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Manchester

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and Proposals Report

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Structural Appraisal, Condition and Proposals Report

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1. Introduction

1.1 Commission

Manner will be submitting a full planning application for a purpose-built student accommodation development located adjacent to the eastern side of the curve comprising both Cambridge Street and Cambridge Street.

Civic Engineers have been appointed to prepare a Structural Appraisal, Condition and Proposals Report to accompany the planning application.

This report should be read in conjunction with other consultants' work, including Architect, Mechanical and Electrical Engineer and Historic Building Consultant

1.2 Development Proposals

The Hotspur Press building is located adjacent to the eastern side of the curve comprising both Cambridge Street and Cambridge Street. The development site fronts the curve onto Cambridge Street to the east, and is bounded by the River Medlock to the south and west with First Street beyond, and the train line viaduct structure between Manchester Oxford Road and Deansgate stations to the north. The existing building, which dates back to the early 19th Century as a waterside textile mill, is a five-storey building with split-level basement, with load bearing brick masonry facade.

The building is a key asset located in the heart of Manchester city centre, and this project is to design a 36 storey tower with a padel court and gym provided at roof level, and plant and amenity uses within the basement level, whilst retaining two elevations of the prominent masonry façade of the 1801 mill as well as the curved masonry façade to the river front of the 1882 warehouse .

The re-invention of the Hotspur Press requires imaginative and flexible re-use of the existing building with investment in new public realm to create an external environment that is as attractive for public use, and as a feature link between First Street and Oxford Road train station.

The proposals include the retention and re-use of the 1882 warehouse, the façade retention of the northern and eastern existing façade of the 1801 mill building, the curved river-front façade of the 1882 warehouse and the curved boundary wall of the 1880s sheds fronting onto Cambridge Street.

The remainder of the building is expected to be demolished, and a new 36-storey tower block is proposed to replace parts of the Hotspur Press. The main reason for the proposed

demolition of the existing 1801 mill building is due to the existing constrained floor to ceiling heights rendering the existing construction unsuitable for conversion. Modern interventions will be required to the retained façade to provide restraint and stability alongside the new structure of the new building.

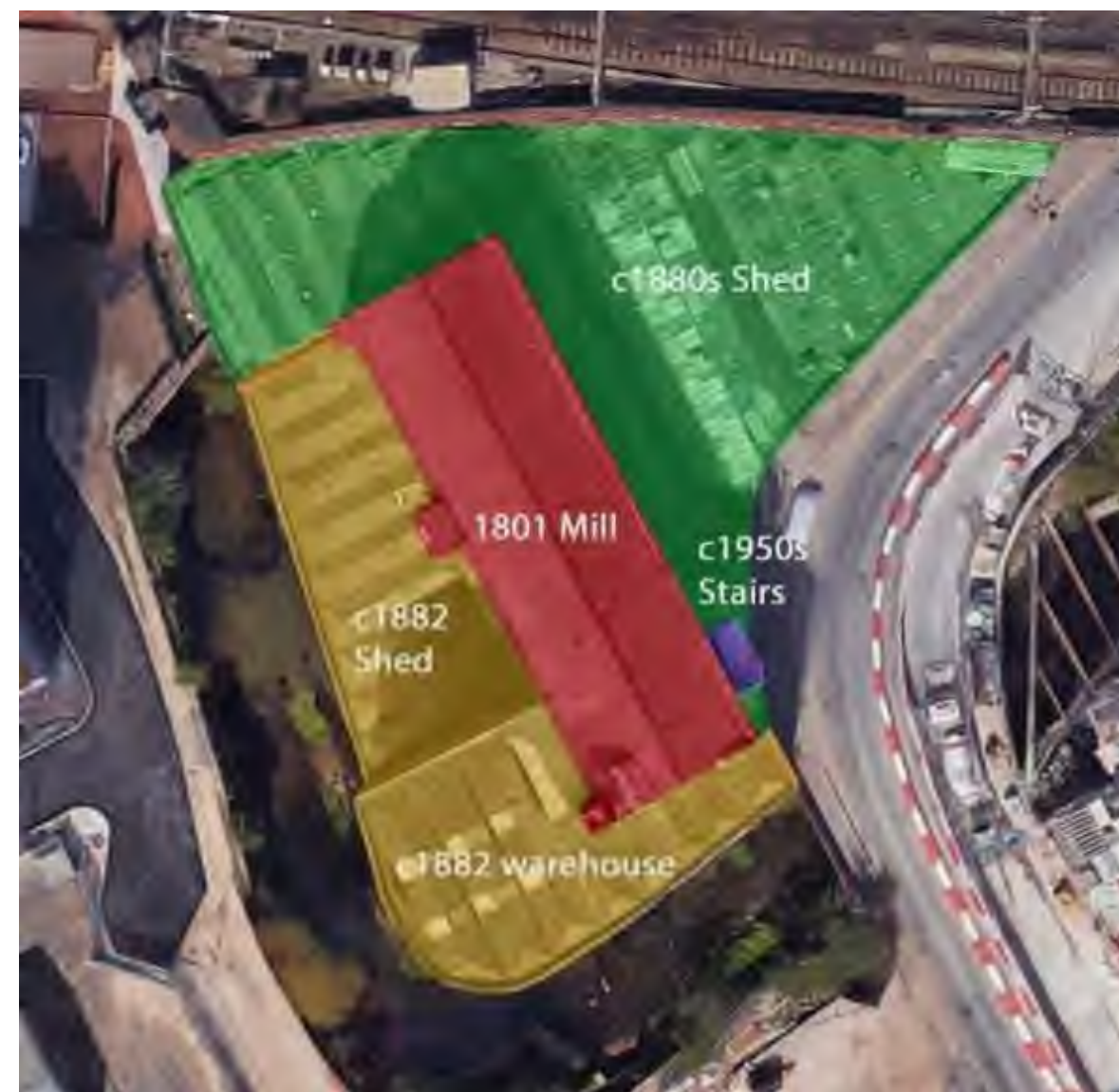


Figure 1 - Hotspur Press Site Location

1.3 Report Content

The site contains four buildings which were constructed at different times, as delineated by Figure 1. They collectively form the Hotspur Press, formerly known as Medlock cotton mill. The Mill and curved Warehouse are five storey structures with load bearing brickwork masonry walls, intermediate circular cast iron columns internally and timber joisted floors. Both sheds are single storey structures with load bearing brickwork masonry walls, cast iron columns internally and assumed concrete ground bearing slab. They have pitched timber roofs that are supported off timber beams.

This report provides a description of the buildings structure and the current condition of the buildings based on visual assessment of safely accessible areas, and where structural defects are apparent the potential reasoning for them.

The buildings were inspected over 4 No. initial site visits in May of 2018 where the majority of the following observations were made, and subsequent visits in March and July 2023 where the condition of the building was reassessed for any new defects, or further deterioration of existing defects identified previously. Civic Engineers were generally able to gain internal access to all floors of the Hotspur Press building complex.

2. Limitations

The surveys undertaken by Civic Engineers were limited to a general visual inspection of the buildings. Externally the buildings were viewed from ground level, internally from either ground or upper floor levels where safe access was possible. High level access into the roof structure was not possible.

It should be noted that a number of areas were concealed with ceilings / finishes in place which did not allow visual inspection of the structure locally. Further assessment of these localised areas will be required in due course upon soft strip of the finishes.

Whilst all reasonable care has been exercised in identifying defects and areas of structural concern, there may be underlying faults which are not ordinarily revealed during a visual inspection of this kind, which could affect the outcome and cost of the proposed remedial works.

3. Survey and Reports

In addition to the visual inspections carried out by Civic Engineers, several specialist surveys have been undertaken to provide further information on the condition of key structural elements in each of the buildings investigated. These specialist surveys/reports are listed below.

3.1 Asbestos Survey

An asbestos survey has been undertaken in 2004 by ASAP Building & Construction Solutions to determine whether asbestos containing materials are present at the site of Hotspur Press. The asbestos report (reference 61239) states that several samples have proven positive for Asbestos Containing Materials (ACMs). Reference should be made to the aforementioned report for all instances and locations of ACMs in the buildings. A copy of this report can be provided upon request.

3.2 Measured Building Survey

A measured building survey has been undertaken by Chris Partington Land Surveyors (CPLS) in April 2017 providing detailed plans of the current layouts of each floor plate and elevations. These plans have formed the basis of Civic Engineers' existing structural drawings found in Appendix A of this report. It is noted that the accuracy of some of these drawings cannot be wholly relied upon as there are some discrepancies between current layouts and the layouts surveyed at the time. There are also some dimensional discrepancies between column and beam layouts between floors. In these instances, Civic Engineers have assumed columns line vertically through the building except where it appears that structural elements have been previously removed. It would therefore be prudent for a further survey undertaken prior to any construction work taking place.

3.3 Timber and Damp Preliminary Survey

Timberwise have conducted an inspection of the buildings to determine the presence and extent of rising damp in ground floor walls, waterproofing, wood insects or fungi. A copy of this report can be provided upon request. A comprehensive damp and timber decay survey was not available at the time of writing this report, however, such a survey is currently being commissioned and the results of the survey will be appended to this report once it has been completed.

3.4 Structural Report

A structural appraisal report has been completed previously by Thomason Partnership Limited. The report summarises the condition of each building at Hotspur Press site and briefly sets out structural defects identified while conducting a visual survey. The report concluded that *"the building is in poor condition and would require significant works to both the building structure and fabric in order to ensure satisfactory future performance over any prolonged period of time."* A copy of this report can be provided upon request.

3.5 Phase 1 Geo-environmental Site Investigation

LK Group Ltd. carried out a desk top geoenvironmental investigation for the development site and the immediate surrounding area during May 2018.

A brief summary of the findings of the investigation can be found below:

- Geology at the site seems to compromise of made ground overlaying clay and soft red sandstone with competent sandstone and marl below this.
- Deep made ground and / or relic in-ground structures (from former buildings) may be present on site which could affect groundworks (e.g. grubbing out of structures) and type of foundations required (e.g. deepening of foundations / pilling).
- No past or present underground mining recorded within the site.
- Unexploded Ordnance (UXO) Risk considered to be low.
- No significant source of ground gas identified. Gas monitoring or precautionary gas protection recommended if significant made ground or putrescible material is identified.
- Likely probability of sulphate attack on concrete.
- Likely probability of dermal contact or inhalation of soil, fibres and dust containing heavy metals, PAHs, hydrocarbons and other inorganic and organic contaminants (made ground, cotton mill, printing works)
- Onsite sources of volatile contamination identified (hydrocarbons or solvents) – moderate risk assumed due to the extensive industrial heritage. Low probability of inhalation of vapours due to the concrete floors present on site.
- Sources of mobile contaminants identified on site (metals, PAHs, hydrocarbons, volatile compound). Low probability of mobile contaminants to migrate due to the concrete floors present on site. Groundwater and surface water sampling recommended due to the extensive industrial heritage of the site.
- Moderate risk assumed at this stage of organic contaminants posing a risk to water pipes. Potable waters risk assessment recommended once pipeline depths and routes are known.
- Likely probability of direct contact with phytotoxic contaminants in areas of proposed soft landscaping as contamination considered possible, which may be taken up by flora.

Refer for more details to "Hotspur Press Cambridge Street, Manchester. Phase 1 Preliminary Risk Assessment" report by LK Group, reference LKC 18 1196, May 2018.

4. Historical Development

4.1 Site Development

The Hotspur Press building, also formerly known as Medlock Mill, does not contain any listed buildings. The structure is not located within a conservation area and it does not contain any heritage assets, refer also to Heritage Appraisal Report by Stephen Levrant Heritage Architecture Ltd., May 2018.

The first town map dating to 1794, shows that the site at Medlock Mill is not yet developed, refer also to Figure 2. The location of the first Cambridge Street Bridge can be seen crossing over the River Medlock.

The 1800 Pocket Plan of Manchester shows a considerably smaller mill on the site of Medlock Mill. This initial mill was most probably destroyed in a fire in 1801.

The first historical map that shows a structure approximately resembling the current Hotspur Press building, dates from 1809 (see Figure 4).

The 1921 shows the site partially developed, despite the site being fully developed with sheds to the north between the 1801 mill and rail viaduct. The current map is detailed in Figure 6.



Figure 2 - 1787 Town Map of Manchester



Figure 3 - 1800 Pocket Plan of Manchester



Figure 4 - 1809 Historical Map of Manchester



Figure 5 - 1921 Historical Map of Manchester

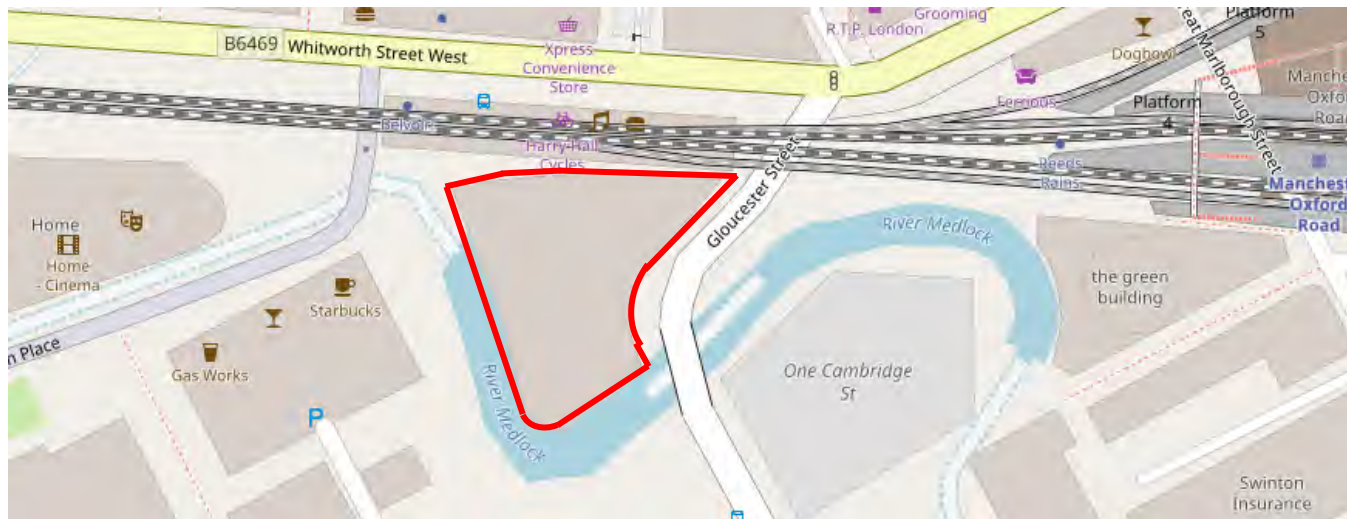


Figure 6 - Current Map of Manchester

4.2 Medlock Mill Development

The initial layout of the Medlock Mill included five buildings marked in Figure 7- Building (a), (b), (c), (d) and (e).

Building (a) was originally a six-storey factory and loft, and forms part of the only structure that still exists on site today. The mill was being used for spinning cotton and flax. The mill would have most likely been water powered due to the close proximity to the River Medlock.

Building (b) was the engine house, a two-storey building adjacent to the factory.

Buildings (c), (d) and (e) were designated as batting rooms and each of the buildings were three-storey structures. They were later demolished to allow for the erection of the current shed located to the north and north-east of the site, adjacent to the train line viaduct. Percy Brothers Limited ('Percy Bros'), a large printing firm, was the longest-reigning owner and business to have occupied the Medlock Mill. They purchased the site in c.1900 and renamed the building as is also know today 'The Hotspur Press'.

A photograph dating from c1903, refer also to Figure 8 shows the historic sign 'The Hotspur Press' which still survives today. The early wall, looking across the eastern elevation, was removed to allow for the Cambridge Street bridge to be widened.

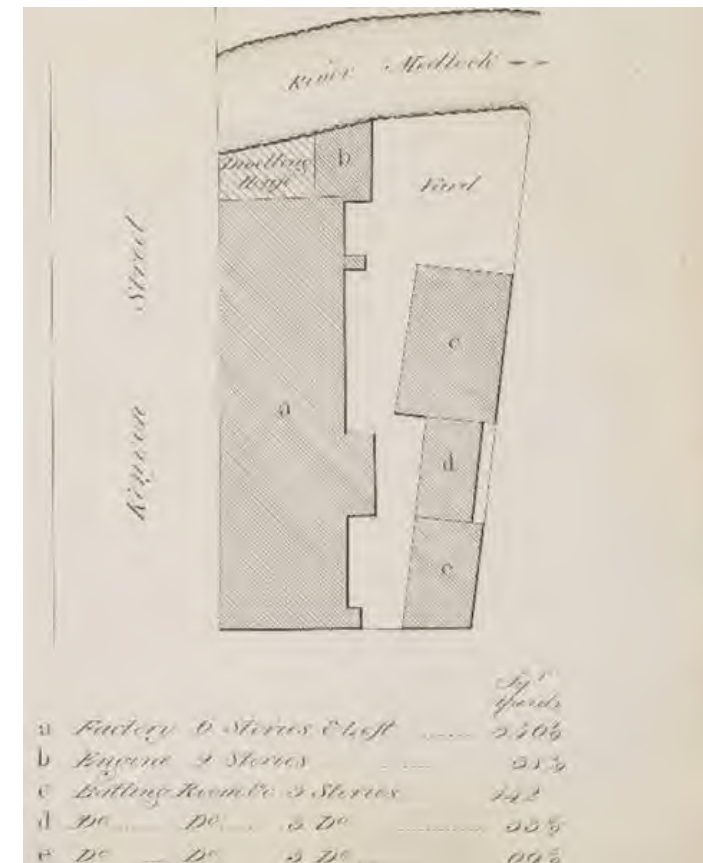


Figure 7 - 1822 Medlock Mill Buildings Plan



Figure 8 - Medlock Mill in 1903 as viewed from south east to north west

5. Structural Arrangement and Condition

5.1 Warehouse (5 storey) –

5.1.1 Roof



Figure 9 - Building Aerial View



Figure 10 - Warehouse Roof Structure (taken 2018)

While conducting the visual survey, Civic Engineers was not able to gain access to the external roof of the Warehouse. From aerial photos, refer also to Figure 9, it appears as though the roof has a bituminous covering and some vegetation growth is visible within the troughs of the pitched roof. The roof structure features a pitched timber roof with primary timber beams spanning between load bearing perimeter brickwork masonry walls with intermediate circular cast iron columns. The primary timber beams feature two primary softwood timber sections back to back, with staggered bolts connecting them. From visual survey, it was not possible to determine whether a central fitch plate existed between the two back-to-back timber members.

The timber beams at the southern section of the Warehouse span between the two load bearing external brickwork masonry walls. The timber beams to the remainder of the Warehouse are spanning between load bearing brickwork masonry walls with circular cast

iron columns offering intermediate supports, as illustrated also in drawing S-EX-106, Appendix A of this report.

Roof timber rafters are typically located at 400mm centres (approx. as measured from floor level) and span between the timber ridge beam at the apex and the primary timber beams in the trough of the roof. The roof construction in the southern section was obstructed from view during the surveys due to the roof being internally under-boarded with timber boards as shown in Figure 11.



