

Structural Inspection Report
Bevin Bevin & Co. Ltd.
Brewery Hill, Arundel
West Sussex



Client:

T. Hollister (Chertsey Ltd.)

Ref.:2361
08 March 2012
Rev –

Introduction

Paul Tanner Associates have been instructed by T Hollister (Chertsey) Ltd. to visit the site, carry out a visual inspection of existing buildings and to report in connection with a proposed redevelopment scheme by Martin Critchell Architects.

Arun District Council has requested a structural report to accompany the Listed Building Consent Application for the proposed development.

Report Status

This report is confidential to the addressee and for the specific purpose to which it refers. It may be disclosed to other professional advisers assisting in respect of their purpose, but neither the whole, nor any part of the report or any reference thereto may be included in any published documents, circular or statement, nor published in any way without our express consent. No liability can be accepted to other third parties.

Nothing in this report confers or purports to confer on any third party any benefit or any right to enforce any term of the contract pursuant to the Contracts (Rights of Third Parties) Act 1999.

The inspection was carried out from ground level externally and from floor levels internally. No opening up was carried out. Our insurers require us to state that we have not inspected any parts of the structure, which were covered, unexposed or inaccessible and therefore we are not able to report that any such part is free from defect.

This report is a pre-planning document and is not intended to be a fully detailed structural or condition survey of the buildings.

Description of the Buildings

The history and architectural description of the buildings will be addressed in the Heritage Statement.

A key plan indicating building references is included in Appendix A.

For the purposes of this report it is noted that the warehouse building (referred to as Building 1) is listed Grade II and that the site lies within a Conservation Area. In addition to the warehouse there are a number of curtilage buildings. The site which was originally a brewery has been used for the past 50 years as a domestic hardware wholesaler by Bevin Bevin & Co. until the business closed in 2011.

With reference to the Conservation Architect's report, there appears to have been buildings on the site since at least the late 18th C. The current arrangement of buildings had become largely established by the mid-19th C.

The buildings generally have brick and flint walls, constructed traditionally, with brickwork used in bands, piers and at quoins to provide strengthening. The flints are generally a mixture of beach pebbles and knapped materials.

It is worth noting from Reference 1, that until the mid-19th C most building construction in Sussex was carried out by local labour using traditional techniques and indigenous materials. It was not until the railways were built in the 1850's that more widespread distribution of materials became economic. The collection of beach pebbles was freely available until 1916 when removal became regulated by Act of Parliament and most coastal towns such as Arundel had ready access to this material which was brought up from the coast by river.

Some walls within the single storey buildings also contain stones of other types.

These industrial buildings combine traditional materials and methods with use of cast iron in columns and substantial imported timber sections, probably from the Baltic countries to construct roof trusses and for principal floor beams.

From our inspection, the following is an outline description of each building:

Building 1 – Listed Warehouse

This is a three storey building comprising mass masonry walls of brick and brick and flint banding and suspended timber intermediate floors.

The ground floor is of solid construction, set at slightly above the external yard level.

The pitched clay tiled roof is carried by common rafters, purlins and a pair of king post trusses. Supporting the centre of each roof truss tie beam are cast iron circular section columns bearing onto second floor principal timber floor beams which span between the columns and in turn bear into the north and south gable walls.

The lines of columns continue down to first and ground floor levels with an additional line of cast iron columns and beams added to support the first floor, this evidently having been the main storage area. The first floor has clearly been adapted more than once to achieve its current arrangement and support. (Refer to cover illustration).

Common timber joists span between principal beams and flank walls on each floor to support the timber floors.

The south gable wall is now mostly obscured by the later addition of Building 2 and the north gable wall has been adapted with new ground floor openings into the present buildings to the north and west sides. Windows retained in these walls suggest that these were external walls at the original time of construction.

The north and south gable walls are generally constructed in 9 inch brickwork above first floor level including flint facing where present below the brickwork gable wall level. The flank walls and ground floor walls are more substantial in construction.

A view of the west elevation of Building 1 as shown in Figure 1 with Building 2 in the foreground illustrates the form of construction.



Figure 1 - West flank wall of Building 1 and rendered gable of Building 2. Note wall and roof construction, together with bulging wall line at roof level.

