Mann Williams Consulting Civil and Structural Engineers
7 Old King Street, Bath BA1 2JW, T 01225 464419

Athlone House
Hampstead
London N6 4RU

Structural Inspection

Prepared by:- **Jon Avent** *BSc(Hons) CEng MIStructE IHBC*
Accredited conservation engineer

for:- **Mr Mikhail Fridman**

Date:- **May 2016**

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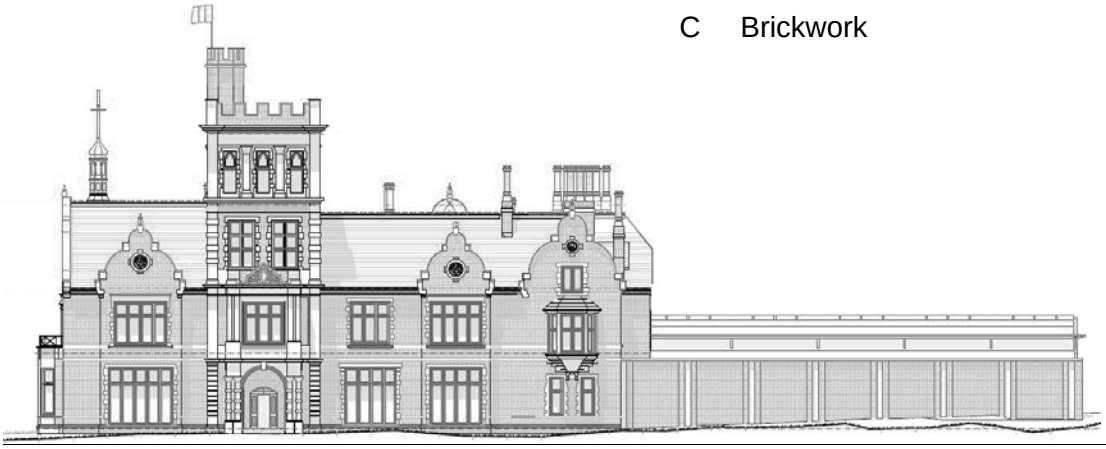

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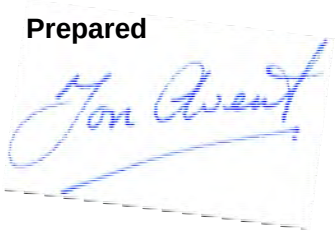	JNA	JWS	23rd May 2016

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1.0 Introduction

1.01 Mann Williams have been commissioned to provide a structural inspection on Athlone House by Mr Mikhail Fridman with the objective of confirming its suitability for refurbishment and reinstatement as a domestic dwelling.

1.02 Athlone House is a brick and stone Victorian mansion completed in 1871 as Caenwood Towers. It was designed by Edward Salomons and John Philpot Jones in a richly eclectic Victorian style reflecting a variety of architectural traditions. It lies on high ground amongst trees just beyond the northern edge of Hampstead Heath and is visible from parts of the Heath and from nearby Hampstead Lane. A single dominant square tower can be seen from greater distances.

1.03 

After being requisitioned by the RAF during WW2 it was handed back to its previous owner, but was never occupied as a private dwelling again and was purchased by the National Health Service. It was used for healthcare provision before becoming surplus to the requirements in 2002. The building is illustrated in the aerial photograph opposite. It was the residence of several prominent London men during the period between 1870 and 1940.

1.04 Private owners adjusted the interior to some extent, but the building remained much as it was originally built until the 20th century. Around 1900, a distinctive copper roofed extension was added to what was the ground floor drawing room and a 2 storey block was built on the north side in the 1930s. In common with many Victorian properties alterations to provide bedrooms and en-suite lavatories in accordance with evolving standards meant that many original fixtures and fittings were removed along with some decorative features and joinery.

1.05 The photograph opposite show the east elevation with a range of architectural detailing typical of the building.

1.06 The survey has been based on a visual inspection of the property carried out on 4th May 2016. No opening up works were carried out during the inspection and all comments are based on visual evidence available from ground level and other normally accessible areas of the property.

1.07 A site plan is provided in Appendix A to assist with referencing specific areas of the building.

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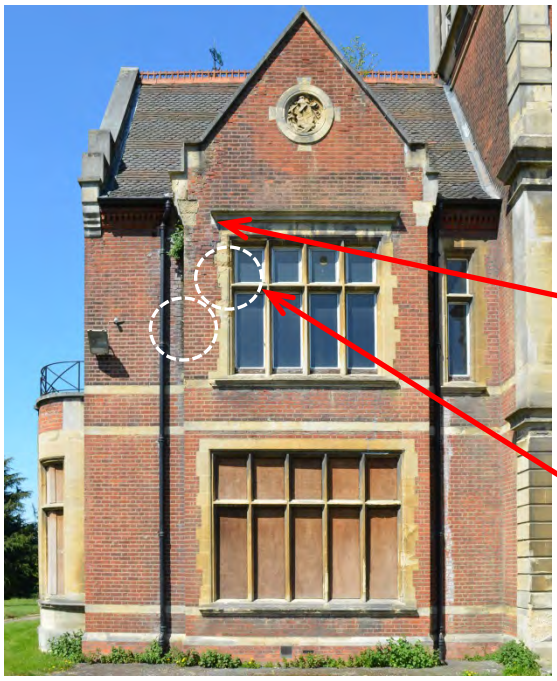
2.0 External Inspection

2.01 Photographic records of the existing principal external elevations are provided in Appendix B for reference. It is noted that demolitions have occurred to the north of the property to remove modern poor quality extensions from the mid-late c20th. This has left a number of scars and historical alterations that will require careful repairs and conservation works, but none of the proposed works are considered to have potential for detrimental action on the existing historic fabric, and proposed new extensions to this side of the property will provide an opportunity to blend new works with the existing historic fabric as part of a sustainable evolution of the building.

