Clegg Associates
CIVIL AND STRUCTURAL CONSULTING ENGINEERS

14 High Street, Salisbury

Structural Appraisal

For

Simpson Hilder Associates

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Executive Summary

The building at the time of the inspection had been stripped down partly and therefore it was possible to inspect and observe many structural elements, in particular the roofs. However, some of the main structural elements were not exposed and it wasn't possible to inspect them.

The existing building seems to have performed well over the years. There are however many signs of damage to the timber and the brickwork.

It is proposed to turn the existing building from an office use to a residential use which will reduce the magnitude of the applied imposed loading. It can therefore be argued that the existing structure is fit for purpose. However, in order to increase the life span of the building, some repair work will be required to the timber and the brickwork. The repair will include scarfing in new timbers, replacing timbers, securing joints, strengthening timber members with steelwork, replacing brickwork and repointing brickwork.

The proposed alterations to the existing internal layout are minor. The walls at second floor level which are to be removed are non-loadbearing. A few openings at first floor level will require new suitable lintels.

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1.0 Introduction

Clegg Associates were appointed by Simpson Hilder Associates to carry out a non-intrusive visual survey of the property at 14, Hight Street in Salisbury. This report intends to review and appraise the existing structural elements, and comment on the proposed alterations from a structural perspective.

2.0 General

We have not inspected woodwork or other parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect.

This report letter is prepared for the sole use of you and your professional advisers. We accept responsibility to you alone for the stated purposes that the report will be prepared with the skill, care and diligence reasonably expected of a competent Chartered Engineer, but accept no responsibility whatsoever to any person other than you. Any other person relies on the report at his own risk.

3.0 Description

No. 14 High Street is a Grade II listed building located within the city of Salisbury Wiltshire and is within the Salisbury City Conservation Area.

The three storey building dates back to the 18th century and is of braced timber frame construction with external single leaf brick walls. It also comprises timber floors and a tiled timber roof. A modern shop front forms the front elevation and cuts back into the original windows at first floor level, where steelwork was installed. A modern staircase was installed in 1995 down a covered alleyway to provide direct access to the first floor above the commercial premises.

Broadly speaking, the building is framed in timber with the main structural support lines located around the perimeter of the building with additional supports centrally.

The floors are formed with primary and secondary timber beams supporting timber boards.

The roofs are formed with timber rafters supported on timber purlins / timber walls.

Please refer to the Heritage Statement for a detailed description of the building.

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4.0 Observations

The roof is formed with three separate duo-pitch roof sections, including the main roof section along the front elevation, and the two roof sections at the back running perpendicular to the main roof section.

The two roof sections at the back are of similar construction. They consist of a timber ridge board and timber rafters spanning onto timber purlins / stud walls. The timber rafters appear to be a mix of original timbers and patched up timbers. They all visually appear to be undersized to comply with modern standards, however there doesn't seem to be excessive structural damage. The timber members supporting the rafters appear to be in a more advanced stage of deterioration. In places the cross-sectional area of the members has been lost almost entirely. The joints are loose and in places there is no visible contact between the members. The internal timber partitions do not appear to be load bearing with the roof structure spanning from external wall to external wall.

The front roof section is formed with timber trussed rafters spanning between the front elevation and a timber beam. The timber beam is supported on the original timber frame at both ends. The timbers forming the roof all appear to be undersized to comply to modern standards however there doesn't seem to be excessive structural damage. The supporting timber beam also appears to be undersized and has clearly deflected vertically. The beam support which is located near the central staircase seems to have shifted. There is no apparent contact between the end of the beam and the top of the supporting stud. Repair work was clearly carried out but it seems unsuitable.

The first and second floor structures appear to be of similar construction, comprising primary timber beams and timber joists supporting timber boards. Only the front section's floor structure was visible - the second floor supporting beams visible from the first floor and the first floor supporting beams visible from the first floor. Only parts of the structure were exposed at the time of the survey. It was apparent that the floors were uneven. It wasn't possible however to assess the condition of the main timber elements.

The supporting timber frame was partly exposed at the time of the survey and the condition of the timber studs varied greatly throughout the building. Some repair work has been carried out over the years. Some timber studs appear to be in sound condition, with sound joints however a significant number of studs have been damaged over time and now display loss of cross-sectional area and loose joints.

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The brickwork appears to be overall in acceptable condition, especially considering the age of the building. Some of the mortar joints are loose and some of the bricks are damaged. The front elevation, where the timber frame is visibly embedded within the single skin of brickwork, appears to be leaning outwards slightly however there are no signs of major deterioration to the main timber frame elements at this location.

The front elevation at first floor level was cut back to form the shop front. New steelwork and modern blockwork were inserted.