In terms of condition, there is some roof spread and displacement of wallplates as shown in Figure 2. There is also cracking of the walls, particularly at corners of the building above first floor level. Cracking in the south east corner of the building is most pronounced as shown in Figures 3 and 4.



Figure 2 - North West Corner Cracking and Wallplate Movement

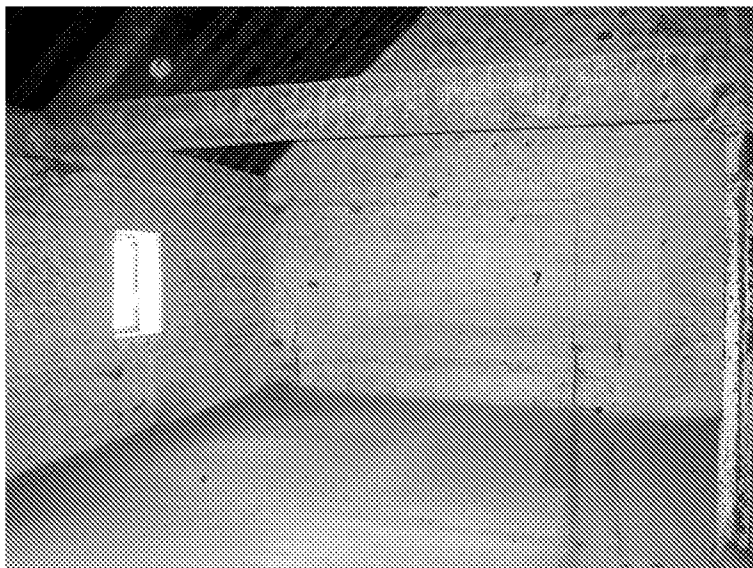


Figure 3 - South east corner cracking at second floor level



Figure 4 - Cracking on first floor level in south east corner, flank wall to left of picture

Water has entered the building through roof defects and there has been deterioration in some timber elements.

Building 2 – To South of the Listed Warehouse

This is a three storey building with semi-basement and comprises mass masonry external walls of rendered brick and brick and flint with suspended timber intermediate floors. There is a central spine wall on the first floor.

The semi-basement floor is of solid construction, set at about 700mm below the external yard level.

The pitched clay tiled roof is assumed to be carried by common rafters and mid-height collars supported on purlins. The purlins have centre span timber posts bearing onto a principal floor beam or the central spine wall. The underside of the rafters and collars are covered by timber boarding, concealing these elements from view. The rafters on the north side are built into the south gable wall of Building 1.

The second floor is assumed to be formed from the principal beam, with common joists spanning between the beam and flank walls. These elements are concealed by the floor and plaster ceiling.

The first floor is formed from a central principal beam, with common joists spanning between the beam and flank walls. A makeshift timber prop has been added to support the centre of the principal beam as shown in Figure 5.

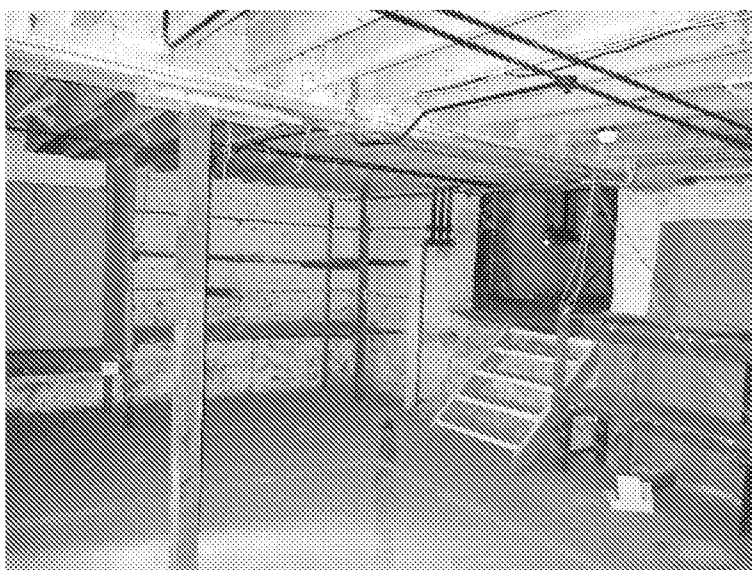


Figure 5 - Building 2 semi-basement showing propping of principal beam and steps up to Building 1 ground floor level.