2.02



The image opposite shows the southern end of the east elevation and illustrates the typical façade configuration of brickwork with dressed Doulting stone window reveals, heads, cills, transoms and mullions. Stone string courses are also set within the brickwork. It is noted that the relatively soft Doulting stone shows surface decay to a large number of areas as typically illustrated in the inset details below.

2.03

The south side of the porte-cochère to the east elevation is shown in the image opposite. Close inspection of the stonework reveals areas of mortar patching to the Doulting Stone as illustrated in the inset details below. In many areas these patch repairs have performed reasonably well although the cement based material is unlikely to perform well in the long-term and the underlying natural stone is at elevated risk of frost damage and decay as a result of trapped moisture and poor breathability of the repair. Local stone repairs would be recommended and these would either take the form of whole stone replacements or the cutting in of stone slip repairs.

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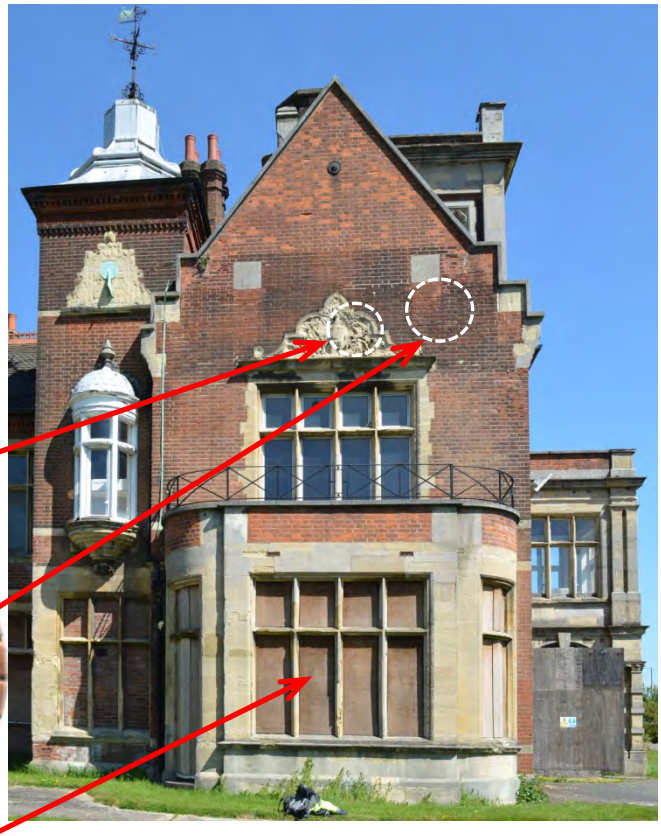
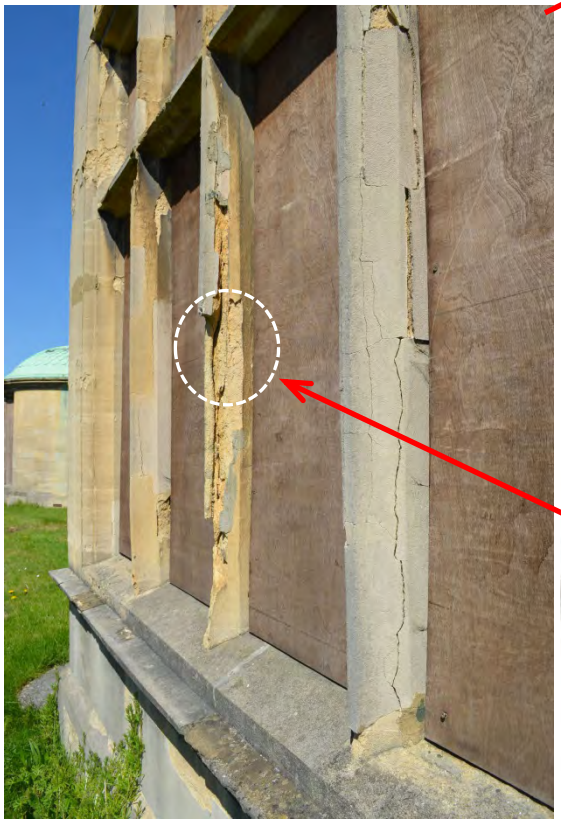
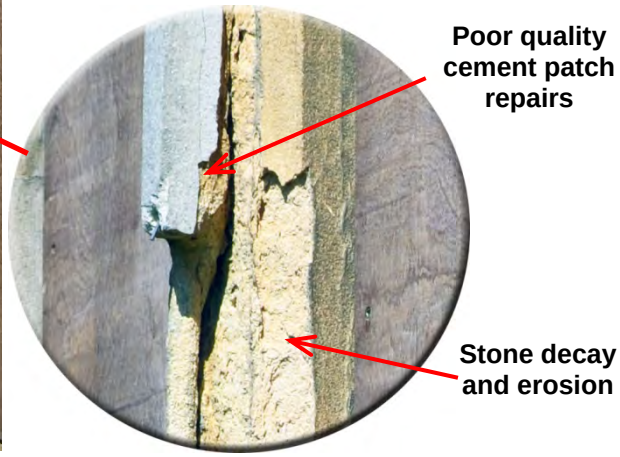
2.04 The south elevation on the south east corner, is shown in the image opposite. In common with the east elevation the Doulting Stone shows evidence of decay and historical patch repairs. The brickwork is generally performing significantly better than the stone and with the exception of isolated brickwork decay and damage, as shown in inset below, the majority of bricks are capable of being retained. Some of the carved stone details and plaques around the building are in various stages of erosion. Although these are not a structural concern there may need to be decisions made on their conservation and repair or replacement.