5.0 Proposals



Proposed floor plans

The existing building is to be refurbished and converted into residential accommodation, as shown on the above plans.

We understand that the building was previously used as an office, and therefore the proposed re-development will result in a reduction in imposed loading, according to modern design standards.

The current proposals do not greatly alter the current internal layout. On the second floor, it is proposed to relocate a couple of internal partitions, believed to be non-loadbearing. On the

first floor, it is proposed to relocate a door directly at the top of the modern stairs, create a new door opening through a non-loadbearing internal stud partition, insert a new internal partition and form a new opening for a set of French doors through the external wall through to the roof terrace.

6.0 Discussion

The building as it stands is currently in passable condition considering its age. Certain areas seem to be fit for purpose whilst others will require substantial repairing / replacing work.

Starting with the roofs, the first observation is that there is no obvious signs of water ingress and they seem to have served their purpose well. However, most of the timber roof members and supporting purlins / studs seem inadequately sized and damaged. It is not proposed to increase the loading on the roof and therefore one could argue that the timbers can be left in place, however we believe that to increase the structure's life span remedial work will be required. We would recommend that all damaged timber members be repaired, using scarfed joints, or replaced with modern C24 grade softwood.

The same logic would apply to the main timber frame. A number of members appear to be in good condition, although visibly undersized. But many other members are damaged and have experienced significant loss of cross-sectional area with loose joints in place. We would therefore recommend that as with the roof, defective timber members be repaired or replaced.

The timber beam that supports the front roof section appears inadequate from a strength point of view. It could be argued that the vertical deflection of the beam is historical and providing that its loading is not increased it could continue to perform adequately. However, it is our opinion that it needs to be strengthened. The easiest way to strengthen this member would be to bolt a rolled steel angle or a steel channel on the face of it along its length. Furthermore, as described in the previous section, one of the supports seems to be inadequate. The timber stud supporting the timber beam need to be replaced and appropriately fixed to the beam.

The timber floors are uneven. It was not possible at the time of the survey to inspect the main structural floor elements and therefore not possible to assess their condition. Based on other observations made on site it would be fair to assume that some members have been damaged overtime and would require some remedial work. We don't anticipate that the primary timber beams would need replacing, but allowance should be made for strengthening via rolled steel angle or channel bolted along the face of the beams. Also, allowance should be made for replacing or replacing some of the existing timber joists.

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Finally, the brickwork throughout appears to be in fair condition, but there again some repair work will be required. We would recommend that all loose mortar be raked out, and the brickwork repointed with a lime-based mortar where appropriate. We would also recommend that any damaged bricks be removed and replaced with reclaimed bricks.

In our opinion there are two ways to look at how best to scope and quantify the extent of the repair work required. The first option would be to strip the building completely in order to expose every single structural element, and then carry out a new inspection where defective members can be identified. The other option would be to provide a set of standard repair details for various structural members and let the contractor carry out the repair work where required.

7.0 Conclusions & Recommendations

The building at the time of the inspection had been stripped down partly and therefore it was possible to inspect and observe many structural elements, in particular the roofs. However, some of the main structural elements were not exposed and it wasn't possible to inspect them.

