

Barn Survey Document



On:

Folly Farm

Shilton Road

Kirkby Mallory, LE9 7QL

For:

Mr Edward Herrick

By: Paul Smith
Geomex Ltd
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Date: 24th November 2025

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1.0 Brief

- 1.1 In accordance with instructions conveyed by Rebecca at The Rural Planning Co on behalf of Mr E Herrick we have undertaken a survey at Folly Farm, Shilton Road, Kirkby Mallory, Leicester, LE9 7QL in connection with assessing the structural adequacy of barn and condition for change of use into a habitable dwelling.
- 1.2 Our appraisal took the form of a single visual inspection carried out during dry and overcast weather conditions on the 24th November 2025.
- 1.3 The object of our involvement is to make a structural appraisal of the building with particular regard to the above and therefore the scope of this report is confined accordingly and should not be construed as comprehensive survey including the survey of unrelated matters.
- 1.4 We have not inspected parts of the property that are covered, unexposed, or otherwise visually inaccessible and therefore cannot comment on these matters.
- 1.5 Our inspection was carried out from ground level and around the perimeter of the property or from adjacent public land. Any notes are made with the walls described handed facing the front but notes on a particular wall are described facing the elevation in question.
- 1.6 We would advise that no physical or specialist testing has been undertaken for example to determine the presence of Asbestos or High Alumina Cement.
- 1.7 Cracking is classified in terms of visual damage in accordance with I Struct E Assessment and we include the following table for your information.

Category of damage	Approximate crack width (mm)	Definition
0	Up to 0.1	Hairline
1	0.2-2	Fine
2	2 to 5	Moderate
3	5 to 15	Serious
4	15 to 25	Severe
5	Greater than 25	Very Severe

2.0 Location

- 2.1 The barn is verified as a steel frame structure, located at Folly Farm on a relatively level plot with yard levels corresponding to floor levels. The barn faces east.

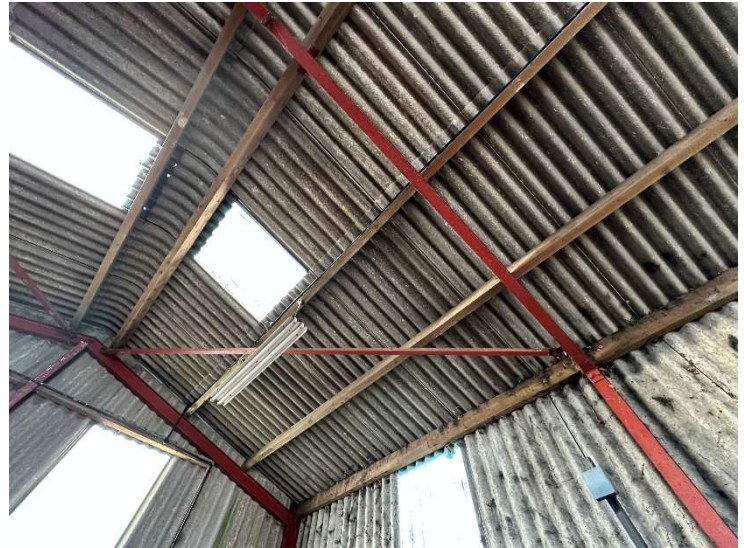


3.0 Description

- 3.1 The barn comprises of 4 steel frames and 3 bays.
- 3.2 The internal measurements are 13.4m x 7.2m, 3.9m to the eaves and 4.9m to the ridge.
- 3.3 The steel frame comprises of 178x102x19UB extending to eaves where there's a bolted connection comprising of 4 No 16mm bolts and a steel plate attached to a 152x89x16UB which acts as a principle rafter.
- 3.3 Principle rafters are joined at the apex on a bolted connection comprising of 2 plates, 4 No bolts which are approximately 16mm in diameter.

- 3.4 The south elevation has wind bracing comprising of 50mm angle sections from the centre column extending back to the eaves of the portal frame.
- 3.5 The gable walls have a centre column 178x102x19UB extending from the ground to meet the connection of the principle rafters.
- 3.6 The walls comprise of 140mm hollow concrete blocks extending to a height of 2.02m inter the web of the steel.
- 3.7 Above the blockwork is a 100x75mm timber to which corrugated cement fibre sheets are attached extending to an eaves beam which spans between the portal frames and measures 75x200mm.
- 3.8 The gable walls have an additional 75 x 100mm timber rail approximately 1.84m above the block work wall to offer a further fixing to the corrugated cement fibre sheets.
- 3.9 The roof comprises of 75x200mm purlins of which are 4 each side of the roof to which the corrugated cement fibre sheets are attached to the steel frames. The span of the purlin is 4.542m and the spacing of the purlins appears to be 2.23m.





