STRUCTURAL REPORT



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Proposal : Proposed Change of Use of an Agricultural Building to Three Dwellings at Witteman Nurseries
South Drove, Spalding
Lincs. PE11 3BD

June 2023

Project No JDA/2022/720

This Structural Report is part and parcel of a Prior Approval Notification submitted to South Holland District Council Under the Town and Country Planning (General Permitted Development) (England) Order 2015 Schedule 2, Part 3 - Class Q

1.00 Introduction

We are instructed by Mr N. Witteman respect of a Prior Determination Application made to South Holland District Council in relation to a proposed change of use of an agricultural building into three dwellings at Witteman Nurseries at South Drove, Spalding, Lincs. PE11 3BD

It is the purpose of this Report to demonstrate that the existing building (sub and superstructure) is robust enough to be converted into three dwellings without building works that would result in a 're-building' rather than a 'conversion' of a building. We inspected the building on the 22nd and 23rd of August 2020.

Our inspection has only included the main buildings on this site being considered for conversion. We have not inspected any other buildings or structures not specifically identified within this report – i.e. the adjoining glasshouses.

The site itself is generally level with no significant slopes down in any direction.

The object of this report is to comment upon the current structural condition and viability for conversion to domestic accommodation. It confines itself to the Basic Structural Fabric and is not intended to comment upon non-structural items.

During the course of the survey and in preparation of this report no cladding, internal features or items were moved, therefore, we cannot comment upon the condition of areas which were covered or inaccessible.

Assessing compliance with the Building Regulations 2000, Approved Document B - Fire Safety Regulations, Approved Document K - Protection From Falling Regulations, Control of Asbestos Regulations 2012 and the Equality Act 2010 (incorporating DDA 1995 legislation) did not form part of our instruction. Whilst no Asbestos Containing Materials were observed in the building proposed for conversion, prior to commencing any demolition works it is recommended that a full asbestos survey is undertaken.

Any further clarification relating to the condition of all building services will need to be undertaken by the separate appointment of a mechanical and electrical specialist as deemed necessary by the Client.

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2.00 Legislation and Guidance

This report is written with due regard to the published guidance notes and rules under the General Permitted Development (England) Order 2018 (GPDO) relating to building operations allowed under the change to residential use. This states:-

"Building works are allowed under the right permitted agricultural buildings to change to residential use, however the right assumes that the agricultural building is capable of functioning as a dwelling. The right permits building operations which are reasonably necessary to convert the building, which may include those which would affect the external appearance of the building and would otherwise require planning permission. This includes the installation or replacement of windows, doors roofs, exterior walls, water, drainage, electricity, gas or other services to the extent reasonably necessary for the building to function as a dwelling house; and partial demolition to the extent reasonably necessary to carry out these building operations. It is not the intention of the permitted development right to allow rebuilding work which would go beyond what is reasonably necessary for the conversion of the building to residential use. Therefore, it is only where the existing building is already suitable for conversion to residential use that the building would be considered to have the permitted development right.

Internal works are not generally development. For the building to function as a dwelling it may be appropriate to undertake internal structural works, including to allow for a floor, the insertion of a mezzanine or upper floors within the overall residential floor space permitted, or internal walls, which are not prohibited by Class Q."

John Dickie Associates have been commissioned to prepare an assessment of the South Drove building and its potential for conversion in accordance within the rules (and guidance) for Permitted Development.

The objective of this Report is to record the structural condition of the existing buildings and to make observations on the suitability of said buildings for conversion. At the time of the inspection the building was used for agricultural purposes and as a farm workshop/store.

The inspection has not dealt with electrical or concealed services or other elements of the premises not visible due to cover by minor debris and stored items. For the purposes of this report, it is assumed that no hazardous materials or contamination is present. The report is limited to commenting upon structural suitability for conversion only within the rules and guidelines.

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3. DISCLAIMER and LIMITATION

This report is for the sole use of the named client. While it may be shown to other professionals acting for them, the contents are not to be disclosed to nor made use of by any third party without our express prior written consent.

This Report is limited to the structural appraisal of the main steel framed structure and the adjoining flat roofed superstructure. The 'glasshouses' that flank the aforementioned buildings to the North and South are excluded from this appraisal.