Figure 11 - False ceiling at roof level (taken 2018)

Parallel flange channel (PFC) sections have been used to strengthen several timber beams at the supports, refer also to Figure 12. The PFC sections have been face-fixed to the sides of the timber beams with staggered bolts.

There are areas along the west elevation with significant water ingress that appears to have resulted in expansion of historical embedded timber (possible rot, subject to detailed survey) and has caused the failure of numerous lintels at roof level. Brickwork and mortar is typically in poor condition and crumbles to the touch. There are numerous signs of

efflorescence of the brickwork and mortar where water has been allowed to penetrate the existing roof coverings.

Most lintels have been replaced with newer precast concrete lintels internally and there has been rebuilt brickwork at eaves level over the lintels. This is also evident externally where new brickwork appears at parapet level.

Rafters appear damp where openings within roof lights have perished. Timber at eaves level is also visibly wet.

There is significant deformation and signs of decay to the first main timber beam on the western section of the building. The deformation is due to movement of the column supporting the roof in this area.



Figure 12 - Previous strengthening of timber beams (taken 2018)

During the most recent site visits in 2023, it was evident that water ingress at this level had continued since the original observations were made. Water staining and flaking paint finishes were more pronounced across the majority of roof members, with evidence of timber members having deteriorated further resulting in section loss in some instances (refer to figure 13).



Figure 13 – Timber structural member decay and section loss (taken 2023)

5.1.2 Third Floor

The primary timber beams feature two primary softwood timber sections back to back, with staggered bolts connecting them, as per Figure 14. From visual survey, it was not possible to determine whether a central flitch plate existed between the two back-to-back timber members. Most of the timber beams at third floor levels have a paint covering. False ceiling present to the underside of third floor level obstructed the inspection of the timber joists. It is assumed the timber joists at second floor level are similar to the timber joisted floor at lower levels. The timber joists are assumed to be approximately 75mm wide and 230mm deep at 400mm centres, as illustrated also in drawing S-EX-105, Appendix A.. Timber floorboards are overlaying the timber joists.

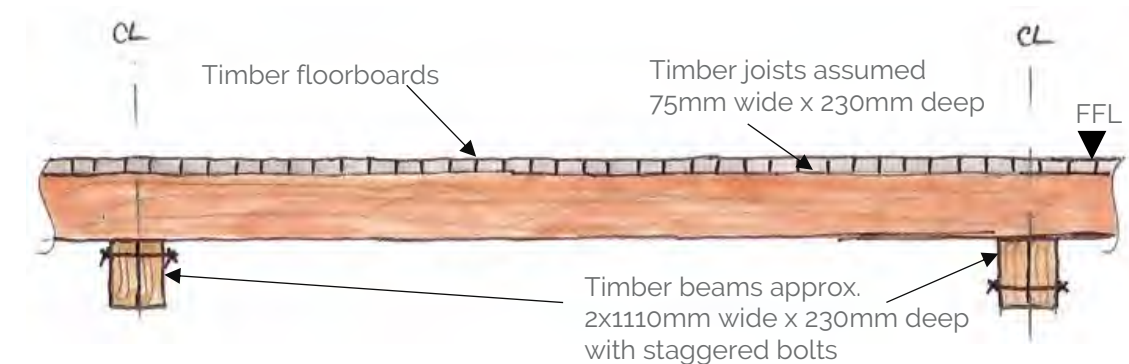


Figure 14 - Timber joisted floor at third floor level

At the western section of the Warehouse, more recent steel beams have been introduced most probably to provide support for several lifting hoists. The steel beams span between the cast iron columns and masonry elevation walls, as per Figure 15. It appears the steel beams are supported directly on the masonry elevation walls with no signs of any padstones.



Figure 15 - New steel beams (taken 2018)



Figure 16 - Timber board introduced with the timber posts (taken 2018)

It appears that several timber posts have been introduced at third floor level to offer additional propping to the roof timber beams. A timber bearing member is located between the roof timber beams and the timber posts, as per Figure 16

Cast iron columns at third floor level are typically 135mm in diameter (approx.).



Figure 17 - Cracks below sill at third floor level (taken 2018)

There are numerous visible cracks below window sills, which is likely attributed to the failure of timber lintels above windows at second floor level, as shown in Figure 17. The failure of the lintels has allowed the sill to deflect with the possible rotten timber. Crack patterns are consistent with failed lintels; diagonal cracks emanating from the support where the timber lintel has been allowed to deflect. Tension develops to the underside of the brickwork resulting in the cracking.

Pattress plates are found in the large brickwork pier adjacent to the lift shaft, as shown in Figure 18. The pattress plates may be an indication that the brickwork pier is hollow. A large tension rod was found that ties the external elevation with Cambridge St to the pier, which is likely to be attributed to the cracking evident in the pier that extends vertically from roof level. It is not known when the tension rod was installed during the lifetime of the warehouse.



Figure 18 - Brickwork pier adjacent to the lift shaft (taken 2018)



Figure 19 - Cracking to external wall on Cambridge Street, corresponding to return wall (taken 2018)



Figure 20 – Significant dish to the third floor (left column) (taken 2018)

Significant dish is evident to the floor plate where there has been movement of the column supporting the roof, as per Figure 20. The floor is sloping down towards the position of the left column delineated in Figure 20. The magnitude of the slope was not recorded, however the dishing is clearly visible to the eye. Further investigations are recommended to better understand the cause of the dishing. Opening-up works are proposed to be carried out here to investigate the restraint of the column base.

This section of floor displacement is the largest evident in the 1880s warehouse at third floor, and reduces in magnitude at lower levels. It appears there are no evident signs which would indicate when this dishing initially occurred.

The columns at roof level have a lack of restraint to the column heads. The pitched roof exerts a lateral force on the column head, and an imbalance in the load, combined with pinned connection at the base and head, has allowed the column to deflect laterally due to a mechanism forming. There are also weak points at the column head where beam splicing is evident.

Vertical deflection in the primary beam at the column head is evident. The larger part of the beam deflection is located in the central span of the primary beam.

Some areas of the timber floor at third floor level are displaying obvious signs of damp and deterioration from previous water ingress, as is evident in Figure 21. Water ingress is prevalent through the external walls.



Figure 21 - Deterioration of the timber floor at third floor level (taken 2018)

There appears to have been a previous fire to the underside of third floor as there is evidence of charring to the timber floor joists. The extent of fire damage is unknown due to the floor joists being concealed by a false ceiling and other finishes.



Figure 22 - Internal vegetation growth on southern masonry wall (taken 2018)

Vegetation growth is evident along all elevations at third floor level, see Figure 22 as example. Missing rainwater goods may have facilitated the vegetation growth as water may be running down the elevation rather than flowing in to roof gutters and down pipes.

Open joints and missing mortar between the masonry units is further facilitating the vegetation growth within the elevation walls.

Debonding of perpendicular walls is evident between the 1801 mill (shown bottom right) and the 1882 warehouse (shown bottom left). This is shown in Figure 23 below, in which expandable foam can be seen between the two wall interfaces. The expanding foam is a later addition to the original construction.



Figure 23: Debonding of walls between 1882 warehouse and 1801 mill (taken 2018)

During the most recent site visits in 2023, the lower levels had continued to deteriorate due to the continued water ingress at roof level as described above.

5.1.3 Second Floor

The primary timber beams at second floor level are similar to third floor level. The timber beams feature two primary softwood timber sections back to back, with staggered bolts connecting them, as illustrated in Figure 24. From visual survey, it was not possible to determine whether a central flitch plate existed between the two back-to-back timber members. The timber beams are approximately 110mm wide and 230mm deep.

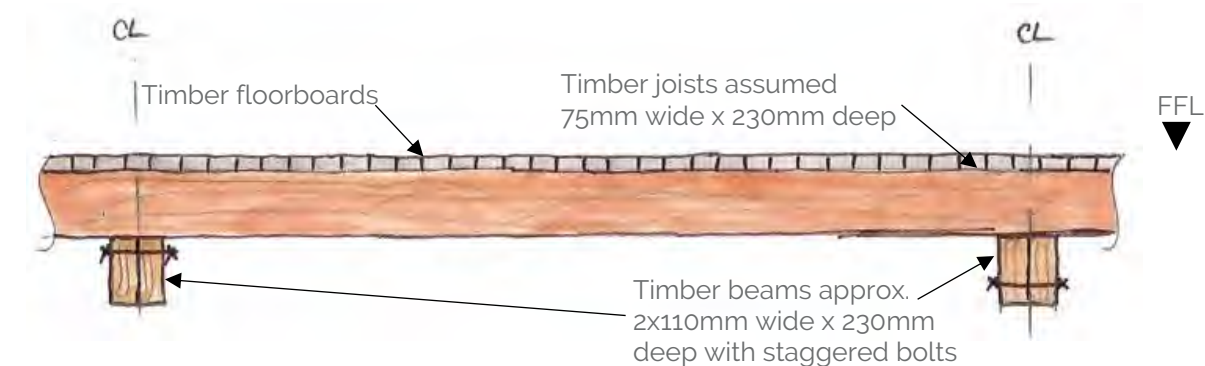


Figure 24 - Timber joisted floor at second floor level

Generally, a false ceiling was present to the underside of timber joists and it did not allow for an inspection of the existing timber joist sections at second floor level. It is assumed the timber joists at second floor level are similar to the timber joisted floor at lower levels. The timber joists are assumed to be approximately 75mm wide and 230mm deep at 400mm centres, as illustrated in drawing S-EX-104 in Appendix A. Timber floorboards are overlaying the timber joists.

Several steel beams have been added to the underside of the timber floor at second floor level most probably to provide support for different lifting hoists during the previous use of the building. Primary steel beams span from west to east directly onto the cast iron columns, as per Figure 25. A bracket around the column head has been later added to support the primary steel beam. The secondary steel beams span from north to south between the primary steel beams and masonry elevation walls. The end supports of secondary steel beams are built into the external walls, with no padstone supports observed.

Further water ingress across the floor plate is evident at second floor level, most noticeably to the building perimeter. Rotten timber lintels in the external elevation has caused window sills to drop and crack at second floor (timber lintels over windows at first floor).



Figure 25 - Primary steel beams bearing onto cast iron columns (taken 2018)



Figure 26 - Secondary steel beams bearing onto primary steel beams (taken 2018)

Located near the lift shaft there is a complex steel beam structure in a V-form arrangement with several stacked layers of steel beams and timber beams, as delineated in Figure 27. The steel beam structure most probably provided support for a heavy lifting hoist. Splice connections are located at approximately mid-span of the steel beams.



Figure 27 - Complex steel and timber beam structure (taken 2018)

Cast iron columns at second floor level are typically 135mm in diameter (approx.). Typical cast iron stanchions support the timber floor beams at second floor level, as delineated in Figure 25 and Figure 26.

Significant vertical displacement is evident in the column located in the north-west section of the Warehouse. A slope in the timber floor coverings was evident in this location. This distortion corresponds to the deviation observed above, however from visual inspection this does not appear as severe. The floor boards at the interface with the external walls appear to have come away, owing to the displacement in the floor.

It is noted from the time of survey that all lintels over windows appear to be existing timber lintels. There is cracking through masonry spandrel panels below sill level. This is likely attributed to rotten timber lintels to the window below.

Further cracking is evident through the large masonry pier adjacent to the lift. It appears this cracking is at approximately the same location as the crack in the large pier at upper levels. There is further cracking to the masonry wall on Cambridge St elevation which seems to be a continuation from above. The joint in the masonry wall is wide open. This is shown below with cracking evident through the paintwork in the WC that extends from ceiling to floor level, see Figure 28



Figure 28 - Further cracking through external wall (taken 2018)

At the eastern section of the building, a screed overlays the timber floor at second floor level.

During the most recent site visits in 2023, the lower levels had continued to deteriorate due to the continued water ingress at roof level as described above.

5.1.4 First Floor

The primary timber beams at first floor level feature two primary softwood timber sections back to back with staggered bolts connecting them. From visual survey, it was not possible to determine whether a central flitch plate existed between the two back-to-back timber members. Each of the two timber beam sections is approximately 100mm wide and 360mm deep with notches at joists locations, as delineated in Figure 29. Timber joists approximately 75mm wide and 230mm deep span between the timber beams, as illustrated in drawing S-EX-103, Appendix A. Timber floorboards overlay the timber joists.

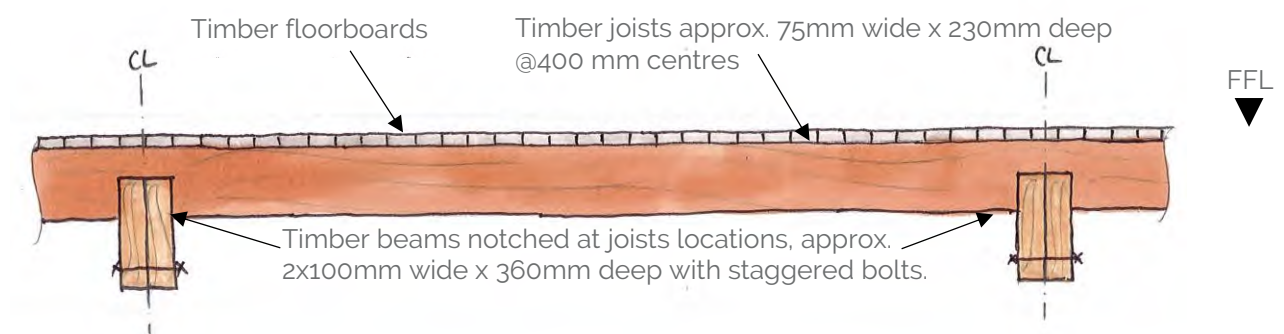


Figure 29 - Timber joisted floor at first floor level

Similarly to second floor, supplementary steelwork structure is supporting first floor at a number of locations across floor plate. In the southern section of the Warehouse, several steel beams have been added to the underside of the timber floor at first floor level. The steel beams most probably provided support for lifting hoists during the previous use of the building. The primary steel beams span from west to east directly onto the cast iron columns. The secondary steel beams span from north to south between the primary steel beams and masonry elevation walls. It appears the secondary steel beams are bearing directly onto the masonry walls, with no evident signs of any padstones.

At first floor level the cast iron columns are typically 135mm in diameter (approx.) and support the timber floor beams at the level above.

Located in the eastern section of the Warehouse there is a heavily corroded steel beam infilled with brickwork, as per Figure 30 (far end). It appears the steel beam is offering support to the upper eastern elevation. The underside of the timber floor at first floor level is showing significant signs of decay, as delineated in Figure 30. Steel beams are spanning between the southern elevation masonry wall and internal masonry wall. These steel beams have obvious signs of corrosion as illustrated by Figure 30.

Areas of the timber floor at first floor level are covered with a shallow depth of levelling screed. Testing should be carried out to assess whether asbestos is present within the screed.



Figure 30 - Corroded steel beams infilled with brickwork (far end) (taken 2018)

Further water ingress along the west elevation and staining is typical throughout the floor plate at first floor level.

During the visual inspection survey it was noted that cracking is evident at first floor level through masonry spandrel panels below sill level. This is likely attributed to rotten timber lintels to the window below.

Further cracking is evident at first floor level through the large masonry pier adjacent to the lift. The cracking at first floor level is likely to be a continuation from above

Further cracking to the wall on Cambridge St elevation, a continuation from above. Two cracks have developed at the lower level, which continue from ceiling level down to ground floor, as illustrated in Figure 31.



Figure 31 - Cracking to wall elevation on Cambridge Street (taken 2018)

During the most recent site visits in 2023, the lower levels had continued to deteriorate due to the continued water ingress at roof level as described above.

5.1.5 Ground Floor

The primary timber beams at ground floor level feature two primary softwood timber sections back to back with staggered bolts connecting them. From visual survey, it was not possible to determine whether a central flitch plate existed between the two back-to-back timber members. Each of the two timber beam sections is approximately 120mm wide and 380mm deep with notches at joists locations, as delineated in Figure 32. Timber joists approximately 75mm wide and 230mm deep span between the timber beams. Timber floorboards overlay the timber joists.

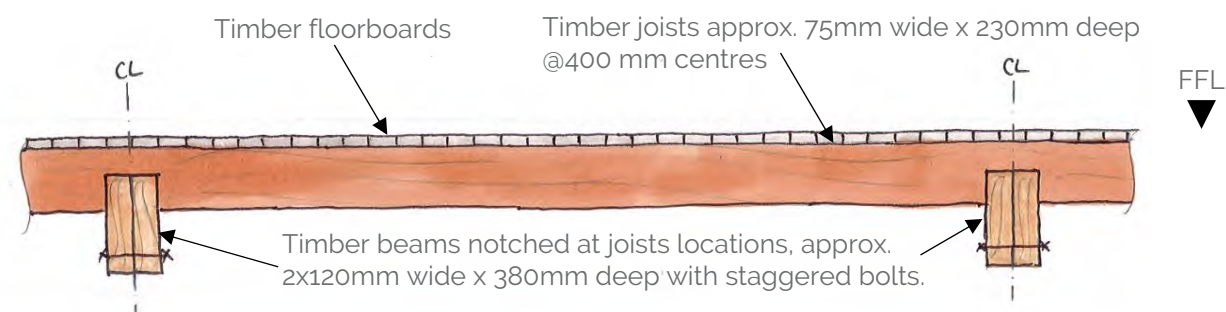


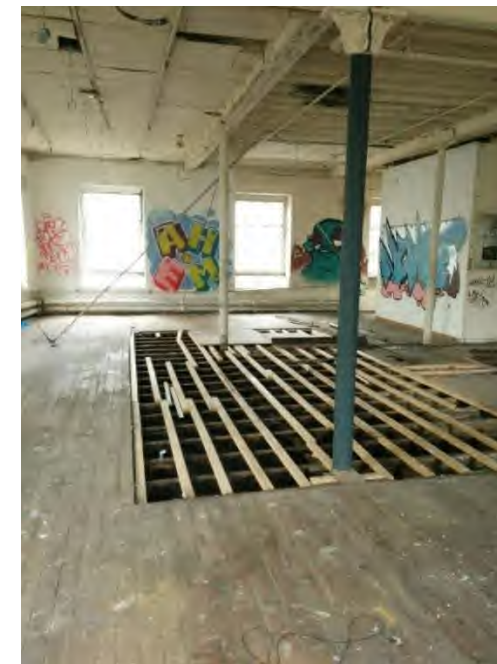
Figure 32 - Timber joisted floor at ground floor level

There is a step in the ground floor level in the easternmost section of the Warehouse. The floor structure to the east of this step is approximately 1.18m lower than the western section. The lower floor section level appears to be at same level as the Cambridge Street.

