w www.jcconsultancyltd.com
e info@jcconsultancyltd.com

Boston Office: 01205 317540
Morgan House, Gilbert Drive,
Boston, Lincolnshire, PE21 7TQ

j c consultancy ltd
consulting structural & civil engineers

STRUCTURAL APPRAISAL REPORT

Existing Barn at;-
Pells Yard,
Coney Garth Lane,
Surfleet,
Lincolnshire
PE11 4DS



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Property;-	**Existing Barn at;-** Pells Yard, Coney Garth Lane, Surfleet, Lincolnshire. PE11 4DS	**Instructed**;- Feb 2024 **Survey & Report by**;- JC Consultancy Limited
Client:-	**Executer of D.W Machin (Dec.)** c/o **Origin Design Studio Ltd,** Brunel House, Deepdale Enterprise Park, Nettleham, Lincolnshire. LN2 2LL	**Checked by**;- J. Ellington BSc. CEng MIStructE, FRSA, MIoD **Authorised by**;- J. Hicks BEng(Hons) MSc. PgDipCHE.,MIoD
Reference:-	JC/24/02/7471	**Issued**:- Mar 2024

STRUCTURAL APPRAISAL REPORT,

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Our Ref;- JC/24/02/7471

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1.0 BRIEF

1.1 JC Consultancy Limited was requested by Executer of D.W Machin (Deceased), to assess and comment on the structural condition of an existing barn located at Pells Yard, Coney Garth Lane, Surfleet, Spalding, Lincolnshire. PE11 4DZ.

2.0 INTRODUCTION & SCOPE

2.1 The building is in a rural location, North-East of the village of Surfleet in Lincolnshire.
The building is located to the East of the A16 highway that travels between the nearby towns of Spalding and Boston and is accessible off the public road known as Coney Garth Lane.

2.2 The client has instructed a structural appraisal report is to be carried out in order to assess possible options for future development, change of use and conversion. This instruction was provided by the clients agent, Origin Design Studio Ltd via email correspondence dated 22nd February 2024.

2.3 This report is to be regarded as confidential to the party to whom it is addressed, and it is intended for the use of that party only. No responsibility will be accepted to any other party in respect of its contents in whole or in part. Prior to the report or any part of it being reproduced or referred to in any documents, our written approval as to its form and content must first be obtained.

2.4 JC Consultancy Limited visited the property on 19th March 2024, in order to carry out a structural appraisal survey.

2.5 The weather condition at the time of the visit was overcast but dry.

2.6 The purpose of this report is limited to an opinion on the structural condition of the building. We have only reported upon those structural defects that materially affect the stability of the building and provided that these defects are reasonably detectable at the time of our inspection. Whilst we have used all reasonable skill and care in preparing this report it should be appreciated that we cannot offer any guarantee that the buildings will be free from future defects or that existing ones will not suffer from further deterioration. This report is limited to commenting on elements of the structural fabric only. No further assessment will be made to elements elsewhere in the property. Comments will relate to structural condition and performance of elements only.

2.7 The report does not contain observations, comments or recommendations to any non-structural items including, but not limited to drainage, electrical, heating and plumbing services, timber work and any decorative finishes / plasters.

2.8 Decay associated to damp, fungal attack, insect infestation or contamination (including the presence of asbestos materials or similar) is outside the scope of our appointment or report. Any reference to decay associated to damp, fungal attack, insect infestation or contamination to either structural or non-structural items are observations only. As such we recommend that further advice is sought from specialists in the fields of damp, fungal attack, insect infestation or contamination in order to guarantee peace of mind from these potential defects.

2.9 The inspection was of a visual nature only. There has been no opening up works involved in this investigation. Any wall finishes or floor finishes, including tiles or carpets where applicable will not have not been removed or lifted during the inspection.