2.05 The elevations do all contain areas where deterioration has occurred through historical neglect and poor maintenance. Areas of Doulting stone mullions and window reveals have suffered from erosion and spalling as illustrated in the photograph opposite. Proposals to lower existing window cills will provide opportunity to replace the defective mullions. It would be anticipated that stainless steel backing supports would be provided to enable the increased slenderness to be accommodated.





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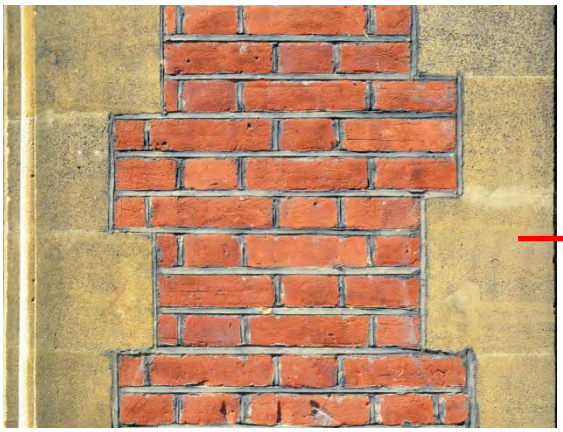
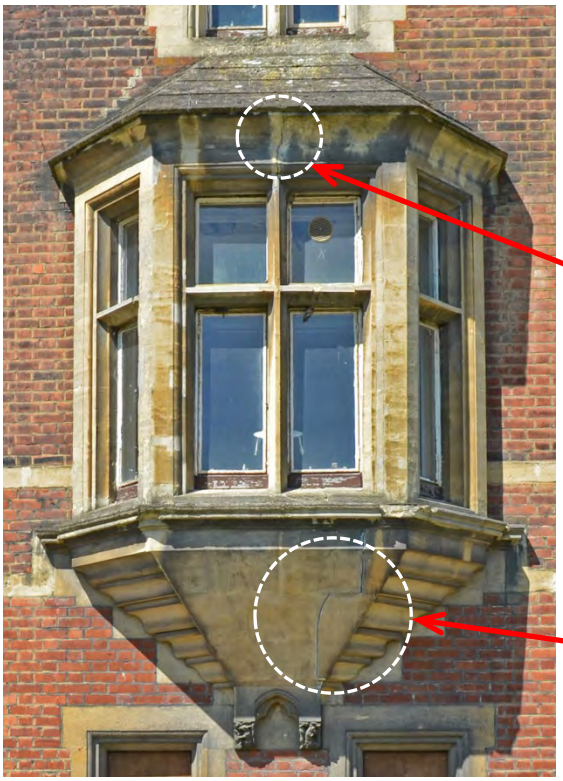
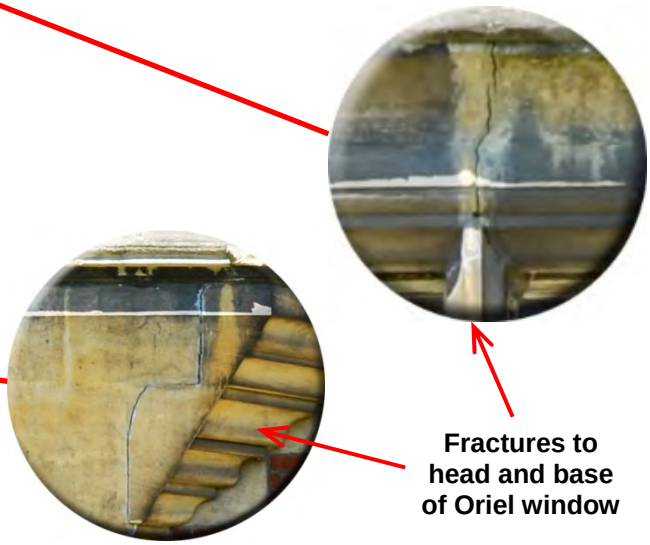
2.06 The north end of the east elevation is shown in the image opposite. The stone in this area is generally in reasonably good condition compared to the south elevation noted previously. The inset image below illustrates a typical panel of brickwork and stonework to adjacent window reveals. The joints to the brickwork appear as a relatively hard strap pointed detail which has potential to damage the brick through poor breathability. It is noted that the extent of damage witnessed in this area was not significant and this is principally a longer-term consideration.



2.07 Some localised movement is evident, as illustrated opposite in the base and head of the Oriel window to this elevation. The movement appears long standing and is not considered significant. Local repairs and stitching will enable the movement to be stabilised insitu and there is no requirement for significant reconstruction anticipated.





