P.K. Naldrett & Partners
Civil and Structural Engineers

14 FREEMANS LANE,
BURBAGE,
LEICS.,
LE10 2HZ

REPORT ON SUITABILITY OF EXISTING BARNS FOR CONVERSION INTO DOMESTIC ACCOMMODATION

at

YEW TREE FARM

OCCUPATION ROAD

NAILSTONE

NUNEATON

DEVELOPMENT SERVICES
22 JUN 2007
RECEIVED

for

MR J. DAWSON & MRS D. B. DAWSON

16 April 2007

Ref. 3134-R

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INTRODUCTION

Instructions were received from Mr Peter Goddard to make an inspection of the barns at Yew Tree Farm, Occupation Road, Nailstone, Nuneaton, and to report on their structural condition with respect of their general suitability for conversion into domestic accommodation. Detailed recommendations for remedial works are specifically excluded from this report.

A site visit to inspect the property was made on 19 March 2007.

Please note that this report is strictly limited to structural appraisal of the suitability of the barns for conversion into domestic accommodation. No inspection has been made of any finishes to walls, floors or ceilings. Neither has any inspection been made for timber disease of any description, woodworm, beetle infestation or other vermin, and we are unable to report that any part of the property is free from such defect.

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DESCRIPTION OF THE BARNS

The barns comprise a pair of single-storey barns arranged in an L-shaped configuration and situated alongside the road on the boundary of the farmyard at Yew Tree Farm. Photographs of typical views of the barns are shown on Figures 1 – 4 on Appendices A & B attached to the end of this appraisal.

The barn roofs are constructed using plain clay tiles on timber tiling battens and rafters on canted timber purlins all supported off timber trusses, steel beams, masonry cross-walls and masonry gable end and hipped-gable end walls. A timber joisted and boarded loft floor provided over the shorter leg of the barns appears to be currently used to store animal feed.

The external walls to the barns are all of brickwork, mostly at least one-brick (Approximately 225mm.) thick. Internal walls are also of brickwork.

All ground floors are of concrete ground-bearing slab construction. A large 750mm deep pit is present in the shorter leg of the barns.

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INSPECTION AND DISCUSSION

Please note that in this appraisal the terms *front*, *right-hand*, *left-hand*, and *rear*, are all based on viewing the barns from the centre of the farmyard.

Roof of Barns

Viewed externally, the roof appears to be in reasonable condition. The roof slopes are reasonably planar and do not appear to be sagging unduly. Viewed internally no sarking felt was seen under the tiles; so the existing tiles will need to be removed and re-laid on new timber tiling battens over new sarking felt. The rafters look to be adequately sized but the single purlins provided to support each roof slope look to be undersized. Even though the purlins are not deflecting excessively under their load they should be stiffened in accordance with current building regulation requirements. The roof would also benefit from the addition of new stiff timber or steel apex purlins to help reduce the possibility of the roof spreading and damaging the walls at eaves level.

The king-post trusses appear to be in fair condition and seem to be carrying the current roof loading with no evident distress. Little steelwork or ironwork has been used in their fabrication, but any that has been used is probably fairly corroded by now and should be overhauled, replacing any parts as necessary. One truss has been modified – see Figure 5 on Appendix B attached to the end of this Appraisal – and it is recommended that it be reinstated to its original king-post configuration in order to increase its strength.

The purlin supports consisting of canted timber props supported off steel beams at eaves level look to be serviceable, but are unattractive and may not be suitable if a new ceiling is not provided to hide them. In any case they will most likely carry additional loading from either a new ceiling or rafter under-lining, so their strength and stiffness should be checked to verify their continued suitability.

In common with all other existing retained timbers, all roof timbers should be inspected by a timber specialist and treated according to their recommendations.

Loft Floor over Shorter Leg of Barns

The loft floor joists are currently supporting several hundred millimetres depth of animal feed, the weight of which is in excess of the proposed loft loading. Consequently the timbers could be considered to have been adequately load-tested. Notwithstanding this, it is recommended that the principal floor/roof support steel beams be checked by an engineer to confirm their adequacy whilst the

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joists may be checked against the current TRADA tables. The retained timbers should, as stated previously, be inspected by a timber specialist and treated according to their recommendations.

External Walls to Barns

Generally, the external walls appear mostly to be in good structural condition, being sensibly plumb and containing no excessive bulges, bows and leans. Some bowing out at eaves level was noted due to spreading of the roof, but this is quite minor and may be left un-treated. Eyeing along the brickwork bed joints showed that they were mostly reasonably true-to-level, demonstrating that the wall footings are generally satisfactory, but the level of the bed joints of the walls facing the farmyard was a little varied, so perhaps some slight future foundation movement is possible. It was noted that the back wall and left-hand side wall were built off a wider brick plinth (See Figure 6 on Appendix B attached to the end of this Appraisal.) whilst the other walls were not. Perhaps the courtyard facing walls are founded at a shallower depth than those built off a brick plinth. In any case, the footings are most likely very shallow by current standards and may well permit some future minor movements in the wall. Consequently they will probably require a little re-pointing of the external face, also some fine internal plaster cracks might require filling. The future relative settlements should, however, be quite limited, causing at worst 'aesthetic' damage only. Any re-pointing and filling should be viewed as maintenance items to be carried out during normal, periodic, redecoration.

The internal piers stiffening the back wall of the barns have been cut through to suit a water pipe that runs across the internal face of the wall. The water pipe should be removed and the piers repaired.

