ASHLEY LARGENT ASSOCIATES LTD
BUILDING DESIGN AND CONSULTING ENGINEERS

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Our Ref: **H059/AL/01**

Your Ref: **-**

Mr & Mrs W Henley
c/o SJB Designs
Cherry Tree Cottage
Hitcham Road
Wattisham
Ipswich,
Suffolk,
IP7 7LD

Date: **1st Nov 2022**

Dear Sirs,

Proposed Alterations & Extensions to 23 & 24 Park Cottages
Church Road, Tattingstone - Structural Considerations

This report letter has been written following our site visit to the above properties and in particular no 24, to report on the current structural condition and consider the extent of remedial repair. It is understood that a planning application is to be submitted to extend these two amalgamated cottages into a larger private residential dwelling.

It was quite apparent that no 24, the derelict and smaller of the two cottages, was suffering with significant structural failure, by the undulating roof line and *bulging* external masonry walls. The roof tiles had been stripped, the roof framework covered with tarpaulin, and a temporary scaffolding support had been installed around the property to prevent further structural deflections.

The property is constructed using typical, traditional materials and construction methods, with a duo pitch roof to the main body of the cottage and a lower pitched lean-to (garden room) to the north/rear. The walls are constructed using solid soft red brickwork laid in lime mortar and the roof consists of a raised collar rafter roof with a trapped/clasped purlin at approx. mid slope. The wall plates sit onto the solid walls, behind the originally toothed brick corbelled eaves, and the gable end (which incorporates the internal chimney stack) has a shallow parapet with flat copings.

Roof Structure

The roof structure is suffering with significant structural deformations, namely lateral spread at eaves level which has been primarily caused by the bending failure of the principal rafters on the central two principal frames.

The structural capacity of the *undersized* principal rafters has been reduced further at the position where the applied bending moment is at its greatest, by the cross-section reduction for both the

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collar mortice and the elongated birds-mouth for the clasped purlin. This structural inadequacy has resulted in excessive bending deflection on the common rafters and in turn the roof coverings failing. Evidence of further damage due to water egress was apparent.

The lateral spread of the roof, along with the lack of any horizontal restraint at eaves level has displaced the wall plate and pushed out the top of the masonry walls.

Unfortunately, due to the amount of deformation and structural damage to the roof timbers, there would be no possibility to retain the existing roof structure and only a very few timbers remain that would be suitable for reuse.

Walls
Like the roof, and as expected the walls are also constructed using traditional methods and materials, soft red brickwork laid in lime mortar.

The *flexible* nature of such a masonry wall has allowed the top of the wall to excessively deflect laterally, due the unplanned horizontal forces from the failing roof structure. This transposed horizontal movement is also noticed on the lower lean-to at the rear and has resulted in the lower masonry structure being separated away from the main cottage. The now displaced alignment of the wall plate is resulting in the vertical load from the roof being applied far beyond the centroid of the walls and this eccentricity loading without significant structural intervention will certainly in time result in collapse.

Although a degree of horizontal restraint to the front and rear walls is provided by the timber first floor, some lateral spread of the walls was noted at floor level which is started to compromise the primary floor beam bearing. The horizontal tie effect to the building envelope provided by the first floor is likely to be primary prevention of the building collapsing.

The verticality of the gable end wall is comparably much better than the front and back walls. Although there is some minor lean of the existing chimney stack above the roof line, likely due to the lack of restraint of the unbraced roof structure.

The arched lintels to the door and window openings on the south/front elevation had dropped and need to be reconstructed.

The walls to the cottage require a large amount of repair and replacement to be structurally sound to support the replacement roof structure, and additional remedial ties would need to be installed at floor and ideally eaves level. Further substantial steel framing would be required to immobilise the structural movement and resist the eccentric wall loading, however it is envisaged that would not be aesthetically pleasing, and furthermore difficult to conceal in such a small and basic building. Due to the amount of work, associated risk and temporary works required, it would be much more practical to consider rebuilding the walls.

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Summary
The poor condition of the property, which has primarily been caused by the structural failure of the roof structure, has resulted in this building being beyond the realms of simple, practical and safe repair.

The new roof should be detailed and constructed using typical traditional timber frame detailing – common rafters with a mid-slope purlin, supported off primary rafters with a raised collar. The effective rafter cross section capacity at this critical intersection should be checked to resist the applied bending stresses. The introduction of a sheathing board to the roof is envisaged to give overall robustness and practical member enhancement.