2.10 Any part of the structures that were hidden, covered or otherwise inaccessible, have not been inspected or commented upon. We therefore cannot guarantee that any such parts are free from defect. It should be noted that the internal fabric has been formerly part coated with a intumescent foam style spray material. As such some of the internal fabric was hidden, covered or otherwise inaccessible.

2.11 The performance of the existing ground strata, general ground conditions and foundations may be referred to within this report; however, the ground conditions and foundations have not been fully inspected or investigated as part of this survey. Therefore, comments made will be based on analysis sought from indicative desktop sources including but not limited to the ‘British Geological Society’. These sources generally provide sound interpretation, however local anomalies can occur, and as such we cannot guarantee their accuracy.

2.12 The observations and defects noted within this report should not be read as a comprehensive inventory of each and every single item witnessed during our survey. Instead the records should be taken as an indication of the condition of the outbuildings in general and should demonstrate the likely defects that may be present elsewhere in areas of the fabric that have not been surveyed or recorded.

3.0 GENERAL DESCRIPTION

3.1 The property consists of a single storey, rectangular shaped, steel portal-framed storage building, located on a predominantly level site. The approximate dimensions of the building are 30 metres long x 15 metres wide, with an eaves height of approximately 5.0 metres and a duo-pitch roof pitch of approximately 15 degree.

The building is complimented with an open-fronted, rectangular shaped duo-pitched, steel portal framed canopy located off the North facing elevation and a further open sided, rectangular shaped, mono-pitched steel lean-to style canopy off the East facing elevation.

The open fronted duo-pitch canopy follows as a continuation to the main building, with approximate dimensions of 12 metres long x 15 metres wide, with an eaves height of approximately 5.0 metres and a duo-pitch roof pitch of approximately 15 degree.

The open sided mono-pitch canopy runs adjacent to the duo-pitched canopy and the main building, with approximate dimensions of 24 metres long x 6 metres wide, with an eaves height of approximately 3.3 metres and a mono-pitch roof pitch of approximately 15 degree.

The canopies appear to be later additions to the construction of the main building.

The building is predominantly surrounded by hardstanding yard to the North, the highway to the East, and general paddock style land to the West. A couple of traditionally constructed, single storey barns are located adjacent to the South Elevation; however these buildings are outside the scope of this report.

3.2 The exact construction date of the building under consideration is unknown, but it is understood to have been supplied by local Steel Building manufacturers, D.A Green & Sons, who erected many similar buildings across South Lincolnshire during the 1970-1990's. Therefore it is likely to be in the order of 40 to 50 years old.

The building is currently vacant and not in use. The former use of the building is agriculture commodity storage and includes a timber 'drier tunnel' which is commonplace in buildings of this use. The canopy areas are likely to have been used for implement storage / commodity box storage and general farming activities conducted under cover from the elements.

3.3 The general construction of the building consists of; -

Duo-pitched Roof and Steel Frame

The roof to the main building consists of a profiled sheet roof covering over 'Z' style cold rolled steel purlins that span between a series of single span steel portal frames that are located in 6.0m centre bays. The steel frames are formed with 305x127 Universal Beam (UB) style Steel Portal Rafters, that are supported on 356x171 UB Style Portal Columns. The rafter-to-column connections are a typical bolted eaves connections that incorporates a standard eaves haunch system. The rafter-to-rafter connection at the ridge consist of a typical bolted apex connection. Rolled steel angle (RSA) cross bracings in both the roof and walls complete the frame arrangement.

The roof to the duo-pitched canopy consists of a continuation of the main building, with a profiled sheet roof covering over 'Z' style cold rolled steel purlins that span between a pair of single span steel portal frames that are located in 6.0m centre bays. The steel frames are formed with 305x127 (UB) style Steel Portal Rafters, that are supported on 356x171 UB Style Portal Columns. Circular Hollow Steel section (CHS) cross bracings in roof complete the canopy frame arrangement.

