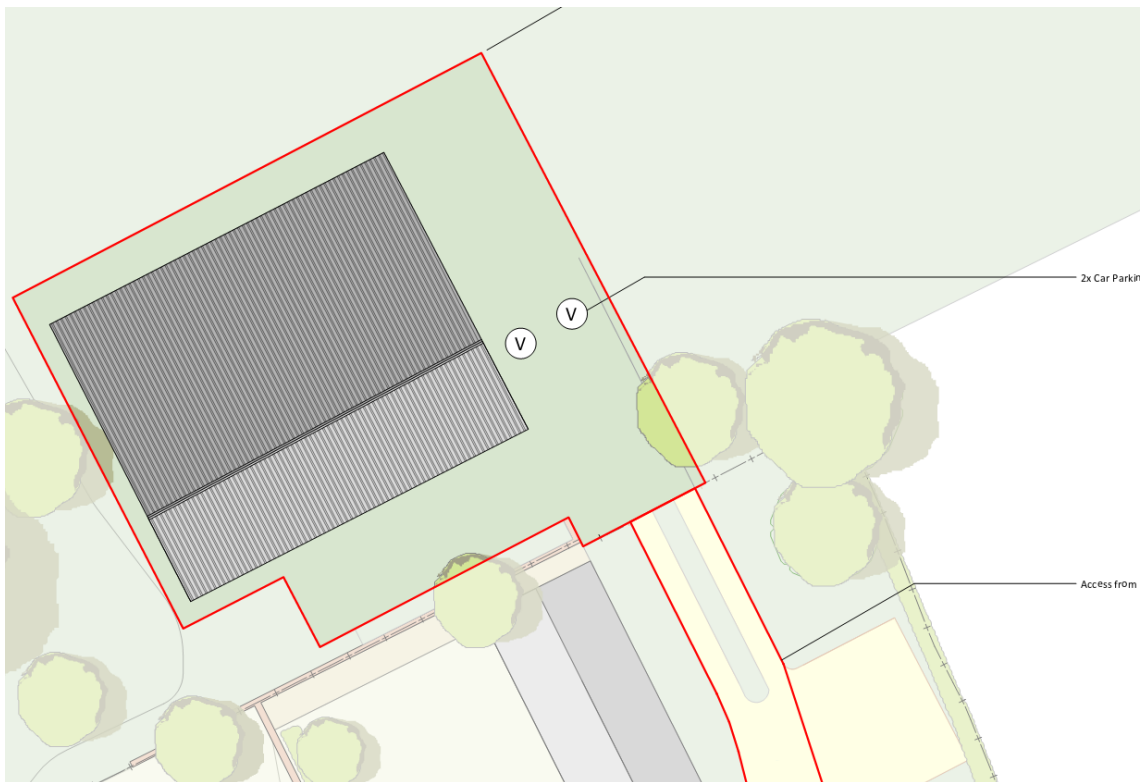


STRUCTURAL ENGINEERS ASSESMENT
ON CONVERSION OF AGRICULTURAL BUILDING
TO SINGLE STOREY RESIDENTIAL DWELLING



Property

Crockwell Farm
Great Bourton

Client

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1 BRIEF

AB Design Solutions Ltd were appointed by Crockwell Farm LLP to assess an agricultural building at Crockwell Farm, Manor Road, Great Bourton, Nr Banbury as to its structural condition and suitability for a conversion to a dwelling under the Class Q provisions of the Town and Country Planning (General Permitted Development) Order 2015.

2 DESCRIPTION

The barn to be converted is a steel portal framed building with corrugated sheet roofing and part corrugated cladding walls, part vertical timber boarding with remaining areas in blockwork.

The barn was inspected on 04 May 2020.

The structural report is based upon an inspection of the building and a review of the architect's drawings. The proposed conversion is single storey and involves the retention of the existing roofing material, cladding material to the walls, the blockwork and the concrete floor, with the insertion of windows, doors and associated infilling of the existing openings in the building.

3 OBSERVATIONS

3.1 Roof

The roof is corrugated sheeting supported on steel purlins. The steel purlins are in turn supported on the steel frame portals and gable frames at the ends.

There is no evidence of distress or structurally significant distortion to the roof sheeting purlins or frame. The roof covering and purlins are in good condition, with no works required for them to support the external envelope in the proposed use of the building. There is some minor surface rust, but the purlins have a galvanised corrosion protection layer. They can be cleaned and painted if required however, the new environment as a heated dwelling is likely to be less corrosive than the existing use. No further action is required.

