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Structural Inspection

On

Chatham Mill, Chester Street, Manchester, M1 5GE

For

Span Group

August 2016

STRUCTURAL INSPECTION

ON

CHATHAM MILL, CHESTER STREET, MANCHESTER, M1 5GE

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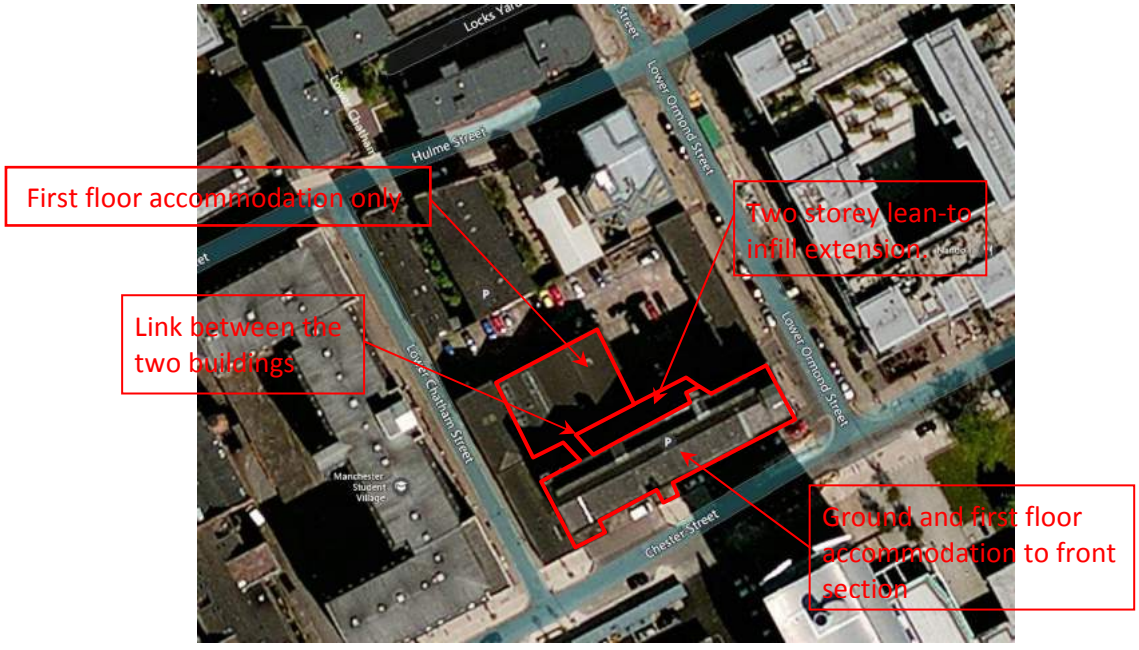
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1.0 INTRODUCTION

This report was commissioned by Span Group to comment upon the structural condition of the property in advance of the refurbishment that is planned to be undertaken.

The property was visited on the 4 August 2016 when a visual inspection was carried out on the section of the property under the ownership of Span Group. The section of the property under consideration is the ground and first floor of the front section of the overall building. The ground and first floor section on the corner of Lower Chatham Street and Chester Street is outside of the demise and therefore has been excluded.

Although the internal inspection was limited to those areas under the ownership of Span Group, a general visual inspection from pavement level of the complete external envelope of the Mill was undertaken. The extents covered by this Report are indicated below.



As noted, this report is based on visual observations. We have not carried out any exposure work and therefore any areas that were covered, unexposed or inaccessible have not been commented upon. A detailed inspection of the roof coverings and roof structure that was not exposed has not been undertaken and is also excluded from this Report.

We did not check for any evidence of damp, wet rot, dry rot or timber infestation as this falls outside our area of expertise and would recommend that a specialist survey be undertaken to cover these items specifically.

