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**Structural Appraisal Report,
Rose Villa, Holbeach Drove, Spalding, Lincolnshire**



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Property:-	Rose Villa Drove Road, Holbeach Drove, Spalding, Lincolnshire PE12 0PS	Instructed:- Sept 2014
Client:-	Mr Holland Drove Road, Holbeach Drove, Spalding, Lincolnshire PE12 0PS	Survey & Report by:- J. Ellington BSc. CEng MStructE J. Hicks BEng(Hons) MSc
Reference:-	JC/14/07/1971	Issued:- Nov 2014

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Structural Appraisal Report,

Rose Villa
Drove Road,
Holbeach Drove,
Spalding,
Lincolnshire
PE12 0PS

Our Ref;- JC/14/07/1971

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1.0 Brief

- 1.1 JC Consultancy Limited was requested by Mr Holland to assess and comment on the structural condition of the existing property known as Rose Villa, Holbeach Drove, Lincolnshire.

2.0 Introduction & Scope

- 2.1 Rose Villa is an existing two storey, detached dwelling, located in the rural village of Holbeach Drove, Lincolnshire.
- 2.2 The client currently owns the freehold of the property and has instructed that a structural appraisal is carried out in order to advise of possible structural defects present within the building in order to evaluate options for future developments of the property.
- 2.3 This report is defined as a Structural Appraisal Report. A full Structural Survey has not been carried out on the property, as there has been no opening up works involved in this investigation. Therefore, only items relating to issues (2.3.1.) stated below will be assessed and commented upon within this structural appraisal report.

Items highlighted by the client that we have been asked to investigate and comment upon are as follows:-

2.3.1 *An assessment to advise of the structural condition of the property, and to identify possible structural defects within the fabric, in order to evaluate options for the buildings future development.*

- 2.4 The instruction was provided by Mr Holland via correspondence dated 29th July 2014.
- 2.5 This report is solely for the purposes of the client and no other third parties.
- 2.6 JC Consultancy Limited visited the property on 11th August 2014 in order to carry out a structural appraisal survey.
- 2.7 The weather condition during the survey was warm and dry.
- 2.8 This report is limited to those elements of the structural fabric noted in items 2.3.1 of this report, and comments only upon their structural condition and performance.
- 2.9 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 decorative plasters.

- 2.10 Decay associated to damp, fungal attack, insect infestation or contamination 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.
- 2.11 The inspection was of a visual nature only. There has been no opening up works involved in this investigation. Finishes have not been removed and carpets have not been lifted during the inspection.
- 2.12 Any part of the structure that was hidden, covered or otherwise inaccessible, either by permanent finishes such as, but not limited to wallpaper, decorative plasters, suspended ceilings, or carpets, or by items of furniture, either fitted or freestanding, have not been inspected or commented upon. We therefore cannot guarantee that any such parts are free from defect.
- 2.13 The performance of foundations may be referred to within this report, however the existing foundation system has not been inspected during this investigation, and as such we cannot guarantee that it is free from defect throughout.
- 2.14 The performance of the existing ground strata and general ground conditions may be referred to within this report; however the existing ground conditions have not been inspected therefore comments made will be based on analysis sought from indicative desktop sources including but not limited to the 'British Geological Society' (BGS). These sources generally provide sound interpretation, however local anomalies can occur, and as such we cannot guarantee their accuracy.

3.0 General Description.

- 3.1 The property is an existing, rectangular shaped, one and a half storey, detached dwelling located on a predominantly level site, directly adjacent to B1166, Drove Road. The property is accessed off the highway via a gravelled driveway, which also serves as access to the horticultural nursery behind.
- 3.2 The property appears to have been altered during its lifetime. The construction date of the property is unknown, but it is likely to have been originally constructed during the late C.18th. Various alterations and later additions have been conducted, including the remodelling of the majority of the window and door openings, and introduction of masonry chimney stacks.
- 3.3 The construction of the property consists of;-

Duo-pitched Roof

A clay pan tile roof covering over a raised collar tied cut roof consisting of timber rafters, collars, purlins and ties. Original and later roof timbers are both present.

External Walls

Predominantly 215mm wide, traditional solid wall construction consisting of clay masonry units laid in generally a lime based mortar mainly in an English style bond. There are extensive areas of repointing, in various cement based mortars throughout the elevations.