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4. GENERAL DESCRIPTION

The main building

The main structure – see below – is typical of agricultural buildings encountered in the South Lincs region built in the second half of the 20th century.



The main 'higher level' building is a 'gambrel' shaped steel lattice framed construction with steel profiled sheet cladding to the roof pitches. The gable ends are infilled with a combination of structural curtain walling and sliding doors. The main plastic clad metal profile roofing sheets are supported by cold rolled galvanised steel 'Z' purlins (sleeved) spanning between the main lattice frames.

The whole building is clad in steel profiled sheeting - the roof has no translucent roof lights. the roof has no translucent roof lights.

Appropriate wind lacing and bracing is provided by a typical arrangement of predominantly circular hollow section galvanised steel 'ties' that enable wind loads (from any direction) to be transmitted back to the main superstructure. Given the installed wind bracing configuration and specification, we consider the superstructure to have adequate lateral restraint and stability. Plan bracing is provided to the compression chord fixed at lacing tube positions along the beams.

Where the compression chord varied along the length of the beam (continuous beam arrangements), then compression chord lacing & plan bracing has been provided to both top and bottom chords. There are no 'spigot connections' that could compromise the integrity of the beams. All of the lattice beams have been provided with appropriate compression chord lacing, tension chord lacing, compression chord plan bracing and diagonal bracing (as described in the foregoing text).

The installed lattice beams consist of top and bottom chords separated by angled chords designed to allow forces to pass from the top chord to the bottom chord. All connections

between the various 'elements of structure' are cleated and bolted. The underside of some of the 'gambrel slopes' have been sprayed with a proprietary insulation – it is pertinent to note that this does not affect the overall structural stability and, in fact, helps to 'stiffen' the roof panels under loading.

The lower 'eaves' section of the gambrel duo-pitched roof profile incorporates a channel section 'ring beam' providing continuous linear support to the imposed live and dead loadings from the higher level roof sections. The aforementioned channel section ring beam is provided with intermediate support at 3.05m centres from 90 x 90mm galvanised steel (hollow section) columns.

The ridge section consists of a continuous circa 200 x 100mm galvanised steel 'Z' purlin (sleeved) bolted to the lattice frames.

Brief background to 'Gambrel' structures

Agricultural buildings formed using lattice beams (in whole or part) are commonplace throughout the country but especially (in our experience) in East Anglia and the East Midlands. They were (and are) often favoured over conventional solid steel portal frames (I beams) because of their superior strength to weight ratio (up to 50% less weight), the ability to allow the passage of services and better control of deflections. In this case, we believe the installed lattice beam elements to be supplied by Metsec – now MLB Steel. We estimate the weight of the assumed Metsec sections to be in the order of 70kg with a Permissible Shear of 23kN and a Permissible Moment of some 35kNm.

Part of the main building is built in blockwork forming toilet accommodation for the agricultural usage. The existing floor shows no signs of settlement or cracking and is in a sound and serviceable condition.

- **Overall, the building is in excellent order and appears structurally sound with no movement, cracking or damage observed during our inspection.**

As Chartered Building Engineers, we can confirm that (in our professional opinion), this steel framed building was designed and built to conform to whatever British Standards and Building Regulations were applicable at the time of erection.

The lower level 'flat roofed' building

This attached structure – circa 98 sq m GIA – is directly attached to and forms part of the overall agricultural operation – see below ;



Joined at roof level to the Gambrel superstructure via a fully functioning 'box gutter', this building was constructed (probably after the main building) with 150mm solid concrete blockwork walling with piers. The 'flat roof' actually has a pitch of some 2.5 degrees and finished with metal profile sheeting – much the same as the main building.

The roof structure is formed with a series of main timber support beams (circa 250 x 75mm sections laid to a fall) acting as 'purlins' with 150 x 50mm flat roof joists at 90 degrees to the purlins running the whole length of the building. The ceiling material (where applied) is indeterminate but likely to be Masterboard or similar. Exposed noggins provide appropriate lateral support to the main purlins with framing anchor connections providing stability. The North East corner of this building provides office and toilet accommodation for the agricultural use.

The existing floor shows no signs of settlement or cracking and is in a sound and serviceable condition.

This building is both sound and serviceable and, (in our professional opinion), was designed and built to conform to whatever British Standards and Building Regulations were applicable (for its purpose) at the time of erection.