2.0 HISTORY AND GENERAL DESCRIPTION

Chatham Mill (formerly known as Runcorn's Mill) became a Grade II Listed Building in 1988 and was a cotton spinning mill originally. The front section of the mill, fronting onto Chester Street was built in 1820 with the side extension fronting onto Lower Ormond Street being built shortly after in 1823. On the front South West corner, the twentieth century loading dock had been formed from what was probably the original internal engine house. Behind this the original chimney at the North West corner had been truncated.

Generally the elevations are red brick with relatively small rectangular windows, centred on the structural bays, with cambered brick window heads concealing what were probably timber lintels. The main entrance to the former mill building is on Chester Street and is of a type and style that is consistent with the thought that it was introduced in the 1920's.

The form of construction for the front section that encompasses the part of the building that is the subject of this report was typical for a building of this age and was typically timber floor construction supported off cast iron columns. Our inspection of the interior of the building at the ground and first floor levels revealed that the original columns and floor beams had been replaced with contemporary steel sections.

Mid-way along the rear elevation, the original taking-in doors have been retained together with the timber surround and vertical slate cladding to the winch-room at the head.

3.0 OBSERVATIONS AND DISCUSSIONS

For ease of reporting, the building had been split into three areas falling in the ownership of Span Group, namely the original front section internally at both ground and first floor levels, the rear building at first floor level only and the lean-to infill extension between. The external envelope has been commented upon separately.

3.1 Area 1 – Original Front Section

To the left hand side of the original building there is a two storey internal loading bay that was formed sometime during the twentieth century. The roof and separating floor appeared to have been formed in concrete with shutter boarding being visible. Towards the rear at high level there is a soffit forming what appeared to be a staircase that is also of concrete construction by which is trimmed with cranked steel beams (Plate 1). Although decoratively in poor condition, the soffit appeared to be in a reasonable condition from a structural point of view.

The main body of the floor plate is accessed via two steps down through a full height opening that provides forklift access to the ground and first floor levels and a standard height opening onto a concrete slab that is believed to be ground bearing. Personnel access to the upper level is gained from the loading dock via a light gauge steel staircase located in an ante-room off the loading bay at the front (Plate 2). The ground floor is given over to storage for the full length which, at the time of inspection, was fairly dense thus limiting the degree of free access. From the aisles it was noted that the original two rows of cast iron columns had been supplemented with modern hot rolled steel channel sections that were laced together with bolted steel plates at approximate third points. The vertical steel channels supported pairs of steel beams, one either side of what appeared to be the original steel beam, which spanned onto the front and rear walls and on steel angle cleats bolted to the faces of the channels (Plates 3 & 4). The beam ends appeared to be set in a concrete surround in both front and rear walls which will act as a padstone as well as providing rotational restraint at the support (Plate 5). The new steel beams appeared to be of a standard paint finish. Sprinklers had been installed.

The underside of the timber first floor construction spanning between the beam lines had been clad with what appeared to be ply sheeting with battened joints that had received a textured paper covering prior to painting. Consequently we were unable to inspect the timber joists themselves, although it was noted that there was no evidence of appreciable deflection across the spans.

The main access point to the first floor was via a concrete staircase rising from a lobby within the main entrance contemporary portico framing the entrance doors. Approximately 50% of the floor plate is laid out for offices, with the remainder being used for storage purposes. Access to the rear section is given off this level by a link bridge between the two sections.

As with the ground floor level, the structure within the warehousing section also appeared to be supplemented with relatively new steelwork. Mid-way across the rear of the warehouse section a significant area of ceiling board had been taken down and the timber construction forming the second floor level had been exposed. At this point it could be seen that the original timber joists were heavily charred and that they had been supplemented by new timbers laid beside them (Plate 6).

Within the office space there is a metal grid suspended ceiling below the ply boarded soffit to the second floor thus limiting the inspection of the base construction, however where visible the floor beams appeared to have been clad. Similarly, the columns within the office space had also been clad and from the overall size of the column cladding, we believe that the original structural cast iron columns had also been supplemented with hot rolled steel sections as had the columns within the warehousing (Plate 7).