The majority of the building would unfortunately need to be rebuilt to assure that the structural envelope is structurally sound and have suitable alignment to transfer the applied vertical loading down to the foundations. Generally, we should attempt to sympathetically retain/repair historic buildings, however, in this case, due to the very small amount of the building fabric that could remain effectively untouched by the necessary remedial works, we would be anticipate that the most economical viable solution, and indeed pose the least safety risk, would be to rebuild.

Careful considerations and planning should be undertaken to ensure the structure is taken down in a safe and controlled manner, ensuring that as much of the original materials are reclaimed for reuse as practically possible.

The scheme proposals are such that they do not unduly alter the appearance of the cottage from the font elevation and the cottage forms a well-established feature in the landscape. Considering the above reported structural issues along with our practical experience of restoration of historic buildings we would suggest that reconstruction is likely to be the only economically viable means of guaranteeing long term retention of this cottage.

We trust the above is satisfactory and please do not hesitate to contact the writer should you have any comments or queries. This report shall only by used by the Client to whom it is addressed and not be used for any purpose other than for which it is written.

Yours faithfully

[redacted]

Ashley Largent MS
Senior Structural Engineer / Director
For and on behalf of Ashley Largent Associates Ltd

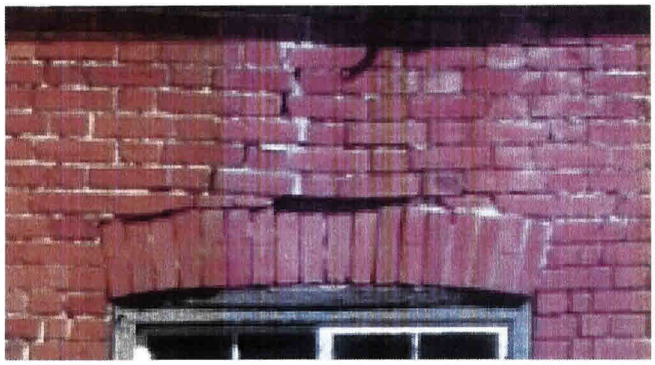
Encs.

Temporary Scaffolding Installed Around Cottage (View from South/Front)

Temporary Scaffolding Installed Around Cottage (View from North/Rear)