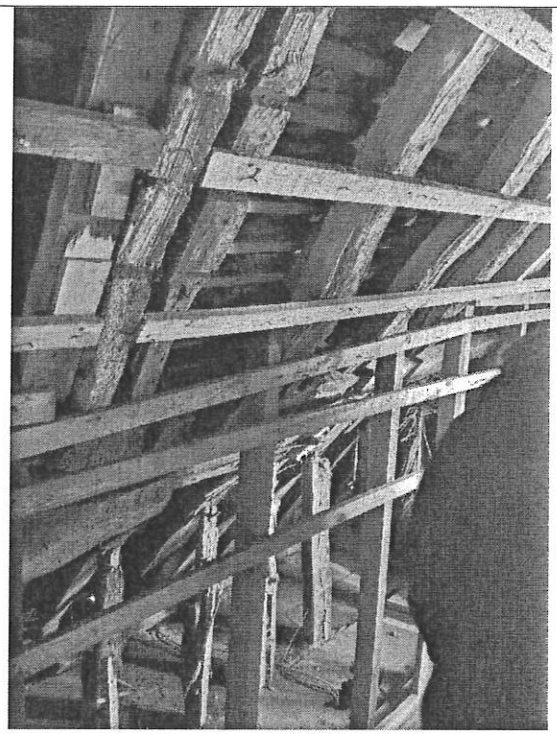
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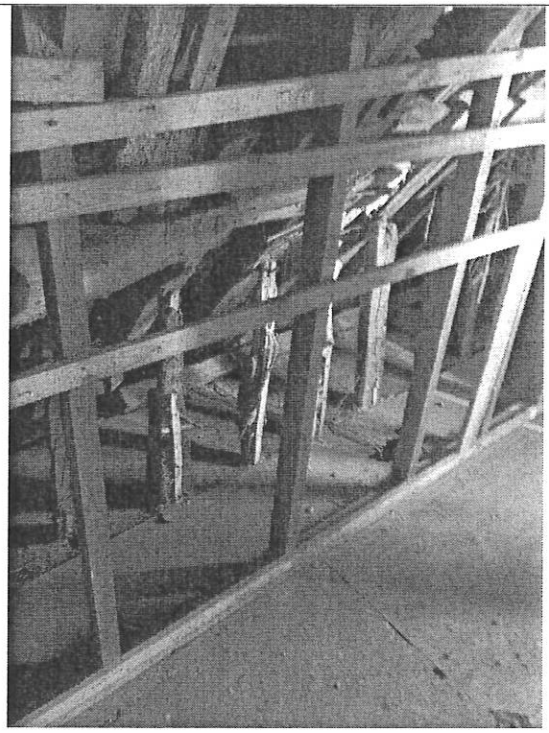
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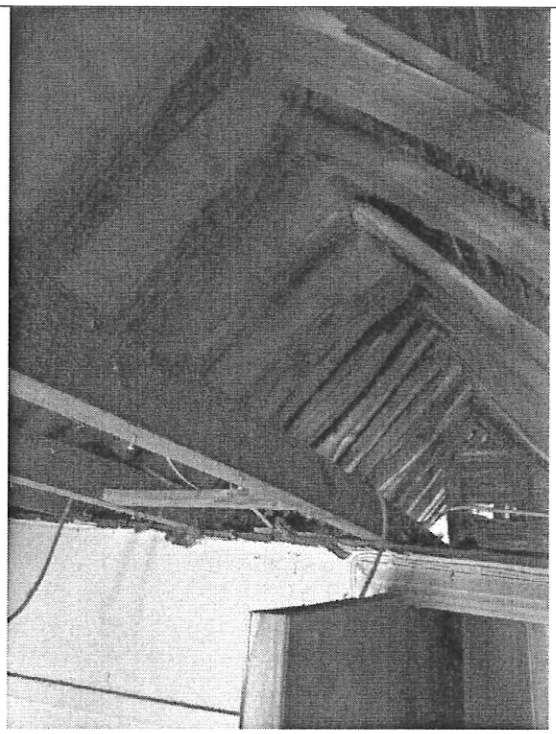
8.0 Appendix A - Photos



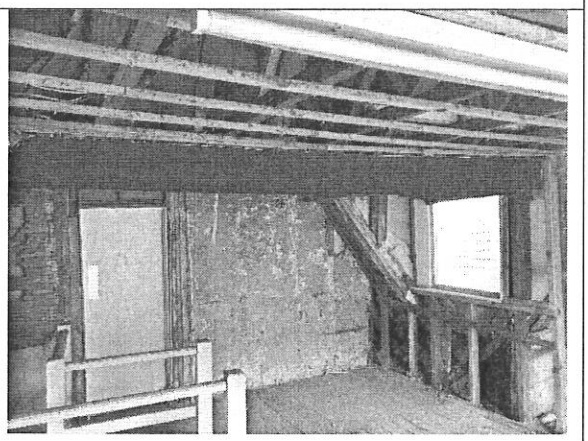
Back roof section - rafters and stud support



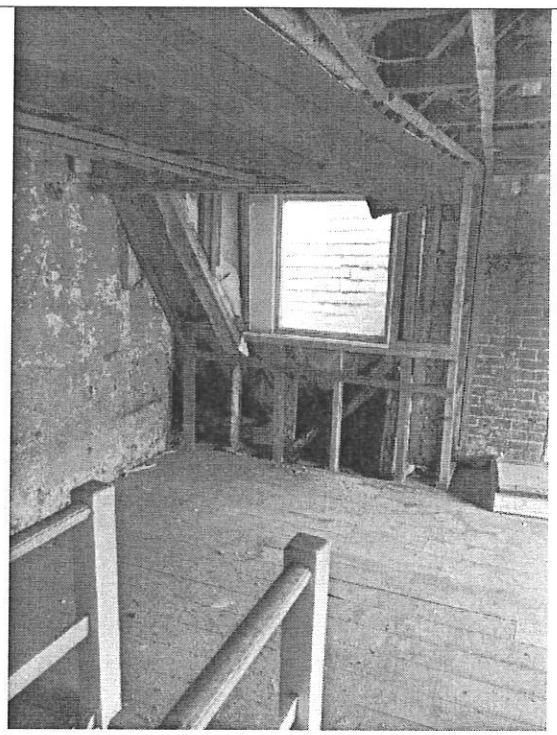
Back roof section - stud support with sectional loss