Fractures to head and base of Oriel window

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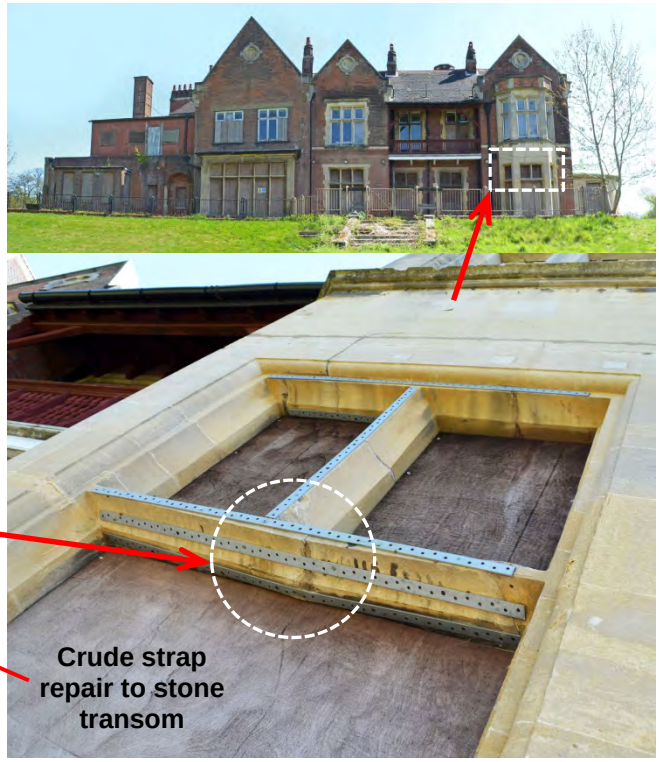
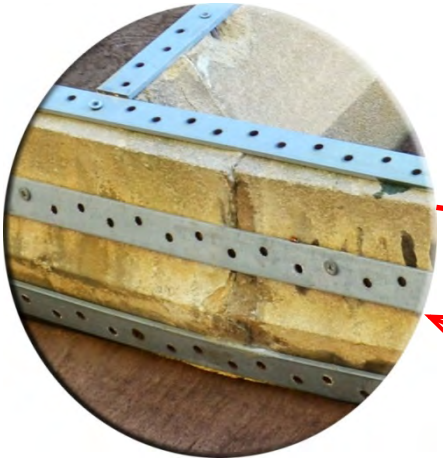
2.08 On the west elevation there is crude strapping present to the ground floor window transom and upper mullion as illustrated in the image opposite and inset detail below. It would appear that a lower mullion is missing although there is no significant evidence of removal. Reconstruction of the window configuration would be anticipated in this location.





2.09 At first floor level on the south elevation there is further evidence of decay to the Doulting stonework as illustrated in the bay window image opposite. The insert details show further cement patch repairs and erosion/spalling to stone mullion. Patch repairs to the stonework would be an anticipated requirement.

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2.10 The tower above the east elevation is shown opposite. Structurally the tower appears stable with no evidence of significant instability. It is noted that stone repairs and cement patching is present as noted previously in other areas. The inset image below illustrates and example of the patching to this area of the building.

Cement patching to dressed stone

2.11

Although the brickwork to the elevations is generally in a condition that does not give any concern over structural stability, there are a few areas where some decay is evident to the face of the brick. The causes of brick decay can be wide ranging, and some general information on brickwork problems is provided in Appendix C for reference. The image opposite is an area at ground floor level to the south west corner of the building. The pointing in this area is of poor quality and appears cement based. The brick faces have decayed back slightly and frost action in combination with poor pointing is considered a likely cause. Repointing using a more appropriate Lime mix would be recommended. Any brick replacement should be carefully considered to ensure that an appropriate and consistent strategy is applied across the building.

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2.12 The image opposite illustrates the fact that in some areas the stone work decay relates to long standing leaking rainwater goods. The presence of pipes and adjacent mould staining of adjacent walls illustrates the situation. It is essential that the existing drainage system is fully investigated at the earliest opportunity.

2.13 The north elevation has been disfigured and damaged by the later extensions, which have now been removed. The elevation is illustrated below and shows the upper floors and roof structure predominantly intact and simply in need of general refurbishment. At ground floor level some cosmetic damage has occurred as a result of becoming internal habitable spaces, but there is no evidence of significant structural damage and cosmetic repairs would be straightforward in any building refurbishment scheme.

2.14 The image opposite shows the first floor central window pair on the north elevation and illustrates masonry in need of careful cleaning and localised cosmetic repairs, but generally not in a condition that requires extensive replacement or reconstruction.

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2.15 Similar situations exist around the full perimeter of the property, however despite evidence of spalled brickwork and decay to stone details there is also considerable and significant areas of serviceable masonry, and in particular a significant quantity of fine historic detailing in both stone and brick which is illustrated in the images opposite and below.

2.16 The photograph opposite shows the north end of the east elevation. The masonry is generally structurally sound, with only localised repairs required.

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2.17

The image opposite shows a smaller Oriel window on the south elevation and is a further example of the detail present around the perimeter of the building. The window requires some cosmetic repairs, but appears to be structurally in serviceable condition.

2.18 The image opposite illustrates elements of brick detailing to be found around the building. These are reasonably extensive and in predominantly serviceable condition. They are a key feature of the building and retention and careful cleaning and refurbishment is considered to be a practical option.

2.19

Further brick detailing is illustrated in the photograph opposite. Although some vegetation has established around gutter areas through poor maintenance the brickwork remains in serviceable condition. It is, however, important that all gutters are kept clear of vegetation and all drains running freely.

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2.20 The principal entrance to the east elevation is in the form of a porte-cochère as illustrated in the photograph opposite. The structure contains a range of original features. Although areas of cosmetic decay and cement patch mortar repair was noted the overall entrance area appears generally structurally sound.

2.21 The image above shows the fine detailing around the springing points of the entrance arch to the porte-cochère. The photograph opposite shows the fine intersecting brick vaulting detail to the area above. All of this appears to be in a structurally stable condition and capable of refurbishment.