As a general observation the first floor felt solid for timber construction, and there were no excessive deflections noticeable from above or below. Likewise the second floor appeared to be level.

3.2 Area 2 – Rear Section

The rear section of the area within the ownership of Span Group is accessed via a link structure bridging from the main building. This link is of a masonry form of construction, with the upper level of the link being supported by steel beams spanning between the two buildings. There is a level difference between the two buildings that has been taken out with a ramp. The roof to the link is flat with translucent sheeting to provide some natural light (Plates 8 & 9). The area under the link has been bricked in to provide an enclosed space forming part of the lean-to infill extension that has been included in Area 3.

The rear section within the demise occupies the first floor of two different buildings, both having a pitched roof; these have been referenced as Buildings 1 and 2 (Plate 10). Within Building 1 there is a mezzanine floor that is without the demise and therefore excluded from this report. This mezzanine has a fire escape, the soffit of which intrudes into the space, which is shared with a fire door from the demise giving entry to the escape stairs down to ground level (Plate 11). The mezzanine is incorporated within the roof space, with timber floor joists spanning between the original timber roof trusses that span across the width of Building 1 (Plate 12). The bottom boom of the trusses have been propped by small diameter circular steel posts which we believe are positioned directly above the main structural columns that support the floor.

The first floor level to both Buildings 1 and 2 were, we understand, given over to storage, although at the time of our inspection the floor plates had been cleared. As with the main warehousing within the front section, Building 1 had a sprinkler system that protects the floor construction over, as well as the soffit of the escape stairs. The external walls had been constructed as loadbearing masonry with punched windows.

There were signs of cracking in the apron between ground and first floor levels that were visible internally and although not new in their formation they are considered to be indicative of movement in the masonry caused by deterioration of the lintels from either rot or creed deflection (Plates 13 & 14).

Building 2 was accessed via two double personnel doors through the party wall, there is also a fire door leading into a lobby that discharges onto an external fire escape down to the inner courtyard area. We would note that the fire escape routes that had been provided to Buildings 1 and 2 have not been tested. The first floor level within Building 2 is a clear space with timber and steel tie roof trusses spanning across the space (Plate 15). This space also had sprinklers installed. There was damp staining on both of the side walls and along the lines of the valley gutters (Plate 16). There was old stepped cracking on the front wall at high level running diagonally downwards from the gutter board adjacent to the party wall with the adjoining property (Plate 17).

3.3 Area 3 – Lean-to Infill Section

This section was two storeys in height with the ground floor level being accessed from the main warehouse area in the front section. Approximately 50% of this section has been built between the main mill building and Building 1 towards the rear. The remaining section of Area 3 was formed with what appears to be a new cavity wall forming the real wall of the lean-to section; the flank wall is of a similar form of construction and incorporates a full height roller shutter door (Plates 18). There was also a brick built lift shaft that passes through the extension. The roof covering to in lean-to infill was a mixture of corrugated sheeting and roof glazing.

At ground floor level there was a large amount of goods being stored that severely limited our access for inspection (Plate 19). We were able to establish that the first floor level was supported by longitudinal steel beams spanning between transverse steel beams spanning from wall to wall, being built in at both ends. A section of ceiling had been removed to reveal timber joists forming the floor to the upper level which are supported on the main longitudinal beam at one end and a steel section that appeared to have been bolted back to the masonry wall at the opposite end (Plate 20). This area also had a sprinkler installation beneath the upper floor.

The upper level is accessed from the link and had a pitched ceiling that was under-lined with what appeared to be ply sheeting similar to that used elsewhere. There were inclined steel beams spanning from the main mill building to the external wall or end wall of Building 1 (Plate 21). At the end of the floor plate there was an office and against the back wall there was a steel roof truss in lieu of the steel beams used elsewhere (Plate 22). As with all other areas, this area had a sprinkler installed. Beyond the back wall there is additional dead space that wraps around the lift shaft that, at the time of our inspection, we were unable to gain access to due to the storage at ground floor level (Plate 23). As noted this space, which was directly behind the roller shutter door, was dead as it had no permanent access.