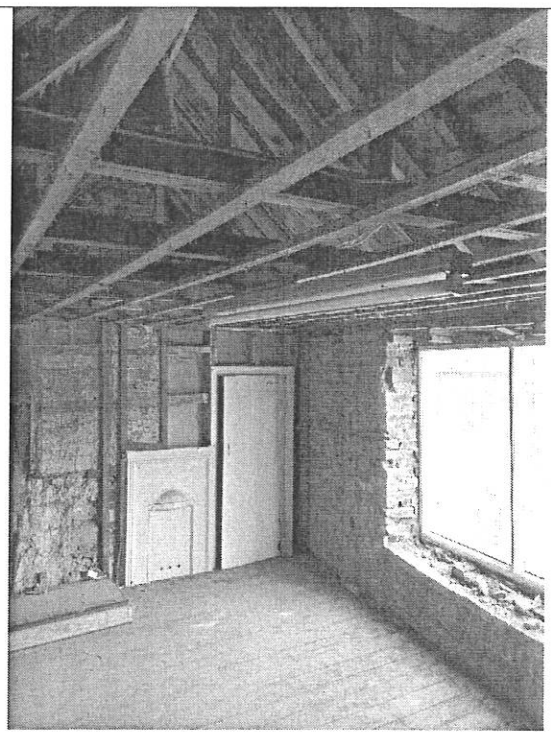
Back roof section



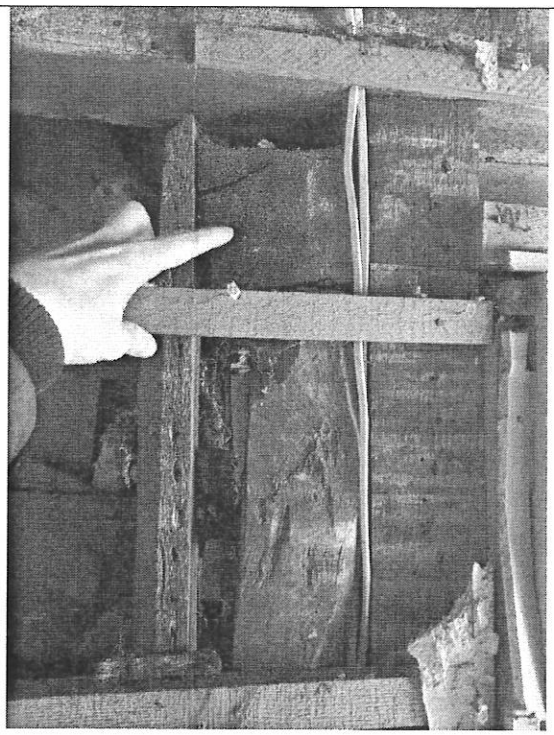
Front roof supporting timber beam



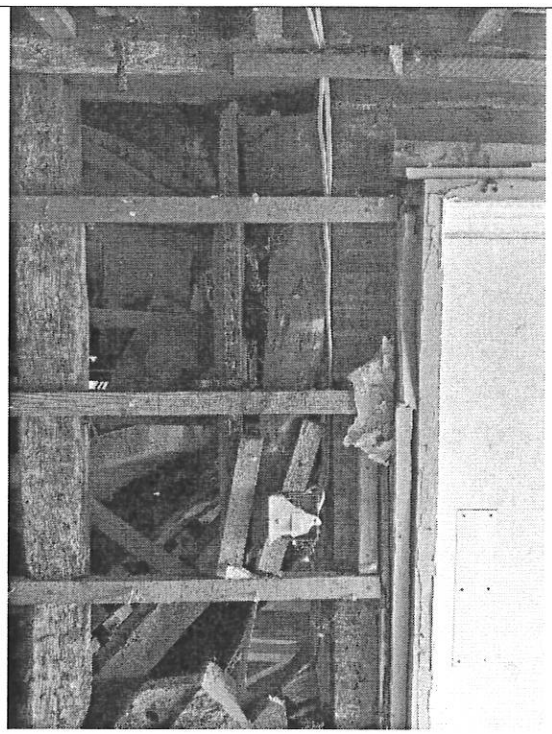
Front roof supporting timber beam



Front roof

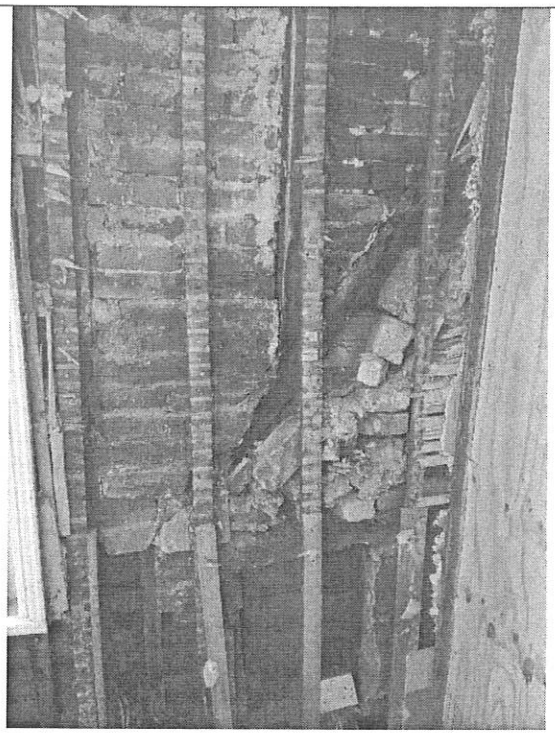