3.2 Walls

The existing walls are corrugated sheeting of different types, "Yorkshire" vertical timber boarding and in places concrete blockwork. There is a large opening to the front (south) elevation and others in the east and west elevations of the main barn and the north elevation of the lean-to extension. Again, there is no structurally significant distortion or visible shortcomings to the walls.

The existing cladding is proposed to remain, this may require some localised repair or replacement, but is largely in good condition. The existing steel corrugated cladding to NW wall can be cleaned by abrasive means and repainted if required. There are no structural works required to walls, as all existing structural elements are in good condition.

3.3 Steel Portal Frame

This is in good condition. We would recommend that the frame is cleaned by abrasive means to remove surface rust and redecorate it to improve its appearance and for long term corrosion protection. There are no areas of decay that require repair or replacement.

3.4 Floor

The existing concrete floor oversite slab is in good condition, and is suitable for supporting internal finishes such as floor screeds, insulation, etc. It is also capable of supporting lightweight partitions which are required to divide the existing space into the rooms proposed. We can confirm this as the existing floor has been trafficked by farm vehicles, tractors, trailers, telehandlers and the weight of stored/stacked bales forage and animal bedding and grain. This is far more onerous than the loads involved with use as a dwelling, including finishes, insulation and partitions.

In summary, the concrete floor is sound, level and can be insulated without being excavated and replaced.

3.5 Foundations

The steel frame is supported on pad foundations. These are typically mass concrete pad foundations, given that there is little bracing in the building these are fixed based foundations. These are likely to have been constructed by pouring a layer of concrete in an excavation, to which a column is positioned when set. Then an upper layer of concrete is cast upon that, nearly to ground surface level. The are satisfactory to support the weight of the building and provide stability. There were no signs of subsidence or displacements and no undue movement of foundations. The existing foundations can remain with no alteration.

4 PROPOSALS

4.1

The proposals are for a single storey dwelling. The existing corrugated cladding and timber boarding is to be retained and lined internally to provide thermal and finish surfaces. The roof covering is also to be retained and insulated internally. Existing openings are to be infilled with glazing and cladding.

There is no evidence to suggest there are any shortcomings to the existing structure to support linings to the existing external walls or roof. However, we would suggest linings to the roof are light weight as whilst there is some redundancy in the existing structure, this would need to be checked if heavier more traditional linings are used to the roof soffit/ceiling.

Internal studwork or concrete walls will not be structural and therefore will add no additional loads to the walls or can be easily supported by the steel portal frame.

5 CONCLUSIONS

5.1

This is a substantial building. Although of modern construction it is a building that has been fabricated off site and then erected on site. This is a building that has been designed and fabricated by engineers, considering loadings, such as wind and snow. The structural elements have not been modified and are intact from their original state.

5.2

The original building envelope, materials and dimensions are proposed to be retained. There is likely to be spare capacity in the structural elements to support internal lightweight linings and insulation. The floor also, will have significantly less loading than the current use, even with insulation and floor screeds and partitions upon it. Importantly the load path will remain unchanged with all loads getting transferred to the existing pad foundations.

5.3

The existing building structure is in good condition with just some surface rust to steelwork. This can be easily cleaned by abrasive means and redecorated for long term corrosion protection. However, the proposed use will be a less corrosive environment, being heated and ventilated with much lower humidity, with no requirement for any special coatings.

5.4

The proposal inserts new windows and doors mainly within existing openings and does not affect the primary structure. The new openings are positioned to minimise structural works, and with some trimming of intermediate cladding rails. This does not alter the existing load path where cladding rails transfer vertical wall loads to the portal columns.

5.5

The load paths remain unaltered and thus the character and integrity of the structure will also remain unaltered. In our opinion the work proposed is in line with Class Q requirements. The structure does not require strengthening and the existing envelope is not changing. There is likely to be sufficient spare capacity in the structure to support internal linings and lightweight finishes suitable for conversion and use as a dwelling. The building does require the addition of doors and windows, which are permitted under Class Q criteria.

5.6

In conclusion, inspections on site and consideration of the architect's proposals indicate the conversion of the barn is entirely feasible without the need to introduce additional structure nor with any re-construction, re-building or change to the external structure or dimensions of the building.

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