3.4 External Envelope

Front Elevation
Another lift shaft had been built against the front elevation which appeared to have been constructed at the same time as the shaft at the rear. In both cases there was a straight joint between the new brickwork and the original elevations. As noted in the introduction a new main entrance was created mid-way along the elevation (Plate 24) probably during the 1920's and it was noted that the original structure had not been adversely affected by its introduction.

In general all of the fenestrations within this elevation were square and it was noted that there were no obvious signs of damage or distortions that could have occurred as a consequence of ground movements. Above the new entrance there were what appeared to be the remnants of monitoring pins being fixed to the brickwork, although it was noted that at the time of our inspection there was no obvious signs of cracking around these suspected monitoring points. There was a widespread problem within the elevation with the pointing to the brickwork being poor with erosion of the joints being noted (Plate 25). Above several of the windows there was cracking apparent in the masonry apron between the windows, the most notable of which was adjacent to the left hand gable (Plate 26).

Lower Ormond Street Elevation
Our inspection disregarded the 1823 extension that forms the majority of this elevation as it is not within the demise of the Span Group and with the exception of the junction of the two storey section above the undercroft leading to the car parking at the rear of the mill buildings. Above the undercroft there was a concrete floor that was supported by concrete downstands, possibly steel/cast-iron beams encased in concrete, at third points and built into the rear wall of the main mill building. The entrance is formed with a semi-circular masonry arch supporting the masonry over, and at the back there are two steel/cast-iron beams performing the same function. The ends of these were also built into the rear wall (Plate 27).

On the gable elevation of the original mill building the pointing is in a reasonable condition, particularly when compared with the front elevation. The windows on the gable elevation were "blank" with the exception on the central vertical stack of windows, together with some smaller windows that gave light onto the internal staircase in this corner. It was noted that all of the aprons between the central stack of windows had cracking in them over the cambered brick window heads (Plate 28).

Rear Elevation
On the rear elevation, adjacent to the undercroft, there were what appeared to be four bosses to tie bars above the ground floor window, the purpose of which was unknown. Above a first floor window within this section of the rear elevation there was an apron that had vertical cracking following the mortar joints and an apparent step between the apron and the main pier between the windows (Plate 29). Generally, from our ground level observations, the mortar joints and pointing appeared to be in a reasonably sound condition and in better order than the front elevation.

As noted in our previous observations, there a several buildings that have been added to the rear of the main mill building, although the upper levels of the elevation appeared largely as original. On the rear wall of Building 1 the peak of the gable had been rebuilt sometime in the recent past, together with the introduction of an additional window to the mezzanine level. The original loading-in doors had been removed and replaced with windows similar to the original. The aprons between these windows was set back from the original wall line, the apron between the ground and first floor windows had a bond similar to the original wall, whereas the apron above the first floor window had a different form of bond that suggests that the mezzanine window was introduced at a later date. The apron between the two windows adjacent to the lean-to infill extension did not display cracking indicating that the cracking noted internally had not been reflected through the wall. Generally the masonry and pointing to building 1 were found to be in a relatively good condition. The external walls to the lean-to infill extension also appeared to be in good condition with no evidence of movement being obviously apparent (Plate 30). The roof to Building 1 had been re-covered with interlocking concrete roof tiles which are heavier than the original slate roof covering. We would note however that the roof line appears to be true with no obvious or significant sagging being apparent.

The rear wall of Building 2 is flanked by Building 1 on one side and the adjoining building fronting onto Lower Chatham Street on the other and is set back from both by varying degrees. As noted previously, the latter is excluded from this report. As with building 1, the loading-in door at first floor level had been removed and replaced with a window with what appeared to be a concrete lintel over. The original pulley beam projecting from the face of the wall remained. Generally the masonry and pointing to Building 2 was found to be in a relatively good condition with no evidence of movement being obviously apparent therein. Unlike Building 1, the roof to Building 2 retained the original slate roof covering.

