AJP/21/127

PROPOSED CONVERSION OF EXISTING OUTBUILDING TO DWELLING

GEDDING GRANGE, BURY ST. EDMUNDS

ENGINEER'S APPRAISAL

1. Introduction

Following new instructions from Jen Milner, an inspection of the building was made on the 29th Sept 2021 in order to provide an updated report following our original engineers report of May 2007.

2. General

The building is a two-storey outbuilding with a duo-pitch pantile roof set within the land occupied by Grange Farm, Gedding. The structure comprises solid brickwork on the rear and end elevations. The front elevation has been re-constructed in recent times in solid concrete blockwork up to first floor level. Above 1st floor the original wall construction comprising timber stud framing with brick infill has been retained. The surrounding land is generally level and a drainage ditch runs parallel to the rear of the building. A hedge of mixed species runs along the ditch from the north-east corner of the building which is somewhat overgrown with vegetation. A line of poplar trees runs north-south approximately 20m away from the rear of the building.

3. Roof Structure

The existing roof structure comprises naturally shaped common rafters approximately 90mm deep at 400mm centres supported on 125 x 63 purlins spanning between 90 x 63 principal collared rafters at 1.2-1.6m spacing. Additional support has been provided to the purlins in the form of raking props down to the 1st floor structure. The wallplates on both sides of the building are largely concealed behind mortar haunching and their size could not be determined.

A 125 x 125 eaves tie beam is present half way along the building. This is not continuous and is interrupted at mid-span by a rectangular timber frame comprising 115 x 115 posts with tenon connections to a 125 x 50 headpiece. The posts appear to sit on a 50mm thick bearer plate on the 1st floor joists and the end of one of the tenons to the header piece has broken away. Hence the frame can no longer resist the tensile force in the tie beam and a remedial steel tie bar has been inserted close by, across the building between wallplates.

The ridgeline is generally straight and there is currently no sign of significant spread at eaves level. The building has been re-roofed however relatively recently with the

provision of new felt and 100 x 25 plates fixed to the side of all the rafters to achieve a straight line for fixing new tiling battens. The introduction of the raking purlin props noted above and the steel tie bar suggests that the original roof structure was not performing satisfactorily.

In order to create usable space at 1st floor level it will be necessary to remove the raking props and hence a number of strengthening works to the roof structure will be required as detailed on drawing 21/127/D1.

4. 1st Floor Structure

The 1st floor structure comprises 175 x 63 softwood joists at 400mm centres spanning between two 185 x 150 timber beams. The beam themselves are supported on timber posts of varying size and shape. All the timbers are in sound condition and adequately sized for domestic floor loading.

5. External Walls

a) Front (South) Elevation

The front elevation has been re-built relatively recently up to 1st floor level using concrete blocks. Above 1st floor the original timber frame structure remains with brick infill between the vertical studs and generally appears to be in good condition.

b) Rear (North) Elevation

The rear elevation comprises 13" solid brick walls reducing to 9" thick above 1st floor level. Lateral restraint is provided at 1st floor level in the form of steel ties fixed to the two floor beams. There is evidence of some cracking to the wall at this end running full height. There is no suggestion that the building is subject to significant active or progressive movement and the cracks should be repaired by raking out the mortar joints and installing 6mm 'Helifix' or similar stainless-steel brick reinforcement in accordance with manufacturer's instructions.

c) Gables

The gable ends also comprise solid brickwork. The western gable is generally in good condition although there is some de-lamination of the brickwork in places mortar has eroded out of the joints beneath the high level door opening and will need raking out and re-pointing. The brickwork is damaged on the corner local to the fixing for a farm gate and the brick arch lintel above the doorway has failed and will need to be replaced.

The eastern gable has a diagonal crack at low level towards the front of the building where a brick buttress has been added. A vertical crack is present under the high level window and the brick arch lintel has also failed in a similar way to the other end. There is no evidence of any ongoing movement and the cracked masonry should be repaired as above.

6. Foundations and Ground Floor Slab

The ground floor comprises bare earth. A new insulated ground bearing floor can be installed.

A trial hole was excavated on the northern side of the building. The brickwork terminates approximately 250mm below ground level and is supported on a flint/rubble trench fill footing at shallow depth. The sub-soil comprised very stiff sandy clay.

Shallow foundations on clay subsoil are prone to movement due to variations in soil moisture content. Where conditions around the building are uniform and consistent, the seasonal movements are usually relatively minor and it is only when local external influences such as leaking pipes or root growth from nearby vegetation result in localised moisture changes that more severe movement and damage occurs.

It is understood that the 1st floor of the building originally served as a grain store and hence the structure has probably been subjected to heavier loads than those that will be imposed by domestic use. Historically this building does appear to have suffered some minor foundation movement, but general improvement of the existing foundations is not considered to be essential if no significant extra loading is to be applied and the risk of minor cracking/movement is acceptable. Care should be taken not to substantially reduce the external soil cover to footings and vegetation around the annex should be cleared and new planting restricted; shrubs and climbers adjacent to walls should be in containers. The building would also benefit from paving around the perimeter to offer additional protection to the footings.

7. Stable wing.

The stable wing comprises a relatively modern addition formed with 150mm blockwork walls clad externally with feather-edge softwood boarding. The metal sheeted mono-pitched roof is to be replaced with a more traditional duo-pitched, pantiled roof. The blockwork walls do not show any signs of former movement and will be satisfactory for support of the new tiled roof.

8. Conclusions

The building is suitable for conversion subject to the structural recommendations outlined above. Provided that the work is carried out carefully using skilled labour, traditional repair methods and materials that are compatible with the existing, the building will be structurally sound and suitable for the proposed use.

Adam Power BSc CEng MICE 05/11/21