Cobb&Company
Consulting Engineers

Wheatsheaf Yard, 50c Red Lion Street, London WC1R 4PF

Structural Engineer's Report for Planning Application

Contents

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1 Introduction

Jennifer Dyne of David Kohn Architects (on behalf of Patricia Lennox Boyd) asked Cobb & Company to inspect the building at 50c Red Lion Street, WC1R 4PF. The London Borough of Camden requested that the client appoint a Conservation Registered Engineer to assess the structure of the front facade in advance of a Planning Application involving the demolition of the internal timber structures. Fiona Cobb of Cobb & Company has been a Conservation Accredited Engineer with CARE since 2010.

The site was visited on 6th February 2020. The weather was cool and dry. The inspection was limited to the visible parts of the buildings. No damp meter readings were taken and no timber was inspected for rot or worm. A specialist historic timber report by Floyd Consult was commissioned separately by the client and took place on 10th March 2020. This report is included in Appendix A.

2 Historical Background

The Site is located within Wheatsheaf Yard, through an archway, to the rear of 50 Red Lion Street. The building is not Listed and is located within the Bloomsbury Conservation Area.

Figure 1 1875 OS Map

The building is thought to have originally been a stable associated with the Sherriff's Offices at No.23 Red Lion Square, which lay to the west but was destroyed in World War II. The bomb damage from the war has resulted in a confused street layout and a mixed pattern of development. A detailed analysis of the site has been carried out by Iceni Projects (report dated June 2019).

There are three Grade II Listed Buildings in the vicinity as shown in Figure 2 below although none of these have any historical relationship to 50c Red Lion Street:

1. No.50 Red Lion Street, directly to the east,
2. Nos. 45-46 Red Lion Street, slightly north east, and
3. The Conway Hall, 25 Red Lion Square, to the west.

Figure 2 Extract from the National Heritage List for England (accessed February 2020)

The earliest indication of use is on the Goad Map of 1888 as shown in Figure 3, which was a Fire Insurance Map intended to catalogue building use & materials, and therefore an assessment of fire risk. The Site is labelled as being 2½ storeys tall and in use as a 'Cocoa Mat Factory' to the 2nd and 3rd floor. The black cross through the site indicates stabling at ground level; the double lines to the east elevation indicate significant glazing and the brown shading to the south end of the roof (including the note "WD3Rd") indicates that the construction was wood, rather than brick. The partial shading in brown, and notes regarding a half storey, suggests that only part of the top floor had accommodation and that the roof may have had a hipped end.

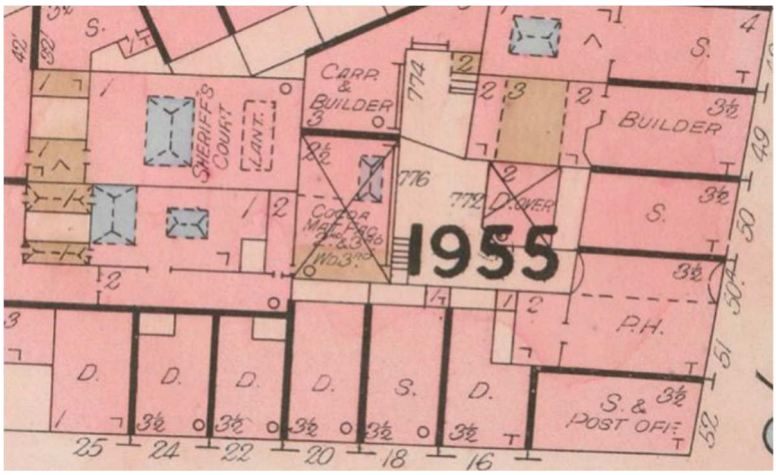

Figure 3 Extract from 1888 Goad Map

Also on the Goad Map, to the west of the main stable structure, is a narrow rectangular form, marked as two storeys, which was once part of the Sheriff's Offices. It has a stone slab roof construction and therefore is thought to have been built as prisoner cells, but it is also thought to have served as a munitions store and ARP Station during World War II. After the destruction of the Sherriff's Office due to bomb damage, this stone roofed section of building was absorbed into the stable block site at 50c Red Lion Street.