Internal walls

A combination of load bearing and non-load bearing single leaf partitions. The partitions are likely to be constructed using a combination of loadbearing and non-loadbearing clay masonry units, blockwork and timber studwork with plaster wall finishes to both faces.

Ground Floor

Solid, presumably brick or ground bearing concrete floors, likely to be laid directly on soil strata, with a combination of carpet, tile and brick floor finishes over.

Foundations

Foundations were exposed via a single trial hole. There is no foundation as such present. No corbelled masonry was identified. The wall construction continued at the same 215mm thickness for approximately 5No.courses (-375mm) below the ground level whereby it ceased. Extensive root activity was present within the trial hole.

- 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 Formation (Mudstone) overlain by Tidal Flat Deposits (Sand & Silts).
- 3.5 There are several mature trees in close proximity to the property. To the rear of the property there are several large Leylandii within 3m of the elevations.

4.0 Observations and Defects Log

The observations and defects noted below 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 property 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.

4.1 Duo-pitched Roof

- When observed externally from the front and rear elevation, it could be seen that the pitched roof was dishing and sagging on its slope. The ridge appears reasonably level, with only slight sagging noticeable towards the South facing gable. There were no missing tiles noted. Mortar fillets underneath the ridge were missing.
- Masonry immediately below the wall plate level of the roof is distorted. When viewed longitudinally, it can be seen that a degree of roof spread has occurred.
- When observed internally, it can be seen that the roof structure consists of a replacement pegged style tied roof system. The pitched roof appeared in reasonable condition, with no missing or defective roof elements noted. Older, presumably original roof timbers remain present in parts.
- Any refurbishment schemes proposed is likely to introduce modern, plaster and tile type finishes. In order to accommodate these kinds of finishes, and to terminate the spread, dishing and sagging of the roof structure, considerable strengthening of the roof and ceiling timbers will be required.

4.2 Walls

- When observed externally, all walls appear to have suffered reasonable amounts of movement in the past. The movement is a combination of vertical (downward) and lateral (bulging, bowing and leaning) movement.

Front Elevation

- Extensive cracking is evident over the ground floor window and door openings.
- Hard cement repointing has been used extensively throughout the elevation. The lower level of masonry, from ground to underside of windowsill is repointed throughout.

- When viewed along the elevation, it can be seen that the panels adjacent to both gable ends have settled, resulting in an arching effect of the elevation as a whole.
- Masonry at high level, below the wall-plate has pushed out. Observations suggest that the outward movement is up to +75mm over the mid-span of the elevation, and up to +50mm over the ground floor window locations. It is likely that a degree of roof spread has contributed towards the lateral movement.
- Masonry at low level adjacent ground level is missing in parts and is becoming eroded.
- In brief, the following estimates were recorded;-
30% of brick units are extremely brittle and would need replacement.
40% of brick units have been previously repointed using hard cement repointing.
2-5% of brick units are modern replacement units around door openings.

Rear Elevation

- Extensive cracking is evident over the ground floor window and door openings.
- Hard cement repointing has been used in a number of areas throughout the elevation.
- Similarly to the front elevation, it can be seen that the panels adjacent to both gable ends have settled, resulting in an arching effect of the elevation as a whole. This may have been exacerbated by the effects of the Leylandii trees that are close by.
- Significant outward movement was noted to the masonry panels around the window panels. Observations suggest that the outward movement is up-to +75mm to the panel between openings.
- A reasonable amount of rebuilding will be required to the elevation.
- In brief, the following estimates were recorded;-
20% of brick units are extremely brittle and would need replacement.
30% of brick units have been previously repointed using hard cement repointing.

Gable Elevation (North Facing)

- Inspection was limited due to vegetation growing against the elevation.
- A Significant bulge was noted to the masonry panel around the gable window. Observations suggest that the outward movement is up-to +75mm. Observations suggest that there is no restraint between floor and wall at floor level.

- Localised cracking is evident throughout the elevations.

Gable Elevation (South Facing)

- This elevation is in a reasonable condition, with no major structural defects noted. The elevation has been buttressed by the former greenhouse structure that is adjacent to the gable.
- Localised cracking is present on the verge masonry.
- Hard cement repointing has been used in places throughout the elevation. The lower level of masonry, from ground to underside of windowsill is repointed throughout.