The building has three external walls and these appear to be constructed in 9 inch brick and flintwork, rendered in cement mortar.

A new chimney has been constructed within Building 2 abutting the former south wall of Building 1.

In terms of condition, there is some roof spread and displacement of the southern wallplate. There is also cracking of the walls, particularly at corners of the building above first floor level and at windows in the south and east elevations. Cracking and roof spread in the south east corner of the building is most pronounced as shown in Figure 6. There is also separation between the spine wall and front wall above the first floor.

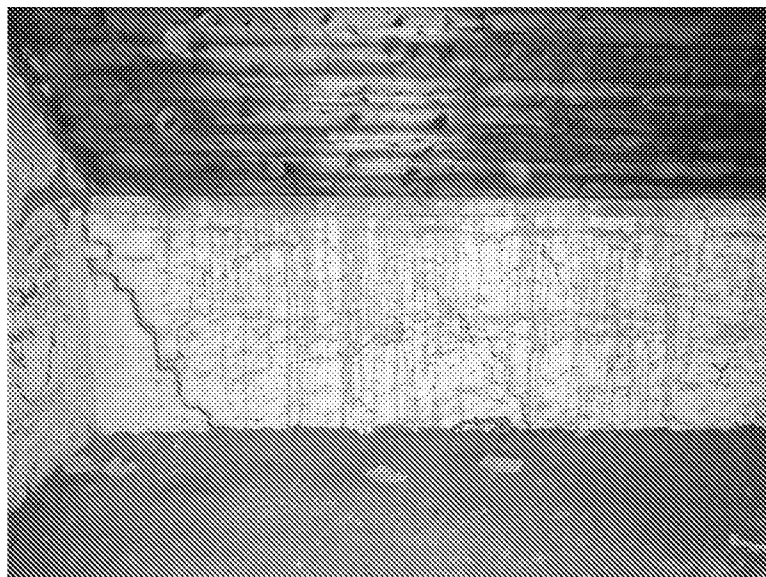


Figure 6 - Cracking, roof spread and water entry at south east corner on second floor

Water has entered the building through roof defects and there has been deterioration in some timber elements.

Building 3 – To North of the Listed Warehouse

This is a two storey building constructed between the north gable wall of Building 1 and the site north boundary retaining wall. Both walls appear to be constructed in brick and flintwork.

The pitched clay tiled roof is carried by common rafters with mid-height purlins supported on a series of king post trusses. The trusses and rafters bear into the rear gable wall of Building 1 and onto the retaining wall. The structure is partly concealed by timber boarding to the ceiling line.

The first floor is formed from series of principal beams spanning between the retaining wall and rear wall of Building 1, with timber joists between the beams.

The ground floor has a mass masonry retaining wall to its north side, rear gable wall of Building 1 on its south side and blockwork / brickwork walls at its east end. These east walls extend beyond Building 1 and appear to be more recent.

In terms of condition, there has been considerable water entry along the roof valley to Building 1 and also on the north side. There is extensive timber decay and some of the principal beams have been propped where their ends have decayed in the past.

The general details of these areas and decay is illustrated in Figures 7 and 8.



Figure 7 - Looking east in Building 3, indicating roof structure and water entry



Figure 8 - Looking west on the ground floor of Building 3, illustrating propped first floor beam and water entry. Retaining wall is to right of photograph.

The east end of Building 3 extends beyond Building 1, and the south wall is heavily overgrown with vegetation and is separating from the east wall as shown in Figure 9.