In the 1920s the building was converted for use as a studio by sculptor, Esmond Burton, until 1964 when photographer, Napier Russel had a studio on the first floor. In 1970, ownership passed to Jocelyn Burton for use in her work as a silver and goldsmith. Her partner was an architect who is thought to have assisted with alterations to the building at around that time. It is thought that the couple installed a new floor slab to the Ground Floor, new glazing at Ground Floor level and modern building services.

3 Description of the Existing Site & Drainage

The existing building at 50c Red Lion Street consists of a front "stable block" and a rear "stone slab block" at Ground, First and Second Floors. The site has Party Walls to the north and south sides. The front door is in the east elevation towards Wheatsheaf Yard, and the rear of 50 Red Lion Street, with level access. An external steel stair allows access to a First Floor access door in the front elevation.

The back door, is in the west elevation towards a semi-private courtyard at the rear of Omnium Court on Princeton Street. There is a small strip of garden associated with the site, to the west elevation within the courtyard. The ground levels generally in the rear courtyard are about 0.9m above the Ground Floor level. Based on the signs of water ingress visible internally, the earth is presumably piled against the external walls without any exterior damp proofing.

A survey of the foul drainage was carried out by Drain Smart Ltd in April 2018. There are two, relatively shallow, internal inspection chambers, which fall towards Wheatsheaf Yard. The drain has a blind connection to the drain beneath the yard (which has been assumed to also collect water from the external gulley) which is presumed to pass through the alley to connect to the public sewer beneath Red Lion Street. The drains were generally found to be in good condition, although those beneath the Yard were cracked and were not fully surveyed due to debris and deposits within the pipe. During our visit the staff from the kitchen of the restaurant at 50 Red Lion Street were seen to deposit ice, from fish deliveries, on the ground over the gulley which may be the source of some debris. If the drain is shared, it is owned by Thames Water who will clean and repair the pipes if notified.

Surface water drainage, other than the yard gulley, was not included in the 2018 survey. It is assumed that this is because the system disposing of the surface water at present, is not immediately apparent. A parapet gutter to the front elevation is collected in a hopper which discharges to the yard, and in turn the yard gulley. However the paving does not fall towards the gulley and it is likely that water ponds around the base of the building. The roofs to the rear of the building are collected in a valley gutter behind the rear parapet. It is not clear whether there is an internal drain pipe, or whether an external hopper is covered by

vegetation on the rear wall. Based on the water staining internally, none of the gutters are in good repair.

Geological maps indicate that the site is underlain by made ground, over Lynch Hill Gravel over London Clay. Geotechnical investigations were carried out by Connaughts Site Investigation Ltd in April 2018. The work consisted of 6 trial pits (generally 0.7-1.5m deep with one including a hand auger to 2.5m depth) and one continuous flight auger borehole to 12m. The made ground was recorded in the trial pits at 1.3-1.7m below ground level, over an orange-brown weathered clay. Granular soil was recorded at around 2.4m consistent with Lynch Hill gravel which extends to about 4.6m depth. London clay was present below this level and was proved to 12m. Borehole records for the local area correlate with these findings and indicate that London Clay extends to a depth of about 30m, becoming gravelly in a transition to Harwich Beds by 34m depth. Water was encountered at around 5m depth, eventually standing at 7.3m on the day of investigation. This suggested that the gravel layer was generally dry, although further water monitoring was recommended, and a standpipe installed. The building generally has traditional spread foundations which are located in the made ground and weathered clay layers.

Particularly notable findings from the trial pit excavations:

- The building generally has traditional spread foundations, which are located in the made ground, rather than the good gravel at around 2.5m depth.
- The front brick wall was found to be sitting on a "concrete beam" (possibly the edge of the 1970s ground slab) and is therefore likely to be an infill wall, applied as part of the conversion of the building from a basic stable/workshop.
- Testing of the subsoil in the trial pits indicated that the made ground is of very low strength. Half of the foundations were on soil with strength in the range 12-16kN/m^2 while the soil strength for the other half were in the range 58-66kN/m^2. These values are very low; for comparison London Clay is generally accepted as having a bearing capacity of around 100kN/m^2.
- The variability in construction, competence and depth of the foundation and founding stratum, suggests that unpredictable or significant settlements might be induced if additional loads were imposed on the existing walls as part of any future alterations.