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5. PROPOSED WORKS OVERVIEW

The proposed works include the removal of both the wall sheeting and roof sheeting and replacement with timber clad walls (or composite equivalent) re-roofing with insulated steel sheets and adding windows and doors.

An upper storey is proposed for bedroom accommodation and domestic storage. This would be constructed with lightweight aluminium 'Z' joists – typical of a 'mezzanine floor'. The floor would be built off a lightweight aluminium framework with 90 x 90mm aluminium posts built directly off the existing reinforced concrete floor structure using 600 x 600mm 14mm thick 'spreader plates'. Having examined both the 200 + mm thick reinforced concrete floor and the sub strata, we are satisfied that said floor is capable of taking the new live and dead loadings.

The existing concrete floor will be waterproofed, insulated and screeded. Internal timber framed walls are proposed to create the proposed internal layout. A first floor will be formed using 'Posi-Joists' with flooring grade chipboard decking.

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6. IMPLICATION OF NEW WORKS AND PLANNING PRACTICE GUIDELINES

The replacement cladding to both the walls and roof is within the guidelines allowing for new walls and roof. The insertion of windows and doors is also within the guidelines.
The Planning Practice Guidance states that the building must be suitable for conversion, which it clearly is. The works are what is reasonably necessary to comply with the Building Regulations.

The internal works are not **development** as clarified in the Planning Practice Guidance.

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7. CONCLUSION

The building at South Drove is in good order and structurally sound. It is necessary to replace the roof and wall claddings to convert to a dwelling and replace with insulated material. This is within the rules and guidelines of Class Q. Other works are internal and not **development.**

As with all such projects, once planning permission has been obtained, a detail design will be required for submission of a Building Regulation application.

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Detailed Structural Appraisal of Existing Building

8.00 General

It is proposed to convert the existing agricultural building at South Drove into three dwellings. The purpose of this section is to provide a structural appraisal of the existing building in accordance with the recommendations of BRE Digest DG366 Part 2.

This report deals only with the structural aspect of the material change of use and should be read in conjunction with the architectural proposals developed by JDA.

8.1 Existing Structure

Refer to the foregoing text in section 3.

The existing superstructure shows no signs of distortion or degradation and appears to be able to accommodate vertical and horizontal loading satisfactorily.

- **The floor of the building comprises a 200mm + reinforced concrete ground bearing slab with 2no layers of A393 steel mesh . The slab shows no significant signs of cracking or settlement. The concrete was poured onto circa 300mm of rolled and consolidated crushed stone with a DPM on sand blinding.**

The building inspected is located alongside a lower level flat roofed structure. We have examined the connectivity between the two superstructures and they are linked solely at roof covering level with a proprietary wide valley gutter.

The adjacent glasshouse buildings can be demolished without impairing the structural integrity of the building that is the subject of this Class Q application.

We surveyed the vertical alignment of the column sections in order to ascertain if the superstructure had moved out of a vertical plane - all columns were vertical to within 2% indicating that the building is appropriately resistant to wind loadings. We also examined the building for subsidence and found no evidence of any undue displacement or settlement of the sub-structure.

Foundations (pad and strip) were exposed and found to be capable of transmitting the live and dead loadings from the superstructure into the firm clay subsoil at a depth of some 900mm. Said foundations are also capable of transmitting the dead and live loads from the proposed first floor zone to the sub-strata.

Publicly available British Geological Society maps and borehole records indicate the site to be underlain with Tidal flat deposits of Clay and Silt tidal flat deposits over the Clay Formations.

Some routine maintenance and relatively minor localised repairs are required. However, these are minor and do not affect the overall condition of the buildings.

Building Services. We were not instructed to carry out an inspection of the building services and therefore these are outside the scope of this report.

Ceilings (Including Finishes). There were no specific ceiling linings or finishes present within the main building for comment (underside of roof structure).

8.2 Proposed Works

It is proposed to convert the building into three dwellings using timber frame construction methods to create the internal arrangement of rooms and to comply with the Building Regulations. The envelope of the existing building is to remain although it is to be re-clad with modern materials – where shown - including the formation of new openings through the perimeter walls and roof for access and light. The new internal timber framed walls will spring from the existing slab. The timber frame will act as Architectural infill and is not required to contribute towards stability of the original frame. The line loading from the internal party walls (the most heavily loaded) will be in the order of 30kN/m2 which is significantly less than the loads imposed from the current use. The existing steel columns are sufficiently robust to transmit the additional loadings from the first floor zone.