The roof to the mono-pitched canopy consists of a profiled sheet roof covering over 'Z' style cold rolled steel purlins that span between steel mono pitched frames that are located in 6.0m centre bays. The steel frames are formed with 203x133 UB style steel lean-to rafters, that are supported between 254x146 UB Style Columns and the columns of the main building. CHS cross bracings in roof complete the canopy frame arrangement.

External Walls

The upper section of external walls to the main building consists of profiled sheeting, supported on steel 'Z' style sheeting rails that span between portal steel frame columns. The lower section of external walls consists of a vertically spanning, chevron corrugated 'grain' retaining sheeting system that was commonplace in agricultural storage buildings of this nature.

The canopies are predominantly open fronted / sided other than the west facing elevation of the Duo-pitched canopy and the South facing elevation of the Mono-picthed canopy which are enclosed with profiled sheeting, supported on steel 'Z' style sheeting rails that span between steel frame columns. The North facing elevation of the Duo-pitched canopy has some verge cladding which is supported on secondary steel hangers portal frame, complimented with CHS style diagonal struts.

Internal walls

There are no internal walls present, and as such the building is open plan, other than the independent timber framed ‘drier tunnel’ that is present adjacent to the West facing elevation.

Ground Floor

The ground floor consists of a ground bearing concrete slab system, the specification of which is unknown.

Foundations

Existing foundations were not inspected but based on the age and construction of the building are likely to consist of mass concrete pad style foundations.

3.4 Published Geological records show the building to be within an area where the soil sequence consists of a solid formation of Oxford Clay (Mudstone) at depth overlain by a considerable thickness of Tidal Flat Deposits (Clays & Silts).

4.0 OBSERVATIONS AND DEFECTS LOG

(Read in conjunction with Sections 2.6 - 2.12 of this report)

4.1 Roof

- When viewed externally, the roof does not appear to sag, and there is little in the way of undulation noted within the roof finish.
- There were no large areas of sheeting missing or damaged.
- When viewed internally all elements are visible, however an intumescent foam style spray material has been applied throughout the underside of the roof.
- The purlins were not deflecting excessively between their supports.
- Angle cross-bracing is present at various locations.
- No missing elements were observed. The roof and steel frame appears in its original form.

4.2 Walls

- Externally, the profiled cladding is in reasonable condition.
- Internally all elements are visible however an intumescent foam style spray material has been applied to the walls. Where visible, the sheeting rails are not sagging.
- When viewed along their length, elevation and gable, columns appeared plumb and vertical and are not showing signs of distress.
- Steel cross bracing that aids stability is present in isolated bays of the long elevations.
- Rainwater guttering and downpipes were present. A lack of staining to fabric suggests they are discharging effectively.

4.3 Ground Floor

- The concrete floor has been cast level; however, its specification is unknown.
- In areas that could be accessed, there was no evidence of localised settlement or cracking to the floor slab.

4.4 Foundations

- Existing foundations were not inspected, but there was no evidence from the superstructure to suggest that the foundations are accommodating any degree of stress or settlement.
- No significant / mature trees are currently present in close proximity to the building. There was a small bush growing, presumably self-seeded adjacent to the West facing elevation, however there was no evidence to suggest that the foundations are currently affected by current or any previously removed trees or vegetation.

5.0 CONCLUSIONS.

5.1 The main building is relatively small in agricultural storage terms and consists of a simple but robust steel framed system. Being in the order of 40-50 years old, the main building is relatively modern and appears in its original form and condition other than the previously discussed addition of the adjoining canopies. To the best of our knowledge and understanding the building is free from any structural defect that would materially affect its overall structural stability. No alterations or changes to the original steel framed building appears to have been previously conducted, other than the application of an intumescent foam style spray material that was presumably applied as part of a fire protection measure. The additional weight from the spray foam will not have placed any degree of significant stress onto the steel frame.

5.2 The existing building is a simple arrangement, with only a few, key, loadbearing elements present. The buildings overall lateral stability is obtained from the steel frame action of the portal frame, together with diagonal steel cross bracing members present between rafters and columns.