4 Description of the Existing Structure

External Observations

The front elevation consists of a brick parapet at roof level, on an exposed timber bressummer, above a continuous band of timber windows (containing structural timber posts). The timber beam supporting the parapet extends to the full width of the elevation. This arrangement is, in turn, supported on a number of full height posts (either side of the loading door and by the Party Walls). However load is undoubtedly transferred through the window frames to a loadbearing brick spandrel which sits on another exposed timber bressumer below First Floor level. There are brick panels at ground floor level which appear to have been built around/in front of the timber beam, but the main supports appear to be timber posts sitting inboard of the glazing. Two of these posts sit above ground level on soft stone pads to keep them above the splash zone, suggesting that they may be part of the

original stable construction. Elsewhere posts appear to sit directly on the 1970s floor slab. Some of the post bases have decayed and are soft. An external metal stair serves the First Floor and is generally in good condition, albeit with a missing tread.

The rear elevation consists of solid masonry walls which have been built up over different periods. The internal ground floor level is lower than the external ground level, so the lower portion of the wall is a retaining wall. It seems likely that most of the Ground & First Floor levels date from the 18th century buildings and that these might originally have been plastered interior walls. At Second Floor level there appear to be two different ages of brickwork. The lower portion may be associated with face brickwork above original roof level, with the upper parts appearing to be late 20th century. It is not clear whether this was post war repair or 1970s roof extension where the hipped roof was raised up at the south end (as indicated by the diagonal line in the brickwork).

A slate roof is concealed behind a parapet wall. There are signs of damp in the brickwork and timber around the gutter outlets and interfaces between the brick & timber elements.

Internal Observations

The roof structure appears to be a conventional cut rafter roof, on purlins supported on King Post trusses, in Baltic Pine. The common rafters are concealed entirely within a plasterboard ceiling. Purlins, where they have not been cut away, are partially exposed and partially concealed in the ceiling. The roof does not appear to be suffering as a result of the removal of the purlins, which suggests that strengthening works are concealed in the ceiling. This should be verified by opening up if the roof is to be retained. The King Post trusses have been substantially altered with their diagonal members removed. These appear to be functioning acceptably but the truss end at the north west corner of the roof has deformed slightly.

The truss end at the south west corner of the roof has been reinforced with a steel channel at its bearing on the west wall. This same truss supports a section of Second Floor in modern softwood which spans north south between it and the party wall. The truss appears to be performing acceptably, although it might be difficult to prove this by calculation for domestic loadings to Part A of the Building Regulations.

There have been alterations at roof level to expand the roof space referred to on the Goad Plan. Cut rafter ends on site, and raking lines in the rear brickwork, indicate that a hipped end to the roof was removed and enlarged into the current dormer, possibly in the 1980-90s. More recently a Second Floor room has been added over the stone roofed building to the rear, with lightweight roofs, possibly in the last 10 years.

The First Floor structure appears to be suspended timber. There is laminate flooring on the top surface and a plasterboard ceiling on the underside, which obscures both the size and direction of span of the joists. At some stage a timber trimmer beam has been added beneath the First Floor, spanning between the rear wall and a new timber post inboard of the front elevation. It is not clear why this has been done and if the floor is to be retained, some opening-up will be required to investigate.

Where the rear wall is retaining soil, signs of damp are visible in the masonry. It is likely that there is little, or no, damp proofing on this wall. The Ground Floor has chipboard flooring on a concrete slab and presumably there will be signs of damp concealed within this build up which should also be addressed as part of any proposed works.

The timber framing of the front elevation is visible internally and appears to be Baltic Pine which is in reasonably condition based on a superficial visual inspection. It is made up of a beam on a series of posts and beams with infill spandrel panels. Figure 1 shows the sizes and relative positions of the principal elements.