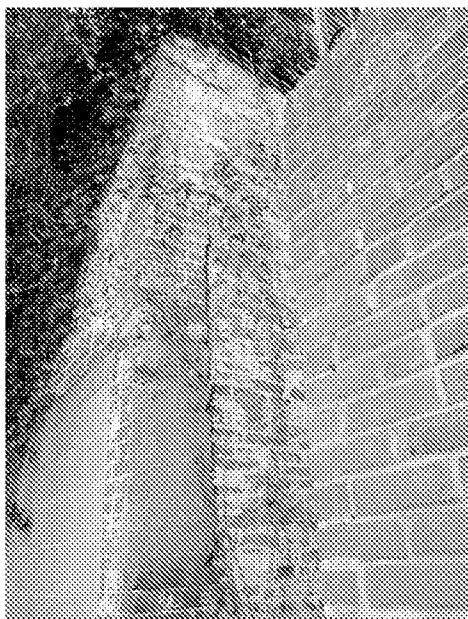


Figure 9 - East end of front and side wall of Building 3, showing vegetation growth and vertical cracking

Building 4 – To West of the Listed Warehouse

This is a large single storey storage building with modern timber mezzanine storage flooring constructed to the west of Buildings 1 and 3. To its north and west sides, the building has mass masonry partial retaining walls. Both walls appear to be constructed in brick and flintwork. To the south the building abuts Buildings 5, 6 and 9.

The pitched clay tiled roof is formed in three bays each carried by common rafters with mid-height purlins and supported on three lines of king post trusses. The end trusses and rafters bear onto the retaining wall and adjacent walls. Intermediate truss ends are supported on cast iron circular section columns.

Valley beams support the rafter feet between roof trusses.

The mezzanine floor is formed from series of softwood modern posts, joists and boards for former storage use.

This arrangement is illustrated in Figure 10.



Figure 10 - Building 4 central roof looking towards the west gable wall.

In terms of condition, there has been considerable water entry along the roof valleys and at the wallplates. There is also extensive decay in many areas as illustrated in Figures 11 to 13. Figure 12 indicates cracking at the support end of a steel beam carrying the south end of the two central roof trusses.

Some of the truss tie beams have been propped where their ends have decayed in the past as shown in Figure 13.



Figure 11 - Water entry and decay to valley area.

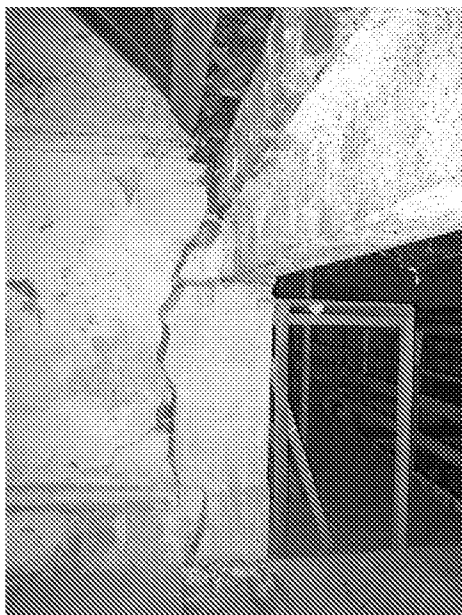


Figure 12 - Cracking of support to steel beam carrying roof trusses

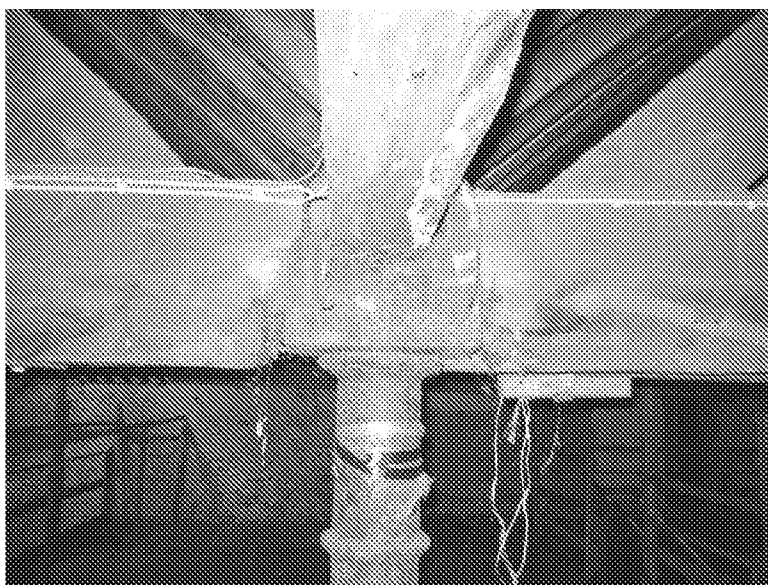


Figure 13 - Cast iron column head showing decay of roof truss tie beam ends (Beam on left has been propped with a steel post).