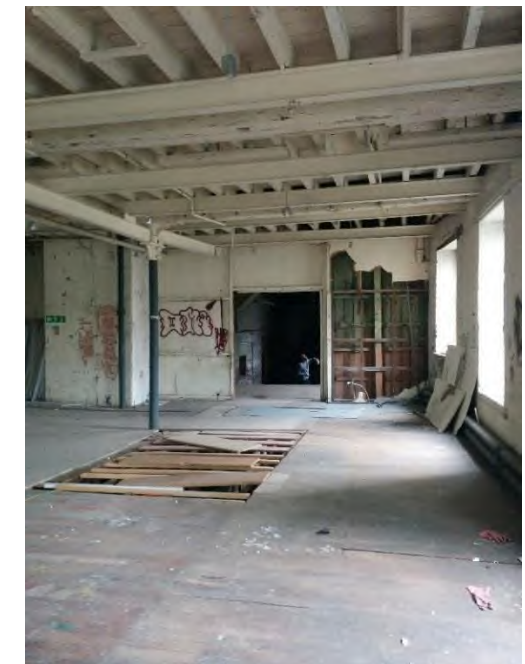
A steel roller shutter door is located on the eastern elevation. It is not known if the steel roller shutter door is still functional and if access into the building can be provided through this shutter door. Anecdotal evidence suggests that this door is still operational.

Several areas at ground floor have missing floor boards, as delineated in Figure 33. This may be attributed to reparation of fire damaged timber.

Sand dust infill is located in between timber joists in the central part of the Warehouse at ground floor. It is likely that this is historical insulation.



(A)



(B)

Figure 33 - Missing floor boards at ground floor level (taken 2018)

Supplementary steelwork structure in place supporting ground floor level at numerous locations across floor plate, as illustrated in Figure 34.

Areas of the timber floor at ground floor level are covered with a shallow depth of levelling screed. Testing should be carried out to assess whether asbestos is present within the screed if not already done so.



(A)



(B)

Figure 34 - Supplementary steelwork supporting ground floor level (taken 2018)

Water ingress is present along the western and southern brickwork elevation and staining is typical throughout the floor plate at ground floor level, as delineated in Figure 35.

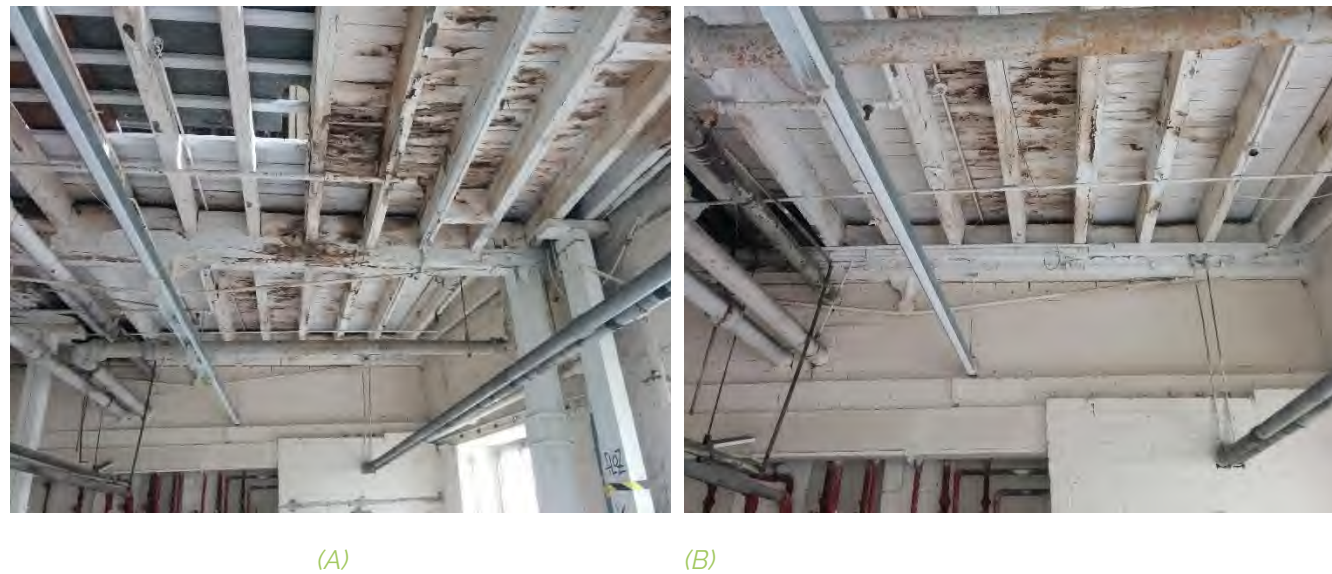


Figure 35 – Decayed timber joisted floor at ground floor level (taken 2018)

There are numerous visible cracks below window sills, which is likely attributed to the failure of timber lintels above windows at basement level. The failure of the lintels has allowed the sill to deflect with the possible rotten timber. Crack patterns are consistent with failed lintels; diagonal cracks emanating from the support where the timber lintel has been allowed to deflect. Tension develops to the underside of the brickwork resulting in the cracking.

Evidence of replacement joists where previous fire has caused damage as indicated in Figure 33.

Further cracking through large pier adjacent to lift, a continuation from above. Pattress plates do not exist at ground floor level to arrest the further deterioration of the cracking. Some areas have displaced by circa 10mm, though this was not measured on site.

Further cracking is evident to the wall on Cambridge St elevation. The crack at ground floor level seems to be a continuation of the crack found at upper levels. The cracking has opened at the lower level, which is found to be in excess of 10mm. The cracking appears

to be historic as there is water staining inside the crack, in the pier and mortar. This is shown in Figure 36 below.



Figure 36 - Extensive cracking through pier at ground floor level (taken 2018)

During the most recent site visits in 2023, the lower levels had continued to deteriorate due to the continued water ingress at roof level as described above.

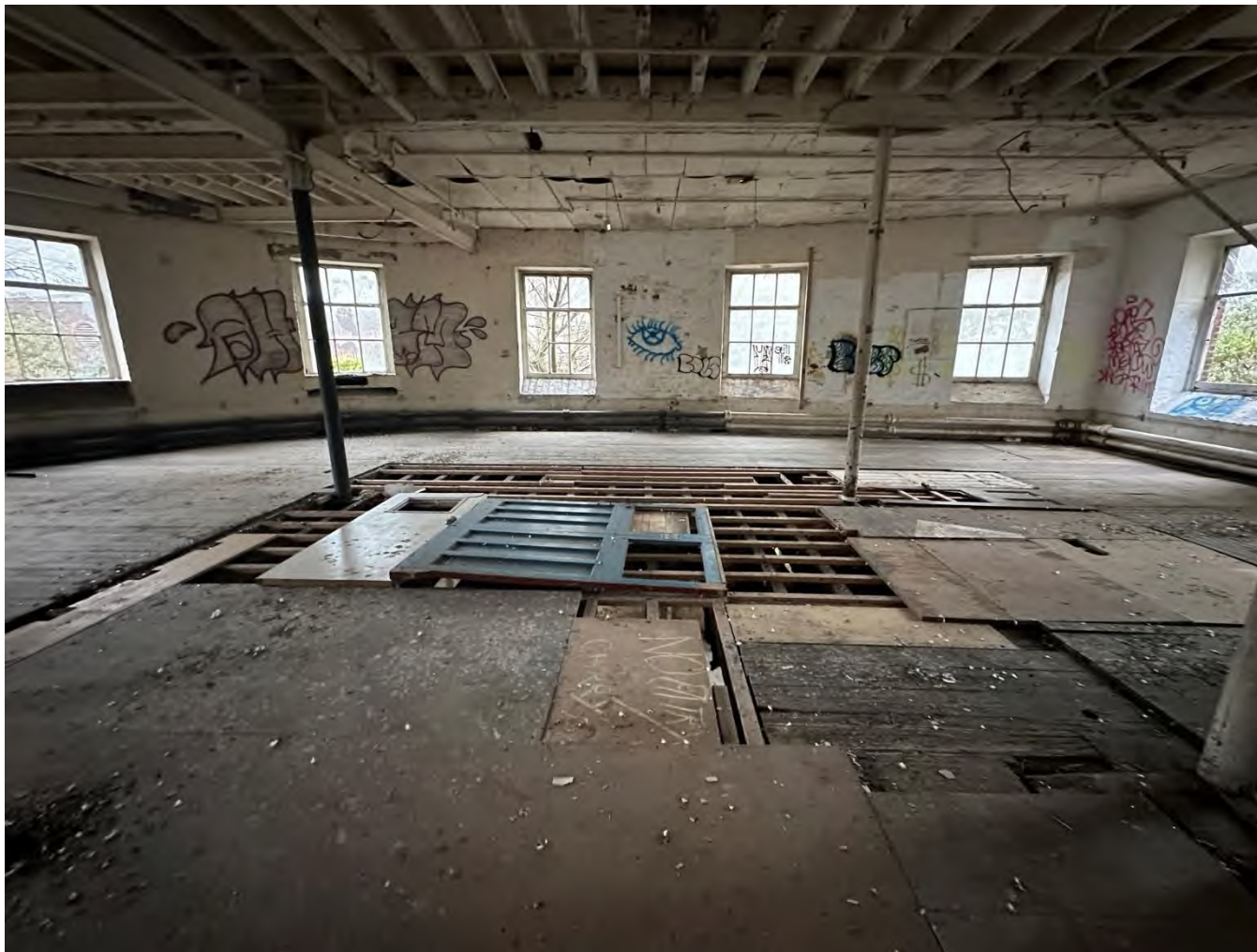


Figure 37 – Photo of missing floor boards and general floor condition at ground floor level (taken 2023)

5.1.6 Basement

The basement level features a concrete ground slab. No opening up works have been conducted to ascertain the thickness of the basement concrete slab. Opening up works will be required to determine the thickness of the concrete slab and determine whether the concrete slab is screed overlaying stone floor or whether it is a suspended concrete slab or ground bearing slab. It is assumed at this stage that due to age of the buildings, the concrete slab is likely to be ground bearing slab.

Several more recent steel columns appear to have been previously introduced at basement level in close proximity to the original cast iron columns, as illustrated in Figure 38 and Civic Engineers drawing S-EX-100 found in Appendix A of this report. The steel columns support the supplementary steel beams at the floor levels above. The additional steel columns appear to have been introduced on an ad hoc basis, compromising of parallel flange channels (PFC) or universal beams (UB) sections alongside the existing cast iron columns, and the newer columns are bolted together using plates between adjacent flanges. The new steel columns bear on to the same footings as the existing cast iron columns. It is likely these more recent additions were to provide additional support to machinery throughout the life of the building.



Figure 38 – Ad hoc additional steel columns in basement (taken 2018)

Given that no base plates are visible beneath the newer steel columns it would be prudent to suggest that the concrete slab is not original.

Water ingress is present along the western and southern elevation and staining is typical throughout the floor plate. Vegetation growth from River Medlock seems to have caused the upward movement of the sills. Cracking above rotten timber lintels at basement level is evident, which has likely been caused by the water ingress and the subsequent failure of the lintels.

It is not anticipated that the basement construction will contain any form of waterproofing to protect the basement space from flooding.

Further cracking through the large masonry pier adjacent to the lift. It appears the cracking at basement level is a continuation from the cracking at upper levels. A parrass plate is evident on the west elevation of the pier. The corresponding tie element is not evident at ground floor level.

During the most recent site visits in 2023, the lower levels had continued to deteriorate due to the continued water ingress at roof level as described above.

5.2 1801 Mill (5 storeys)

As with the other buildings on site, a lot of the distress caused to the Mill building is attributed to water ingress that has been allowed to continue for numerous years. The building fabric is generally in poor condition and on some elevations there is vegetation growth that is exacerbating the problem – water ingress causes vegetation growth, the vegetation growth opens up the structure for further water ingress.

There are large open joints in brickwork that allow water through. All floor plates down to basement are visibly wet, brickwork and mortar is in poor condition and crumbles to the touch, particularly at upper storeys.

The pitched roof adjacent to Cambridge Street has allowed water ingress through between first floor and upper ground floor where eaves connect. There are numerous downpipes that have failed on the building perimeter exacerbating the water ingress issue.

5.2.1 Roof

The roof comprises a pitched timber roof with slates coverings as depicted in the aerial image in (refer to Figure 9 at the beginning of Chapter 5). Roof skylights are located on the southern part of the roof in close proximity to the roof ridge, as illustrated in Figure 39 and Civic Engineers drawing S-EX-106 found in Appendix A of this report.

The condition of the external roof could not be inspected at the time of the survey.

Queen-post timber roof trusses span between external load bearing masonry walls, as delineated in Figure 40. Two lines of cast iron columns, typically approximately 90mm in diameter, are offering support to the bottom timber chord, as delineated in Figure 40 and Figure 41. The roof trusses comprise of timber roof rafters approximately 250mm deep and 100mm wide and timber web members approximately 200mm deep and 100mm wide.

The timber ring post is not evident for several trusses which would suggest that previous works to the timber roof trusses have been likely carried out as it appears the queen-post timber trusses look slightly different throughout the roof level, as delineated in Figure 39. It appears that previous strengthening works have been carried out to the timber roof trusses by replacing the timber web members located in close proximity to the eastern elevation with steel plate web members, as illustrated in Figure 40 and Figure 42. The steel plates web members appear to be approximately 200mm wide.

All bottom chord sections of the timber trusses have been previously strengthened with parallel flange channels (PFC) sections towards the eastern section of the Mill, as delineated in Figure 42. The PFC sections are bolted in a staggered arrangement to each vertical face of the timber elements. It is possible that the PFC strengthening has been installed due to the poor condition of the bearing ends of the timber roof trusses, which has likely been caused by water ingress.



Figure 39 - Roof skylights and timber roof trusses (taken 2018)



Figure 41 - Cast iron columns supporting timber roof trusses; damp timber floor at third floor level (taken 2018)

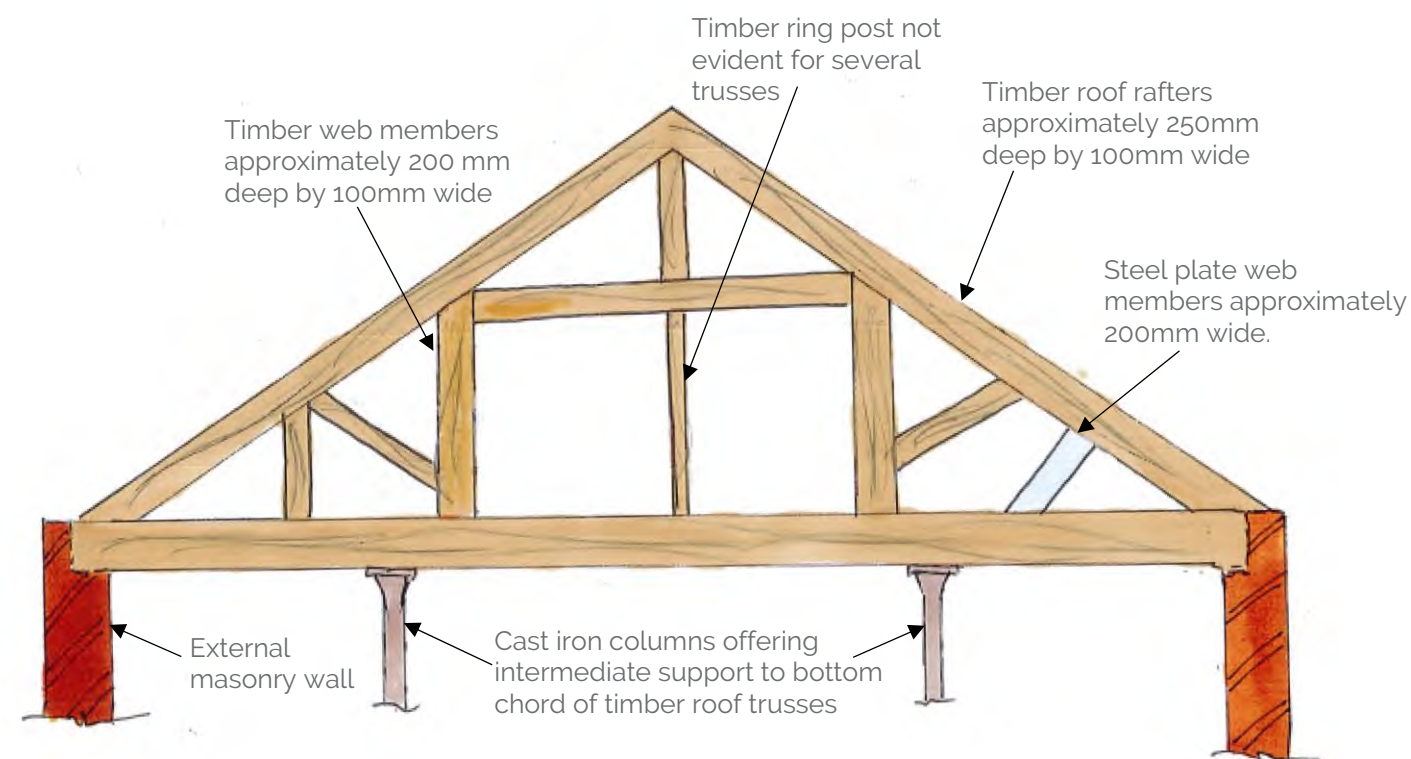


Figure 40 - Queen-post style timber roof trusses



Figure 42 - Timber beam strengthening with PFC sections and steel plates (taken 2018)

During the most recent site visits in 2023, it was evident that water ingress had continued in the period since the previous inspections and the building, and structure, and continued to deteriorate as a consequence.

5.2.2 Third Floor

At third floor level, timber beams span between the external masonry load bearing walls with cast iron columns offering intermediate support. The timber beams at third floor level are typically 150mm wide and 270mm deep (approx.), as illustrated in drawing S-EX-105 in Appendix A of this report. Timber joists approximately 75mm wide and 180mm deep span onto the timber beams at 450mm centres, as illustrated in Figure 43. Timber floor boards span between timber joists.

The central timber beam, located in close proximity to the western staircase tower, has a larger cross-section than the other timber beams at third floor level. The central timber beam is formed out of two sections with each section being approximately 350mm deep and 175mm wide. The two sections of the central timber beam are connected with staggered bolts along the entire beam. From visual survey, it was not possible to determine whether a central flitch plate existed between the two back-to-back timber members.

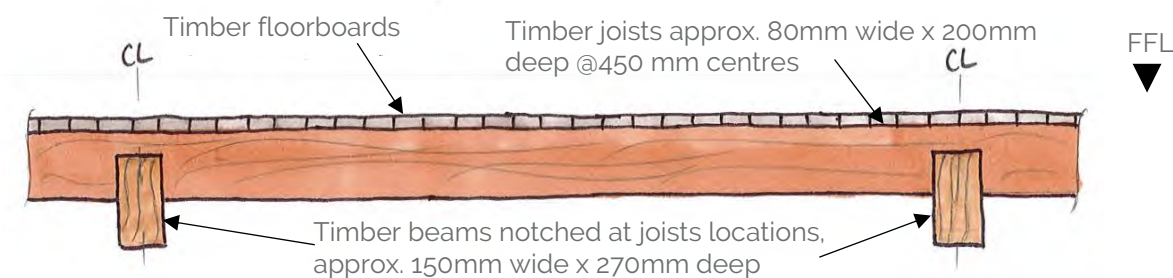


Figure 43 - Timber joisted floor at third floor level

Simple timber truss arrangements, located in the mezzanine area of the building, support the third floor level, also see Figure 44. In the first and second bay from the northern elevation, as well as in two central bays, timber truss top chords and diagonal members are missing.