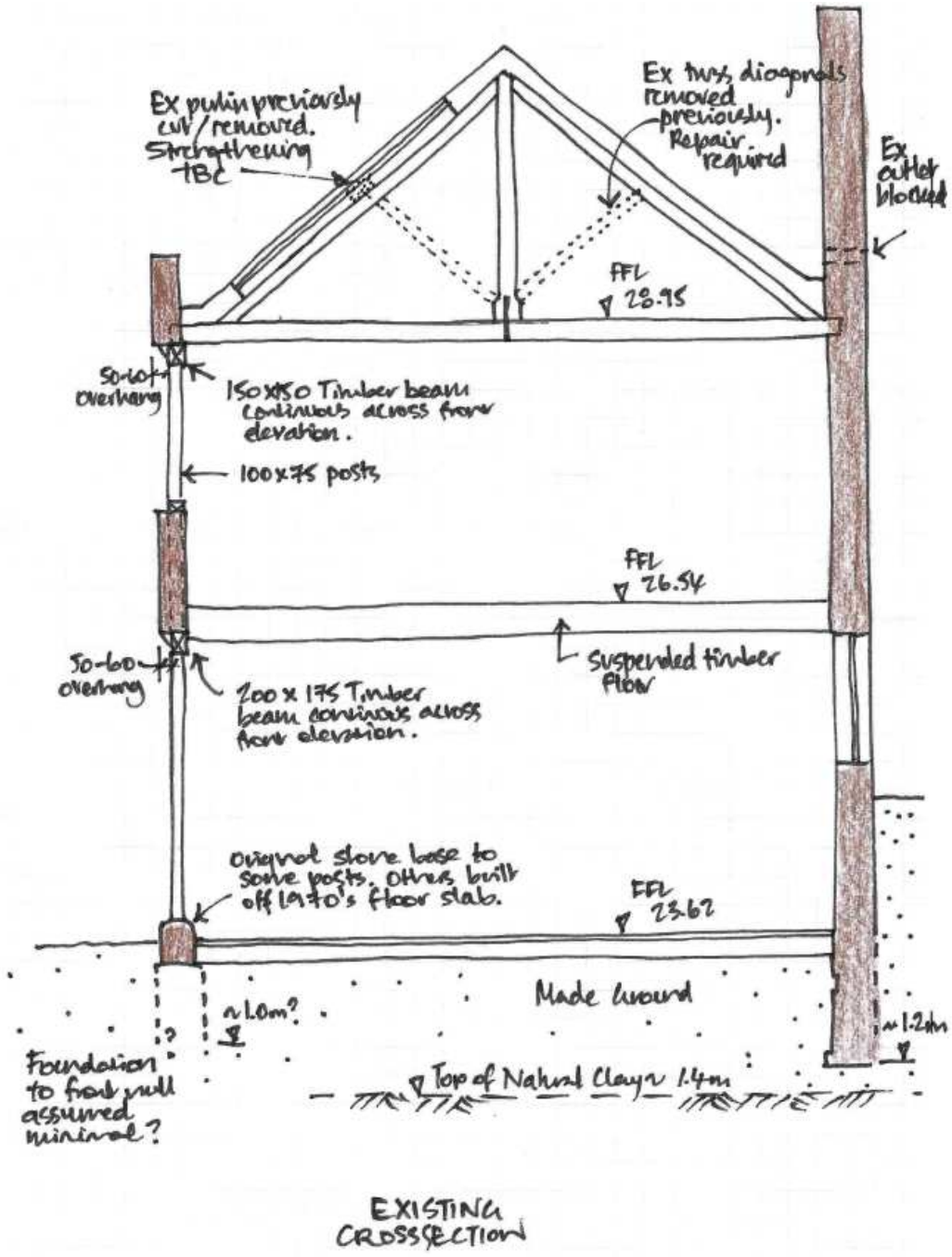

Figure 1 – Principal Structural Elements

There are signs of damp in the brickwork and timber throughout the property, which is likely to have resulted in the deterioration of structural timbers. A specialist timber survey has been carried out by Tim Floyd of Floyd Consult which is included in Appendix A which outlines the condition of the existing timbers as reasonably sound, but requiring some repair. Should the existing timber structures be retained as part of a future scheme, a full list of repairs and further inspection has been listed out for attention.

5 Proposed Alterations

A planning application was submitted in June 2019 (2019/3406/P) for the *"part demolition of the existing building (in a conservation area), erection of a new front façade and external staircase on the front elevation, rebuild of chimney, raising of roof slopes and erection of a roof extension within the nook of Omnium Court to accommodate a two-bedroom residential unit with ancillary artist's studio/gallery. Insertion of new windows and/or doors on the rear and side elevation. Provision of waste and recycling storage, cycle parking and amenity space."*

Following submission of the application, in October 2019 the planning officer advised that they will be recommending refusal as *"the proposal aims to demolish substantially the building including the front façade which has various attributes of special interest considered to contribute positively to the CA."* They also advise that *"the front façade of the building may have the scope of some improvements, however, it should be, by and large, be preserved."*

Therefore I will consider the two options presented relating to the front facade:

Option A: Original Planning Application – Removal of the front façade and replacement with a contemporary brick frontage and projecting glazed staircase to the front courtyard.