Some areas of half-brick (Approximately 102mm.) thick wall require thickening by the addition of a new internal leaf. Un-bonded butt joints between adjacent brick panels should be bonded together by 'stitching' across the joints at 450mm vertical centres with 6mm diameter stainless steel 'helibars' by Helifix Limited.

Any bonding timbers built into the walls should either be treated by timber specialists, or preferably removed and replaced by new brickwork, incorporating stainless steel ties as needed to replace the tying action of the bonding timbers. Any timber lintels should also either be treated by timber specialists, or preferably replaced by proprietary lintels.

Restraint straps and holding-down straps should be added to tie the external and internal walls to the abutting roof, lost and floor timbers, all as are required by current Building Regulation requirements.

Large areas of brickwork will require re-pointing. This should be carried out using 1 : 1 : 6 portland cement : lime : sand mortar, taking great care to obtain a close colour match between the new and original mortar. Any missing bricks should be replaced and bricks with badly eroded faces should be

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carefully removed, rotated to show their undamaged face, and solidly built back into wall using mortar as described above.

Although few cracks were noted in the walls, any necessary repairs to cracked brickwork should be made as follows. Please note that cracks of width 1.0mm or less are very inconspicuous and it is accordingly recommended that they remain untreated as any repair would probably be more noticeable than the crack. Therefore any cracks of width greater than 1.0mm should be repaired by raking out any joint along which the crack has passed to a minimum depth of 30mm, and filling and re-pointing with 1 : 1 : 6 portland cement : lime : sand mortar. Any cracked bricks should be removed and replaced by similar units set in mortar as above described. Great care should be taken to obtain a close colour match between the new and original bricks and mortar.

All walls should be checked for damp by specialist Contractors and an effective damp proof course (DPC) inserted if so needed..

Ground Floor Slabs

As the concrete slab is uninsulated and its level varies throughout the barns, it is assumed that it will be replaced with a new, insulated concrete ground floor slab. Before laying the new floor slab the existing pit should be infilled with suitable hardcore fully compacted in thin layers.

Barn Foundations

The absence of much significant cracking in the external walls is taken to be an indication that the foundations are all adequate.

The proposed conversion will, at worst, put only a very little extra loading on the foundations. Any new domestic loft loading would be less than the original agricultural storage loading. The extra load from wall and roof linings is insignificant relative to the loading from the existing roof and the solid brickwork walls. Future foundation movement is most unlikely to be much affected by this small increase in loading.

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CONCLUSIONS

The existing barns may be readily converted into domestic accommodation.

The structural repairs necessary for the conversion are considered not to be at all excessive for this type of property.

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APPENDIX A



Figure 1

Part Farmyard Elevation of Barns



Figure 2

Part Farmyard Elevation of Barns



Figure 3

Part Farmyard Elevation of Barns

APPENDIX B

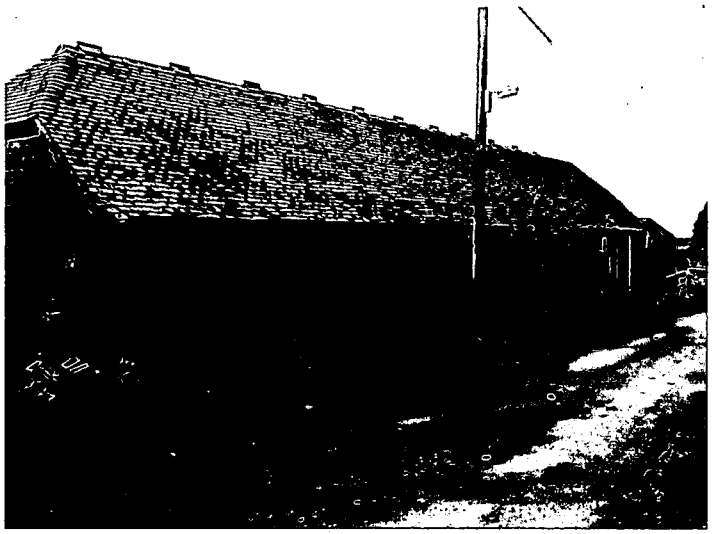


Figure 4

Rear Elevation of Barns

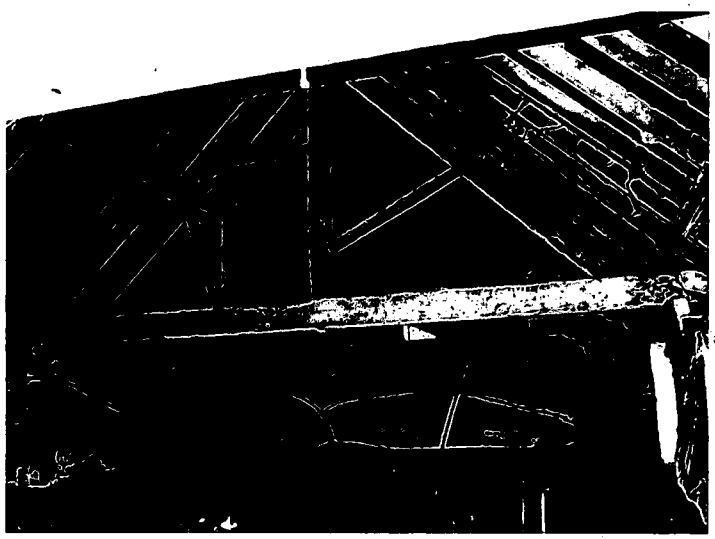


Figure 5

Modified King Post Truss



Figure 6

Brick Plinth at Base of Rear and Left-Hand Side Walls