2.22 

Further detailing around the internal areas of the porte-cochère remains as illustrated opposite. The carvings are generally in reasonable condition and a significant historic record of the building.

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2.23

On the south side of the building a small later addition, believed to have been constructed around 1900 with a domed copper roof is present as illustrated in the photograph opposite. The stonework and roof structure are generally in reasonable condition and capable of refurbishment if desired.

2.24 The window heads on this extension shows evidence of spalling as a result of corrosion of embedded ironwork. The photograph opposite illustrates the defect. This appears to be a local construction issue relating to this later phase of construction as similar embedded ironwork issues have not been noted to window heads on the main building. Local replacement of window heads in this area would be a straightforward and practical remedial solution should this later extension be retained.

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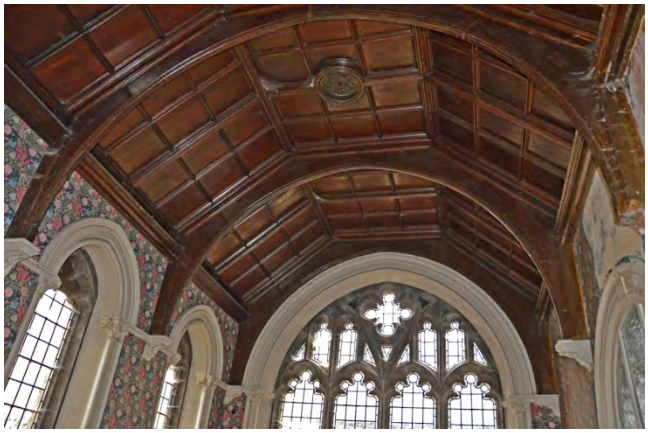
3.0 Internal Inspection

3.01 From the porte-cochère the entrance leads through double doors with fanlight over into a lobby and then on to the main hall and grand staircase as shown below. Although dilapidated through lack of maintenance there are no significant structural issues to prevent refurbishment.

3.02 The area above the main staircase is shown in the photograph opposite and illustrates the timber arch braced roof with panelling between. The principal arch window beyond with tracery detailing looks out to the internal courtyard area of the building.



3.03 

The photograph opposite shows the detailing around the base of the timber arch braces. No significant structural movement was identified.

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3.04 Above the main entrance hall the first floor structure is visible. An arrangement of coffered ribs is present centrally with carved details to joists at bearing positions also recorded. The general lines and levels of the structure are such that no significant concern over general structural integrity was raised. As with all timber structures within historic buildings that have remained unoccupied for a long period there is a risk of local decay; particularly around bearings into external walls. Further opening up works would be required or allowances made in works schedules.

3.05

The photograph opposite shows the first floor timber joists and beam bearings with profiled sprockets and ornate corbels below.

3.06 A range of original features and details are present to the entrance hall and extending along the corridor. The image opposite illustrates a typical detail present, with the letters ‘EB’ clearly visible and referencing Edward Brooke who was responsible for building the house in around 1872.

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3.07 In relation to the rooms around the building they are in various states of dilapidation. The floor structures however, all appear relatively true and level and in robust condition. Plaster detailing and finishes remain in many areas, although in localised areas these have been affected by water ingress and require local repair.

3.08

The image opposite illustrates an area where localised failure of plaster finishes has occurred. The original timber laths remain in place as do elements of original cornice. Repairs can be implemented in all of these locations as the supporting structure remains predominantly robust and serviceable.

3.09 A similar area of localised plaster failure is illustrated in the photograph opposite. Cornice details remain and patch repair and general cosmetic conservation repairs will enable the area to be reinstated.

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3.10 Around the building there are a number of areas where water ingress has occurred through localised failure of roof finishes or poor maintenance. These are not extensive and all are capable of local insitu repairs. The image opposite illustrates an area where localised repairs have already been implemented.

3.11

The areas affected by historical water ingress are generally focused around bay window heads and valley gutters. Localised repairs and effective planned maintenance will address all of these issues. The image opposite shows supporting steelwork above the first floor area located above the porte-cochère. Water ingress has occurred historically causing localised damage to plaster finishes and surface corrosion to the steelwork. The area remains structurally stable and the water ingress appears to have been halted. The steelwork would appear to be capable of retention with appropriate anti corrosion treatment and localised repairs to finishes carried out.

3.12 The photograph opposite shows the insertion of remedial concrete head to an existing bay window affected by water ingress, and illustrates the simple remedial measures appropriate in such locations.

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4.0 Roof Structure Inspection

4.01 The aerial photograph opposite is taken from the south east corner of the site and illustrates the roof configuration with steeply pitched roofs above a principally two storey arrangement of accommodation. The single tower to the east elevation locally extends to four storeys as a principal feature of the house.

4.02

The view opposite is taken from the existing tower roof looking towards the north. The image illustrates the arrangement of chimneys and intersecting roof lines, and gives the building a distinct character. It is noticeable that the existing roof lines all retain consistently regular lines with no evidence of significant movement or distortions either to ridge lines or the principal slopes. This suggests the presence of robust roof structures providing effective service to the building.

4.03 This external evidence is supported by internal evidence on accessible roof voids with large timber trusses present and in good condition where they are visible. The photograph opposite shows a typical roof truss connection with all elements retaining good lines and levels.

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4.04

The photograph opposite illustrates a typical roof void with robust traditional king post trusses supporting a series of timber purlins and common rafters. The structure is in good condition generally and providing effective and efficient service to the existing building.

4.05 Other roof areas include more open attic voids with boarded floors and Queen Post truss arrangements as illustrated in the photograph opposite. As with the other areas inspected the trusses generally appear in good condition, providing effective service.