Option B: Camden's Suggested Amendment – Retain the front elevation via a façade retention scheme.

6 Discussion & Conclusions

The existing building appears to have been built as a relatively lightweight out-building or stable block, not intended to last. The existing structure has been substantially altered, particularly at roof level, with the removal of key elements of structure and the insertion of an extra storey within the roof space which might be difficult to justify to modern domestic floor loadings.

The rainwater disposal system for the roofs is inadequate and there are signs of longstanding damp throughout the building. Despite this, the timber elements of the building appear to be reasonably sound. Although the timbers are currently in reasonably good condition, they are in direct contact with damp masonry and will require ongoing repair and maintenance. While this is an acceptable part of the custodianship of a historic structure, it would be a significant liability in the context of a fully refurbished new building.

The building's existing foundations sit in very soft made ground, rather than extending to good gravels below. The front facade appears to have a very minimal foundation, with some portions sitting on top of the 1970s ground slab – presumably because they are not part of the original elevation. The rear and Party walls would lend themselves to retention and re-use assuming no additional loads are added to them, and that new loads are carried by new structure on new foundations within the existing walls. No additional load could be added to the existing front wall and significant intervention or underpinning would be required to retain the lower portions of front façade, while allowing removal of the 1970s ground slab.

The front elevation has an unusual arrangement of brick spandrel panels supported on a series of Baltic Pine beams and posts. The brickwork overhangs the timber supports at Roof and First Floor levels, so the front wall relies on the internal timber floor and roof for lateral stability. The timber beams are strapped to the Party Walls, but this arrangement is much less robust than if the front wall were entirely masonry and bonded into its returns. Façade retention is usually applied to reasonably robust masonry buildings but it is not clear how successful it would be to perform a façade retention on the hybrid brick and timber of the existing front elevation.

Based on the its minimal foundations, concerns about long term durability, the impracticality of performing a façade retention on such an insubstantial structure, the front elevation is not well suited to retention as part of a redevelopment.

Therefore, of the proposed alterations, Option A (Original Planning Application) would appear to be the feasible option to pursue in more detail, while Option B (Façade Retention) is considered structurally impractical.

Appendix A - Floyd Consult Report – Historic Timber Condition

FLOYDCONSULT

Building science, timber & Conservation

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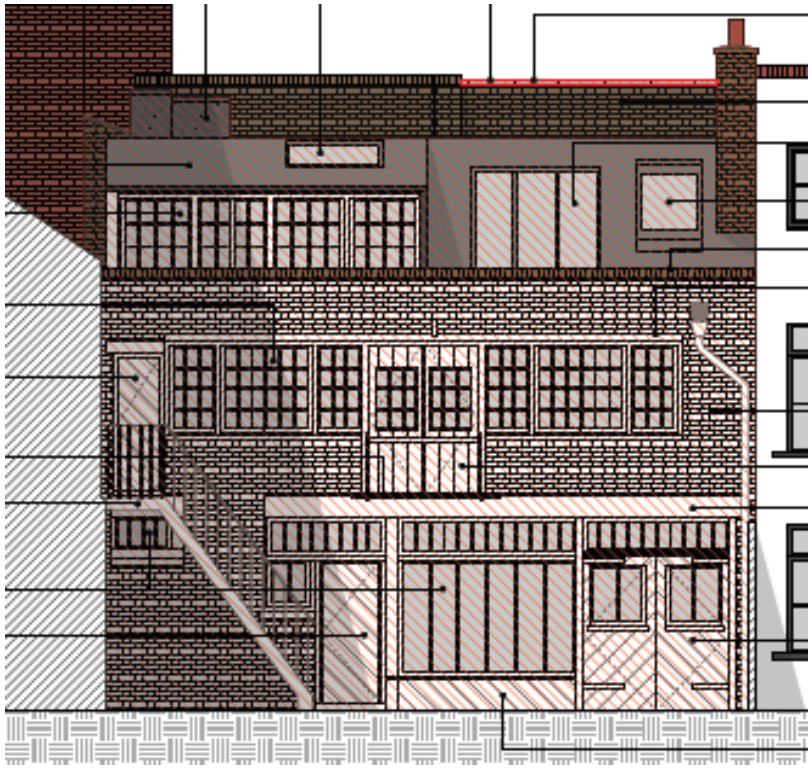
tim@floydconsult.co.uk

An assessment of timber at

50C, RED LION STREET, WC1R 4PF



INTRODUCTION

Following instructions from architect Jennifer Dyne of David Kohn Architects Ltd, I visited the above building on 10.03.20. The report is in the form of a schedule of photo observations which are referenced to plans of the building at the end of the report.