Walls - Internal

- When viewed internally, the majority of the wall finishes were free from major defect. There were minor cracks noted within the wall finish around a number of the door and window openings.
- Puckering wallpaper, and significant gaps were present at the corner of the rooms and at wall junctions, suggesting that restraint of the walls in these locations is minimal.
- The door frames to the majority of the openings were distorted.

Walls – General

- the gable ends of the building have settled resulting in the middle of the building to suffer from increased stress, which can now be seen in the form of cracking, fractures and distorted masonry.

It is possible that the flexibility and softness of the traditional materials, masonry and mortars used is likely to have prevented it from displaying significant failures.

- Much of the repointing has become detached. A number of repointed cracks and fractures have re-opened, which suggests that the building is accommodating progressive movement. The presence of numerous ties various styles suggest that the building has been struggling to accommodate lateral forces over its lifetime.
- A foundation remedial scheme will be required in order to stabilise the vertical movement of the building and to combat the potential effects of trees.

4.3 **Floors**

- During a walk-through of the ground floor, it was noticeable that the floor was uneven and had settled in places.
- It is likely that the construction is of minimal specification.
- It is assumed that a replacement ground floor structure will be installed during any proposed remedial works.
- The first floor joists are springy when subjected to a walkthrough. The joists were measured at 125mm depth which are unlikely to safely accommodate envisaged future loadings. It was noted that cracking was present to the majority of the ceilings and gaps were present between the floor structure and the walls.
- Similarly to the roof, it is assumed that any refurbishment schemes proposed is likely to introduce modern, plaster and tile type finishes to the first floor. In order to accommodate these kinds of finishes, and to increase the overall stability of the structure, considerable strengthening of the existing first floor, or consideration of a replacement first floor, will be required.

5.0 CONCLUSIONS AND RECOMMENDATIONS.

- 5.1 The dwelling appears to be suffering from a combination of continued structural movement and a lack of general maintenance.
- 5.2 Without intervention with suitable stabilisation and repair techniques in the near future, the dwelling will continue to decay and deteriorate, which is likely to result in the further loss of original fabric.
- 5.3 Due to its current condition, and the fact that progressive movement is being accommodated by the dwelling, intervention is going to have to be particularly intrusive in order to provide a satisfactory and sensible stabilisation scheme.

The remaining fabric of the building is 'delicate'. Walls and individual brick units have lost their integrity in large parts, and overall structural restraint and tie-ing action within the building is minimal.

Careful consideration should be made as to the extent of original fabric that may be lost during such repair and stabilisation works. Whilst estimates cannot be provided until a repair scheme has been produced, we would suggest that up-to 50% of the existing masonry present could be 'lost' and require reconstruction in order to complete the degree of intervention discussed in 5.4.4 – 5.4.5 of this report. Further losses to both the roof and floor elements maybe extensive.

Whilst we always attempt to reinvigorate structures with sound and sensible repair solutions, sometimes it needs to be considered that the existing fabric of a building will not be able to accommodate such intrusive intervention. Stresses and changes to load paths imposed upon the materials 'temporarily' during stabilisation works, can have an exhaustive effect on their long term performance.

In our experience, enthusiastic repair schemes at Planning stage can often deviate dramatically once works commence, and it is not uncommon for extensive loss of original fabric to occur. Once at build stage, this loss is often permanent and unrecorded.

In this instance, having considered the existing arrangement, we recommend that in addition to a possible repair and stabilisation scheme, consideration is made to carefully record the existing remaining fabric of the building to enable the careful demolition and construction of a replacement dwelling. In our opinion this option is likely to provide an opportunity for an enhanced detailed record of the building as existing to be conducted, as opposed to substantial loss that may be suffered unrecorded during attempted repair.

Consideration of this option should be done only following liaison with, and guidance from the Local Authority Planning Department.

- 5.4 If a repair and stabilisation programme is to be carried out on the building, then further input and design from ourselves will be required in order to provide the most sensible methods for each element.