On the left hand corner of this elevation a loading bay had been added, with the front being extended out to the back of the pavement line. The roof to this extension is flat with the rainwater discharging via a downpipe against the original front elevation. Spanning between the loading bay extension and the new lift shaft was a steel beam that appeared at some time supported a sloping roof to cover the space as there was a wall plate bolted to the original wall.

Lower Chatham Street Elevation

The gable wall of the original mill building rose above the low level building fronting onto Lower Chatham Street, our view of this section was therefore limited to a visual inspection from pavement level. As with the opposite gable wall, the majority of the windows were “blind” and infilled with masonry that was set back from the main wall line, with only a few being full windows. On the front corner there was a large section of white staining on both faces. From pavement level it appeared that the wall had been re-pointed in this area and it is possible that the staining has been caused by efflorescence emanating from a salt rich mortar mix or cement leeching from the mix. At the head of this staining there was some mature vegetation growing around the cast iron rainwater pipe as well as growing out of the mortar joints themselves (Plate 31).

At the head of the wall, the coping stones running up the gable had sections broken off as well as a general lack of mortar in the joints. With the exception of the aforementioned stained section the gable wall, like the main front elevation, there was a widespread problem with the pointing to the brickwork being poor together with erosion of the joints being noted (Plate 32).

4.0 CONCLUSIONS AND RECOMMENDATIONS

Obviously our comments and observations relate to the structural performance of the building. During our inspection it was apparent that there had been some damp penetration into the building and a general deterioration of the decorative condition of the property. These issues fall outside our area of expertise and responsibility and we would suggest that a comprehensive survey by a qualified Building Surveyor be undertaken to comment on all matters that affect the general fabric of the building.

From our visual inspection of the property as a whole we are of the opinion that there has been no structural movement caused as a consequence of ground movements and the like.

When considering the external envelope of the building, the front and left hand gable that runs parallel to Lower Chatham Street have a general problem associated with the mortar joints and in particular the erosion of the pointing. The two elevations in question are South and West facing respectively and are subjected to greater wind and rain exposure than the North and East facing walls and this would explain why these two walls appear to be affected to a greater degree.

From our inspection of the external envelope there appears to be a fairly wide spread problem of diagonal cracking in the masonry apron between the windows. The most probable cause for this damage is likely to be a deterioration of the timber lintels behind the cambered brick window heads caused as a consequence of wet rot, dry rot or general creep deflection.

Following our inspection of the interior of the property it became apparent that all of the beams at first and second floor levels and the cast iron columns from ground to second floor level had been supplemented by the addition of new hot rolled steel sections. From the charred floor joists that had been exposed in the second floor, within the warehouse, we are of the opinion that the mill building was the subject of a major fire incident at some time in the past. Cast iron when subjected to very high temperatures followed by thermal shock during fire fighting can lead to a reduction in strength of up to 40%. Referring to Blitz Britain: Manchester and Salford by Graham Phythian, it has been established that the fire was not caused as a result if incendiary bombing during the war.

As stated previously, we have only inspected those areas from the mill buildings that fall within the demise of the Span Group, consequently we do not know how badly the building as a whole was affected by the fire and whether the supplementary steel had been added to all levels or not. For the sake of completeness we would recommend that a brief walkover inspection of the remainder of the original mill building be arranged and undertaken to establish the full extent of the remedial works that were undertaken.

As part of any refurbishment programme, we would recommend that all timber backing lintels be fully exposed and inspected by a specialist dealing with wet rot, dry rot or timber infestation. The lintels are likely to be multiple timber sections therefore any specialist inspection must ensure that all timbers are checked. Particular attention is to be paid to those windows where cracking has developed in the masonry over. Obviously any deficient lintels should be removed and replaced on a like for like basis. Subsequent to the repair/replacement of the lintels the cracking within the masonry should be repaired using a mortar mix that is identical to the one that was used originally. The mix can be established following the taking of mortar dust samples in order to determine the proportions and constituent materials that were used. This process is a typical demand when repairing historic buildings that have Grade II listed status and prior to initiating any repairs all relevant approvals must be sought.