8.3 Structural Criteria and Assessment

8.3.1 Alterations and Additions

Due to the fact the proposed works comprises only simple timber infill it is not intended to make any alterations to the existing super structure which is deemed to be robust enough to accommodate the proposed loadings from residential use. The internal timber partitions will be built directly off the existing reinforced concrete ground bearing slab with 147 x 47mm sole

plates shot fired into the existing floor and new DPC/DPM. This loading will be significantly less than that imposed by the existing use and movement of agricultural vehicles.

The only possible additional loading (in addition to the floor zone) that may be imposed is the use of insulated roof sheeting, which will be low. Indeed, it is likely that the wind loading effects on the structure will be less due to the fact that the dominant opening to the East elevation will be infilled reducing the internal pressures.

8.4 Integrity

The main steel framed superstructure is robust, in good condition and has significant longevity. As part of the proposed works, whilst the cladding is removed all bolted connections will be checked for tightness and concrete inspected and repaired as required as is good practice to ensure the longevity of any structure of this type.

The lattice frame building comprises a series of transverse frames braced longitudinally. The primary steelwork is described in Section 3.

The roof and wall cladding separate the enclosed space from the external environment as well as providing a degree of thermal and acoustic insulation. The structural role of the cladding is to transfer loads to secondary steelwork and also to restrain the flange of the purlin or rail to which it is attached.

All elements of structure (steelwork) are fully welded or bolted and of compliant proportions as are the diagonal wind bracing arrangements between the main lattice frames and purlins.

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9.0 Stability

The existing structure is 'portalised' into a series of bays and braced for wind stability. No further loading will be applied to the superstructure, indeed, as previously mentioned the effects of wind loading will be reduced by the infill of the dominant opening to the East elevation.

Resilience of the structure against exceptional loading in the form of vehicular collision is good in that its current use is that of agriculture.

- **The existing structure does not require strengthening in order to be converted for residential use.**

The loadings on the ground slab will be reduced from that of agricultural use. The timber frame to the perimeter is non-structural in terms of vertical and horizontal loading, it forms part of the re cladding works where proposed.

The timber frame is not required to improve the robustness of the existing building superstructure which is in itself capable of accommodating the current dead and imposed loads. The new dead loads applied by the timber infill and the live loads as a result of domestic use are less than the current applied loads. It is impossible not to connect the new timber frame to the existing superstructure and it will therefore, by default, improve the robustness of the frame.

The steel portal frames are stable both vertically and horizontally and show no signs of structural distress indicating that the current articulation and bracing of the structure is sufficient. The method of construction is well documented in published literature and is common. The timber frame and cladding to the proposed structure will apply less load. The concrete slab has been subject to agricultural loading as identified in the main body of this report. As detailed in the foregoing text, the proposed loading from residential conversion is far less.

As previously stated, it is unavoidable to connect the timber frame to the existing steel frame. By this very connection the robustness of the existing structure will be improved due to secondary load paths and this exists in all buildings which have varying degrees of redundancy. The superstructure does not, however, require the timber frame for stability. The inspection and repair of the existing steel frame and ancillary components is part of normal maintenance and should be carried out as good practice. The frame is currently in good condition but maintenance whilst the frame is exposed will ensure longevity.

The existing superstructure and foundations are more than able to carry the proposed dead and imposed loads from residential conversion which, in the case of the live loads, are less than those imposed by agricultural use. Furthermore, the timber frame is not required for principal load paths and no new structural elements are required to ensure stability and robustness of the existing structure going forward.

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10.0 Conclusions

The existing superstructure, floor slab and foundations are more than able to carry the proposed dead and imposed loads from residential conversion which, in the case of the live loads, are less than those imposed by agricultural use. Furthermore, the timber frame is not required for principal load paths and no new structural elements are required to ensure stability and robustness of the existing structure under the new proposed use.

Whilst the cladding is stripped the existing superstructure will be inspected and any necessary maintenance works undertaken to ensure the longevity of the structure under its proposed new use.