Figure 44 - Simple timber truss arrangement at mezzanine level supporting underside of third floor (taken 2018)

The timber floor at third floor level is significantly damp with areas of missing timber floor boards, as illustrated by Figure 41 and Figure 46. The timber finish is generally worn and uneven throughout.

Significant water ingress is evident on the eastern elevation of the Mill with several steel lintels over the windows presenting signs of corrosion.

There are numerous visible cracks below window sills, which is likely attributed to the failure of timber lintels above windows at second floor level, as shown in Figure 45. The failure of the lintels has allowed the sill to deflect with the possible rotten timber. Crack patterns are consistent with failed lintels; diagonal cracks emanating from the support where the timber lintel has been allowed to deflect. Tension develops to the underside of the brickwork resulting in the cracking.

Lintels in the 1801 mill appear to be cast iron (assumed due to age of building), though there has been some replacement of lintels at third floor level with newer steel and precast concrete lintels.



Figure 45 - Significant movement of sill at third floor level. Also shows water ingress (taken 2018)

The second timber beam from the southern section of the building is showing signs of deformation.

The northern end of the eastern elevation is visibly wet. The brickwork, in some areas, crumbles to the touch, and there are areas of efflorescence present. Mortar is also in poor condition across the eastern elevation, similarly which crumbles to the touch. This is owing to poor weatherproofing of the eastern elevation allowing water ingress. There is vegetation growth on this elevation which is likely further exacerbating the issue.



Figure 46 - Missing timber floorboards at third floor level (taken 2018)

During the most recent site visits in 2023, the lower levels had continued to deteriorate due to the continued water ingress at roof level as described above.

5.2.3 Second Floor

Timber beams at second floor level span onto the masonry walls from east to west with intermediate cast iron columns supporting the timber beams. The timber beams are typically 180mm wide and 250mm deep (approx.) with timber joists spanning over. The timber beams are typically notched at joists locations, as illustrated in Figure 47 and drawing S-EX-104 in Appendix A. The timber joists are approximately 75mm wide and 180mm deep located at about 450mm centres.

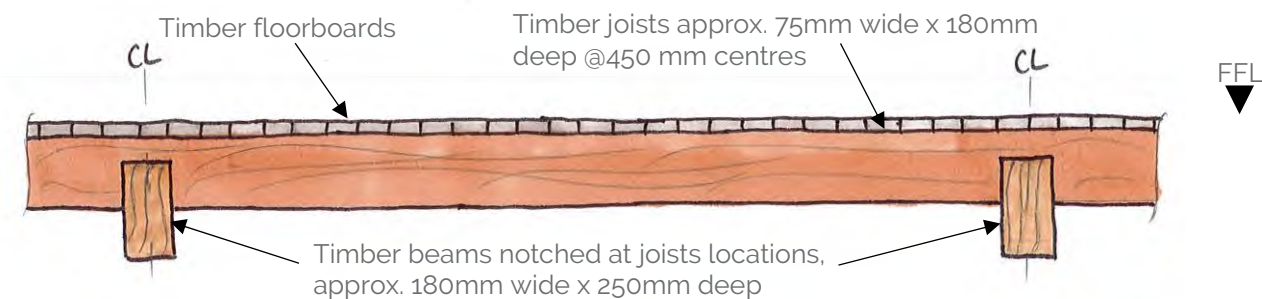


Figure 47 - Timber joisted floor at second floor level



Figure 48 - Mezzanine along central part (taken 2018)

The second floor is noted as a mezzanine level, though a central void space within the floor has historically been created by removing floor joists as per Figure 48. Timber beams span between the external masonry walls and supported at intermediate points by cast iron columns are supporting the mezzanine level. The cast iron columns are approximately 110mm in diameter. A timber parapet is located at mezzanine level. From visual inspection it could not be established how the parapet is fixed to the floor at first level.

Significant water ingress was evident in several areas along the eastern elevation and in close proximity of the tower staircase, as illustrated in Figure 49. Water penetration had extended across the floor plate towards the centre of the building and caused swelling and lifting of the timber floor boards.

The second timber beam from the southern part of the building is showing signs of deformation.

The northern end of the eastern elevation is visibly wet. The brickwork, in some areas, crumbles to the touch, and there are areas of efflorescence present. Mortar is also in poor condition across the eastern elevation, similarly which crumbles to the touch. This is owing to poor weatherproofing of the eastern elevation allowing water ingress. There is vegetation growth on this elevation which is likely further exacerbating the issue.



Figure 49 - Damp timber floor with missing floorboards at second floor level (taken 2018)

During the most recent site visits in 2023, the lower levels had continued to deteriorate due to the continued water ingress at roof level as described above.



Figure 50 – General view of second floor showing deterioration due to continued water ingress (taken 2023)

5.2.4 First Floor

Typically, previous fit-out works to the upper ground floor level are obscuring the inspection to the soffit of the timber floor at first floor level. There were instances where some small areas of the fit-out works have been previously removed allowing some inspection. It is assumed that the floor construction at first floor level is similar to the timber floor construction at the upper levels, where timber beams are spanning between the external soli masonry walls with intermediate cast iron columns offering support as illustrated in drawing S-EX-103 in Appendix A of this report.

Overlaying the timber floor at first floor level are materials that seem to be mineral fibre insulation, as shown in Figure 51. These materials are obstructing an inspection of the condition of the timber floorboards in these areas.

A steel beam supporting the first-floor level seems to be running from central part of the Mill until the external masonry wall.

Supplementary steelwork structure is located in the northern section of the building at first floor level, as per Figure 52 and is offering support to the second floor timber beams.

Three rows of steelwork columns and beams are present across the four eastern bays of the Mill building. Towards the eastern part of the building, the beams are spanning onto lintels which had been positioned across the window openings in the external western elevation, as per Figure 53.

The supplementary steelwork structure has a dark paint finish cover and seems to be in fairly good condition.



Figure 51 - Fibre materials overlaying timber floor at first floor level (taken 2018)

Large areas of the timber floor located in the central-eastern section of the building are visibly very damp (possible rot), as delineated in Figure 54.

The northern end of the eastern elevation is visibly wet. The brickwork, in some areas, crumbles to the touch, and there are areas of efflorescence present. Mortar is also in poor condition across the eastern elevation, similarly which crumbles to the touch. This is owing to poor weatherproofing of the eastern elevation allowing water ingress. There is vegetation growth on this elevation which is likely further exacerbating the issue.



Figure 52 - Supplementary steelwork structure at first floor (taken 2018)



Figure 53 - Steel lintels at windows in first floor level (taken 2018)



Figure 54 - Very damp timber floor areas (possible rot) at first floor level (taken 2018)

The northern end of the eastern elevation is visibly wet. The brickwork, in some areas, crumbles to the touch, and there are areas of efflorescence present. Mortar is also in poor condition across the eastern elevation, similarly which crumbles to the touch. This is owing to poor weatherproofing of the eastern elevation allowing water ingress. There is vegetation growth on this elevation which is likely further exacerbating the issue.

A duo pitch roof bears into the side of the 1801 mill between first and second floor level. the poor condition of the waterproofing within the gutter has allowed water to flow down the external face of the eastern elevation, and the water has also been found to migrate inside. This has caused bearing ends of timber joists and beams to become wet. Rot may be present, which will be determined by a timber decay survey.

There are perished rainwater pipes along the eastern elevation worsening the water ingress issue.

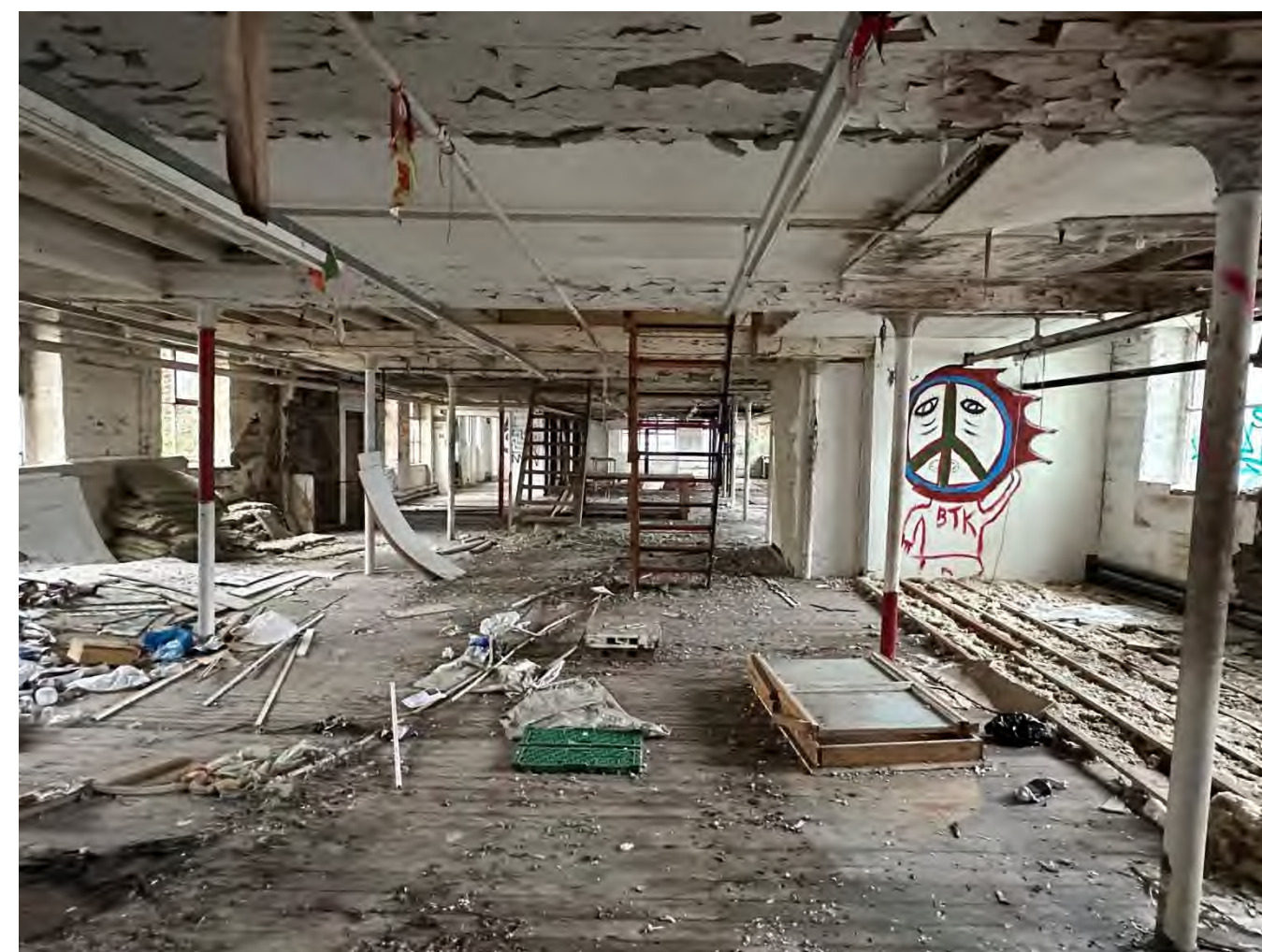


Figure 55 - General view of first floor indicating continued deterioration due to water ingress and damp (taken 2023)

During the most recent site visits in 2023, the lower levels had continued to deteriorate due to the continued water ingress at roof level as described above.

5.2.5 Upper Ground Floor

A considerable area of the upper ground floor (from central part of the Mill and continuing towards the northern section of the building) has been previously fitted out with carpet or linoleum. These finishes are obstructing the inspection of the timber floor.

The timber joisted floor located towards the southern section of the building could be partially inspected. Timber beams are spanning between the load bearing masonry elevation walls with cast iron columns offering intermediate support. Timber joists approximately 80mm wide and 180mm deep are spanning onto the timber beams at 450mm centres. The timber beams are approximately 160mm wide and 300mm deep in section.

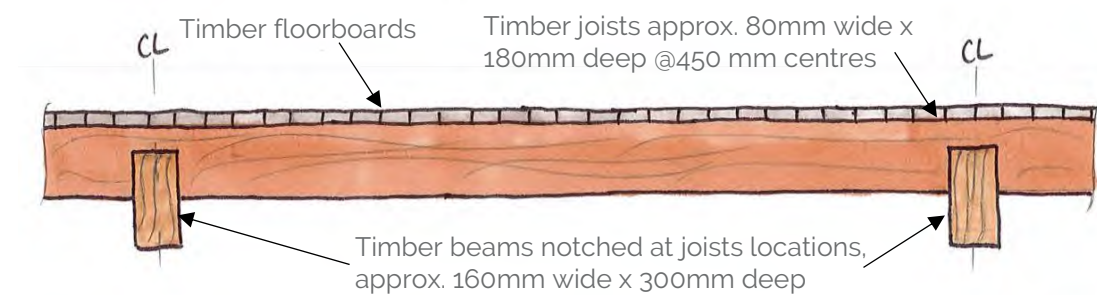


Figure 56 - Timber joisted floor at upper ground floor level (southern section of the building)

Two rows of cast iron columns are located at upper ground floor, similar to the upper floors. In addition to these rows of cast iron column, a central row of columns is visible.

Existing finishes to the upper ground floor level are obscuring the inspection of several cast iron columns. Some finishes to the cast iron columns have been previously removed, as delineated in Figure 57, exposing the structural elements. The columns that could be inspected at upper ground floor level are typically about Ø110mm in diameter.



Figure 57 - Previous opening up works around cast iron columns at Upper Ground Floor Level (taken 2018)

All timber beams bearing ends along the southern elevation are showing signs of significant damp and decay.

During the most recent site visits in 2023, the lower levels had continued to deteriorate due to the continued water ingress at roof level as described above.

5.2.6 Ground Floor

The ground floor construction is similar to the floor construction on upper levels. Timber joists are located at approximately 400mm centres and span onto timber beams. The timber beams span between the southern and western elevation masonry walls with cast iron columns offering intermediate support. The timber beams are formed out of two sections with each section being approximately 380mm deep and 120mm wide. The two sections are connected with staggered bolts along the entire central timber beam. From visual survey, it was not possible to determine whether a central flitch plate existed between the two back-to-back timber members.

Two rows of cast iron columns are located at upper ground floor, similar to the upper floors. In addition to these rows of cast iron column, a central row of columns is visible and supports the central row of columns located at upper ground floor plan. The columns in the central line are formed of two PFC sections with steel plates connecting the PFC sections at third points.

Two cast iron columns located near the stair tower on western elevation seem to have been previously strengthened with PFC sections.

A new UC steel column is located at ground floor in the first row of cast iron columns (when entering the building from Cambridge Street). The UC column is offering additional support to the timber beam located at upper ground floor.

Water ingress evident at ground floor level is facilitating the further decay of the timber floor as per Figure 58 (A) and (B). Several timber floorboards are missing at ground floor level, as per Figure 58 (A).



Figure 58 - Water ingress at ground floor and missing timber floorboards (taken 2018)

During the most recent site visits in 2023, the lower levels had continued to deteriorate due to the continued water ingress at roof level as described above.

5.2.7 Basement

A ramp is located towards the north section of the building and offers a connection to the shed, since the ground floor level of the shed is slightly higher than the basement floor level of the Mill.

Previous fit-out works are located in the northern section of the Mill and is obscuring the inspection of the ground floor level below.

The floor in basement is concrete slab and some signs of water and dampness are present on the floor.

Supplementary steelwork structures have been previously added in the basement to offer support to the first floor level. Several steel beams are spanning between PFC steel columns and load bearing masonry wall, as per Figure 59.



Figure 59 - Supplementary steelwork in basement (taken 2018)

Steel frames located in basement have been most probably added to offer support to lifting hoists associated with the previous use of the building, see also Figure 60.



Figure 60 – Steelwork frame in basement (taken 2018)



Figure 61 - Column baseplate detail (taken 2018)

It appears the steel column baseplates have been added directly on top of the existing concrete slab with a bedding layer of grout, as per column baseplate detail in Figure 61.

An additional acrow prop is located adjacent to the western elevation stair tower and is offering supplementary support to the upper floor timber beams.

During the most recent site visits in 2023, the lower levels had continued to deteriorate due to the continued water ingress at roof level as described above.

5.3 Shed (single storey) – adjacent to Warehouse

The shed adjacent to the Warehouse and the Mill buildings is a single storey structure with a multi-pitched roof structure, load bearing masonry walls and intermediate cast iron columns on, what appears to be, a ground bearing concrete slab. The floor has been assumed to be ground bearing; however, no opening up works have been conducted to ascertain this.

The roof of the shed has been inspected visually from high level inside the 1801 mill building and internally from ground floor level. The roof appears to be covered in a bituminous coating, as delineated in Figure 63. Roof skylights are offering natural light to the shed. Vegetation growth and debris appears to have been building up in the valley gutters of the roof. Ponding of surface water is evident in the gutter, which is likely attributed to poor falls and/or blocked rainwater goods.

Additional steelwork structures have been previously added in every other bay to offer supplementary support to the decayed roof timber beams, as delineated in Figure 65.

It appears that some of the additional steel beams are bearing directly on to the masonry western elevation wall while other steel beams appear to be bearing on to padstones built into the masonry wall.

Towards the north-east part of the building several parallel flange channels (PFC) sections appear to have been introduced as a newer addition, as delineated in Figure 64. The PFC sections were most probably introduced to offer additional support to previous hoisting equipment. The 200x75mm PFC sections are generally corroded.

The cast iron columns in the shed building are typically approximately 135mm in diameter. It appears two cast iron columns have been previously removed towards the northern part of the shed. No subsequent structural support appears to have been reintroduced to replace this removal.

The roof valley timber beams are typically showing signs of decay, while the bearing ends of the valley timber beams have significant signs of decay with rot possibly building up, as illustrated in Figure 66.

Masonry and mortar is generally poor. There is evidence of water ingress through the western elevation, which is attributed to the collection of water within the gutters at roof level and poor discharge and poor waterproofing at roof level.



Figure 62 - Additional steel beams supporting timber beam (taken 2018)



Figure 63 - Roof and vegetation growth in gutters (taken 2018)



Figure 65 - Portal frames at every other bay offering support to timber roof (taken 2018)



Figure 64 - Additional steelwork PFC sections (taken 2018)



(A)



(B)

Figure 66 - Decayed roof valley timber beams (taken 2018)



Figure 67 – Roof and continued vegetation growth in gutters (taken 2023)



Figure 68 – Evidence of continued water ingress and staining (taken 2023)

During the most recent site visits in 2023, it was evident that the vegetation to the lower level roof had continued to grow and intrude into the building roof covering and structure. The result of this is visible from below whereby evidence of continued water ingress and subsequent failure of timber structural elements was observed.