ROOF & 2ND FLOOR

1
Signs of water ingress through roof. Far photo showing the detail externally. There are signs of Peziza growth – a plaster fungus – just below the gutter line, indicating saturated masonry.

As such there is a probability of concealed decay of timber elements adjacent to the wall head.

2
An awkward detail has been formed in the roof, which is allowing slow ingress of water. Adjacent (inaccessible) timber elements in the immediate vicinity are likely to have been wet up and possibly decayed locally.

3
Historic water staining from enclosed valley gutter above. All timber is sound.

4
Vertical framing and panelling – possibly not of great age – found to be dry and in good condition.

Directly below – far photo – the underside of a valley gutter which has been previously repaired, with some remaining damage to 2 gutter brackets. However, the arrangement seems generally watertight.

5 The S bearing of the rafter plate was microdrilled and found to be sound in its bearing. A dragon tie reinforces this corner	
6 Showing the rafter plate restrained by a metal bracket – arrowed – the end of which was found to be sound. Embedded timbers in the N wall are generally sound. As a whole, the rafter plate – and the principal vertical support posts - were found to be in good condition, converted from slow grown Baltic pine.	
7 All accessible elements of the roof were found to be good quality Baltic pine. Historically there has been a reconfiguration of the elements (presumably related to installation of the roof lights) which will have affected the structural abilities of the roof – (structural engineer to advise). With one exception, both bearings of the tie beams of all 3 trusses were microdrilled and found to be sound in the wall (to the W) and over the rafter plate (to the E). The W bearing of truss 1 was inaccessible. All joists which form the mezzanine sections – or second floors – are also in good condition.	

1ST FLOOR

8
The W wall has been wet up - possibly from above by the defects associated with the enclosed valley gutter, possibly a damaged or blocked outfall – arrowed in far photo.

Much of this wall is concealed by plant growth.

The photo shows the underside of the first floor structure directly below this point. It is probable there is a timber element trimming the floor structure over the window opening. There are signs of long term water staining at this point and it is possible there may be some concealed decay to the first floor structure.

The W bearing of the large section floor beam – arrowed opposite – was probed and found to be generally sound – although due to the concealed nature of much of the first floor structure, it is recommended that the boxing is removed to enable a more detailed inspection.

9
Showing the N end of the first floor plate externally. The end of the plate is sound and appears to have a tenon or notch cut in it (arrowed) – presumably originally a connection of some kind – possibly to an embedded timber for restraint.

The bearing is on the line of a downpipe – far photo. It is possible there was previous decay to the end of the plate – which is why it may have been cut and the support reconfigured. The accessible end section is in good condition and the end of this beam presumably now restrained by concealed connections internally. The remainder of this beam is sound – see discussion.

10
Photo showing representative damage to the sill. This is usual, where water and consequent decay have damaged the lower section of the sill for almost the full extent of the first floor windows.

Far photo showing the feet of many of the vertical (window) frame elements have decayed – some showing signs of repair.

The sashes seem to be in better condition – although fixed shut, thereby restricting full access.

11
The extreme end of the post is decayed where in contact with the floor. It is probable some sort of filler has been used as a (substandard) repair.

The post is strapped to the N wall which seems to have stopped it dropping (again).

12
The base of the post bears onto a plinth and is sound for its full height.

13
The base of the post was mostly concealed and inaccessible.

14
Base of post boxed out and partially concealed.

DISCUSSION

W elevation

There were no overt signs of active or damaging decay. There may be concealed decay to elements of the building associated with defects/blockages of the valleys to the W (obs 1 and 8).