The building at South Drove is in good order and structurally sound. It is necessary to replace the roof and wall claddings to convert to a dwelling and replace with insulated material. This is within the rules and guidelines of Class Q. Other works are internal and not **development.**

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Appendix A Photographs of the existing building















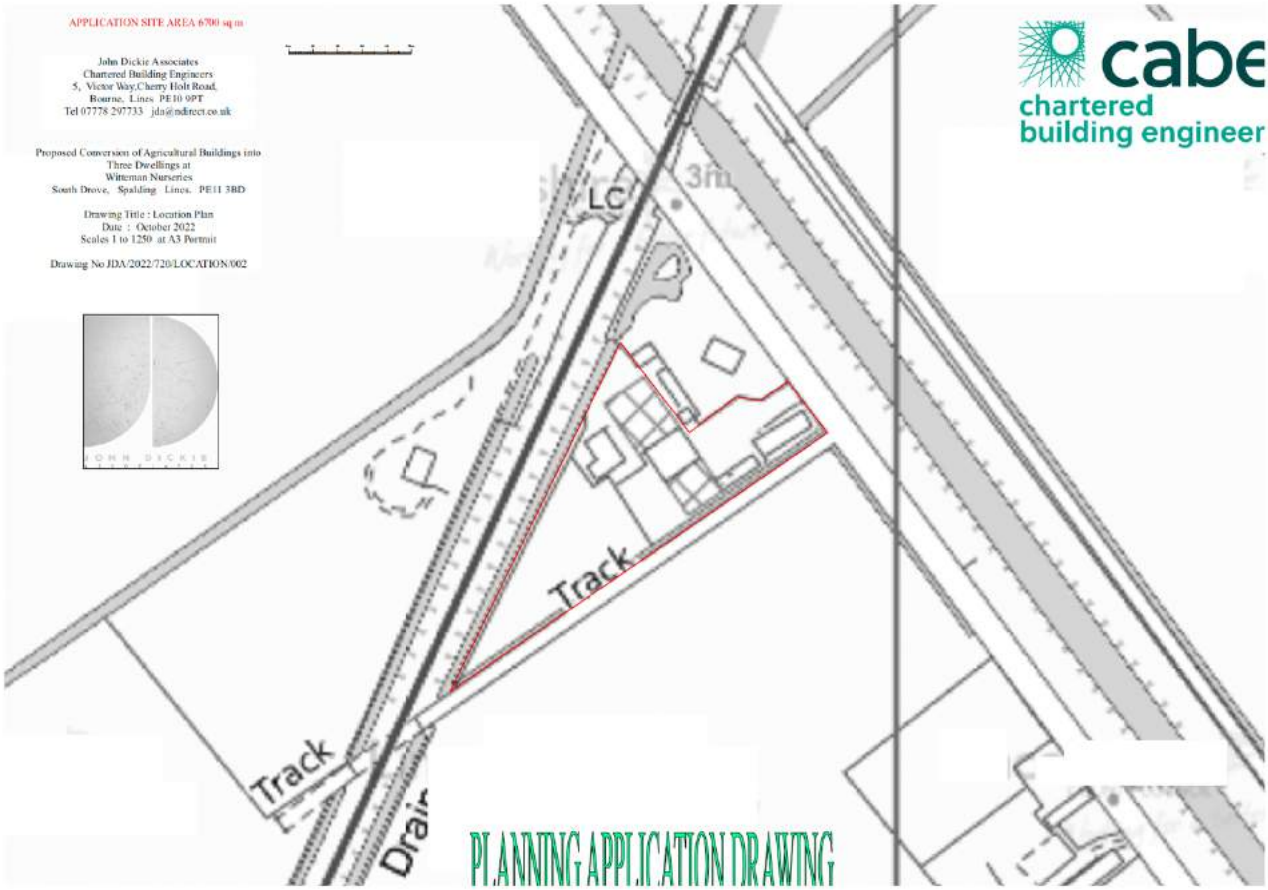




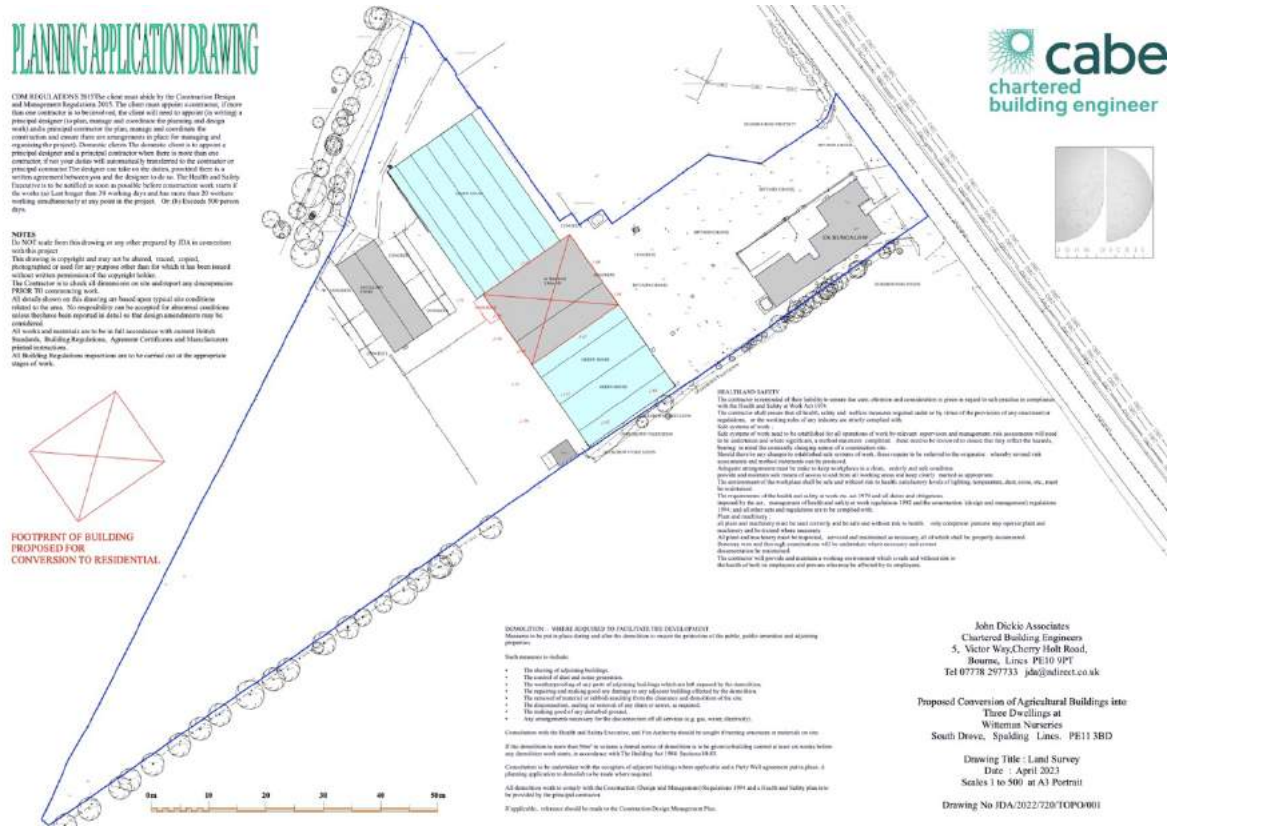




Appendix B Location Plan



Appendix C. Scheme Drawings




NOTES
Do NOT scale from this drawing or any other prepared by JDA in connection with this project
This drawing is copyright and may not be altered, traced, copied, photographed or used for any purpose other than for which it has been issued without written permission of the copyright holder.
The Contractor is to check all dimensions on site and report any discrepancies PRIOR TO commencing work.
All details shown on this drawing are based upon typical site conditions related to the area. No responsibility can be accepted for abnormal conditions unless they have been reported in detail so that design amendments may be considered.
All works and materials are to be in full accordance with current British Standards, Building Regulations, Agrement Certificates and Manufacturers printed instructions.
All Building Regulations inspections are to be carried out at the appropriate stages of work.
EXISTING FRONT ELEVATION
ex floor level 1.84m OD
EXISTING REAR ELEVATION
ex floor level 1.84m OD
SECTION A-A
ex floor level 1.86m OD
EXISTING GROUND LEVEL IS 1.68m AVERAGE
BASED ON FURTHER SPOT LEVELS APRIL 2023
CDM REGULATIONS 2015The client must abide by the Construction Design and Management Regulations 2015. The client is not appoint a contractor, if more than one contractor is to be involved, the client will need to appoint (in writing) a principal designer the plans, manage and coordinate the planning and design work) and a principal contractor (to plan, manage and coordinate the construction and ensure there are arrangements in place for managing and organising the project). Domestic clients The domestic client is to appoint a principal designer and a principal contractor when there is more than one contractor, if not your duties will automatically