The above repairs would apply to all of those areas that are within the care/ownership of Span Group. A greater issue in respect of the general longevity of the building is the need to address the problem of mortar erosion of the South and West elevations. We are unaware of the ownership or lease arrangements that the Span Group hold on their section of the building, however there is a collective responsibility of both owners and tenants to maintain the listed building. We are of the opinion that the South and West elevations should be re-pointed for their entirety and there are obviously shared costs and responsibilities associated with this for which we are not qualified to comment or advise upon.

Notwithstanding the above we are of the opinion that in overall terms the building is in a reasonable structural condition considering its age and that with the implementation of the above recommended works the building will perform satisfactorily for some time to come.

APPENDIX A – PLATE RECORD

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Plate 1 – Loading Bay



Plate 2 – Personnel Access to First Floor



Plate 3 – Supplementary Beams



Plate 4 – Supplementary Columns



Plate 5 – Concrete Surround at Beam Ends



Plate 6 – Charred Second Floor Timbers



Plate 7 – Office Space Showing Clad Column



Plate 8 – Link between Front and Rear Sections - Internal



Plate 9 – Link between Front and Rear Sections – External

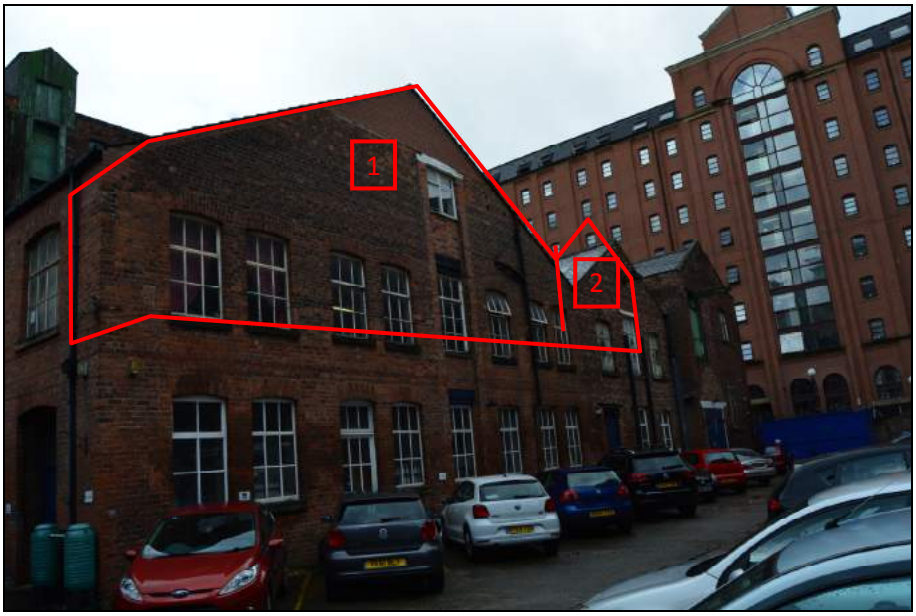