E elevation

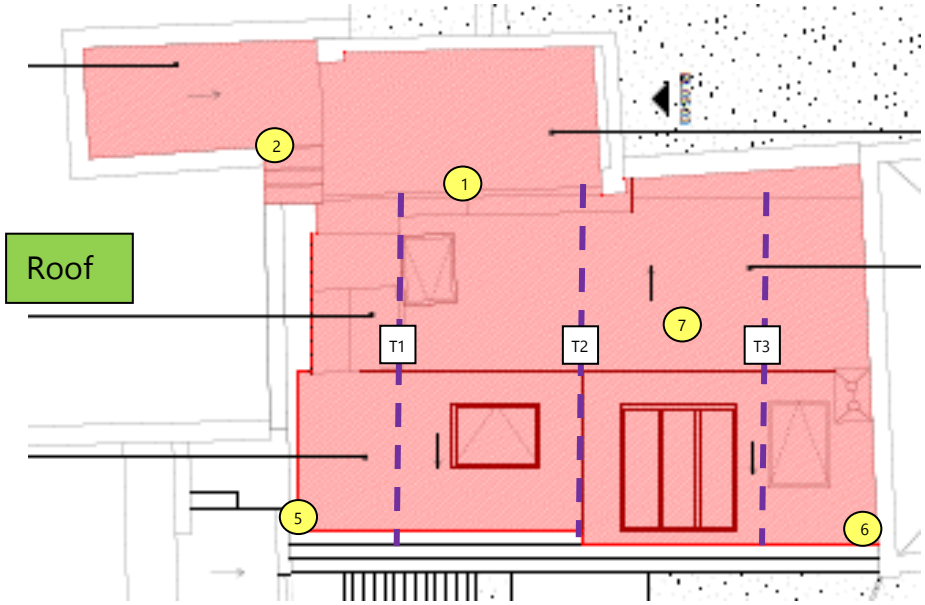
There has been a degree of remedial work carried out over the lifetime of the building associated mainly with the dropping of the N end of the E façade (possibly due to decay of supporting timber structures and/or more general alteration/addition at this end) and subsequent stabilisation works to strap various elements in the façade back to the N wall.

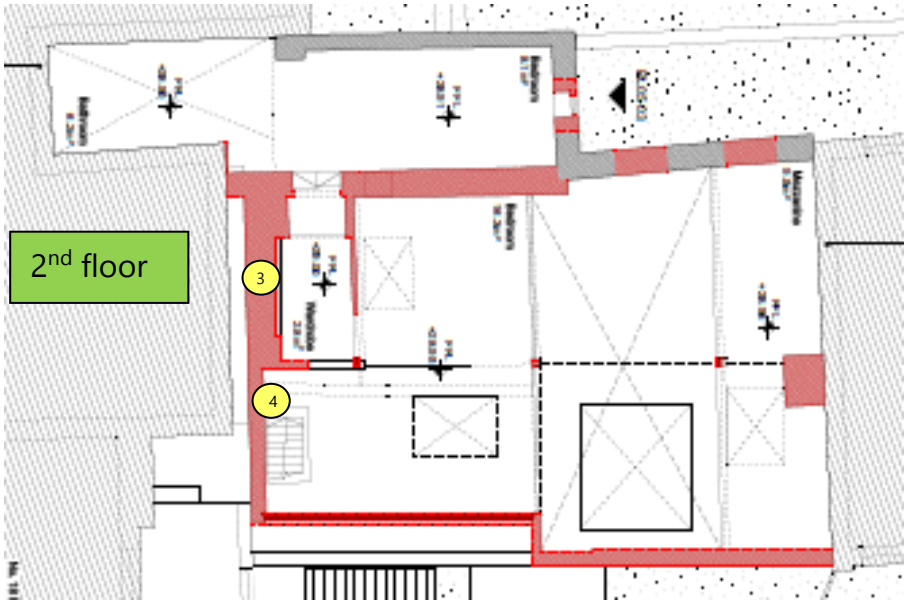
Given the positions of the principal vertical posts – which run either side of the openings and also possibly through the windows at first floor level – the decay to the window sills and feet of some vertical elements of window frame is probably not structurally significant when considering the support for the rafter plate/roof.

The damage to the windows and the sills can be repaired in situ.