Building 5 – To South of Building 4

This is a small two storey building with timber flooring and single hipped clay tiled roof carried by a simple timber truss. The building shares its supporting brick and flint walls with the adjacent buildings.

Buildings 6 & 7 – To South West of the Listed Warehouse

These are single storey covered areas to the south west of Building 1.

The sloping roofs are covered with corrugated metal sheeting carried by modern softwood rafters and supported on a main upper beam. The ends of the rafters are supported on the listed building wall.

In terms of condition, the roof is poorly constructed and there is considerable water entry and decay against the listed building as shown in Figure 14.

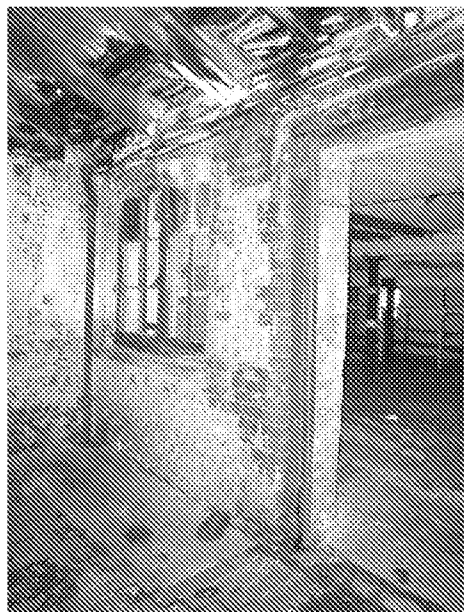


Figure 14 - Roof 6 support on listed building west wall

Building 8 – To South West of the Listed Warehouse

This is a further single storey covered area to the south west of Buildings 1 abutting the roof to Building 7. There is a low raised timber loading floor.

The pitched roof is covered with corrugated metal sheeting carried by modern softwood rafters and supported on main beams.

In terms of condition, the roof is poorly constructed and there is water entry and decay to the timbers.

Building 9 – To West of the Listed Warehouse

This is a single storey storage building with a partial ceiling. The walls are constructed in brick, stone and flintwork.

The pitched slate roof is formed in four bays each carried by common rafters with two lines of purlins and supported on softwood trusses with central tie rods.

In terms of condition, the roof is poorly constructed, there is water entry and decay. The trusses appear to be overloaded and the tie beams sag noticeably.

Building 10 – To West of Building 9

This is a large single storey storage building with timber boarded ceiling at top of wall level. The building has mass masonry partial retaining walls to its north and west sides. The walls appear to be constructed from a mixture brick and flintwork. Within the building are modern softwood timber storage frames which may now also help to support the roof weight.

The pitched clay tiled roof is formed in five bays each carried by common rafters with two lines of purlins supported on king post trusses, each with considerable span.

This arrangement is illustrated in Figure 15.

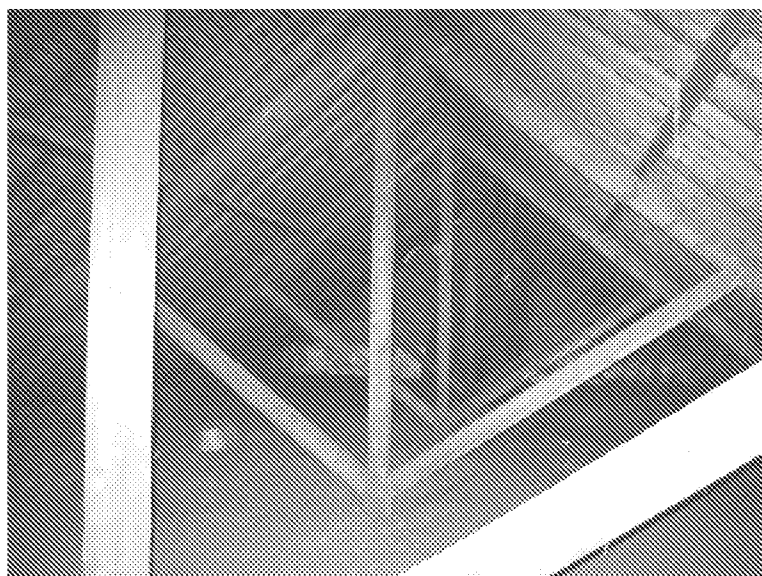


Figure 15 - Building 10 roof void looking towards the west gable wall

In terms of condition, there is some water entry and decay to the roof timbers. There has also been quite extensive vegetation entry.