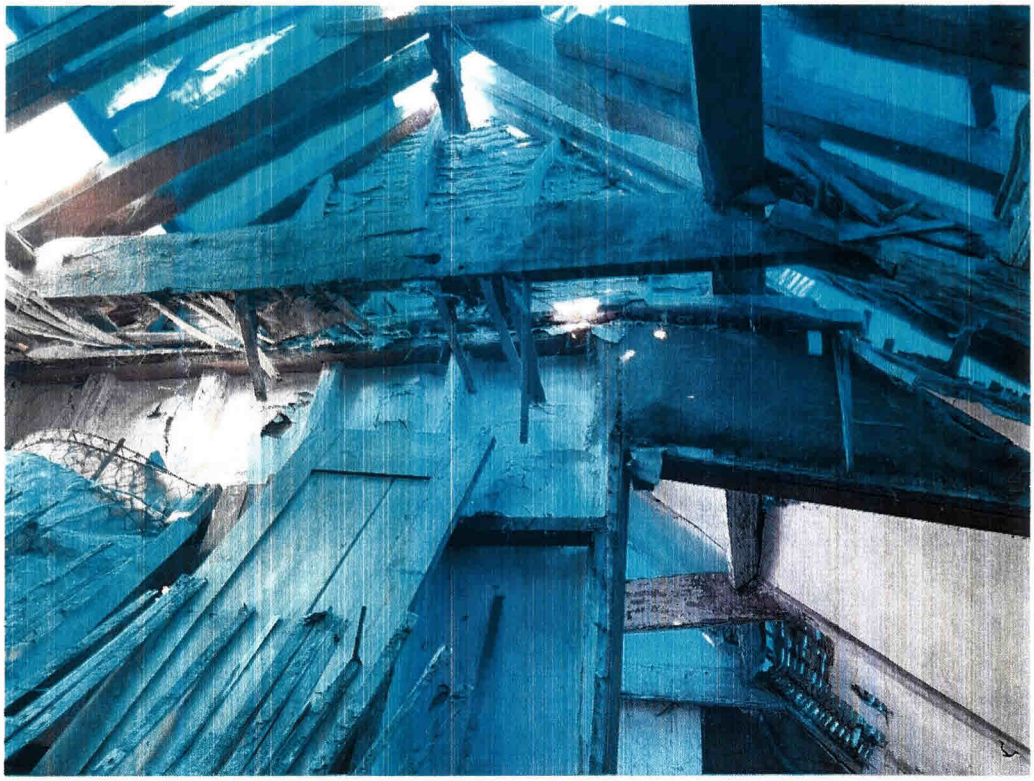
View from South/Front

View from North/Rear



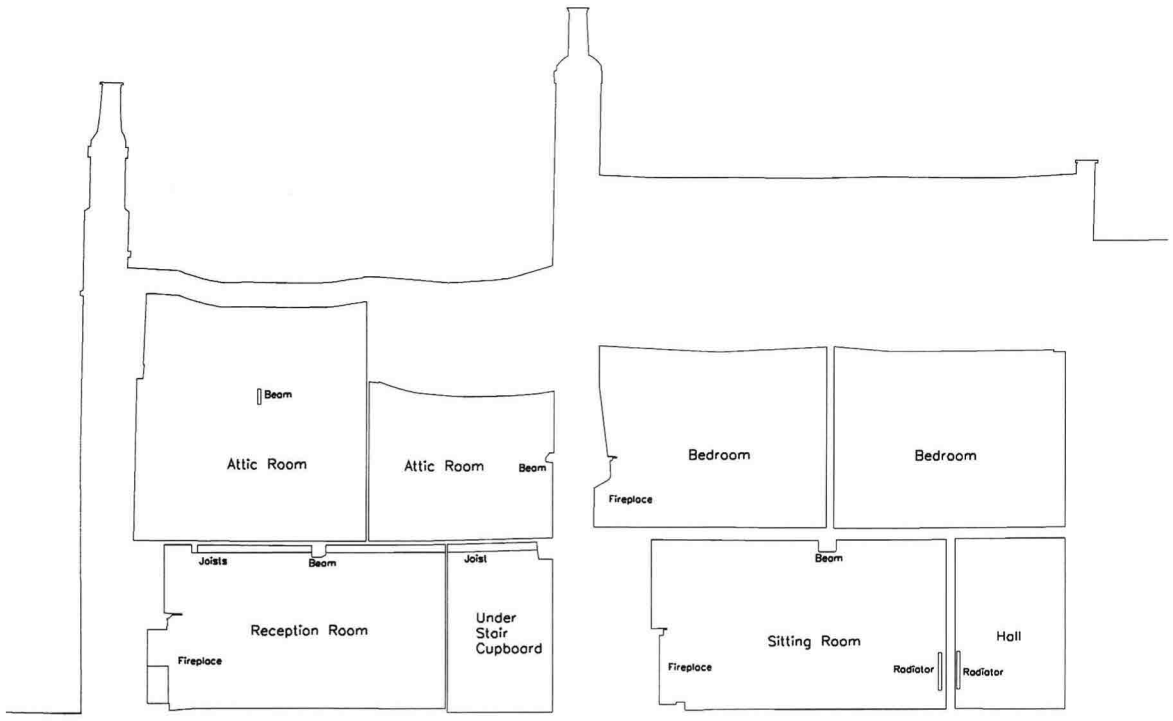
Dropped Masonry Arch to South Elevation

Structural Failure of Principal Rafter
(Note – Mortice for collar and elongated birds' mouth over clasped purlin,
plus further failing principle frame beyond)