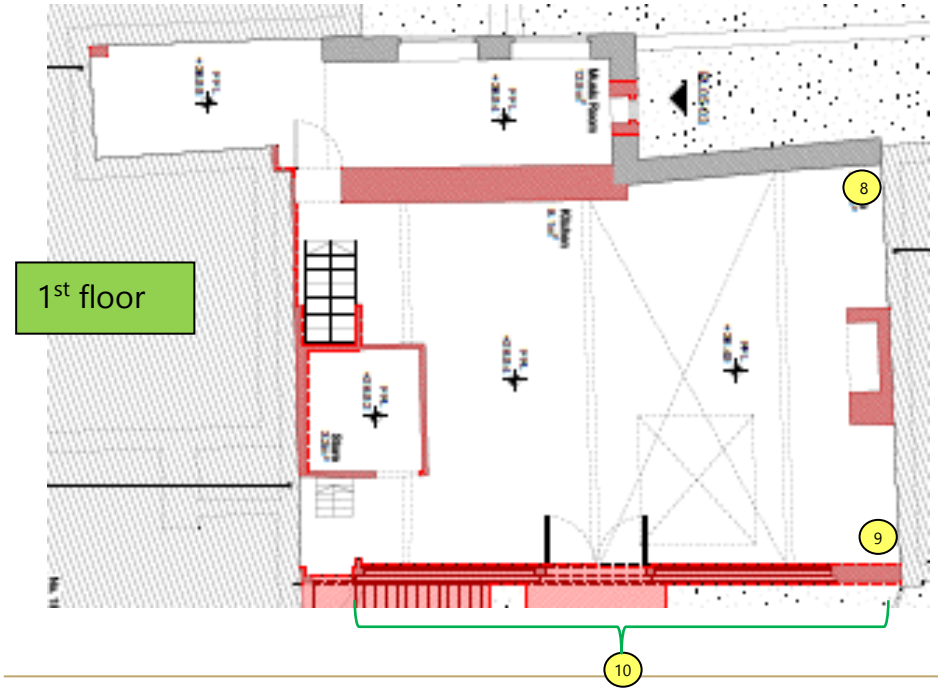
The first floor plate or beam is in good condition. Much of the rest of the first floor structure was inaccessible. The base of the principal vertical support post at the N end of the building is historically decayed and requires a more robust sectional repair. It seems probable that the bases of the inaccessible posts will be sound.

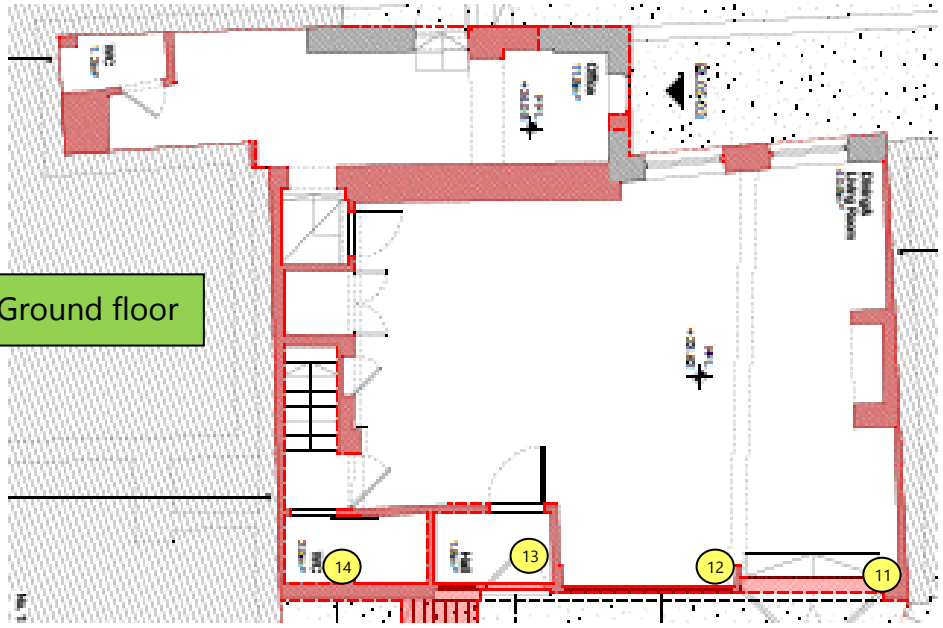
Tim Floyd – March 2020


Roof
1
2
5
6
7
T1
T2
T3


2nd floor
3
4

N


1st floor
8
9
10


Ground floor
11
12
13
14