Figure 69 – Continued water ingress leading to timber decay and failure (taken 2023)

5.4 Shed (single storey) – adjacent to train line viaduct

The shed arrangement adjacent to the train line viaduct is a single storey structure with multi-pitched roof, cast iron columns and, what appears to be, a ground bearing concrete slab. The floor has been assumed to be ground bearing; however, no opening up works have been conducted to ascertain this.

The structural condition of the shed adjacent to the train line viaduct is generally adequate, though there are several local areas where the condition worsens and these areas are thought to be attributed to water ingress.

The roof of the shed has been inspected visually from high level inside the Mill building and internally from ground floor level. The roof appears to be covered in roof slates. Roof skylights are offering natural light to the shed. Significant vegetation growth is present on the roof of the shed adjacent to the train line viaduct, as shown in Figure 70. Some water and debris accumulation are present in the roof valley gutters.



Figure 70 - External roof structure of the shed (taken 2018)



Figure 71 - Galvanised steel roof trusses and masonry piers (taken 2018)

The roof structure in the central part of the shed comprises of newer galvanised steel roof trusses, spanning between primary steel beams, as delineated in Figure 71. Newer galvanised trusses appear to be in good condition, and to have been installed at a much later date than the original pitched timber framed roof. There is potential to reuse these newer trusses in another capacity in the proposed landscaping should this be desired.

Masonry piers, typically approximately 225mm wide, are dividing the central part and the eastern section of the shed with steelwork beams spanning between these masonry piers, as shown in Figure 71. These steels are approximately 178x12 UB sections and are offering support to the roof timber beam.

Several steelwork portal frames have been previously added in the eastern section of the shed assumed to offer additional support to the decayed roof timber beams, as shown in Figure 72. It appears that two of the steelwork portal frames might have been introduced to substitute the cast iron columns which were previously removed.



Figure 72 - Steelwork portal frames supporting decayed timber roof beams (taken 2018)

Towards the far eastern end of the shed, one of the timber beams has been previously strengthened with two parallel flange channels (PFC) sections, as shown in Figure 73. The two PFC sections are fixed to the timber beam with three bolts at approximately 1500mm centres. The condition of the timber beam could be inspected from below. The timber beam is showing significant signs of damp and decay while the PFC sections are generally corroded.

A door is located on the elevation wall on Cambridge Street which might give access inside the shed directly from Cambridge Street. During the visual structural inspection of the shed, it could not be established whether the door is still functional.

The eastern section of the shed is generally in poor condition with several decayed timber beams, ad hoc additional structural elements and a failed timber beam end.

The timber beam end, as shown in Figure 74, should be propped to prevent further failure as this poses a significant hazard to people using the building.

During the most recent site visits in 2023, continued water ingress in this area has resulted in this failed timber beam collapsing onto the ground floor. It was advised at the time that the building management set up an exclusion zone around this area of roof, and install propping to stabilise this member, and the surrounding roof from further risk of collapse.



Figure 73 - Timber beam strengthened with two PFC steel sections (taken 2018)



Figure 74 - Failed timber beam end (taken 2018)

The roof structure of the western section of the shed comprises of steelwork beams spanning from north to south. The steel beams appear to have been spliced at approximately midspan, as there is a bolted splice joint connection visible, as shown in Figure 75. The steel beams are approximately 356x127 UB sections.

A concrete plinth approximately 1600mm wide and 30mm high appears to have been built directly off the basement concrete slab, as illustrated in Figure 75 (far end).



Figure 75 - Western section of the shed (taken 2018)

Steel columns adjacent to the trainline viaduct are supporting the steelwork beams at one end while brickwork piers located near the external masonry wall of the Mill are offering support to the other steel beams end, as illustrated in Figure 75 (left side of image) and Figure 76. The steel columns are approximately 204mm deep and 126mm wide in section and are typically heavily corroded.

There appears to be some form of horizontal tie between the steelwork beams, as delineated in Figure 75 (upper left side of image).

The pitch roof edge is typically infilled with brickwork as is also evident in Figure 76.



Figure 76 - Brickwork piers offering support to steelwork beams (taken 2018)

Several damp areas are visible on the concrete slabs, as shown in Figure 75, due to water ingress from the decayed roof.

5.5 Elevations

During the visual inspection surveys it was only possible to complete distant visual survey of the elevations of the building due to the location of the building. The front wall on Cambridge Street could be visually surveyed from a closer distance.

Square window openings are present on all elevations with either brickwork or stone lintels at the top of the windows and stone lintels at the bottom of the window.

External brickwork has typically signs of discoloration, with build-up of vegetation growths and efflorescence.

5.5.1 South Elevation (adjacent to River Medlock)

The walls on the southern elevation are approximately 620mm thick and of a coursed brickwork construction. Well established vegetation growth, and the build-up of mosses and lichens is evident, particularly the areas surrounding the rainwater goods and the areas adjacent to River Medlock. It is likely that open and recessed mortar joints have allowed for vegetation to take root and become well established. Figure 79 illustrates that the rainwater goods are currently discharging surface water directly into the River Medlock. This rainwater is likely to be running along the elevation and seeping in to the mortar joints, leading to the development of recessed and open mortar joints. Water running down the elevation appears to be facilitating the development of mosses and lichens. There does not appear to be any obvious signs of cracking in the brickwork walls due to the development of the vegetation growth.

There appears to be a significant change in the visual appearance to the brickwork at the head of the third-floor windows. The band of brickwork from the window head of the third-floor appears to be consistent up to the top of the parapet, as illustrated in Figure 78, (A). It appears the original brickwork arch lintels above third-floor windows had been previously replaced with steel lintels, most probably during works of the parapet

At second floor level it appears a former window opening was previously infilled with modern brickwork. The adjacent window openings have been reduced and the space between the previous sill and the new window sills has been previously infilled with modern brickwork as depicted in Figure 79. A protruding hoist structure is protruding over River Medlock between ground and first floor level, refer also to Figure 79.



Figure 77 - Heavy vegetation growth on south elevation (taken 2018)

Cracking is evident to the head of the ground-floor window, with a vertical stepped crack leading up to the window sill at the first-floor level, continuing through the lintel at first-floor window up until the sill at third-floor level, as illustrated in Figure 78 and drawing S-EX-200, Appendix A. Several of the brickwork units to the window opening appear to be loose, due to the cracking in the elevation wall. The cracks in the elevation may be due to movement of the building, which would indicate settlement of the river wall and foundations. Cracking in the brickwork walls could be due also to thermal expansion, although further investigations in to the brickwork is required to determine the cause of this cracking.

There is a significant build-up of efflorescence to the brickwork on this elevation. The efflorescence might be due to masonry being previously subjected to aggressive blast cleaning.



Figure 78 - Significant cracking on southern elevation (taken 2018)



Figure 79 - Modern brickwork infill at second floor (taken 2018)

During the most recent site visits in 2023, it was evident that vegetation to the elevation had continued to grow and intrude into the building façade and structure, particularly at the lower levels adjacent the river water level. It is likely this continued growth will have further penetrated the façade masonry and disturbed the bed joists of the brickwork. It wasn't possible at the time of survey to inspect the façade at touching distance to confirm this assumption.

5.5.2 North Elevation

On the north elevation the original sign of "Percy Brothers Ltd. Hotspur Press" is still evident. It appears some areas in the elevation wall around the lower-right window opening have been previously infilled with modern brickwork. The lower-right window opening has a timber lintel.

Heavy vegetation growth is present in the upper-left corner of the north elevation, as illustrated in drawing S-EX-201, Appendix A of this report.

5.5.3 West Elevation (adjacent to River Medlock)



Figure 80 - Western elevation (adjacent to River Medlock) (taken 2018)

Severe weathering of the western elevation brickwork walls is evident, with areas of brickwork with significant discolouration, as illustrated in drawing S-EX-202, Appendix A of this report.

During the visual structural inspection of the elevation, it could not be established whether the elevation walls of the Warehouse (built at a later date than the adjacent Mill building) have been effectively tied in into the external solid masonry walls of the Mill.

The rainwater pipes along this elevation on the Mill building seem to be in better condition than the waterpipes along the other elevation. It might be that the waterpipes are of newer addition.



Figure 81 - Western elevation (adjacent to River Medlock) showing continued vegetation growth (taken 2023)

During the most recent site visits in 2023, it was evident that vegetation to the elevation had continued to grow and intrude into the building façade and structure. It is likely this continued growth will have further penetrated the façade masonry and disturbed the bed joists of the brickwork. It wasn't possible at the time of survey to inspect the façade at touching distance to confirm this assumption.

5.5.4 East Elevation

As viewed from the Cambridge Street level it appears that there are several pattress plates visible along the eastern elevation, as illustrated in Figure 82 and drawing S-Ex-203, Appendix A. The pattress plates in Figure 82 (A) might be connected through steel tie rods to the pattress plates in the lift shaft, Figure 18, connecting the Warehouse building to the Mill structure. Traditionally, pattress plates are added later to restrain the lateral movement of the facades. The head of the first-floor and second-floor windows, as is evident in Figure 82 (B). The plates in Figure 82 (B) are not visible on the opposite elevation, thus indicating that they do not pass through the entire structure, although ties could be hidden from view

within the floor build up. Since there are no visible corresponding pattress plates on the western elevation, the pattress plates indicated in Figure 82 are likely to be restraining only the eastern elevation from bowing laterally.



(A)

(B)

Figure 82 - Pattress plates on eastern elevation (taken 2018)

In some instances, at the head of the second-floor windows, as per Figure 83 (A), the surrounding brickwork has become dislodged as the vegetation root system expands and forces the brickwork out of alignment. Cracking has also been induced due to the expansion of the root system. Internally, severe water penetration has led to the crumbling and spalling of the masonry, as illustrated in Figure 83 (B).

The root cause of this growth is most likely due to open mortar joints in the stonework, allowing spores within the air to take root.

The window openings on the eastern elevation have typically brickwork lintels, while the window openings of the staircase (which was a later addition) have stone lintels, as illustrated in Figure 84. There was no access possibility near the staircase to establish whether the staircase has been effectively tied in into the external walls of the Mill.



(A)

(B)

Figure 83 - Severe vegetation growth on eastern elevation (taken 2018)

There are signs of vegetation growth at the top of the third-floor window located at the corner with the staircase structure, as per Figure 84.

Part of the eastern elevation wall (at the corner of the building on Cambridge Street) seems to be stonework instead of masonry. Most probably the corner was rebuilt with stonework during works when the steel shutter was installed,

There are no evident signs of lintels present at the top of the first row of window openings on the eastern elevation, as per Figure 84.

The single storey building elevation along Cambridge Street is in poor condition with significant vegetation growth evident in several places along the wall, as delineated in Figure 85 (A). There is a loss of mortar within the brickwork joints and some discoloration of the brickwork, as per Figure 85 (B). There are several brickwork units that appear to be crumbling, with significant build-up of mosses and lichens on the brickwork wall. The wall has been previously painted, with paint chipping off due to weathering of brickwork.

During visual inspection it appeared that the wall is inclining towards Cambridge Street at its top. The inclination was not recorded but was visible to the eye.



Figure 84 - Stone lintels above staircase windows (taken 2018)



(A)

(B)

Figure 85 - Wall following the curve comprising both of Cambridge Street and Cambridge Street (taken 2018)



Figure 86 - Severe vegetation growth on eastern elevation has continued since previous survey (taken 2023)

During the most recent site visits in 2023, it was evident that vegetation to the elevation had continued to grow and intrude into the building façade and structure. It is likely this continued growth will have further penetrated the façade masonry and disturbed the bed joists of the brickwork. It wasn't possible at the time of survey to inspect the façade at touching distance to confirm this assumption.

6. Suitability of 1882 Warehouse for Reuse

Continued water ingress into the building during the period between the original 2018 surveys and the most recent 2023 inspections has resulted in a number of existing timber structural elements at all floor levels within the 1882 warehouse portion of the building being exposed to excessive dampness causing further deterioration, section loss, and in some places, failure of the structural members.

Given the distortion and continued damage to the existing structure as outlined in the above report, and the extent of replacement structure required to stabilise and strengthen the building to provide suitable load carrying capacity for purpose built student accommodation, it is considered the reuse of the existing structure of the 1882 warehouse is not viable, and it is more suitable to propose to retain and preserve the existing river-fronting façade of the building by restraining it with more-suitable new-built structure internally.

7. Proposed Structural Works

Whilst all reasonable care has been exercised in identifying defects and structural problems, there may be underlying faults which are not ordinarily revealed during an inspection of this kind, which could affect the outcome and cost of the proposed remedial works to the retained building.

A number of repairs will be required to the original building façade to provide its structural integrity, and these are largely associated with localised areas of the brickwork repair to the elevations. These areas are summarised below. The extent of the works noted below is not exhaustive and will be subject to the detail design stage and further material surveys to be carried out by a specialist.

7.1 1882 Warehouse – Proposed Retained Façade

7.1.1 Eastern Elevation

- 1) Locally deconstruct outer leaf of brickwork to allow full removal of the well-established vegetation growth, ensuring the root system is completely removed to prevent re-occurrence.
- 2) Remove vegetation growth on elevation wall following the curve of Cambridge Street and repoint brickwork using appropriate lime-based mortar.
- 3) Re-point open and recessed mortar joints using appropriate lime-based mortar.
- 4) Accelerated drying of the eastern elevation brickwork walls required, subject to moisture content of brickwork.
- 5) Reinstate missing down pipes and clear out all original down pipes to ensure clear water flow.

7.1.2 Southern Elevation (adjacent to River Medlock)

- 1) Underpinning might be required to be carried out to foundations underneath the southern elevation to prevent further settlement of the elevation wall, subject to results of further intrusive ground investigation works.
- 2) Locally deconstruct outer leaf of brickwork to allow full removal of the well-established vegetation growth, ensuring the root system is completely removed to prevent re-occurrence.
- 3) Stitch repairs to cracking within the masonry elevation.
- 4) Local scrubbing of brickwork elevation to remove build-up of mosses and Lichens, with additional scrubbing to remove efflorescence.
- 5) Locally rebuild breakouts in southern elevation wall to prevent further water ingress in to the inner leaves of brickwork.
- 6) Re-point open and recessed mortar joints using appropriate lime-based mortar.
- 7) Accelerated drying of the southern elevation brickwork walls required, subject to moisture content of brickwork.
- 8) Reinstate missing down pipes, preventing water running along elevation wall, facilitating vegetation growth.

7.1.3 Western Elevation (adjacent to River Medlock)

- 1) Local rebuilding of the brickwork above window at ground floor where extensive cracking in brickwork has occurred.
- 2) Underpinning works may be required to part of western elevation, subject to results of further localised ground investigations.
- 3) Replace cracked window sill at first floor level.
- 4) Local scrubbing of brickwork elevation to remove build-up of mosses and lichens.
- 5) Locally rebuild breakouts in western elevation wall to prevent further water ingress in to the inner leaves of brickwork.
- 6) Re-point open and recessed mortar joints using appropriate lime-based mortar.
- 7) Accelerated drying of the western elevation brickwork walls required, subject to moisture content of brickwork.
- 8) Reinstate missing down pipes and clear out all original down pipes to ensure clear water flow.

7.2 Mill

The strategy for regenerating the site incorporates the de-construction and removal of the significantly altered Mill with the retention of the eastern façade, with a new 36 storey (plus ground) tower block proposed to be constructed in its place.

Further structural works are required to the elevation wall of the Warehouse, existing foundations, etc. due to demolition of the adjacent Mill building. These structural works are covered in the '*Construction Methodology and Façade Retention Report*', by Civic Engineers.

7.3 Shed (adjacent to Warehouse)

The proposed strategy for regenerating the site incorporates the de-construction and removal of the shed (adjacent to Warehouse), with a new 36 storey (plus ground) tower block proposed to be constructed in its place.

Further structural works are required to the elevation wall of the Warehouse, existing foundations, etc. due to demolition of the adjacent shed. These structural works are to be proposed at future stages of the project.

7.4 Shed (adjacent to train line viaduct)

The proposed strategy for regenerating the site incorporated the de-construction and removal of the shed adjacent to the train line viaduct, with new public realm proposed to be developed in its place. The new public realm would connect Cambridge Street to the existing public realm on Jack Rosenthal Street.

Further structural works are required to the trainline viaduct masonry wall, elevation wall of the Warehouse, existing foundations, etc. due to demolition of the adjacent shed. These structural works are to be proposed at future stages of the project.

7.5 New 36 Storey Tower Block

A new building is proposed to be located on the former ground of the Mill and the shed adjacent to the warehouse. The 36 storey tower block construction is to be rectangular on plan with a flat roof. This building will comprise new purpose built student accommodation with plant and amenity space at basement, ground floor and roof levels. The structural proposals consist of an in-situ concrete frame construction with lateral stability offered through the provision of shear walls.

8. References and Bibliography

The following have been used as guidance documents for this report:

Medlock Mill, Manchester - Heritage Appraisal prepared by Stephen Levrant Heritage Architecture Ltd., May 2017

Timber and Damp Report by Timberwise – Ref. G58680, October 2017

Structural Report on Hotspur House by Thomasons – Ref. 8529, March 2017

Asbestos Survey Report for premises at Hotspur House – Ref. 61239, May 2004.

Measured Survey Plans by Chris Partington Land Surveyors (CPLS) at Hotspur House, Manchester, March 2017.