transferred to be contractor or principal contractor.The designer can take on the duties, provided there is a written agreement between you and the designer to do so The Health and Safety Executive is to be notified as soon as possible before construction work starts if the work:(a) Last longer than 30 working days and has more than 20 workers working simultaneously at any point in the project. Or (b) Exceeds 500 person days.
HEALTH AND SAFETY
The contractor is reminded of their liability to ensure due care, attention and consideration is given in regard to safe practice in compliance with the Health and Safety at Work Act 1974.
The contractor shall ensure that all health, safety and welfare measures required under or by virtue of the provisions of any enactment or regulations, or the working rules of any industry are strictly complied with.
Hazardous Substances ;
Where hazardous substances are identified as being either flammable, toxic, corrosive and explosive, arrangements must be made to ensure that the safe handling, storage and transport of such substances is safe and without risk to health. a written assessment must be made and if the substance is identified as hazardous, necessary control methods, protective clothing and monitoring established.
The employees working with hazardous substances must be fully informed on the hazard and suitably instructed on safe handling/use of the substance.
Safe systems of work ;
Safe systems of work need to be established for all operations of work by relevant supervisors and management. risk assessments will need to be undertaken and where significant, a method statement completed. these need to be reviewed to ensure that they reflect the hazards, bearing in mind the constantly changing nature of a construction site.
Should there be any changes to established safe systems of work, these require to be informed to the originator, whereby revised risk assessments and method statements can be produced.
Adequate arrangements must be make to keep workplaces in a clean, orderly and safe condition.
provide and maintain safe means of access to and from all working areas and keep clearly marked as appropriate.
The environment of the workplace shall be safe and without risk to health. satisfactory levels of lighting, temperature, dust, noise, etc., must be maintained.