However at this stage, we recommend the following items should form the basis of the structural repair programme on the property;-

- 5.4.1 The foundation should be enhanced via a suitable underpin system. Depending on ground conditions encountered at depth, this may consist of a traditional mass concrete type underpin, or alternatively a Pile and Reinforced Concrete Ground Beam / Needle type underpin arrangement maybe required.
- 5.4.2 Ground floor slabs should be replaced with suitable Reinforced Concrete suspended slabs, supported off the installed foundation remediation system. In order to achieve enhanced floor to ceiling levels at ground floor, the replacement floor slabs could be installed at a slightly lower level to that of the existing system, however architectural consideration in respect to damp proofing and access will need to be considered.
- 5.4.3 The roof will need considerable strengthening works. The installation of a remedial ridge beam, the strengthening of existing rafters and the installation of additional collar timbers will be required in order to cease the outward thrust and roof spread that is currently occurring. The amount of works required to the roof may result in the need for a replacement roof structure as a whole.

If the roof arrangement needs to be adjusted for architectural purposes, again a replacement roof structure may need to be considered.

- 5.4.4 The walls to the upper levels of the Front and Rear elevation have accommodated significant levels of movement, distortion and stress. We recommend that allowance is made for the walls to be carefully taken down to a suitable level between current wall plate level and top of ground floor window level, and rebuilt using a suitable wall construction.
- 5.4.5 The North Facing gable wall is severely distorted and is displaying considerable bulging. We recommend that allowance is made for this wall to be carefully taken down to a suitable level between current eaves level and first floor level, and rebuilt using a suitable wall construction.

The South facing gable wall has been buttressed in part by the adjacent structure, is in a reasonable condition and should require only little intervention.

Further allowance for repair / replacement masonry should be made at ground level, throughout the elevations as the envisaged foundation underpin proposals is likely to cause loss of brick units both in its temporary installation and permanent repair.

Any remaining masonry should require only localised area of stitching, strapping and tying. Wall repairs should be carried out using the Helifix masonry repair system where possible. More information can be seen at www.helifix.co.uk.

- 5.4.6 The overall structural stability of the building should be enhanced by ensuring that the floor and roof systems are tied into the masonry wall fabric. This should be done using a combination of the aforementioned Helifix masonry repair system, together with proprietary straps and tie bars in suitable locations.

Lintels and backing lintels over openings should be replaced throughout.

- 5.4.7 The first floor will require localised strengthening works. This can be done by installing additional joists alongside the existing timbers.

If the floor arrangement needs to be adjusted for architectural purposes, a replacement floor structure could be considered.

- 5.4.8 Following masonry repair works, the quality and appearance of the masonry is likely to be extremely variable. You may want to give consideration for the walls to be rendered, however you should seek advice from the Local Authority Planning Department in respect to this matter.

If a render finish is used, a suitable render system to ensure that the structure remains weathertight in addition to allowing the fabric to breathe should be utilised.

Guttering and rain water discharge systems should be installed and connected to suitable soakaway systems.

An injected damp proof system should be applied, which should be contiguous with damp proof systems installed into the ground floor slabs.

- 5.5 Whilst reference to damp is outside the scope of this report (see 2.9), it appears that the structure has suffered from a degree of water penetration over the years.

As such, it is essential that further surveys and advice from specialists in the field of damp and timber decay should be carried out in order to ensure that damp and timber decay are not trapped within the fabric following the restoration. Any repairs recommended by the third party reports should be carried out accordingly.

- 5.6 We recommend that all repair details and designs are produced and submitted by a suitable Architect and Engineer who appreciates the sensitive nature of the existing structure.

In addition we recommend that all works are carried out by contractors who have experience dealing with repairs and properties of this nature.

JC Consultancy Limited

November 2014

6.0 Photographs.



1 – Front Elevation



2 – Front Elevation



3 – Front Elevation



4 – Front Elevation



5 – Front Elevation



6 – Front Elevation



7 – Front Elevation



8 – Front Elevation



9 – Rear Elevation



10 – Rear Elevation



11 – Rear Elevation



12 – Rear Elevation



13 – Rear Elevation



14 – Rear Elevation



15 – Rear Elevation



16 – Gable End



17 – Gable End



18 – Internal



19 – Internal



20 – Internal



21 – Internal



22 – Internal



23 – Internal



24 – Internal Roof



25 - Internal Roof



26 - Internal Roof



27 - Internal Roof



28 - Internal Roof



29 - Internal Roof



30 – Foundations

END OF REPORT