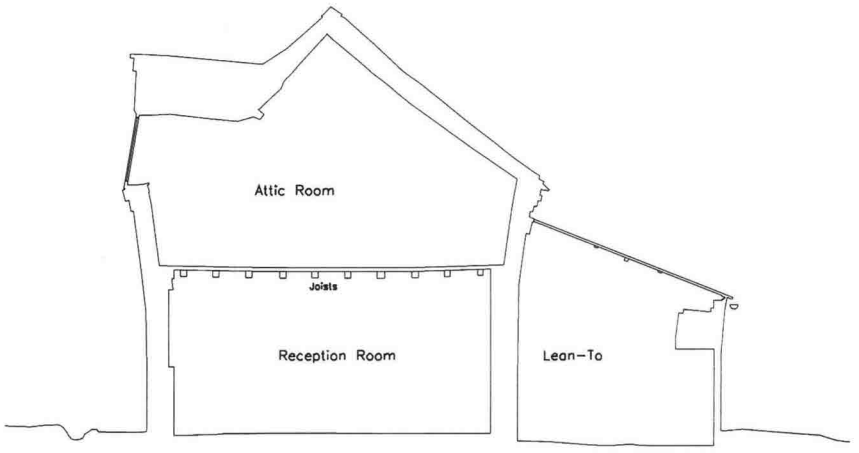


Structural Failure of Principal Rafters & Frames

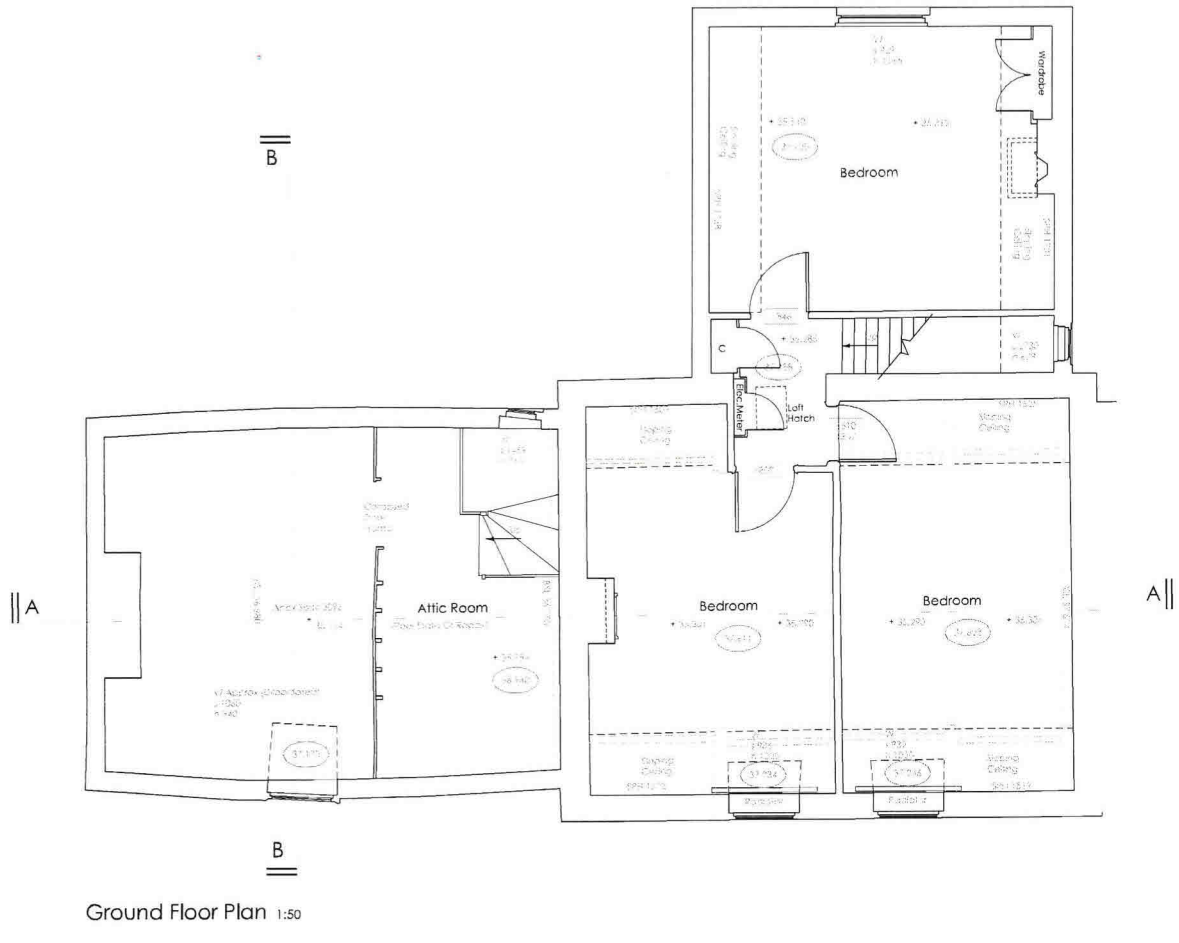
Extent of lateral movement (spread) of top of wall and wall plate