4.0 Geology

- 4.1 From the BSG website we can tell the bedrock is Gunthorpe Member - Mudstone. Sedimentary bedrock formed between 247.1 and 237 million years ago during the Triassic period.
- 4.2 From the LandIS website we can tell the soil is Soliscape 8: Slightly acid loamy and clayey soils with impeded drainage

5.0 Trees

- 5.1 Trees roots can physically affect foundations if planted close to buildings. In addition to this moisture extraction by trees planted in shrinkable soils such as clays can cause subsidence beneath foundations. The NHBC, Institution of Structural Engineers and BRE publish safe distances for trees, which is dependent upon species, distance, mature height, climate and soil types. The organisations do vary on their recommendations, but these can be seen below.

Small shrubs and bushes planted adjacent buildings can also cause damage if they are close to a building with shallow foundations.

- 5.2 The following recommendations are taken from the Building Research Establishments publication “Cracking in Buildings”, the NHBC guidelines and the Institution of Structural Engineers. The first column distance shows for each species the tree to building distance within which 75% of the cases of damage occurred. The distance is measured between the trunk of the tree and part of the building nearest the tree or accessible to the surveyor.
- 5.3 The second column is the NHBC guidelines
- 5.4 The third column distance is the Institution of Structural Engineers assessment as taken from “Subsidence of low rise buildings 2nd Edition” publication. This distance is the maximum distance recorded by Kew root survey. If trees are at a greater distance they can most certainly be ignored.
- 5.5 We didn’t note any trees in the immediate vicinity that would effect the property but we include the table below for your information.
- 5.6 The distances will vary on the shrinkage potential of the soil and the climate.
- 5.7 All distances in the table are in meters.

<u>Tree species</u>	<u>Minimum distance (BRE).</u>	<u>(NHBC)</u>	<u>Tree distance (IStructE)</u>
Oak	13	-	30
Popular	15	-	35
Lime	8	20	20
Ash	10	21	21
Willow	11	-	40
Elm	12	30	30
Hawthorn	7	12	12
Maple Sycamore	9	-	20/17
Cherry Plum	6	11/-	11/11
Beech	9	15	15
Birch	7	10	10
Cypress	3.5	20	20

Inspection notes

6.0 South elevation

- 6.1 The south elevation has 2 corrugated lights. There are no signs of any structural cracking. The walls appear vertical in alignment with no structural defects noted.
- 6.2 The steelwork is in relatively good condition.



7.0 East Elevation

- 7.1 The east elevation comprises of 2 door large opening between 2 portal frames with the bay to the south east of similar construction to the rest of the barn.
- 7.2 No significant defects were noted to the wall construction. The walls appear vertical in alignment and the steel is in reasonable condition.
- 7.3 The door are top hung from 75mm channel section which appears to be performing adequately.





8.0 North Elevation

- 8.1 The north elevation has no significant defects noted to the construction. No cracking to the walls and they appear vertical in alignment. The steels are in reasonable condition.
- 8.2 The walls retains the earth behind to a height of approximately 450mm.
- 8.3 No cracking is evident and the walls are capable of retaining the earth but damp may be an issue.





9.0 West Elevation

- 9.1 The west elevation walls are vertical in alignment with no significant defects noted. The steel members are in reasonably good condition.
- 9.2 The ground level drops to the rear to the same as the internal floor level.





External

10.0 Roof

- 10.1 The roof is a pitched construction of corrugated cement fibre roofing materials with Perspex sky lights.

11.0 Foundation

- 11.1 Foundations of steel have structures typically comprising of 1x1x1m concrete and steel columns. With welded base plates bolted to the concrete foundations. The alternative is a fixed anchor plate fixed into concrete. At the time of inspection, the connection was not visible.

Internal

15.0 Floors

- 15.1 The ground floor is of concrete construction the thickness of which is 120mm this has carried an additional load by supporting agricultural equipment and machinery in

excess of the imposed loads for residential use. There does not appear to be any cracking in the floor, hence we are confident the floor can accommodate a residential load.