Front roof timber beam support

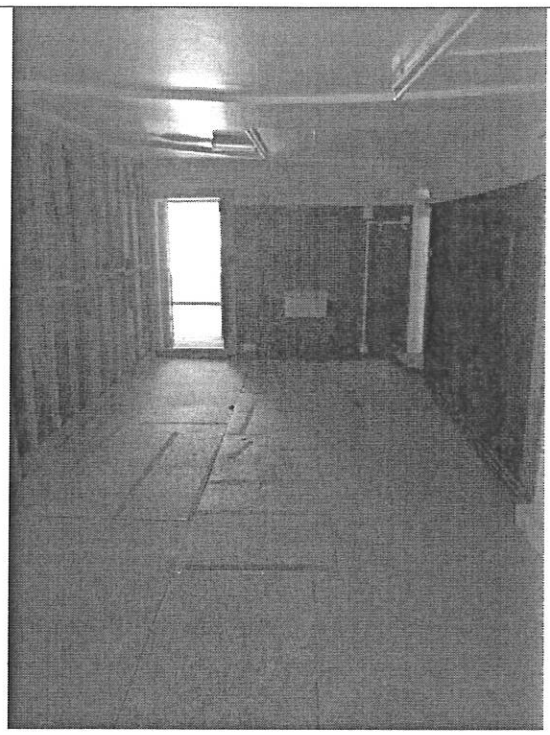


Front roof timber beam support

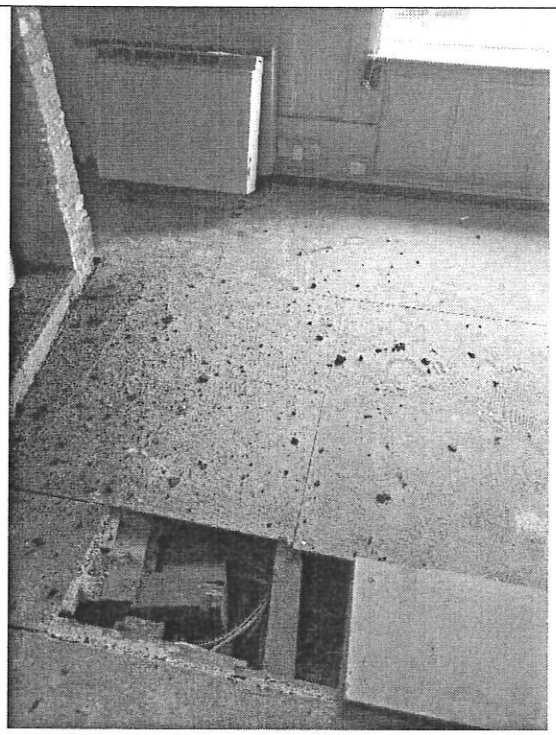
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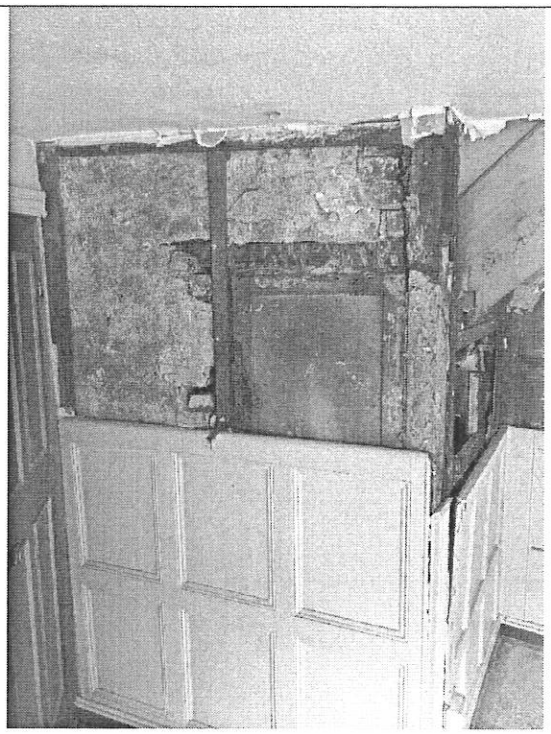
Timber frame



