and rear elevations, around doors, some loss of masonry was noted, refer to Photograph 8. This is localised and not in structural walls.

To the rear elevation diagonal hairline cracking was noted to the blockwork as shown in Photograph 9. The adjacent bay to the left has similar cracking. Between these bays there is a water butt, which is leaking.

The concrete ground bearing slabs to both barns, where visible, are in a good condition with no evidence of cracking or distortion.

Discussion

The existing steels of the portal appear sound with no evidence of distortion. They should be wire brushed and recoated with red oxide to ensure adequate protection.

The barns will require new roofing and a lightweight roof covering would be acceptable. Additional purlins may be required dependent on the materials used.

The ground bearing slab will be suitable for residential imposed loading (1.5kN/m^2) and office loading (2.0kN/m^2) which is less than for an agricultural building. Appropriate insulation and screed will also be able to be supported. To form an insulated wall either insulation can be applied to the existing building blockwork or a cavity wall can be formed by building an inner leaf of block internally off the ground bearing slab.

There is the possibility that one internal column could be removed, to aid architectural design layouts, by providing a steel box frame. Two column removal is likely to result in significant steel framing being required.

The cracking to the blockwork on the left hand elevation can be retained by retro-fitting vertical expansion joints.

In relation to lowering the existing floor slab, details of the existing portal frame column foundations will be required as these will extend into the internal area. Any lowering of the slab will require reinforced concrete retaining walls with appropriate waterproofing detailing.

A mezzanine deck may also be possible. An exploratory core of the slab may be required to confirm depth depending on mezzanine construction.

Additional walls can be added to the existing blockwork to enclose the wall to eaves level.

Internal walls can be constructed in blockwork or timber stud. We would recommend loadbearing timber studwork in areas under a mezzanine structure to reduce loads.

Conclusion

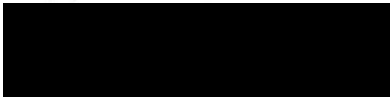
The structural elements of the barn appear sound and suitable for conversion to residential or office space.

Repair works to the steel frame will involve wire brushing and repainting with red oxide.

Once drawings for the conversion have been received we can comment further.

We trust the report is clear. However, if you have any queries, please contact the office.

Yours sincerely,
HLS Structural Engineers Ltd



Julie Littlemore

MEng (Hons) BA (Hons) CEng MStructE FGS



Photograph 1 View on front of barns.



Photograph 2 View of overhang, as viewed from rear.



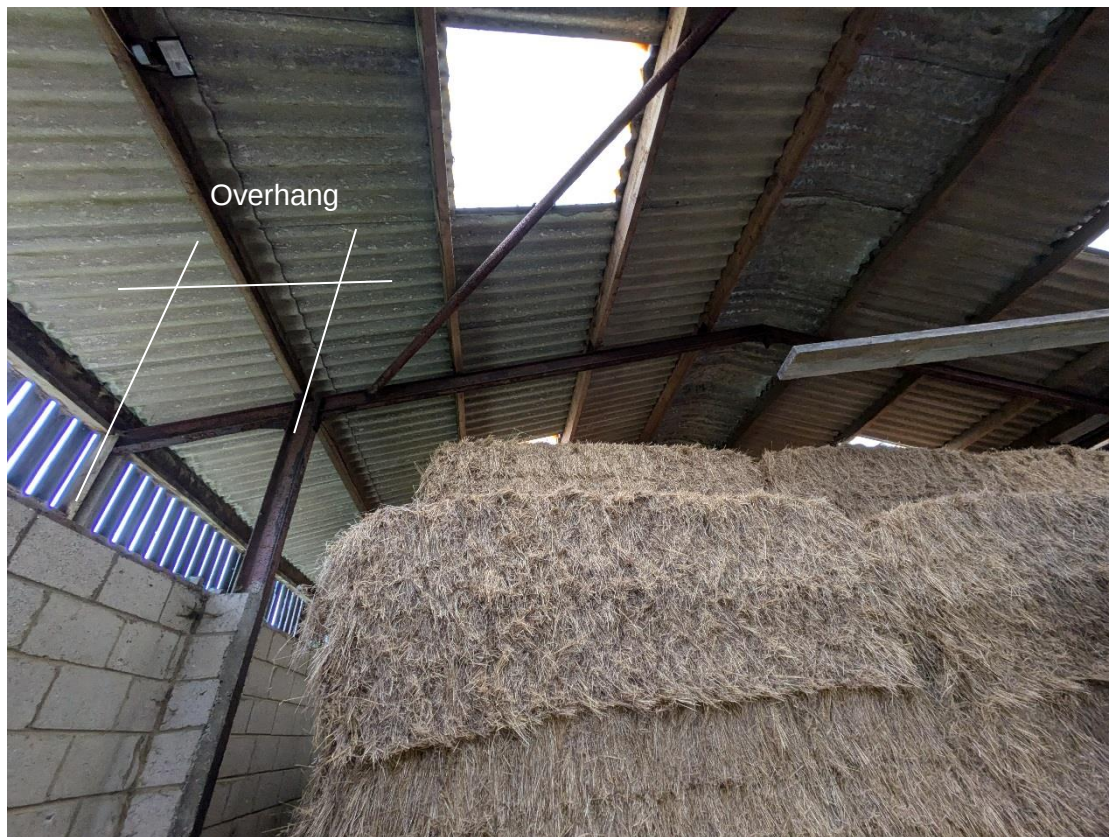
Photograph 3 Internal view of workshop/storage barn.



Photograph 4 Central post of double portal.



Photograph 5 View along right hand side elevation.



Photograph 6 Internal view on overhang steel framing.



Photograph 7 Left hand side elevation – typical vertical hairline crack.



Photograph 8 Typical views on loss of mortar at doors.



Photograph 9 Rear elevation – cracking in bay to right hand side of water butt.