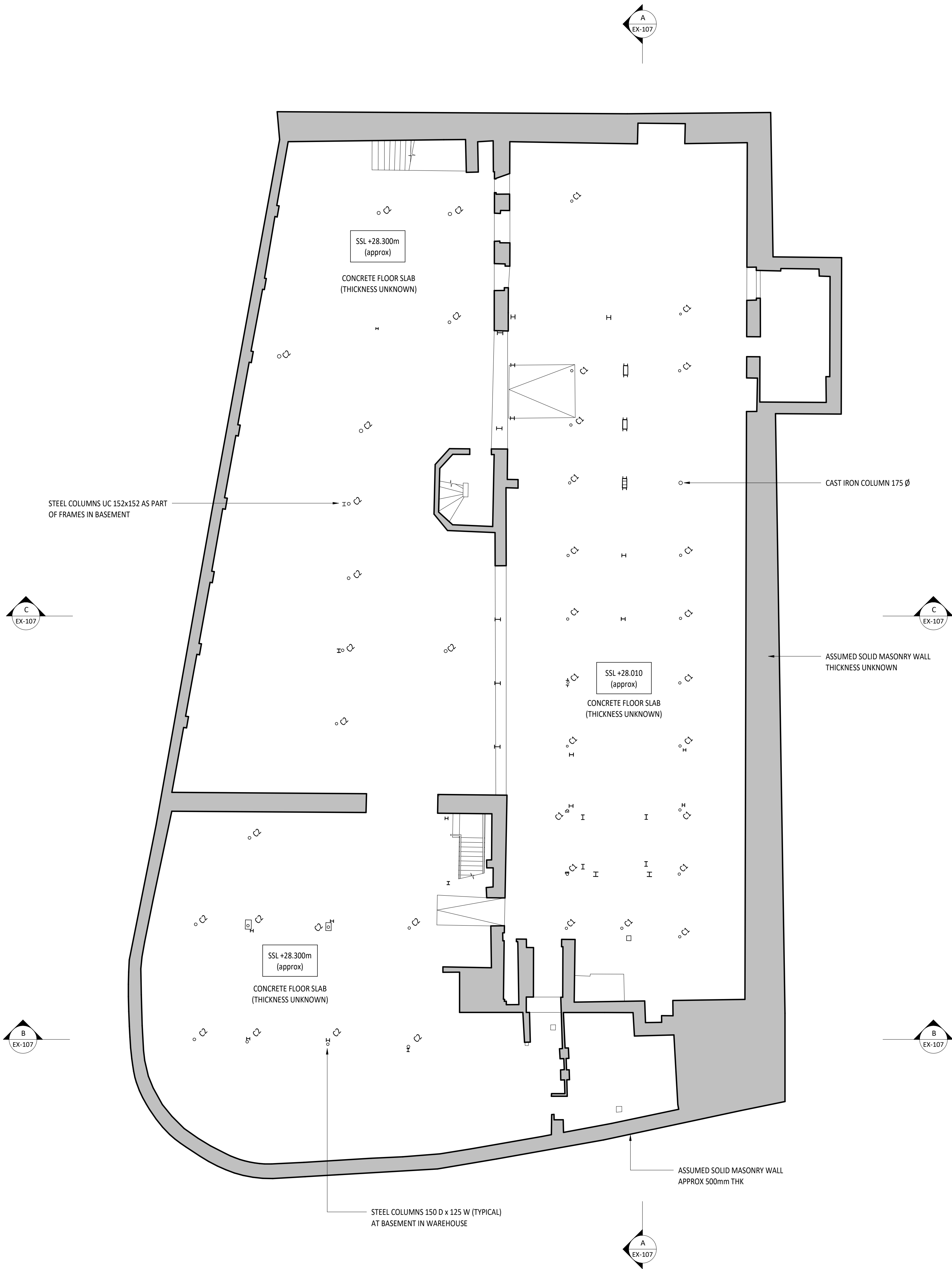
Hotspur Press Cambridge Street, Manchester. Phase 1 Preliminary Risk Assessment by LK Group – Ref. LKC 18 1196, May 2018.

9. Appendices

Appendix A - Existing building general arrangement plan & elevation drawings

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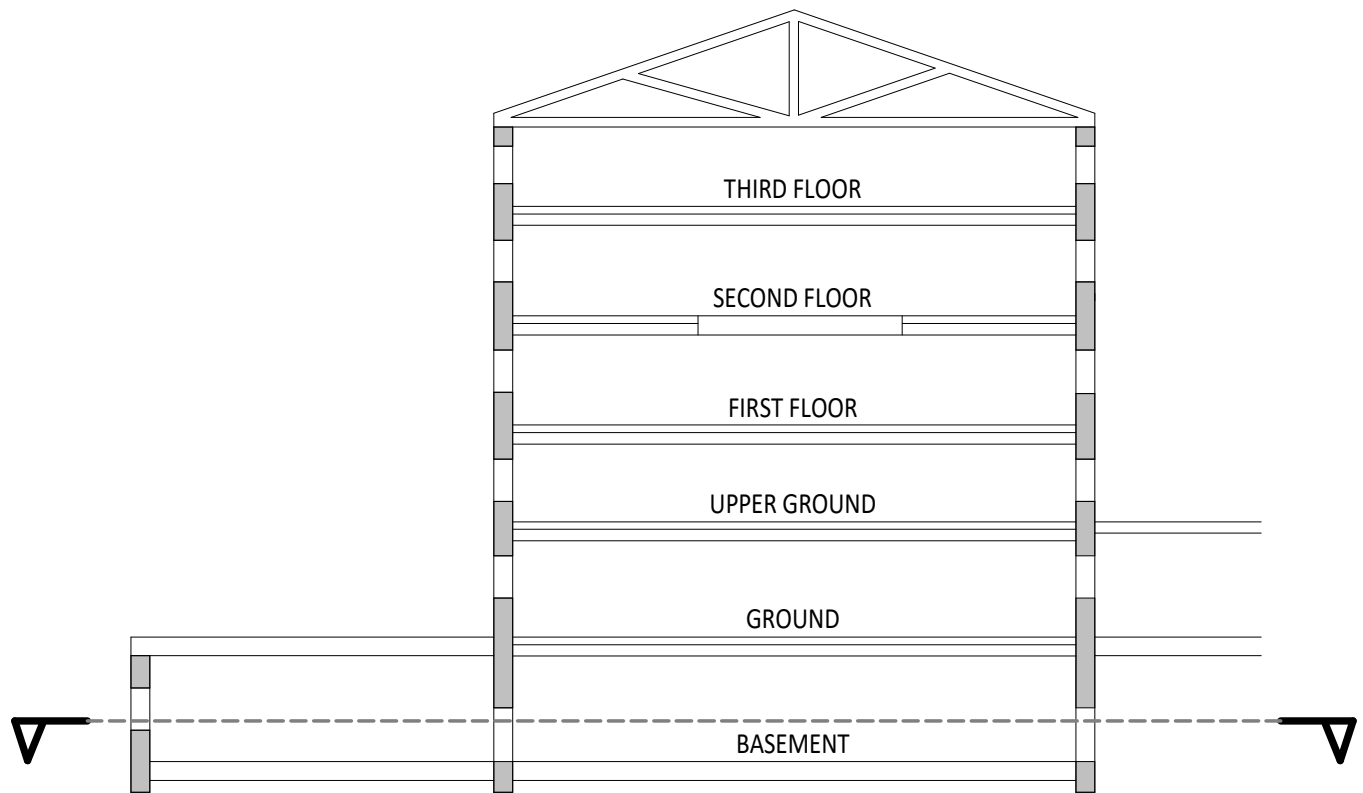
Appendix A - Existing building general arrangement plan & elevation drawings



LEGEND	
○ C1	CAST IRON CIRCULAR COLUMN 90 - 110 DIA.
○ C2	CAST IRON CIRCULAR COLUMN 135 DIA.
----- T1 -----	TIMBER BEAM - 2No. APPROX 360 DP x 100 W
----- T2 -----	TIMBER BEAM - APPROX 270 DP x 150 W
----- T3 -----	TIMBER BEAM - APPROX 300 DP x 160 W
----- T4 -----	TIMBER BEAM - 2No. APPROX 230 DP x 110 W
----- T5 -----	TIMBER BEAM - APPROX 250 DP x 180 W
----- S1 -----	STEEL BEAM - 203x102 UB UNO.
↗	SPANNING DIRECTION OF TIMBER JOISTS ASSUMED 180 DP x 75 W @ 450 c/c
↘	SPANNING DIRECTION OF TIMBER JOISTS ASSUMED 230 DP x 75 W @ 400 c/c
█	EXTERNAL MASONRY WALL - APPROX 500 THK
▨	DENOTES AREA OF DECAYED TIMBER BEAM, TImER JOIST OR TIMBER FLOOR.

NOTE:

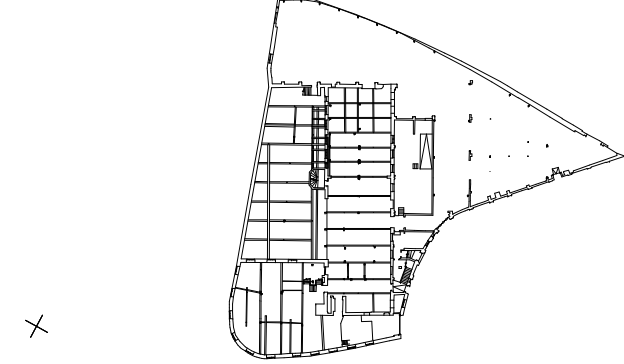
- TIMBER FLOOR BOARDS ARE GENERALLY DAMP.
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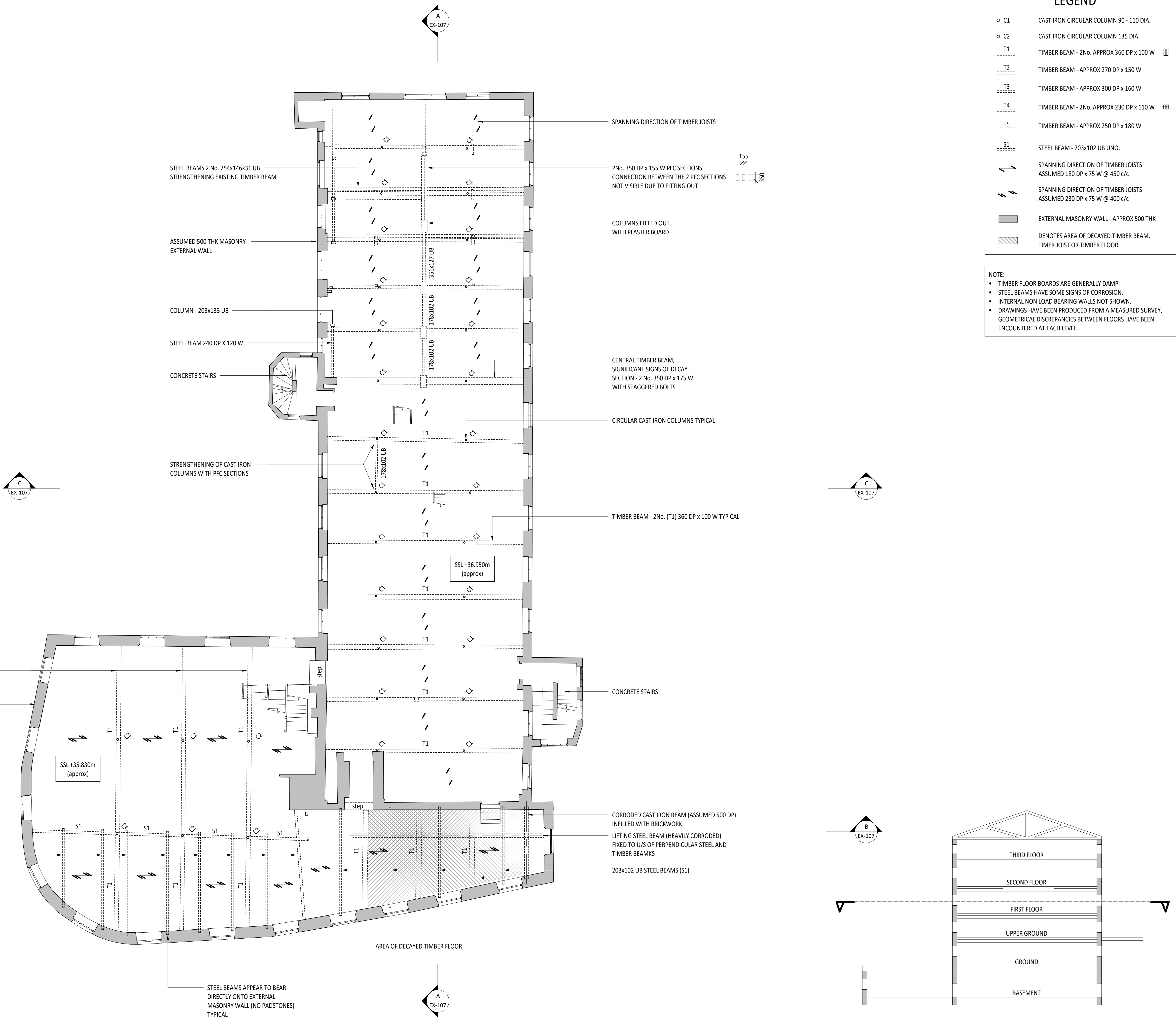
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1006-01	CIVIC	S	EX-100	P01	



LEGEND

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○ C2	CAST IRON CIRCULAR COLUMN 135 DIA.
--- T1 ---	TIMBER BEAM - 2No. APPROX 360 DP x 100 W
--- T2 ---	TIMBER BEAM - APPROX 270 DP x 150 W
--- T3 ---	TIMBER BEAM - APPROX 300 DP x 160 W
--- T4 ---	TIMBER BEAM - 2No. APPROX 230 DP x 110 W
--- T5 ---	TIMBER BEAM - APPROX 250 DP x 180 W
--- S1 ---	STEEL BEAM - 203x102 UB UNO.
↗ ↘	SPANNING DIRECTION OF TIMBER JOISTS ASSUMED 180 DP x 75 W @ 450 c/c
↗ ↘	SPANNING DIRECTION OF TIMBER JOISTS ASSUMED 230 DP x 75 W @ 400 c/c
█	EXTERNAL MASONRY WALL - APPROX 500 THK
▨	DENOTES AREA OF DECAYED TIMBER BEAM, TIMER JOIST OR TIMBER FLOOR.

NOTE:

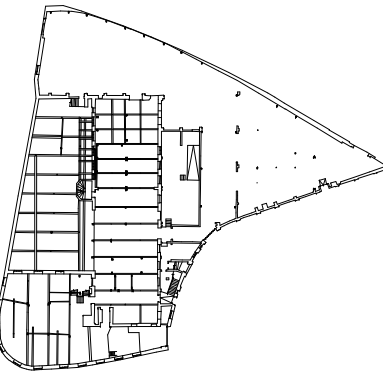
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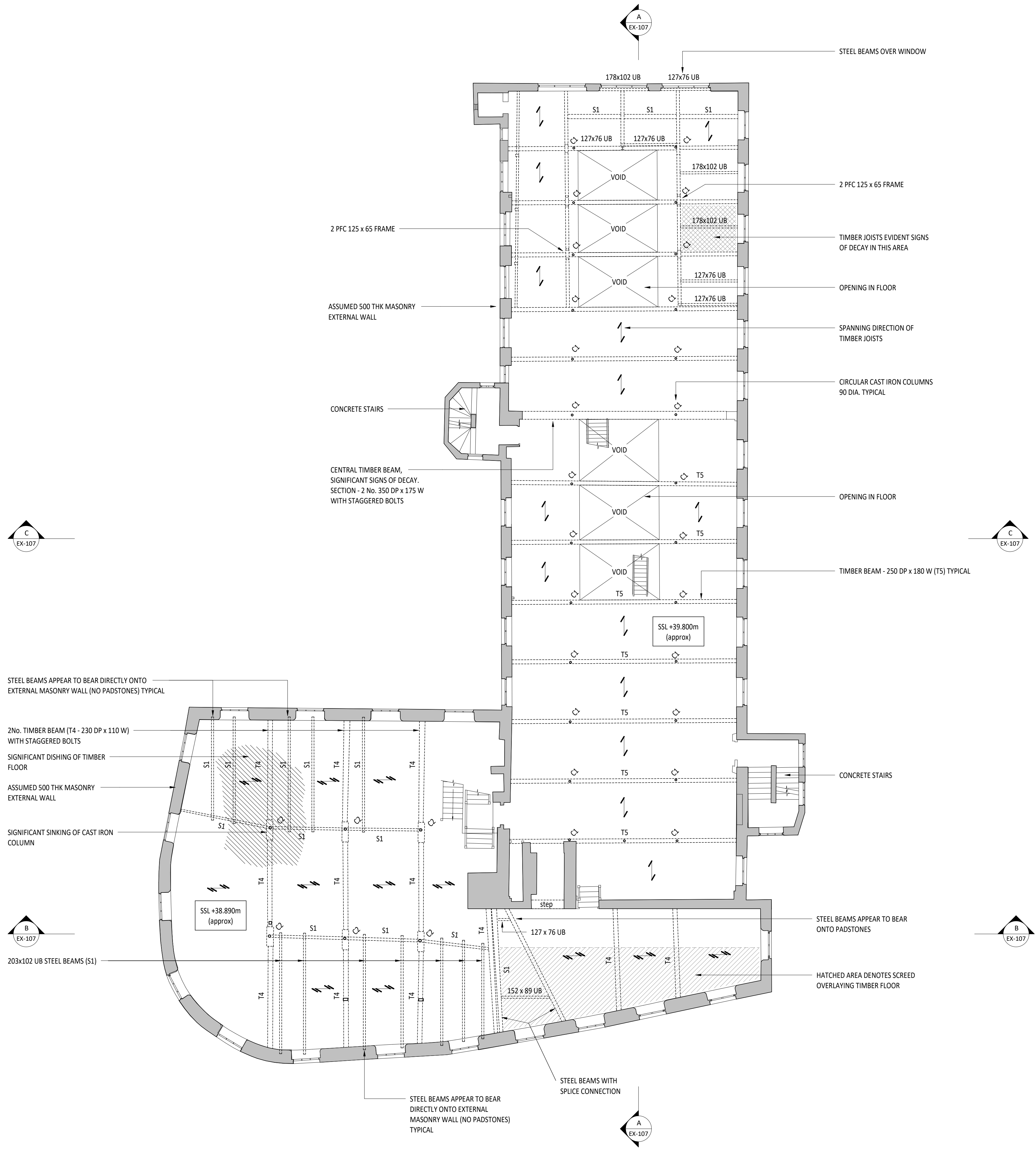
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FIRST FLOOR EXISTING BUILDINGS

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Project Number	Originator	Discipline	Drawing Number
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LEGEND

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CAST IRON CIRCULAR COLUMN 90 - 110 DIA.

C2

CAST IRON CIRCULAR COLUMN 135 DIA.

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TIMBER BEAM - 2No. APPROX 360 DP x 100 W

T2

TIMBER BEAM - APPROX 270 DP x 150 W

T3

TIMBER BEAM - APPROX 300 DP x 160 W

T4

TIMBER BEAM - 2No. APPROX 230 DP x 110 W

T5

TIMBER BEAM - APPROX 250 DP x 180 W

S1

STEEL BEAM - 203x102 UB UNO.

SPANNING DIRECTION OF TIMBER JOISTS ASSUMED 180 DP x 75 W @ 450 c/c

SPANNING DIRECTION OF TIMBER JOISTS ASSUMED 230 DP x 75 W @ 400 c/c

EXTERNAL MASONRY WALL - APPROX 500 THK

DENOTES AREA OF DECAYED TIMBER BEAM, TIMER JOIST OR TIMBER FLOOR.

NOTE:

TIMBER FLOOR BOARDS ARE GENERALLY DAMP.

STEEL BEAMS HAVE SOME SIGNS OF CORROSION.

INTERNAL NON LOAD BEARING WALLS NOT SHOWN.