Externally, the south elevation is visible from the adjacent garages area as shown in Figure 16, indicating vegetation growth, disturbance of brickwork and in-filled former openings.



Figure 16 - Building 10 south elevation.

Building 11 – Warehouse

This is a two storey warehouse building comprising mass masonry walls and timber roof structure. The east gable wall is of brick construction, the flank walls are brick with brick and flint banding and the west gable wall is again a mixture of brick and flint. Internally, there is a suspended timber first floor with a central line of supporting steel beams and columns.

The ground floor is of solid construction, set at the external yard level.

The pitched slate roof is carried by common rafters, double lines of purlins and a pair of king post type trusses with central tie rods as shown in Figure 17.

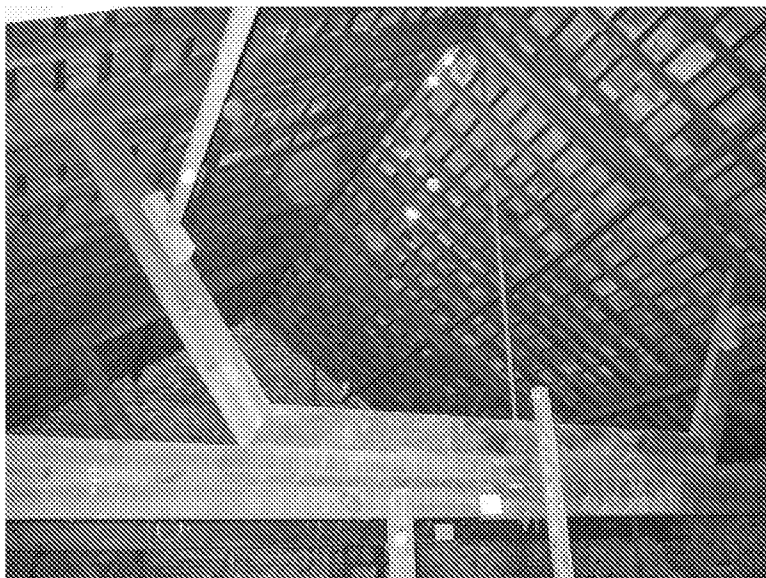


Figure 17 - Building 11 roof looking towards west gable wall

Common timber joists span between the steel beams and flank walls to support the first floor.

In terms of condition, there is local cracking of the walls, and a substantial full height crack in both the south and north walls which also passes through the ground floor paving as shown in Figures 18 and 19. There is noticeable subsidence in the east part of the building, and this extends northwards into Building 9 and south into Buildings 12 and 13.

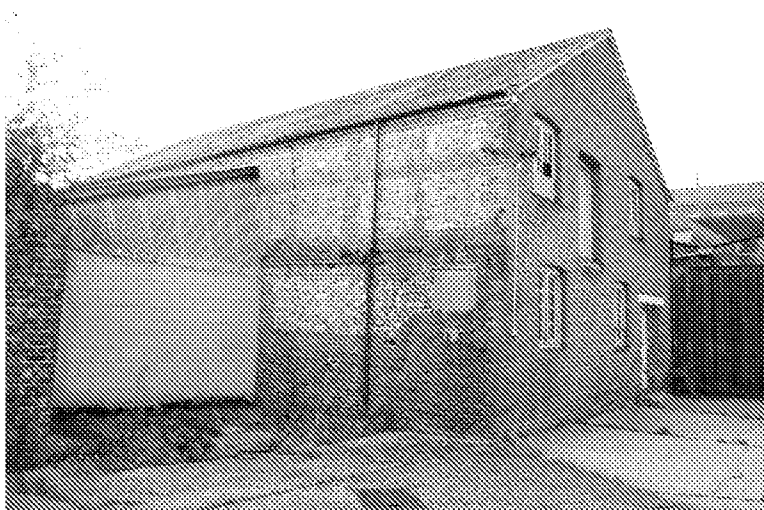


Figure 18 - Building 11 east gable and south flank wall showing cracking in flank wall.