4.06

The building has suffered from isolated damage to the roof structure as illustrated in the photograph opposite. This relates to a localised area of water ingress around the base of a roof valley area. A simple temporary repair has been implemented and finishes would appear to have been locally repaired to prevent further deterioration. Whilst a more permanent repair would be required as part of more extensive refurbishment the works are relatively straightforward and simple to implement.

4.07 A principal and defining feature of the building is the single tower located above the east elevation and illustrated in the photograph opposite. Although some of the historic detailing has been lost the remaining masonry is in reasonable condition with no evidence of significant structural defects. Patch mortar repairs to stonework generally has been noted previously and is also present to the tower. The roof viewing area is accessed via a spiral stair as shown in the images below. Local defects are present to stone and brick requiring repair, however the overall configuration is considered to be reasonably structurally stable.

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5.0 Conclusion

5.01 Athlone house is an imposing High Victorian villa with a classical tower. Architecturally the building is an eclectic mix, blending Gothic, Jacobean, French Renaissance, Greek Revival and Swiss Cottage elements together to create a building of significance and value. Whilst historic features have been lost in some areas, many remain and richly illustrate the history and evolution of the building.

5.02 The building has remained unoccupied for a number of years and deterioration through neglect is evident. The building is however, a robust structure and retains good overall structural integrity to the principal load bearing elements such as walls, floors and roof structure.

5.03 Some architectural features have been lost in the evolution of the building, but many remain and a conservation and repair strategy would need to be established.

5.04 The building is of robust construction and a very significant proportion of the original structure remains. The roof structures remain predominantly intact with generally only isolated defects requiring urgent attention.

5.05 Erosion of elements of soft Doulting Stone dressings is evident in places, with a reasonably large number of inappropriate cement mortar repairs present that will weather and spall in the future. Although many of these could be retained within a refurbishment scheme it may be considered in the long term interest of the building to implement stonework repairs at this stage to ensure protection of adjacent intact stonework.

5.06 The brickwork to the building shows evidence of some scarring from recent demolition of additions to the original building. This has no significant effect on the ability of the building to be refurbished and returned to a high quality, high status, residential dwelling. Overall the brickwork is performing reasonably well despite areas of inappropriate pointing. Replacement of hard cement pointing with a more appropriate and breathable lime mortar would be recommended.

5.07 In summary the building is well suited to repair and restoration, adaptation, and occupation as a fine domestic dwelling.

6.0 Elevation Repairs, Alterations and Conservation Strategy

6.01 The repairs, alterations and refurbishment of external elevations to the building are open to a range of interpretations on final extent of works. Some areas of Doulting Stone dressings, transoms, mullions, heads and other detailing are clearly in need of replacement or patch repairs using indent stone and this would occur on a like-for-like basis in line with good conservation principals.

6.02 Areas where cement patching is firm and intact could potentially be left for future maintenance phases, although it is noted that this may result in greater overall loss of historic fabric in the long term.

6.03 Brickwork repairs principally relate to repointing using more appropriate lime based mortar and defining an appropriate strategy will be essential. Options range from simply raking and repointing loose areas of mortar to a full rake and repoint across all elevations. The former will adopt the conservation principal of minimum intervention, although this would leave cement pointing that is not in the long term interest of the building. The latter option would ensure optimum long-term protection of brickwork and provide a consistent and uniform elevation.

6.04 Any raking of cement pointing should be carried out carefully using experienced contractors and using tools appropriate for the job, such as Arbors. The use of rotary saws should be explicitly prevented due to the risk of damage to brick edges.

6.05 It would be considered essential that sample panels of stone and any replacement brick is provided at an early stage, and with the specialist nature of the masonry repairs consideration given to definition/selection of specialist sub-contractor package within the overall contract.

6.06 Defining the full extent of brick and stone replacement in advance of the building being fully scaffolded is considered unrealistic, and a schedule of works as part of the tender process would be anticipated as being made up of areas of known works such as window alterations and replacement of damaged and shattered stone in combination with clearly defined rates for elements of works such as:-

- Raking of cement pointing to specified depth and repointing (small areas)
- Raking of cement pointing to specified depth and repointing (large areas)
- Raking of existing loose pointing to specified depth and repointing
- Replacement stone details, simple edge treatments (range of sizes to be defined)
- Replacement stone details, ornate treatment (range of sizes to be defined)
- Stone slip repairs and indents pinned to existing (range of sizes)

With realistic allowances set within tender documents cost control can be achieved through re-measurement against set rates and quantities.