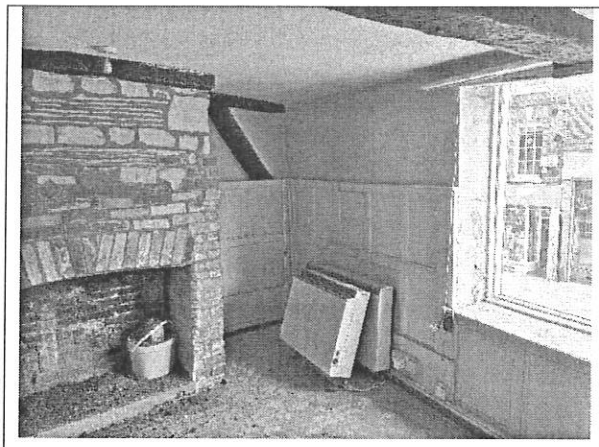
Uneven second floor viewed from first floor



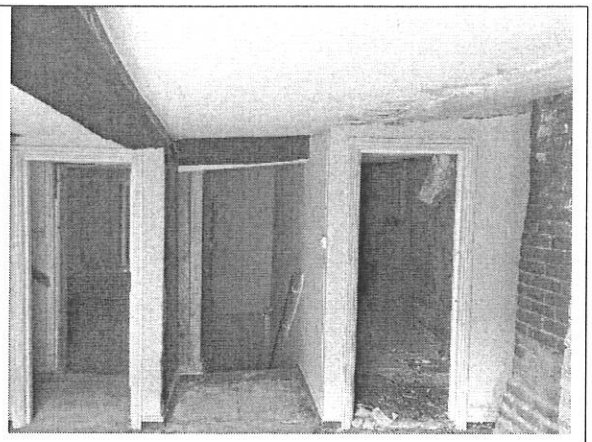
First floor timber elements



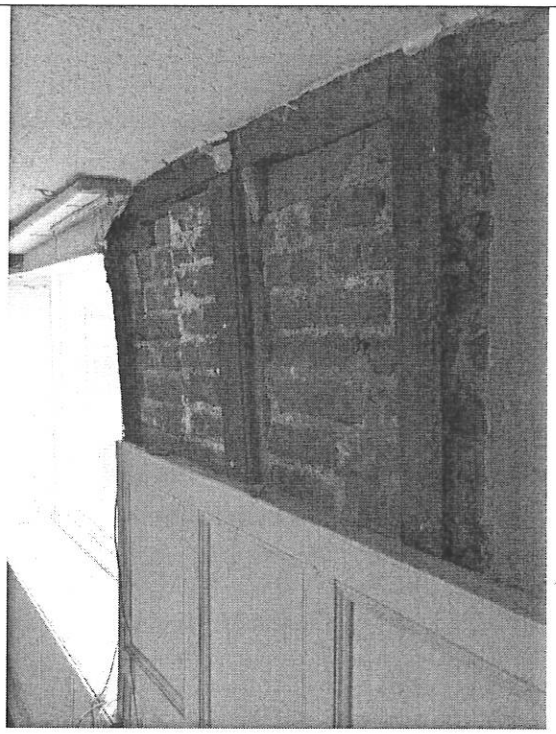
Timber frame around staircase



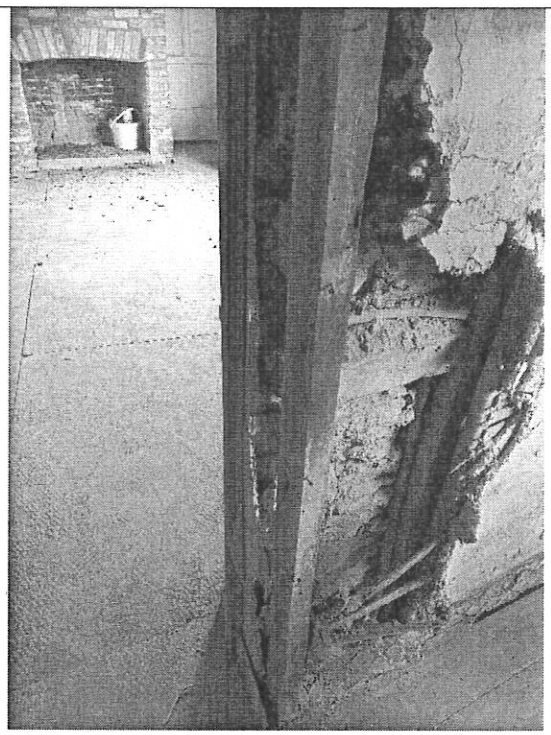
Front elevation showing timber brace



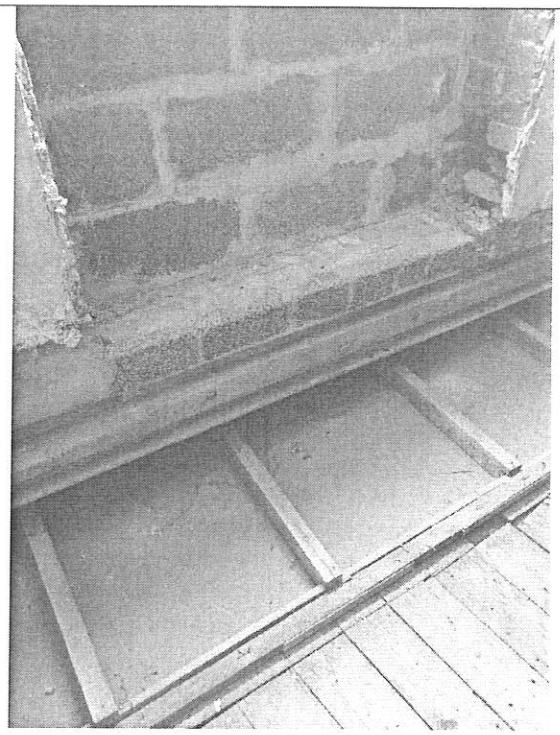
Uneven second floor viewed from first floor



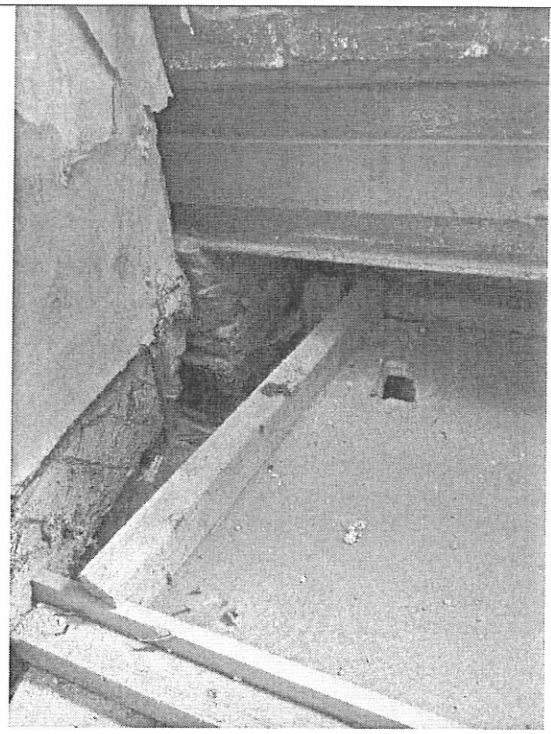
Front elevation leaning



First floor timber frame



Modern steelwork and blockwork to front elevation



Modern steelwork to front elevation

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. The main comment I have is regarding the rear north roof. Allan Hilder considered that there was a major problem of over loading here because the weight of the southern slope of the roof is not resting on a wall, only on the floor. This is causing the present slope in the floor. Allan thought that curing the problem could be difficult. In this report it says that the rear roofs are supported on external walls but I think that this is only the case for both slopes in the southern roof, where the north slope is supported by the dividing wall between Nos 14 and 16. This problem was my main reason for asking for a structural engineer's report and does need to be resolved.
– The north inner slope does extend to the supporting wall. There is a support line onto the second floor additionally. It appears as if this line of support is no longer transferring load. The damage and deformation isn't possible to assess accurately without removal of the ceiling. We also note on the existing plans there appear to be beams shown on the plans, how were these located with the ceiling in place?