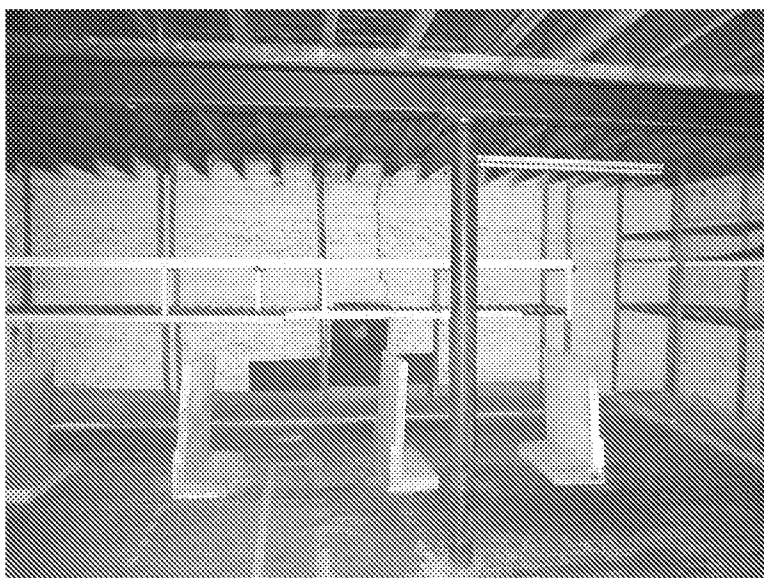


Figure 19 - Building 11 interior showing steel supports to first floor and cracking in north flank wall beyond.

Building 12 – Lean to between Buildings 11 and 13

This is a single storey lean to building comprising a slate roof carried on softwood rafters, purlin and timber trusses.

The ground floor is of solid construction, set at the external yard level.

In terms of condition, the cracking noted in Building 11 extends through the north and south walls and the ground floor slab. Water has entered through the roof and decay to rafter ends and roof trusses is present as shown in Figure 20.

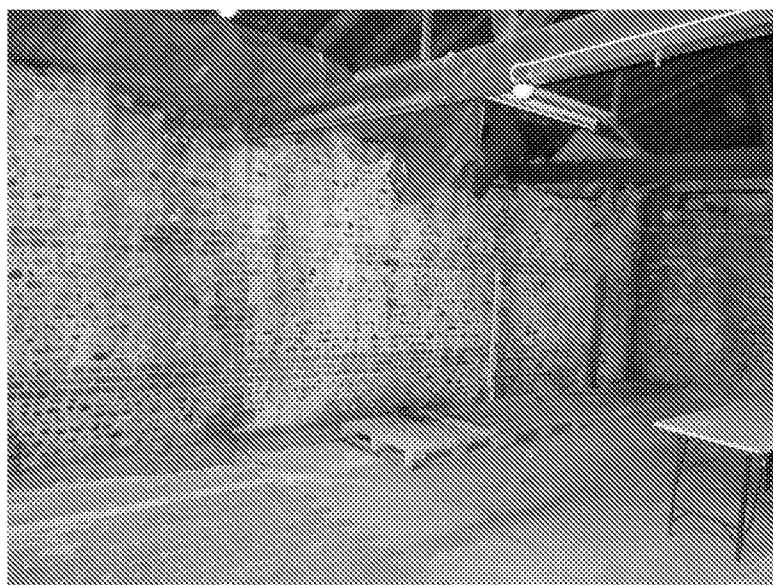


Figure 20 - Building 12 looking at north wall of Building 13. Note water entry and decay.

Building 13 – Open Barn

This is a single storey barn building comprising a tied curved profile corrugated metal sheet roof carried on small section steel roof trusses.

The open elevation of the barn has steel circular section columns supporting a timber wallplate beam.

The ground floor is of solid construction, set at the external yard level.

Walls are brick and flint construction, with the upper south curved gable wall in brickwork. The north gable is open above wallplate level, being only boarded.

The roof is quite lightly constructed and is now in poor condition.