5.3 Its open plan arrangement provides scope for various uses, and if desired it could lend itself for conversion into residential use. Due to its simplicity in construction, there is not likely to be any loss of original structural elements during conversion.

5.4 Agricultural buildings such as this example were required to be designed to support an imposed roof load of at least 80% of that which was specified in the prevailing Code of Practice to BS 6399. This code specified an imposed load of 0.75kN/m². BS6399 design recommends an imposed load of 0.60kN/m², resulting in a similar figure to that which this building would have originally been designed for if designed under the agricultural code of practice. Therefore, as with the majority of steel portal frame buildings of this style and age, it is evident that they were generally designed conservatively with respect to allowable imposed loadings and as such we are satisfied that this existing frame can be demonstrated to have sufficient capacity to accommodate imposed loading as dictated by current design codes if subjected to a change of use.

5.5 The building has the capability to safely accommodate vertical, lateral and snow loadings applied in its current form without the need for any strengthening. The proposed conversion will involve retaining all existing structural elements of the main building and complementing them with the introduction of further independent walls, of either blockwork or timber frame type systems, located internally, to form the partitions and internal layout. As such additional load placed upon the existing steel frame will be minimal, and of no concern from a structural perspective. Furthermore, all elements that provide overall lateral stability including diagonal steel cross bracing members present between rafters and columns, are being retained, and as such overall stability will not be compromised as a result of the conversion.

5.6 Should prospective layouts dictate the installation of a first-floor structure we are satisfied that this could be achieved using a suitably designed independent mezzanine floor system constructed off the ground floor slab, or alternatively a mezzanine could be part supported by the existing steel column arrangement where location and arrangements allow. Indeed, the installation of a mezzanine floor part supported by opposing columns could enhance the performance of the existing steel frame by essentially providing a tie between columns. Either type of installation would be possible in this building, and neither would have a negative impact on the structural stability of the existing frame.

5.7 The main building is completed by a pair of open fronted / open sided canopies as described. The canopies appear to be later additions to the construction of the main building. We confirm that they are not providing assistance to the overall stability of the main building and could be removed if desired.

5.8 The ground floor slab appears to have been adequately serviceable to accommodate and distribute loadings from agricultural storage type use. Proposed loadings from a change of use to residential will be significantly less onerous than that previously applied. Therefore, we envisage that the existing floor slab can be retained, and supplemented with damp proof systems, screeds, insulations and finishes as applicable. Current ground floor levels will need to be increased to accommodate flood risk requirements, and this could be achieved via a number of methods. Consideration could be made for the installation of a suspended floor system off plinth walls for instance, or alternatively additional floor build up using infill slabs could be adopted.

5.9 Similar to the floor slab, the foundations appear to be adequate to accommodate and distribute loadings from agricultural storage type use. Again, additional loadings applied within a change of use to residential are likely to be minimal if any, and as such we do not feel that any strengthening to the foundation system is deemed necessary.

5.10 Whist reference to contamination, including the identification and survey of asbestos based materials, is outside the scope of our reports, we must highlight that the use of asbestos materials was common practice during the original construction of these types of building. This can include asbestos content within roof sheeting, wall cladding, eaves and fascia boarding, as well as within insulations and foam based intumescent sprays. We therefore recommend that further advice is sought from specialists in the fields of asbestos survey, protection and removal during any design and planning stages, in order to guarantee peace of mind from the potential hazards when dealing with materials of this kind.

5.11 In final conclusion, we are satisfied that the existing building is structurally stable and robust and could continue to perform adequately following a change of use without the need for any significant structural strengthening or rehabilitation.

JC Consultancy Limited
Consulting Structural & Civil Engineers

March 2024

6.0 PHOTOGRAPHS



Photograph # 1



Photograph # 2



Photograph # 3



Photograph # 4



Photograph # 5



Photograph # 6

END OF REPORT