And further comments 160720

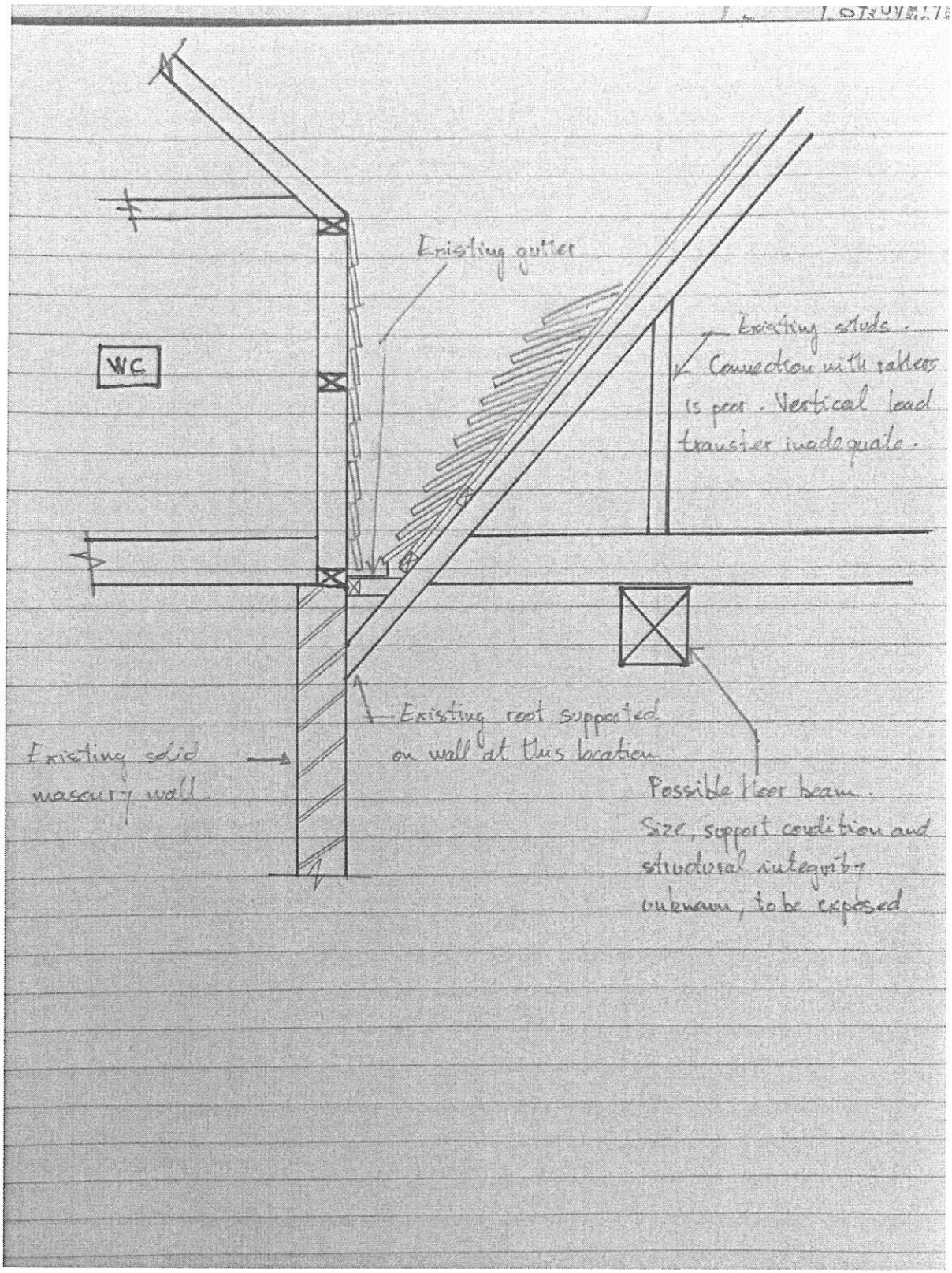
With regards to the main outstanding comment, i.e the southern slope of the northern roof and the sloping floor beam below – please see attachment below to assist. I have drawn an indicative cross section showing the main structural elements.
As you can see, the southern slope of the northern roof takes support on the solid wall below. The unknown is whether originally the roof rafters took intermediate support on the floor below via the short stud partition. It is entirely possible that this is the case, and it is also entirely possible that there is a structural beam below providing that additional support. If this is the case, then it would be fair to assume that the floor beam is over-loaded, hence the apparent deflection visible from the room below. In order to get to the bottom of it all, we need to fully expose the element that is deflecting. We can then establish whether it is meant to provide support to the roof structure above.

Now with regards to the applied imposed loading to the existing floors – Max mentioned that the building was originally designed for office loading. This is not necessarily entirely true, since as Tim pointed out the use of the building changed many times over the years and the original intended use may have been residential. The point remains though, that the building was used as an office, and therefore converting it to residential will decrease the magnitude of the applied loading.

I trust this all makes sense, but please do not hesitate to contact me should you have any further queries.

Regards,

Matthieu Crosnier IEng AMIstructE


Existing gutter
WC
Existing studs.
Connection with rafters is poor. Vertical load transfer inadequate.
Existing roof supported on wall at this location
Existing solid masonry wall.
Possible floor beam. Size, support condition and structural integrity unknown, to be exposed