In terms of condition, the cracking noted in Buildings 11 and 12 extends through the north wall. Water has entered through the roof and decay to wallplates, main beams and roof truss corrosion is present as shown in Figure 21.

The west wall is visible from the adjacent garages site and the wall has vegetation growth and loss of materials as shown in Figure 22.



Figure 21 - Building 13 interior



Figure 2 - West wall of Building 13 showing vegetation growth and loss of masonry facing

Site Boundary Walls to Brewery Hill and River Road

The south and east boundary walls of the site are freestanding flint, brick and occasional stone construction, varying in height. The wall opposite number 2 Brewery Hill also forms the supporting wall to a now derelict lean to building.

At the north end of the east wall, there is vegetation growth, loose coping bricks and cracking. Opposite number 2 Brewery Hill the east wall has some cracking at its corner and between the corner and main entrance gate the wall is cracked and leans slightly outwards. The wall is otherwise in good condition with superficial loss of mortar and other minor defects.

Between the main entrance and Building 13 the wall is in good general condition, and is cracked at the corner near to Building 13. The wall is in otherwise good condition with superficial loss of mortar and other minor defects.

Structural Implications of the Proposed Development

The proposed development scheme is shown on Martin Critchell Architects drawing.

In summary, this drawing indicates:

- Retention of Building 1, the listed building.
- Removal of Building 2, the rendered building.
- Removal of all other buildings on the site, retaining only the walls forming the site boundary to the north and west sides. These walls would be reduced in height to form boundary walls.
- Retaining the east gable wall of Building 10.
- Retaining and lowering the south and east boundary walls.

In summary structural works associated with the retained building elements would be as follows. This list highlights the nature of works and is not exhaustive:

Building 1 – Listed Warehouse

Structural strengthening and repairs to the roof, south gable wall, tying in the flank walls, crack repairs and bonding, repairs to decayed timbers, floor strengthening, making good to brickwork and flintwork.

Structural works would also be required in order to create individual dwellings within the building.

Lowering of the existing ground floor level in order to increase headroom may require underpinning of the existing walls, plinths with foundations to support the internal columns, together with associated works.

The south gable wall will need to be reinstated and repairs made throughout its height.

Retention of Walls

The east gable wall of Building 10 would be retained. This appears to be constructed from brickwork in English bond with occasional flints and two blocked up openings on the ground floor. Suitable strengthening and support would be required to incorporate this wall into a new building.

There is an area of settlement and possible subsidence to the south and west, affecting Buildings 9 to 13. This aspect should be investigated and resolved as part of the new development design.

Reduction in height of the boundary walls appears to be feasible, requiring repairs to flint and brickwork together with stitching and repairs to areas of cracking.

Retention of the retaining walls, incorporating boundary walls would also appear to be feasible, subject to masonry repairs.

Where boundary and retaining walls abut new construction, works to strengthen or underpin existing walls may be required, to integrate these with the new buildings and their foundations.

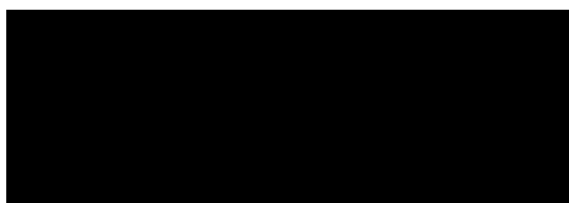
All structural works outlined in this pre-planning stage report will need to be fully designed at detailed stage following a further detailed inspections and assessment of all retained elements prior to any demolition being carried out.

Current Condition of the Buildings

There are many areas as noted in the description of the buildings where water entry has resulted in significant decay to structural timbers and other elements. There are also areas of masonry cracking and leaning boundary walls. The full extent of these defects was not determined during the inspection.

Some of the buildings are in poor condition and it is our view that works to repair these defects are now overdue. In their present state the roof supports to the single storey buildings, particularly Buildings 3 to 9 and 12 could fail without warning under continued decay or during adverse weather conditions.

Because the site is kept locked and secure there is low risk to the public and others from such failures, but the likelihood of problems will increase as the buildings continue to deteriorate.



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For Paul Tanner Associates

Reference 1 – Flint Buildings in West Sussex, Brian Dawson 1998.

APPENDIX A

Building Location Reference Plan

