

ANTHONY-JOHNSON

Consulting Engineer Ltd

Site Address:

98 Dog Drove North,
Holbeach Drove,
Sapling.
PE12 0SA.

Overview:

It is proposed that an existing timber framed structure be converted to residential use.

The structure is formed with a concrete slab to the base, internal to the building and the concrete slab appears in good overall condition with a single expansion joint set to the central line of the slab, running front to back. The concrete appears intact with no visible movement, distortion or cracking. The slab is cast level with the external ground to the front elevation, allowing for vehicle access.



Image 1.0: View of concrete floor slab

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A Plinth course of block-work runs the full perimeter of the structure, setting the sole plate of timber studs above finished floor level, thus protecting them from moisture ingress. Drain holes set to the bottom mortar joint of the block-work allow for the discharge of any water within the structure.



Image 2.0: drain holes to base of structure.

The block Work plinth was found to be visually intact, level and free of distortion. Visual inspection failed to show any movement and lacked any cracks to bed joint, perpend and blocks themselves. The blocks appear to be dense concrete and are likely of a high compressive strength, suitable for use at ground level where freeze-thaw action would otherwise result in long term spalling and failure.

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A timber stud frame has been formed to the head of the block-work with double sole plate running to the head of the block-work throughout.

Timber studs are set at suitable centres with framing having been formed as panel sections, lifted into place and fixed together forming double studs. Infill timbers set to each panel appear to be formed predominantly of primary horizontal members with vertical members running between the horizontals.



Image 3.0: Typical timber stud wall panel.

The roof structure is formed of hand-made double fink timber trusses, formed of solid timber sections to top chords, bottom chords and ties, overlain with plywood sections at joints.

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Image 4.0: View of timber trusses forming roof structure

Trusses are set at approximate 1 m centres and support timber purlins running front to back, set at approximately 800 mm centres. To the head of purlins are set corrugated steel roofing sheets, laid to falls, running from ridge to eaves.

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Image 5.0: View of corrugated steel roofing sheets

A roller shutter door is set to the front elevation, slung from two upright steel square hollow sections, forming support posts either end of the opening. The door opening appears to have been cut into the original front elevation, with timber framing modified to accommodate the opening.

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Image 6.0: View of steel support structure to front roller shutter door

Externally, the structure appears complete, although rainwater goods are missing along the side elevation. The fascia board has decayed significantly, glazing and frames are failing with sills completely missing. External timber cladding runs vertically and appears intact and in good condition with no significant decay evident.

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Inspection to the opposite side elevation of the building reveals the structure to be bounded by trees and shrubs, falling within 1 meter of the structure. The structure and slab were found to remain intact along this elevation with no significant movement or deviation evident.



Image 7.0: View along opposite side elevation of structure

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Image 8.0: View to rear of structure

Observations:

The structure is formed of timber framing panels which distribute wind sway loading up to wall plate and down to sole plate. The wall plate is restrained by the roof structure which, given its shallow pitch, transfers horizontal wind loads to walls either end of the building through plate action, where loads are carried in shear. All wall panels have been over-boarded with Plywood, thereby forming timber racking walls, capable of resisting in-plane thrust, imparted by wind loading on adjacent external elevations and transferred via wall plates.

Vertical loads applied to the roof, including self-weight and potential snow loading are carried by trusses in bending, with vertical loads transferred into side walls of the structure. Stud wall panels transfer vertical loads to the block-work plinth and into the slab, where they are distributed into the foundations.

Given the above mechanisms, it is noted that side elevations of the building remain straight, with no horizontal deviation at the head of wall panels. On this basis, plate action

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within the roof structure continues to function as intended, preventing distortion of the building.

Given the vertical loads imparted by the roof structure on supporting walls, both the wall plates to side elevations and the timber infill panels to the head of large window openings appear free of vertical deflection. Local over-boardings of infill panels to the head of window openings forms plating which stiffens the timber elements to form “box beams” wherein the top chord acts in compression only and the bottom chord in tension only. The partial loss of over-boarding to the “box beams” would therefore be inconsequential, as long as the effective length of the timbers remained suitably “stocky” about their minor axes.

The visual condition of structural elements indicates that they are free from moisture ingress, with no decay evident. Neither dry rot nor wet rot was observed in timber elements and studwork appeared free from wood boring beetle infestation.

Timber trusses appear suitably sound. Ceiling chords remain straight and true, with no visible deflection, thereby indicating that the trusses are not over stressed. The trusses have been formed with consideration given to the purpose of each element, with joins and splices having been suitably introduced.

Conclusion:

Given the above observations, the structure is suitable for conversion to residential use, particularly given the presence of a block-work plinth set to the head of the existing concrete floor slab which allows for the inclusion of DPM, insulation and screed. The floor slab lacks deviation/ movement indicative of poor or shrinkable ground conditions and has not deteriorated to the head, indicating a suitable grade concrete was employed, capable of resisting ice, snow and salts.

Timber wall panels to external elevations should be retained and subsumed into the proposed conversion.

The timber trusses should be retained and incorporated within the proposed conversion, with works carried out so as to suitably prepare the elements for the addition of a ceiling. Existing nails to the underside of the timber trusses indicate that they previously

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supported a finished ceiling, hence the additional loads imparted by plasterboard would likely be within tolerance.

The roof should be finished in material similar in both weight and design philosophy to the current corrugated steel sheeting. Plate action provided by the steel sheeting should not be lost and on this basis, tiles must not be used. Where possible, the new roof covering should incorporate insulation, so as to enclose the roof void within the envelope of the building, thus preventing long term interstitial condensation through cold and the decay of existing timber elements.

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