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Appendices

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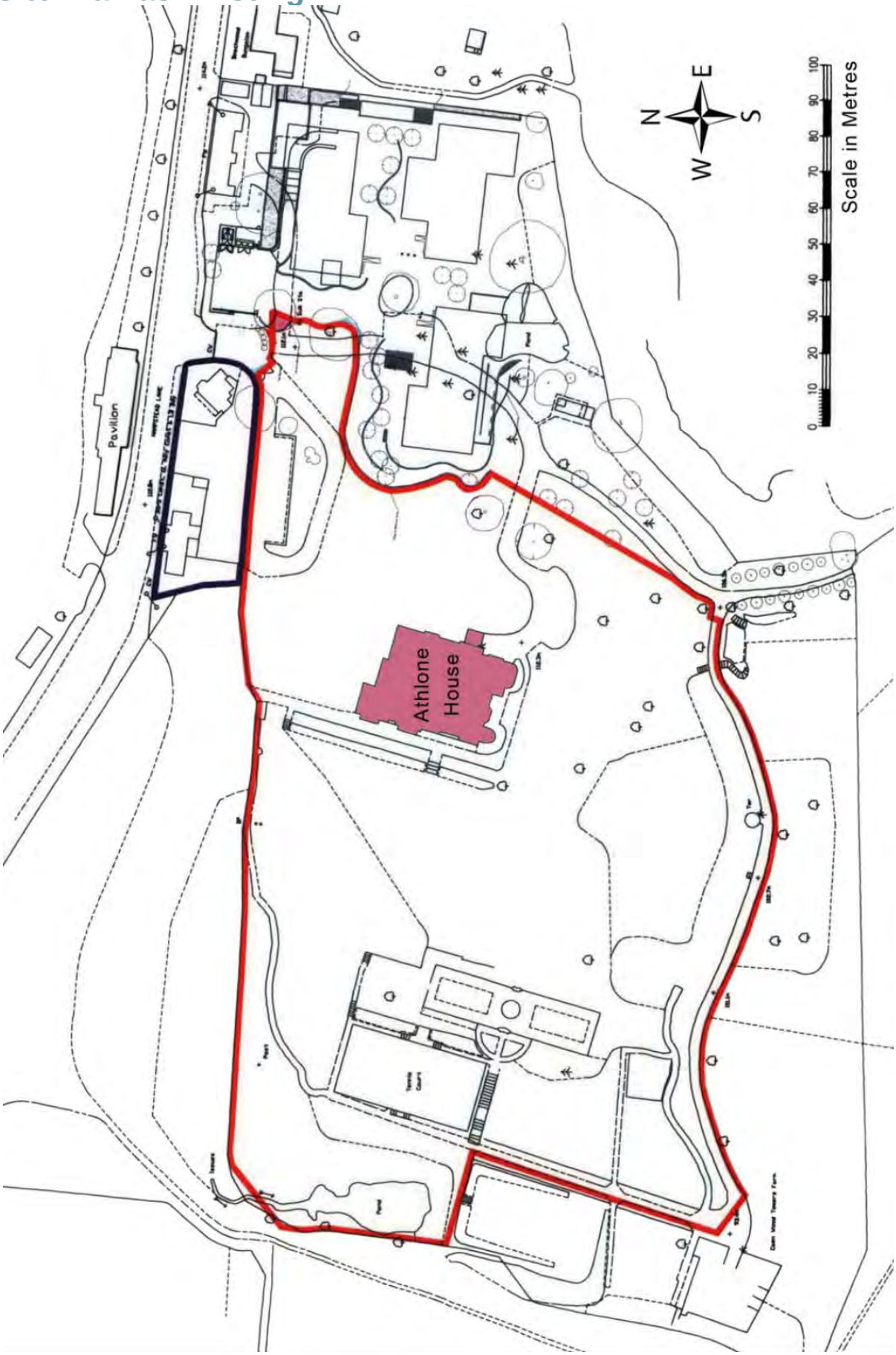
Appendix A

Site Plan as Existing



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Appendix B

Athlone House Principal Elevation Photographs

Principal elevation photographs taken during the inspection

East Elevation

West Elevation

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North Elevation

South Elevation

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Appendix C

Brickwork

Brickwork provides a structural and aesthetic finish to building elevations that is durable and can last for hundreds of years with reasonable maintenance. Understanding risks to brickwork and the type of defects that can occur will assist in the decision process and evolution of appropriate repair strategies. The following text provides general discussion and information in relation to dealing with brickwork.

C.01 **Deterioration of Brickwork**

As with all elements of a traditional building, brickwork will deteriorate and decay if not properly maintained. Such deterioration can be caused by a number of factors and can take various forms. The main signs that brickwork is suffering are:

- Surface growth and staining
- Efflorescence (white powdery residue building up on the wall face)
- Soft, loose or crumbling mortar
- Spalling (deterioration of the surface of bricks)
- Loose bricks becoming dislodged
- Cracks appearing through the bricks or mortar

If a brick structure begins to exhibit any of these signs it is important to identify the cause and rectify it as soon as possible. This will prevent the problem from spreading and further damage being caused

C.02 Causes of deterioration

C.02.1 Water Ingress

One of the most common and serious problems which can affect brickwork is uncontrolled water ingress. This can be a particular problem on exposed areas of a building such as upper floors and chimney stacks and in the vicinity of leaking rain water pipes. Although a brick building may appear sound when viewed from ground level this may not be the case higher up on the wall face. Other areas at particular risk are parapets, areas surrounding down pipes and quoins (brickwork on the corner of a building). Once water has begun to penetrate brickwork it can quickly spread to affect a large area.

The following can be causes of water penetration and associated deterioration:

- Rising damp from subsurface moisture
- Windblown rain
- Condensation caused by lack of ventilation
- Failure of roof systems or rainwater goods
- Infiltration through failed mortar
- Inadequate surface drainage
- Encroaching vegetation
- Defective copings and flashings or damp proof courses

C.02.2 Salts

Salts are a major cause of deterioration. Salt can enter bricks through contaminated water ingress. In coastal areas salt can come from the sea and, in winter, the nearby application of road salt is a constant threat. Salt is damaging because it creates a steady expansion of crystals within the bricks. This can eventually force the structure of the brick apart. The source of salt can occur from within the bricks themselves or from the application of contaminated mortars or renders. Brick lined chimney flues are also vulnerable as sulphates can be introduced when flu gasses condense. This is a common defect where a chimney has been sealed without adequate ventilation.