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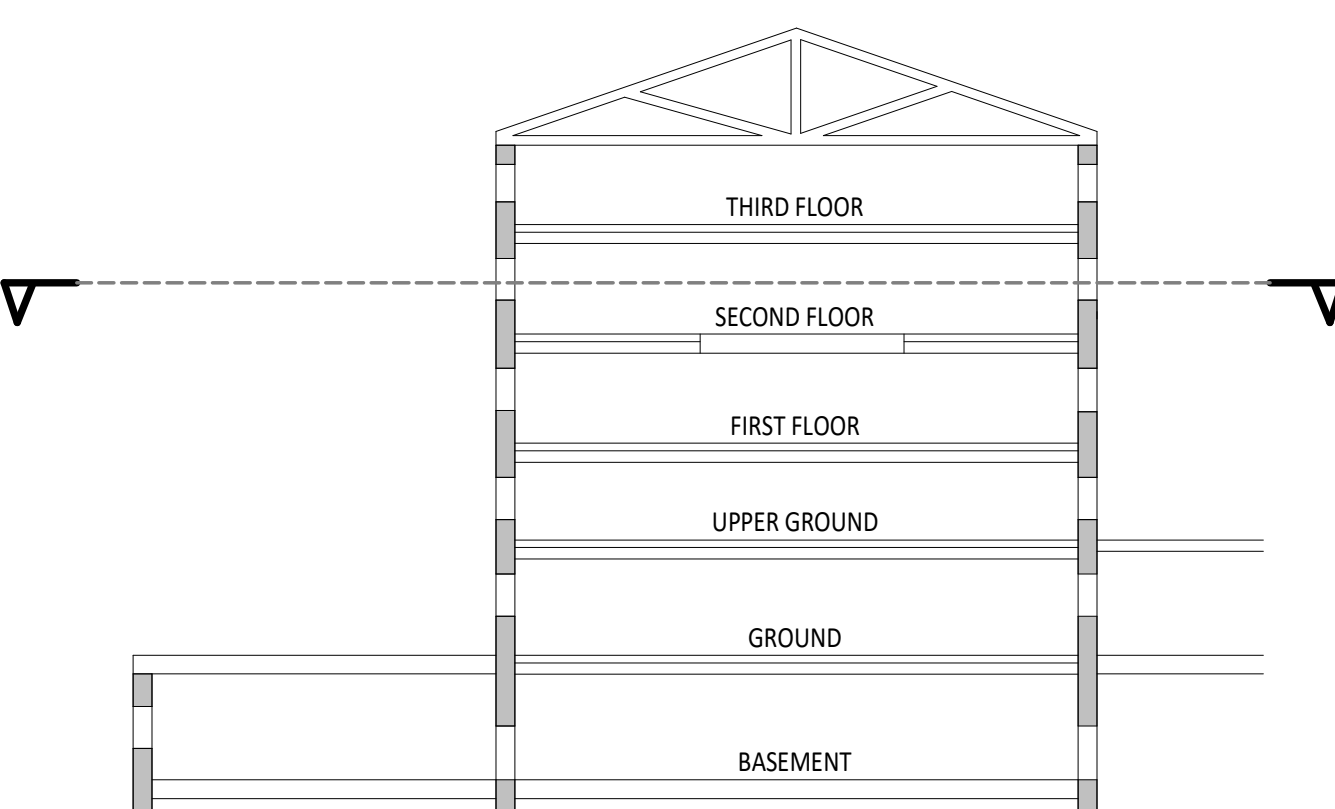
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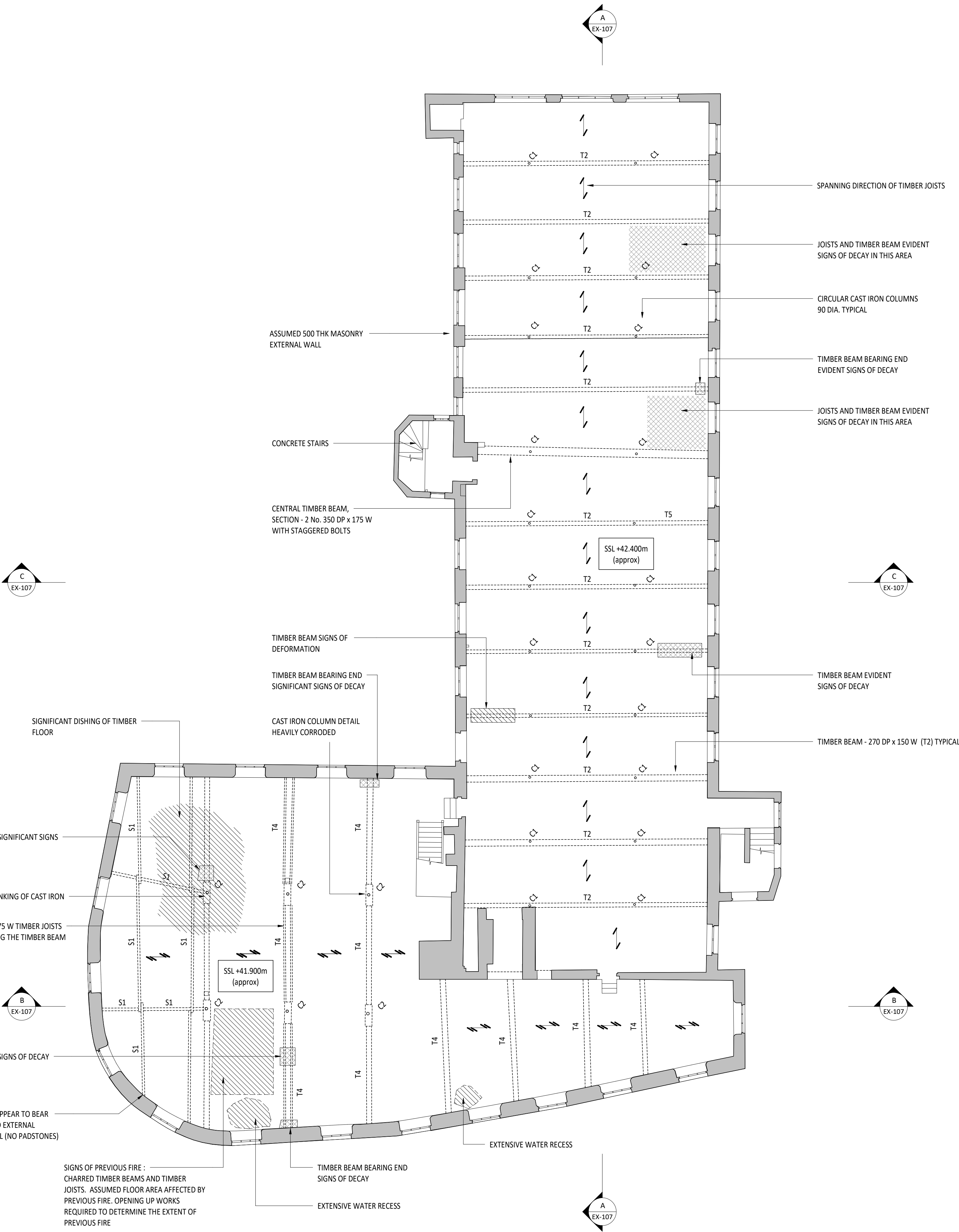
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SECOND FLOOR EXISTING BUILDING

Status

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Project Number	Originator	Discipline	Drawing Number
1006-01	CIVIC	S	EX-104
			P01



LEGEND

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CAST IRON CIRCULAR COLUMN 90 - 110 DIA.

○ C2

CAST IRON CIRCULAR COLUMN 135 DIA.

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--- T2 ---

TIMBER BEAM - APPROX 270 DP x 150 W

--- T3 ---

TIMBER BEAM - APPROX 300 DP x 160 W

--- T4 ---

TIMBER BEAM - 2No. APPROX 230 DP x 110 W

--- T5 ---

TIMBER BEAM - APPROX 250 DP x 180 W

--- S1 ---

STEEL BEAM - 203x102 UB UNO.

SPANNING DIRECTION OF TIMBER JOISTS
ASSUMED 180 DP x 75 W @ 450 c/c

SPANNING DIRECTION OF TIMBER JOISTS
ASSUMED 230 DP x 75 W @ 400 c/c

EXTERNAL MASONRY WALL - APPROX 500 THK

DENOTES AREA OF DECAYED TIMBER BEAM,
TIMBER JOIST OR TIMBER FLOOR.

NOTE:

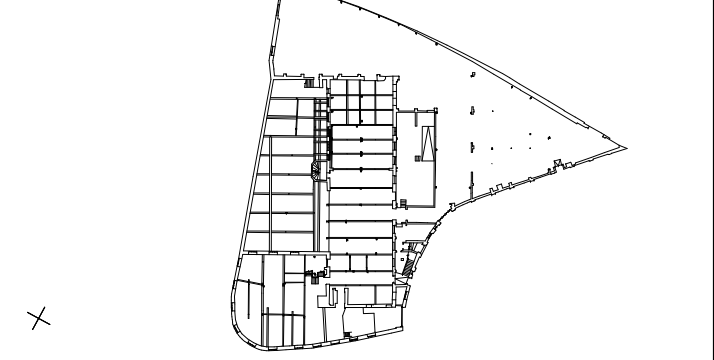
- TIMBER FLOOR BOARDS ARE GENERALLY DAMP.
- STEEL BEAMS HAVE SOME SIGNS OF CORROSION.
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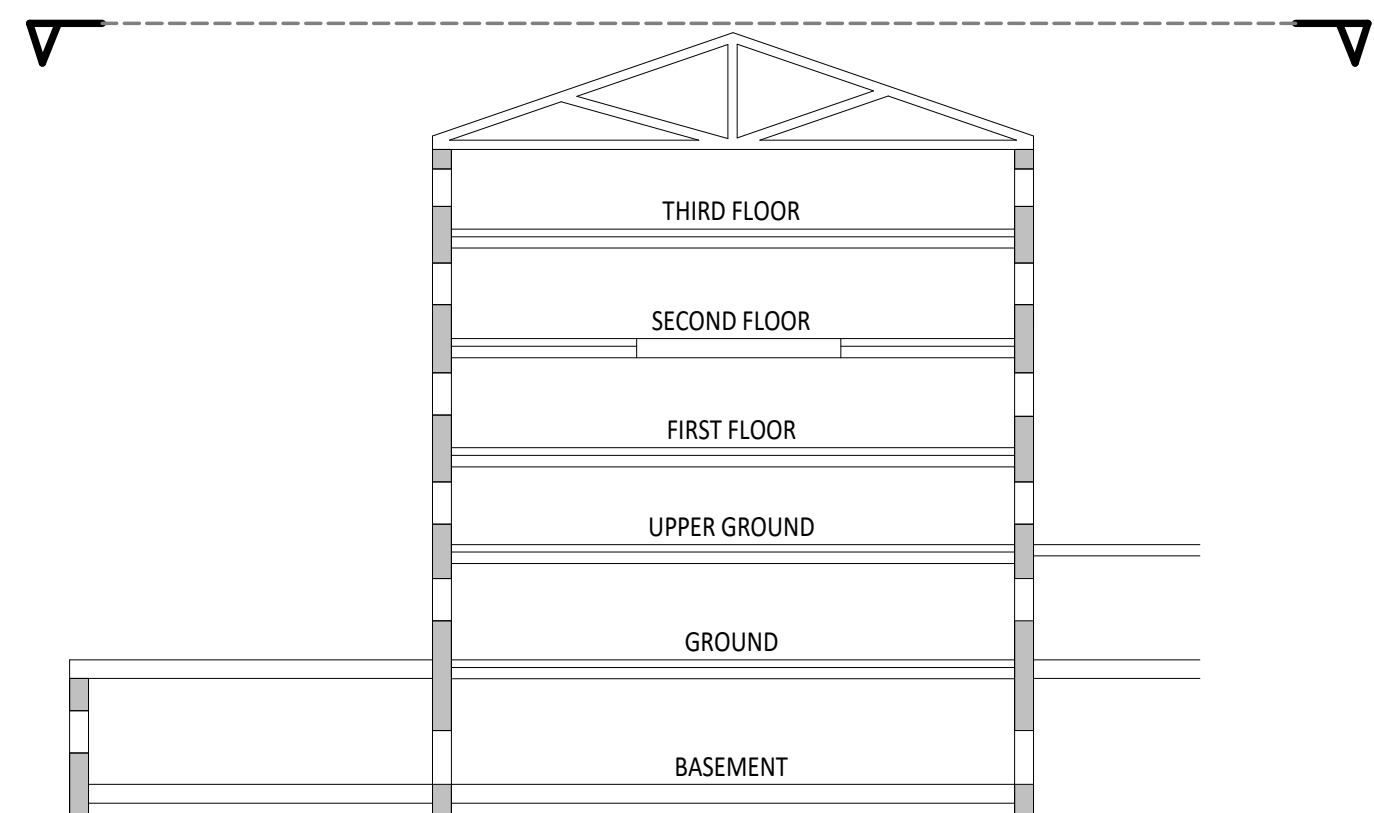
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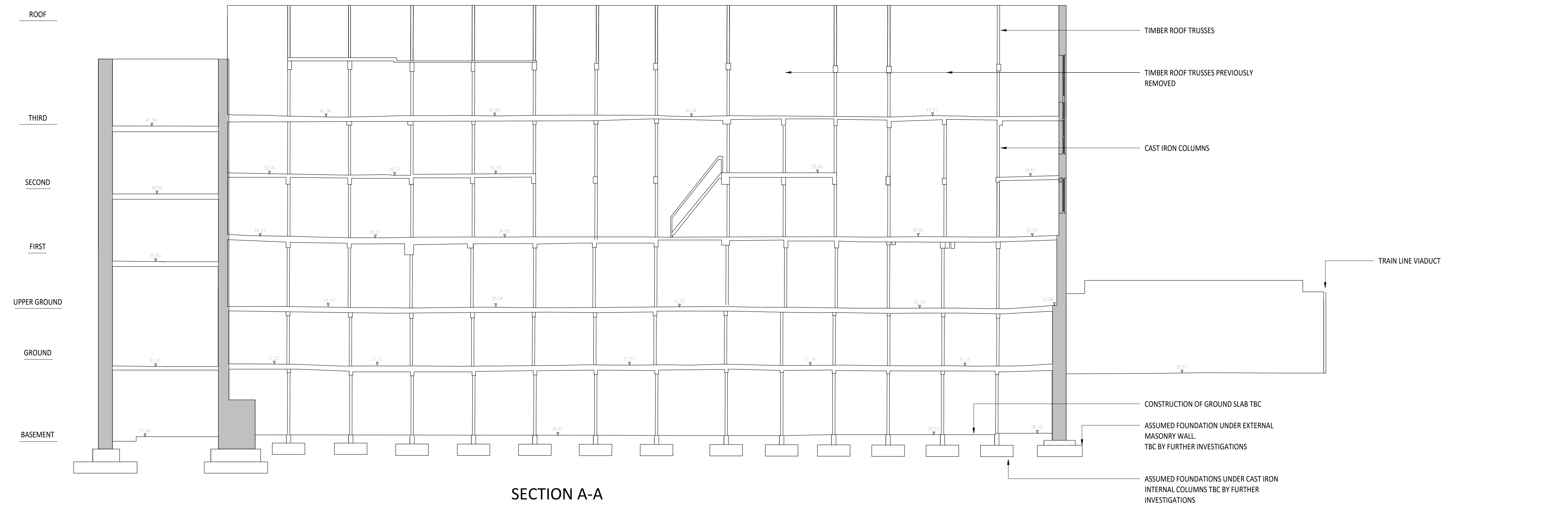
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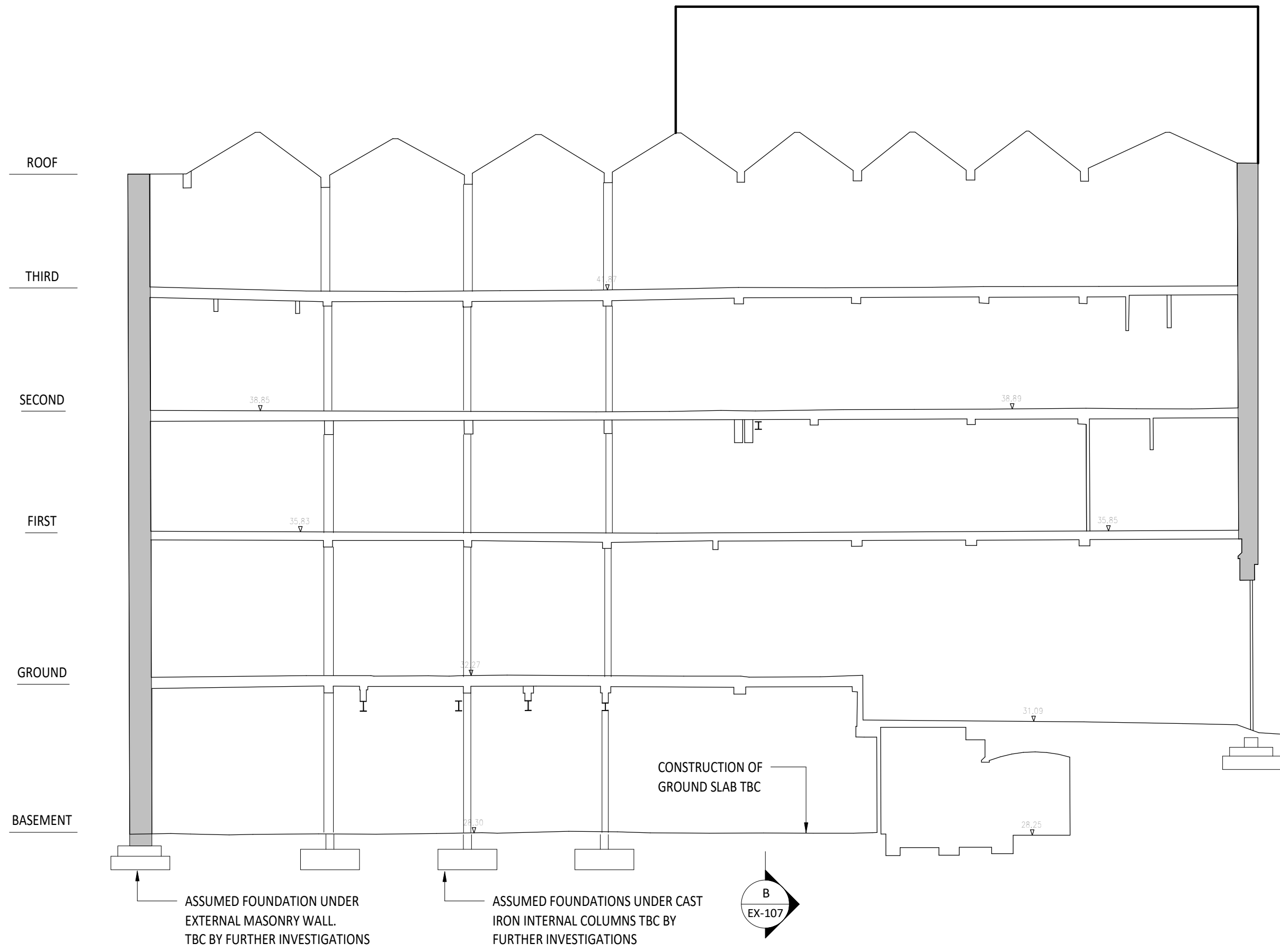
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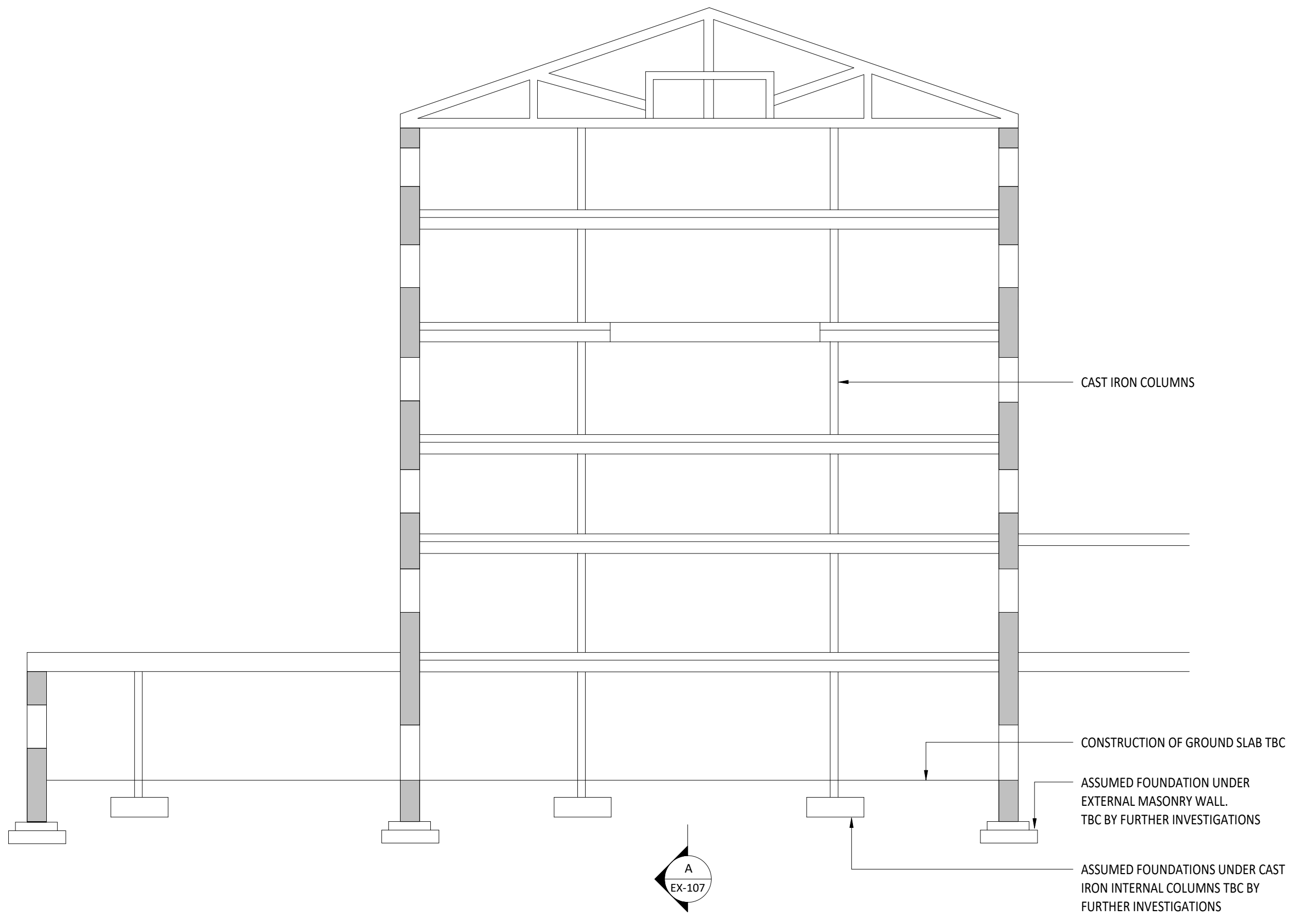
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Project Number 1006-01	Originator MJF	Discipline S	Drawing Number EX-106	Revision P01	