- 15.2 The floor benefits from a Damp Proof Membrane as seen on the south-west corner. The floor could be insulated and a floating floor placed above if the DPM is retained intact.

16.0 Conclusion

The barn does not appear to have suffered any structural distress and should be able to be converted to habitual dwelling in accordance with the plan submitted.

The steel framework would appear adequately sized and considered suitable for the proposed change to residential accommodation. Hence, we do not believe there is any problem with the structural components carrying the loads.

It is our opinion that the structure is suitable for conversion into a habitable dwelling without the need for structural improvements, albeit some thermal qualities will require improvements. The addition of floor insulation and insulation to the existing walls and roof does not afford any necessary structural improvements as the building is already able to sustain the loads imposed on it. These works only afford the necessary thermal and essential improvements to meet current day Building Regulations.

Portal frame buildings can be used for supermarkets, warehouses, agriculture and other applications.

The dead or permanent loading on such structures is relatively light compared with the imposed/variable and wind loads. The imposed/variable and dead/permanent loads are vertical, but the wind loading is horizontal. The dead loads are relatively small and usually involve cladding and insulation. The side rails to which the cladding is attached transfer the permanent/dead loads and wind loads to the columns.

The shape of the building is a key consideration, as one can imagine. If we consider a narrow building in relation to its length, then the building could be susceptible to over-turning should high wind loads be encountered. In such circumstances the overturning will have to be overcome by the buildings dead weight or the possibility of increasing the weight of the foundation. Consequently, a building of this nature may have to be constructed using a large pad foundation to overcome the resulting wind loading.

In general, this type of structure is constructed using large widths to overcome such problems. For spans up to 15 meters, steel frame structures are primarily susceptible to deflection and it is this quality that is the usual concern to designers.

Considering the above, a short span across the gable of say up to 15 meters would normally have a frame spacing of between 3 and 5 meters. For longer spans of 45-60meters the spacing of the frames is 10-12 meters. This is based on experience and is for guidance only to emphasise the points above.

The larger building is not so susceptible to overturning due to the ratio of its length to span, and therefore the frames and transfer of load to the foundation can be less frequent.

The columns will experience the largest bending moment at the eaves or knee, where they connect to the rafters, and therefore the depth is increased to resist the moment by the use of a haunch. This also provides increased depth for the bolted joint connection between the column and rafter. This arrangement is evident in the subject building.

The bottom of the columns can be fixed or pinned. A fixed connection usually comprises anchor plates fixed into a concrete base. A pinned connection has a single pin or bolt from the column to the foundation block and there is no moment at the connection. However, if the column has two or more bolts and/or has haunches at its base, the connection is considered fixed. In this case the building is fixed to large concrete foundations to absorb movement and prevent overturning.

In conclusion, we believe that the barn is structurally sound and suitable for conversion.

The author of this report was

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Signed.....

Date.....26th November 2025.....

Appendix 1

Breathable and non-breathable construction

The way in which old buildings were constructed before cavity walls was to use solid walls built of breathable materials. Where bricks and stone were used, they were generally bonded with weak permeable mortars made of lime and sand. The external walls were often coated with lime render which was lime-washed so that the structure was able to breathe. When it rained moisture was absorbed a few mm into the external surface but was able to evaporate as soon as the rain had stopped helped by the drying effects of the sun and wind.

Inside walls were plastered using lime and finished with simple breathable paints. Any excess humidity from washing or cooking was dispersed through open flues and draughts. A fire or kitchen range would burn from autumn to spring drawing air through the home and keeping internal surfaces at a steady temperature. Provided the building was maintained the building remained relatively dry.

Following the change in construction techniques in the second part of the nineteenth century many buildings were constructed using cement rather than lime. Modern buildings are constructed the exact opposite from traditional solid breathing walls and relies on the impervious outer layer using cavity walls and barriers against moisture.

Over the past forty years modern techniques have been applied to traditional buildings trapping damp within the walls by the use of cement renders and pointing. The understanding of traditional techniques has largely disappeared and the use of cement renders, plastic paints water proof sealants all act as barriers preventing the walls natural ability to breathe. This causes problems and the moisture is trapped within a permeable material exacerbating the problem that they are trying to resolve.