Section AA 1:50



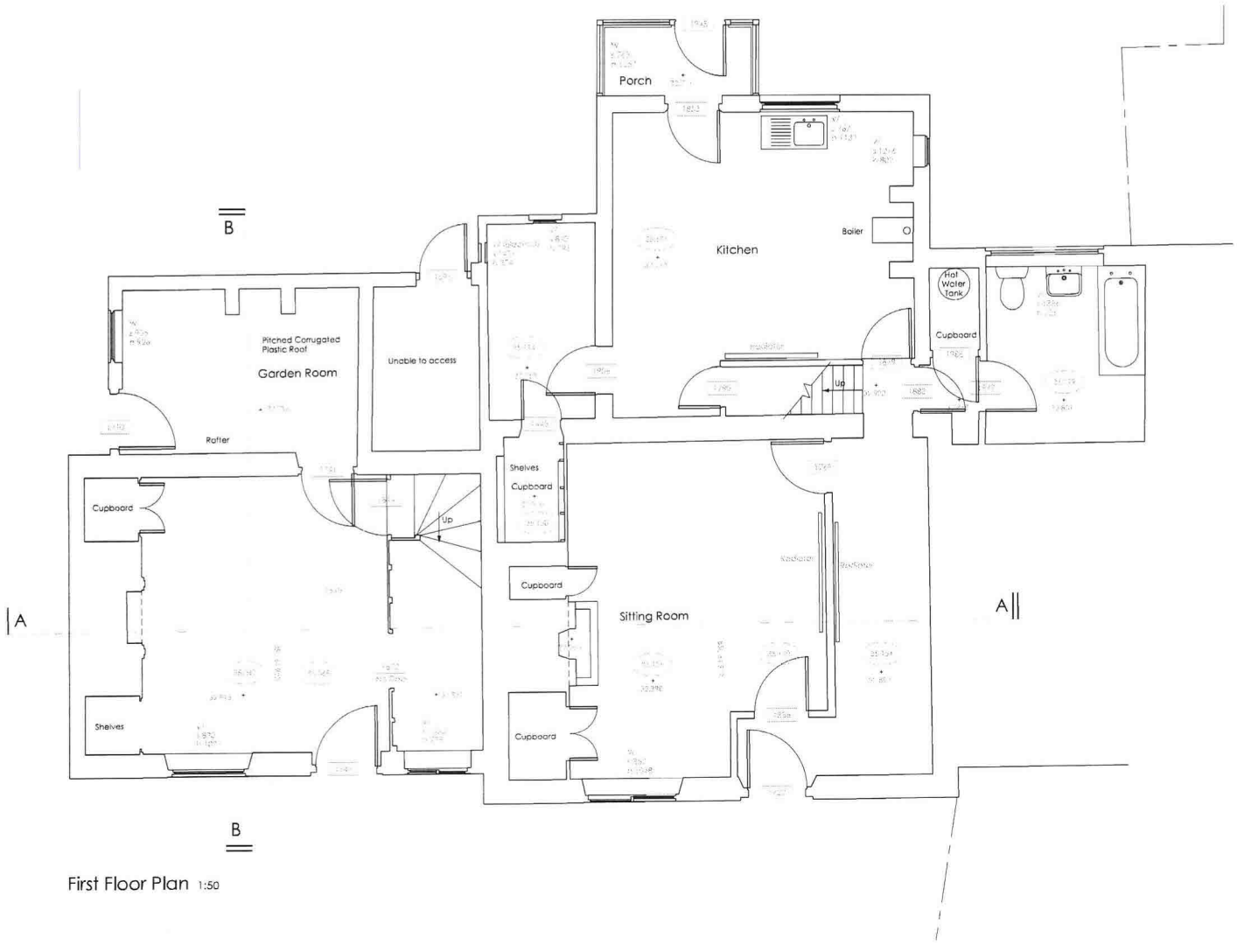
Section BB 1:50



Ground Floor Plan 1:50

South (Front) Elevation 1:100

West (Side) Elevation 1:100



First Floor Plan 1:50

North (Rear) Elevation 1:100

PLANNING ISSUE

Revision

Title
Existing Plans & Elevations

Project
Proposed Works
23 & 24 Park Cottages
Church Road
Tattingstone
for Mr & Mrs. W. Henley

Date
Mar. 22

Scale / Size
Noted
@ A1

Drawn
SJB

Job No.	Drg No.	Rev
488	05	.

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Existing Plans & Elevations