Plate 10 – Extents of Buildings 1 and 2



Plate 11 – Fire Escape from Building 1



Plate 12 – Mezzanine between Roof Trusses



Plate 13 – Cracking in Apron between Windows Adjacent to Link



Plate 14 – Cracking in Apron between Windows on Flank Wall



Plate 15 – Roof Construction to Building 2



Plate 16 – Damp Staining along Line of Valley Gutter



Plate 17 – High Level Cracking in Front Wall



Plate 18 – External Elevations of Lean-to Infill Extension



Plate 19 – Dense Storage at Ground Floor of Lean-to Infill Extension



Plate 20 – Dense Storage at Ground Floor of Lean-to Infill Extension

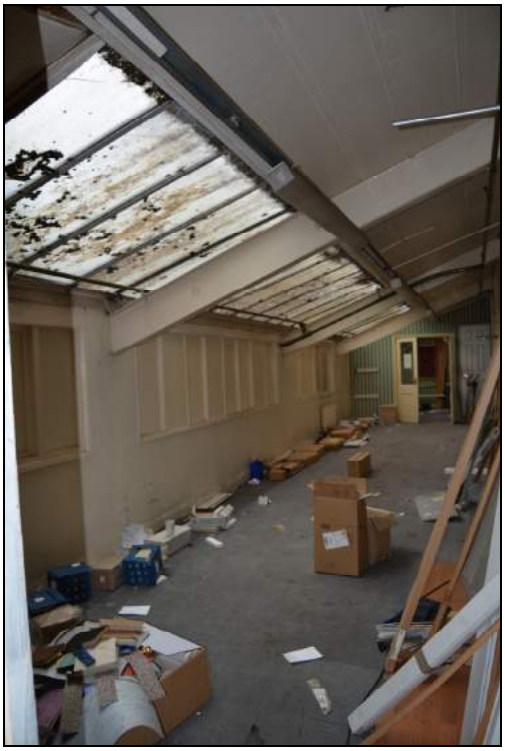


Plate 21 – First Floor Level of Lean-to Infill Extension

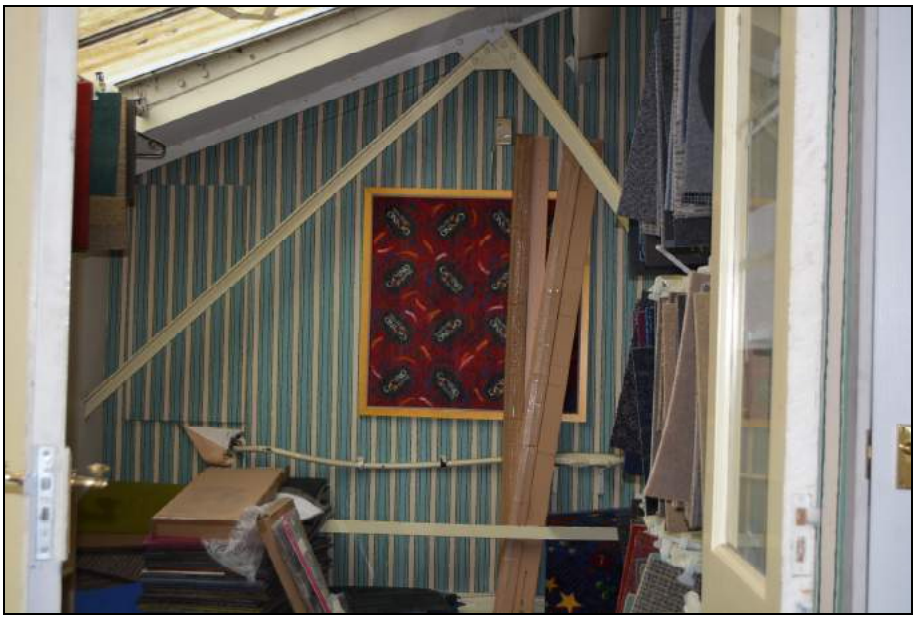


Plate 22 – Steel Truss at End of Lean-to Infill Extension



Plate 23 – Wrap around Space at End of Lean-to Infill Extension



Plate 24 – 1920's Main Entrance in Front Elevation



Plate 25 – Suspected Monitoring Points on Front Elevation



Plate 26 – Cracking in Masonry Apron between Windows on Front Elevation



Plate 27 – Undercroft Leading to Rear Courtyard Car Parking



Plate 28 – Typical Cracking in Masonry Aprons on Gable Elevation



Plate 29 – Main Rear Elevation adjacent to Undercroft



Plate 30 – Flank Wall of Building 1 and External Walls to Lean-to Infill Extension



Plate 31 – Gable Wall of Main Building 1 showing White Staining and Vegetation



Plate 32 – Gable Wall showing Damaged Copings and lack of Pointing