The most obvious sign of the presence of salts is efflorescence. Efflorescence appears as a white powdery deposit on the brick. In severe cases a thick build-up of white crystals can form. This illustrates that salts are present in the construction and are migrating to the surface. The problem of efflorescence can be exacerbated by the improper use of cement mortars during repair. To prevent significant deposits of efflorescence from causing serious damage to bricks it needs to be regularly brushed off the surface using a bristle brush and the source of water causing the build-up of the deposits to be stopped.

C.02.3 **Structural faults**

The most common sign of a structural fault in brickwork is cracking. This can be caused by structural movement, unstable foundations, tree roots or defects in the original construction. Minor cracking will be superficial and restricted to a few isolated bricks but extensive cracking can be an indication of a serious problem. Professional advice should be sought from contractors.

In minor cases of cracking it will be necessary to carefully cut out the affected area and re-point it using a mortar appropriate to the existing structure of the building. In some cases it may be necessary to replace a few fractured bricks rather than fill the crack.

Where bricks are displaced due to structural movement particular note should be taken of any areas where the wall face projects out from the adjacent build. This will usually indicate the presence of some structural movement and lead to the creation of ledges on which water can gather and penetrate the build.

There are also a number of structural elements which can fail and lead to associated deterioration. Where timbers have been embedded in a brick wall (for example timber joists or lintels) these can rot and decay if water is allowed to penetrate through the brickwork and this can lead to instability. Likewise where structural iron or steel elements are incorporated in the build, these too can corrode in similar circumstances. Rust can lead to unsightly staining and, if the corrosion is serious enough, this can create instability due to the fact it expands and creates pressure on the surrounding brickwork sufficient to burst off the wall face.

C.02.4 **Frost**

Bricks vary greatly in their ability to withstand frost. Porous bricks are more easily penetrated by water and consequently have much poorer frost resistance than denser ones. Frost damage results as the water expands within the brick when it freezes. Where such damage occurs it will often be necessary to replace the affected bricks.

C.03 **Original Construction Defects**

Sometimes brick work was poorly constructed and defects inherent in the original construction can lead to later problems. Typical defects of this type are:

- Poor bonding between walls or into existing masonry where a brick addition has been executed.
- Poor quality bricks utilised (this is a particular problem with later mass produced bricks and those manufactured from colliery shale)
- Frog' turned upside down to reduce mortar requirements.

C.04 **Vegetation**

Vegetation can be very harmful to brick structures if left unattended to. Ivy can cause serious damage particularly where some minor decay is already in evidence. This allows the growth to gain a foothold on the broken surface and penetrate into the wall core. Moss is likely to be a sign of a long standing water penetration problem and will damage bricks further by encouraging more water to penetrate the build

C.05 Repair and maintenance of brick structures

C.05.1 Tackling Decay

Where decay has occurred it will be necessary to take action to rectify the damage before this leads to greater problems. The use of chemical treatments to stabilise brick should only be considered with extreme caution. Whilst they may be effective initially, there has been insufficient research carried out on the possible long term damage such treatments could have. Chemical sealants can trap moisture within the brick just as effectively as the claims to keep water out.

C.05.2 Replacement of bricks

In some cases it may be necessary to carefully replace single bricks or small areas of brickwork particularly where spalling has occurred. Great care should be taken when cutting out the affected brickwork not to cause new damage to the surrounding area.

Replacement bricks should match as closely as possible the colour, texture and, most importantly the size of those which they are replacing. As historic bricks were often not of a standard size it may be hard to source suitable replacements. In some cases they may have to be specially manufactured, and there are a number of companies who can still do this. When introducing new bricks it is inadvisable to use a colour stain to tone in new bricks with the existing wall. The weather will do this automatically over time.

Second hand bricks may be available through salvage yards and other building material It is possible in some cases to identify the manufacturer and date of a brick from the makers stamp put on many bricks at the point of manufacture (source information on this can be found in the further reading section). This identity may help in obtaining suitable replacements. It should also be noted that different types of brick are sometimes used in different parts of the building such as corners. Harder bricks were often used on exposed parts of the building such as cornices with poorer quality soft bricks being utilised for walling. It is important when considering replacement bricks that all of these factors are taken into consideration to ensure that a satisfactory job emerges.

C.05.3 Cleaning

Cleaning soiled brick buildings should be undertaken carefully if at all. In the past the use of inappropriate cleaning techniques has resulted in considerable damage being done. If considered essential small scale tests should be employed to assess the effectiveness and likely damage which could be caused before any large scale work is carried out.

Brickwork can simply be washed down using water and a bristle brush to remove some surface deposits but care should be taken to avoid exposing the brickwork to too much water. To avoid it penetrating into the brick care should also be taken not to be too vigorous in scrubbing the face. The use of high pressure hoses is also not recommended, as this will force water deep into the structure.

C.05.4 **Decayed pointing**

Throughout the life of a brick building there will always be some loss of the original mortar. This can lead to a need to repoint areas of brickwork although weathered pointing can still function adequately provided the joints are not totally open.

Where re-pointing is necessary the raking out of the old mortar should carefully be carried out by hand in order to avoid damage to the corners of bricks. The correct tools such as a thin chisel and pointing tool should be used and in many instances the use of a skilled tradesman will be required.

Appropriate replacement mortar should be used. For traditional brickwork this will most often be lime based although, from the late Victorian period onwards, cement is likely to have been used. Cement mortar should not be used as a replacement for lime mortar as this removes the ability of the wall to allow water to escape. Whenever re-pointing is being undertaken it is important to use the same mortar type as originally used. It is also important to note the pointing technique that was used before the existing pointing is replaced as changes to this can have a dramatic effect on the visual appearance and performance of the structure.