SECTION A-A



SECTION B-B

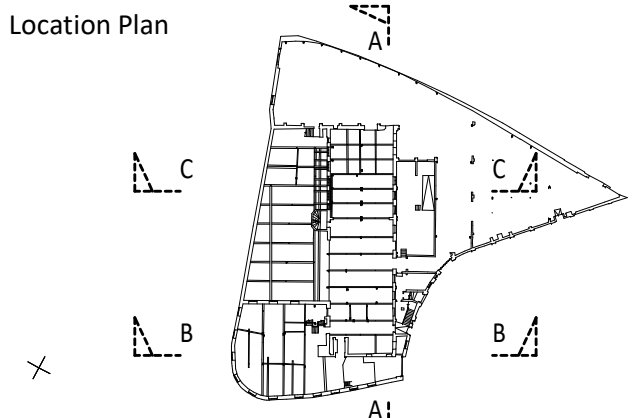


SECTION C-C

- Standard Notes
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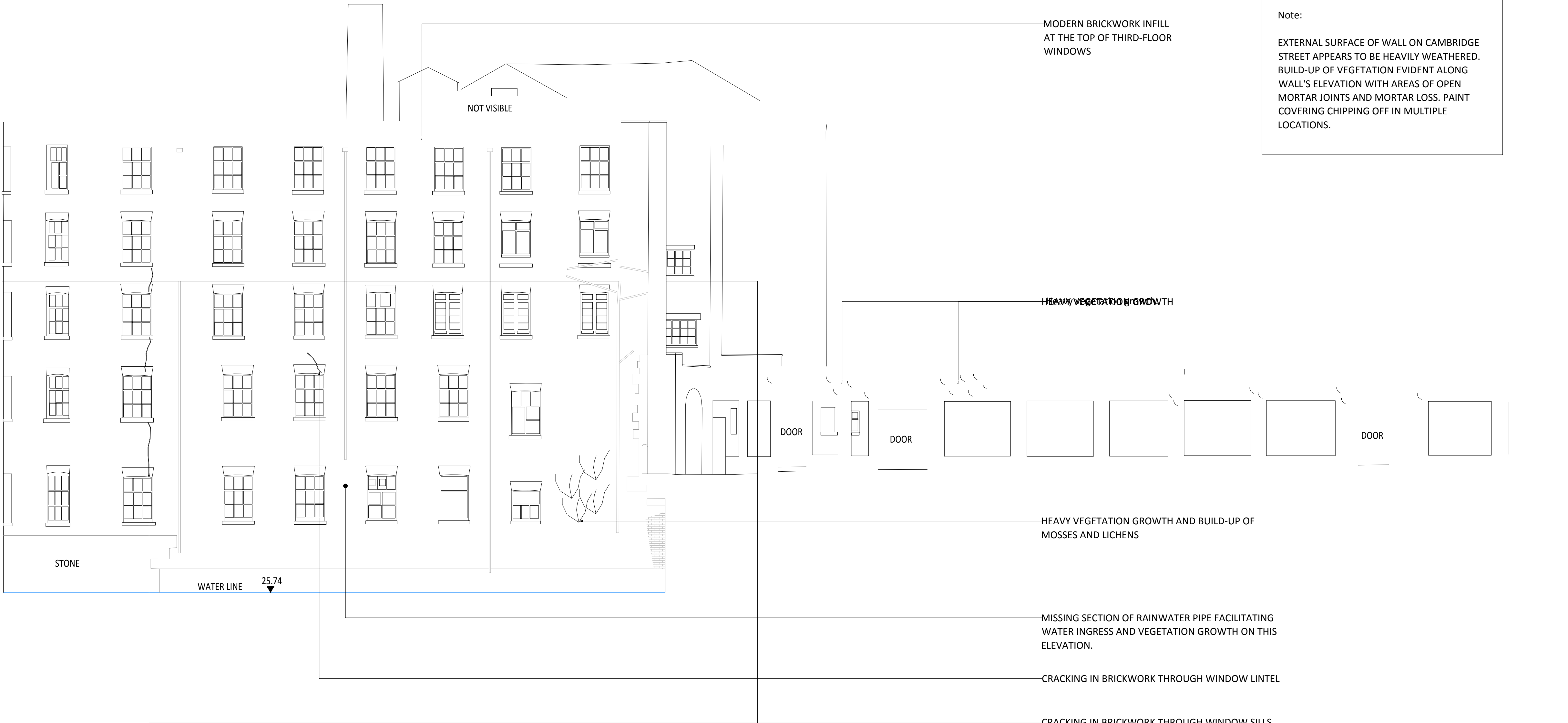
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Title
FULL EXISTING BUILDING SECTIONS

Status
FOR INFORMATION

Scale @ A1	Date Created	Drawn	Checked
1:100	June 18	MJF	DZ
Project Number	Originator	Discipline	Drawing Number
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			P01



SOUTH ELEVATION
(SCALE 1:100@A1)

- Standard Notes
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 2. This drawing should not be scaled.
 3. All dimensions are to be verified by the contractor on site.
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Location Plan



Notes and Keys

Key

- = Brickwork Infill.
- = Blockwork Infill.
- = Concrete Wall.
- = Brickwork Wall.

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Date	Rev	Description	Drawn	Chkd



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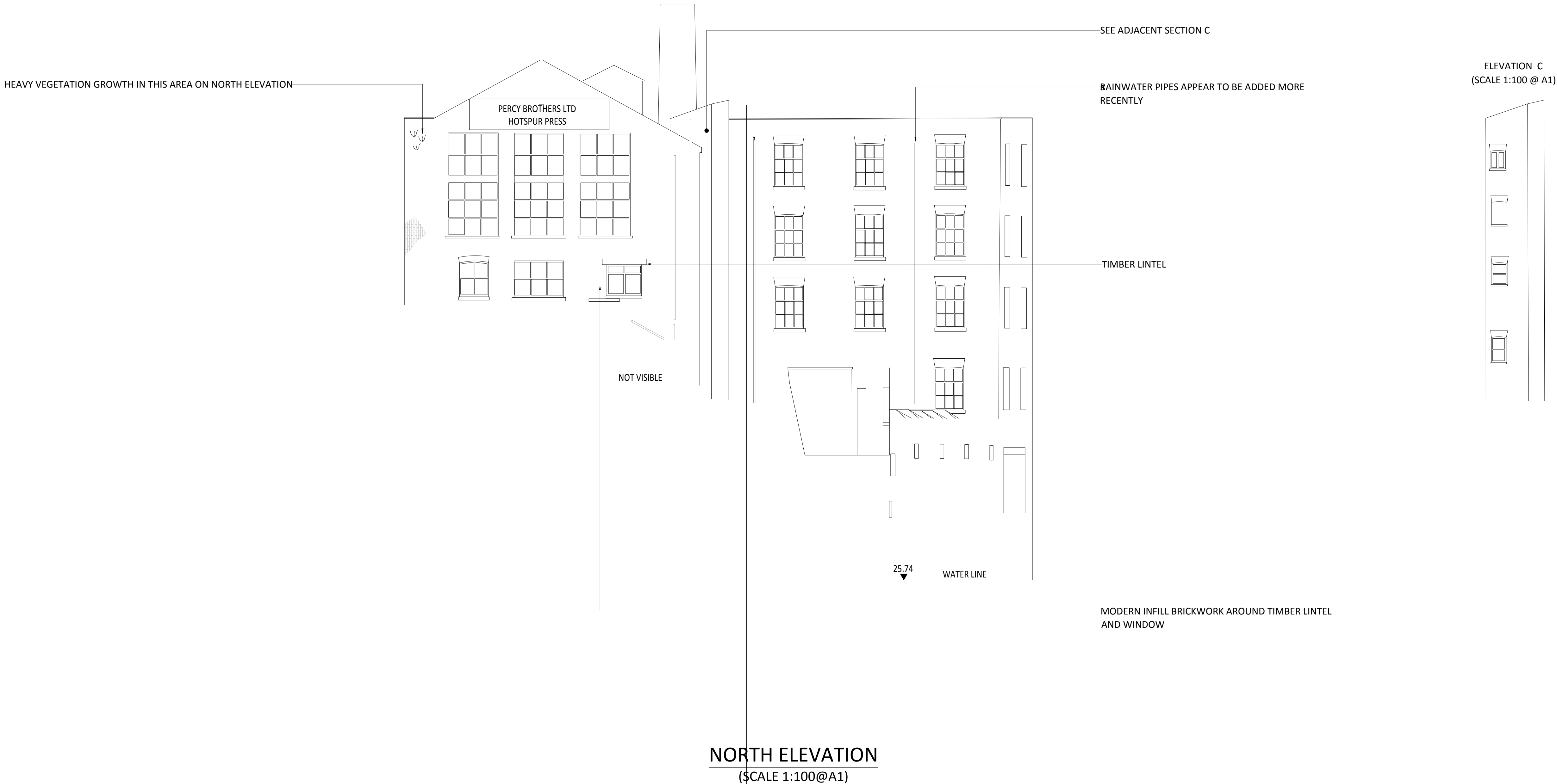
Project
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Title
SOUTH ELEVATION
EXISTING BUILDING

Status

FOR INFORMATION

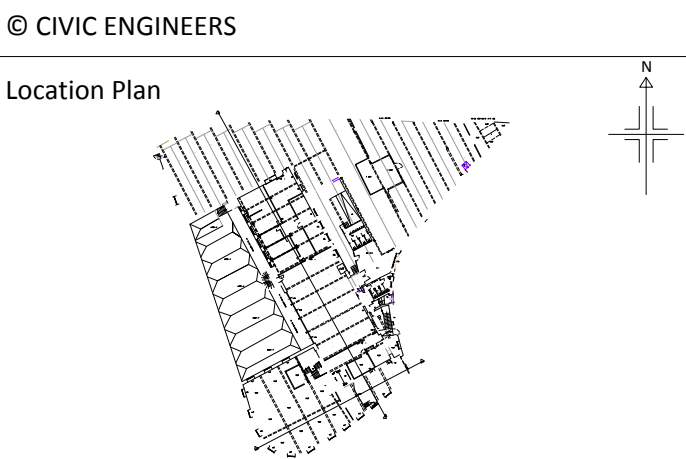
Scale @ A1 1:100	Date Created June-18	Drawn DZ	Checked LK
Project Number 1006-01	Originator CIVIC	Discipline S	Drawing Number EX-200
		Revision P01	



NOTE:

BRICKWORK ON THIS ELEVATION IS GENERALLY WEATHERED. LOCAL REPAIRS TO AREAS OF WEATHERED BRICKWORK AND AREAS OF OPEN MORTAR JOINTS AND MORTAR LOSS. TYPICAL ALONG ELEVATION.

- Standard Notes
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 2. This drawing should not be scaled.
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- Notes and Keys
- Key**
- = Brickwork Infill.
 - = Blockwork Infill.
 - = Concrete Wall.
 - = Brickwork Wall.

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Project

HOTSPUR PRESS, MANCHESTER

Title

NORTH ELEVATION
EXISTING BUILDING

Status

FOR INFORMATION

Scale @ A1	Date Created	Drawn	Checked	
1:100	June-18	DZ	JM	
Project Number	Originator	Discipline	Drawing Number	Revision
1006-01	CIVIC	S	EX-201	P01

NOTE:

BRICKWORK ON THIS ELEVATION IS BADLY WEATHERED. LOCAL REPAIRS TO AREAS OF WEATHERED BRICKWORK AND AREAS OF OPEN MORTAR JOINTS AND MORTAR LOSS. TYPICAL ALONG ELEVATION.

EVIDENT OPEN MORTAR JOINTS AND MORTAR LOSS
ALONG BRICKWORK STAIRCASE TOWER

SEE ELEVATION A BELOW

VEGETATION GROWTH

VEGETATION GROWTH

BRICKWORK IS BADLY CRACKED AROUND WINDOW

MODERN INFILL BRICKWORK

ELEVATION A
(SCALE 1:100 @ A1)

WEST ELEVATION
(SCALE 1:100@A1)

ELEVATION B
(SCALE 1:100 @ A1)

SEE ELEVATION B BELOW

HEAVY VEGETATION GROWTH

MODERN INFILL BRICKWORK
ABOVE WINDOWS OF CURVED
WAREHOUSE AT THIRD-FLOOR
LEVEL.

NOT VISIBLE

SKY LIGHTS

STONE

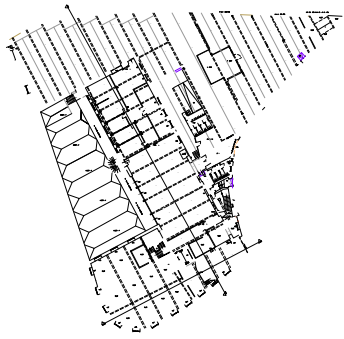
BUILD-UP OF MOSSES AND
LICHENS ALONG RAINWATER
PIPES.

Standard Notes

1. This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and the specification.
2. This drawing should not be scaled.
3. All dimensions are to be verified by the contractor on site.
4. All discrepancies should be reported to the C.A. prior to the commencement of the works.

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Location Plan



Notes and Keys

Key

-  = Brickwork Infill.
-  = Blockwork Infill.
-  = Concrete Wall.
-  = Brickwork Wall.

200618	P01	Issued for Planning	DZ	JM
Date	Rev	Description	Drawn	Chkd



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LONDON Lloyds Wharf, 2 Mill Street, London SE1 2BD. Tel: 020 7293 2977
LEEDS Tower Works, Unit G2-01, Globe Road, Leeds, LS11 5DG. Tel: 0113 2025 130

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Project
HOTSPUR PRESS, MANCHESTER

Title
WEST ELEVATION
EXISTING BUILDING

Status
FOR INFORMATION

Scale @ A1 1:100	Date Created June-18	Drawn DZ	Checked JM
Project Number 1006-01	Originator CIVIC	Discipline S	Drawing Number EX-202
			Revision P01

NOTE:

BRICKWORK ON THIS ELEVATION IS BADLY WEATHERED. LOCAL REPAIRS TO AREAS OF WEATHERED BRICKWORK AND AREAS OF OPEN MORTAR JOINTS AND MORTAR LOSS. TYPICAL ALONG ELEVATION.



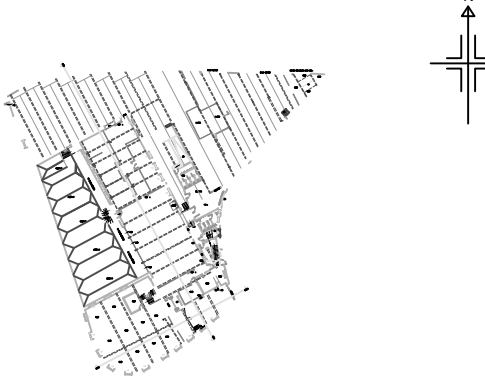
EAST ELEVATION
(SCALE 1:100@A1)

Standard Notes

1. This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and the specification.
2. This drawing should not be scaled.
3. All dimensions are to be verified by the contractor on site.
4. All discrepancies should be reported to the C.A. prior to the commencement of the works.

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Location Plan



Notes and Keys

Key

- = Brickwork Infill.
- = Blockwork Infill.
- = Concrete Wall.
- = Brickwork Wall.

Date	Rev	Description	Drawn	Chkd
2006/18	P01	Issued for Planning	DZ	JM



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Project
HOTSPUR PRESS, MANCHESTER

Title
EAST ELEVATION
EXISTING BUILDING

INFORMATION				
Scale @ A1 1:100	Date Created June-18	Drawn DZ	Checked JM	
Project Number 1006-01	Originator CIVIC	Discipline S	Drawing Number EX-203	Revision P01

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