The requirements of the health and safety at work etc. act 1974 and all duties and obligations imposed by the act, management of health and safety at work regulations 1992 and the construction (design and management) regulations 1994; and all other acts and regulations are to be complied with.
Plant and machinery ;
all plant and machinery must be used correctly and be safe and without risk to health. only competent persons may operate plant and machinery and be trained where necessary.
All plant and machinery must be inspected, serviced and maintained as necessary. all of which shall be properly documented.
Statutory tests and thorough examinations will be undertaken where necessary and correct documentation be maintained.
The contractor will provide and maintain a working environment which is safe and without risk to the health of both its employees and persons who may be affected by its employees.
MATERIALS AND WORKMANSHIP
All works are to be carried out in a workmanlike manner. All materials and workmanship must comply with Regulation 7 of the Building Regulations, all relevant British Standards, European Standards, Agreement Certificates, Product Certification (Chartered Scheme) (Kite Marked etc. Products conforming to a European technical standard or harmonised European product should have a CE marking.
PLANNING APPLICATION DRAWING
0m 10 20 30 40 50m
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5, Victor Way,Cherry Holt Road,
Bourne, Lincs PE10 9PT
Tel 07778 297733 jda@ndirect.co.uk
Proposed Conversion of Agricultural Buildings into Three Dwellings at
Witteman Nurseries
South Drove, Spalding Lincs. PE11 3BD
Drawing Title : Existing Buildings
Date : April 2023
Scales 1 to 200 at A3 Portrait
Drawing No JDA/2022/720/EX.BLD/001
GROUND FLOOR PLAN
PROPOSED REAR ELEVATION
PROPOSED SIDE ELEVATION (SOUTH EAST)
PROPOSED FRONT ELEVATION
PROPOSED SIDE ELEVATION (NORTH WEST)
PLANNING APPLICATION DRAWING
PROPOSED GROUND FLOOR LAYOUT
PROPOSED FIRST FLOOR LAYOUT
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Proposed Conversion of Agricultural Buildings into Three Dwellings at
Witteman Nurseries
South Drove, Spalding Lincs. PE11 3BD
Drawing Title : Proposed Scheme
Date : April 2023
Scales 1 to 200 at A3 Portrait
Drawing No JDA/2023/720/PROP/001

END OF REPORT



