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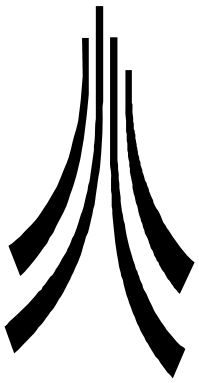

October 1996

# CENTRAL BUILDING

# HATTON HOSPITAL

# Warwickshire

## Fabric Survey Report

Commissioned by:

**A.C.Lloyd (Builders) Ltd**

# Central Building, Hatton Hospital
# Warwick
# Warwickshire

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## Fabric Survey Report

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| Checked by Project Manager.<br><br>..... Date |
| Passed for submission to client.<br><br>..... Date |

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October 1996

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# ACKNOWLEDGEMENTS

Thanks go to the staff of A C Lloyd (Builders) Ltd, and also to Peter Bromwich OBE. We are grateful to the staff of the Warwickshire County Record Office, Warwick for their invaluable assistance, as well as to the staff of the National Monuments Records office, Swindon.

The survey was undertaken by Bob Hill of Hill Beild Associates, who also produced the CAD drawings. The report was written by Bob Hill and edited by Jamie Quartermaine and Richard Newman. The project was managed by Jamie Quartermaine.


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# EXECUTIVE SUMMARY

An historic building survey was undertaken by Lancaster University Archaeological Unit (LUAU) on behalf of A. C. Lloyd (Builders) Limited, in advance of works to the roof structure and within the roof space of the central building (excluding tower block) of Hatton Hospital, Hatton, Warwickshire (NGR SP 25056710). The survey was undertaken during July 1996 in accordance with a brief prepared by English Heritage, which required the recording of the roof structure and ventilation system

The survey was undertaken using manual recording techniques and the data was used to generate a 3-dimensional model of the hospital roof and ventilation system within an industry standard CAD system. The survey plans and isometric drawings have all been generated from this CAD model.

The roof structure was based on iron trusses to which angle-iron tiling battens were fixed and the slates were fixed to that by means of copper ties. The trusses were all of a king rod truss type, which is the same basic pattern as a king post truss, but relies on a tension rod to replace the traditional compression post. All the trusses were constructed of angle iron with cast iron connections at the truss nodes.

The ventilation system was installed as an integral part of the heating system for the whole hospital and was designed to operate as a form of natural air conditioning that relied on natural convection; a pair of chimneys provided sufficient differential pressure to draw the ventilation air through the system. The ventilation system in the roof was constructed of square or rectangular section brickwork ducts with side connections utilising what appeared to be glazed drain pipes.

The hospital has been the subject of continued development since its construction in 1849; however the roof structure and ventilation system appear to have a uniformity of style and design, which suggests that most of this was installed as a single operation during the initial construction phase. To an extent this is confirmed by the survey, which has shown that the ventilation system and the roof were contemporary.

Both the ventilation system and the iron roof construction incorporate constructional elements that were very innovative at the time of building, particularly the use of curved, corrugated iron sheeting for the ceilings. When built the Hatton Hospital would have been of a very advanced design.


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# 1. INTRODUCTION

1.1 An historic building survey was undertaken by Lancaster University Archaeological Unit (LUAU) on behalf of A. C. Lloyd (Builders) Limited, in advance of works to the roof structure and within the roof space of the Grade II listed Central Building (excluding tower block) of Hatton Hospital, Warwick, Warwickshire (NGR SP 25056710). The survey is a condition within the Planning Permission and Listed Building Consent in advance of re-roofing of the hospital building as part of a housing development. The work was undertaken in accordance with a project design compiled by LUAU (Appendix 2) and a brief provided by English Heritage (Appendix 1) and submitted by Peter Bromwich and Company. The survey was undertaken during early July 1996.

1.2 The proposed development of the site involves the conversion of this and several other buildings into new residential properties, which would entail the removal of the original roof structures together with the main part of the ventilation system within the roof space. The aim of the survey was to provide a mitigation record of the original roof structure together with the brick built ventilation system, within the roof space over the side wings of the main hospital building, in advance of their removal during the development.

1.3 The survey was produced to a professional standard in accordance with the specification for recording of historic buildings as set down by the Royal Commission for Historic Monuments of England (second edition). It was undertaken prior to the development and as a result the survey was purely of the visible fabric and did not involve any removal of structural elements, to some extent the results are limited by this constraint.

## 1.4 BUILDING LAYOUT

1.4.1 The hospital central building has a very large and open 'E' shape plan with the mouth of the 'E' facing to the south-east. The central reception part of the building has a dominant tower from which two 'L' shaped wings extend on either side (Fig 2). Although there are slight differences, for the most part the two 'L' shaped wings are mirror copies of each other, both in plan and design. The wings had a series of small cells along one side and open corridors on the opposite side. Other ranges of buildings extend out from this in several directions and many small additional structures have been added to the central building so that it now in places has a somewhat ragged plan. The building contains very few open wards, which would have limited its use when it was converted from a lunatic asylum to a hospital. Significantly there was very little attempt alteration of the design of the Central Building to accommodate this change of use.

# 2. SURVEY METHODOLOGY


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## 2.1 THE BRIEF

2.1.1 The brief required the recording of the roof structure, which would provide plans, selective drawings of the trusses and detail of the truss connections. This would be in conjunction with an analytical text, including historical research of primary sources.

2.1.2 Similarly the ducting forming the ventilation system within the roof space was to be recorded in sufficient detail to be considered as an historic archive for the structure, which would include a plan (at 1:100), detail drawings and a three-dimensional diagrammatic drawing to explain the operation of the system.

## 2.2 ACCESS

2.2.1 The survey of the roof spaces was limited to areas designated by the site contractor; access was provided to all of the two sections of the main roof space which are on either side of the central tower. An examination was also undertaken of the eastern sections of two areas of raised roof at the south-west and north-west corners of the main block (fig 3), where similar types of construction were noted to that in the main roofs. These sections of the roof correspond with the original form of the building shown on a 'birds eye view' engraving of the hospital, dated to 1852 (fig 2).

2.2.2 A thorough inspection of the roof spaces of the central building was undertaken to provide a mitigative record of the ventilation system and roof structure. Access could be gained to all of the area of the roof spaces that were under consideration; however, it was necessary to remove some mineral fibre insulation quilts within the roof space to reveal the extent and type of the ventilation system installed in this area. Apart from this no other dismantling or exposure was undertaken of what was effectively a substantial and integral structure.

## 2.3 SURVEY METHODOLOGY

2.3.1 The recording of the structure was undertaken by a qualified building surveyor prior to commencement of the development and comprised the execution of a measured survey and the production of site photographs from which to derive a plan and a graphic record as required by the brief. The plan and truss drawings, were recorded by hand measured survey and the data was subsequently transferred onto a three-dimensional computer aided draughting (CAD) system.

2.3.2 The final CAD drawings were prepared in line with the second edition of Specification of the Recording of Buildings issued by the Royal Commission of Historic Monuments of England. This plan drawings were augmented by


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digital information extracted from the developers site survey and which was provided by A C Lloyd (Builders) Ltd. The CAD drawings were produced in three-dimensional format to enable the generation of isometric views of the structure.


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# 3. HISTORICAL BACKGROUND

## 3.1 LOCATION AND TOPOGRAPHIC CONTEXT

3.1.1 Hatton is a small scattered rural settlement, lying to the west of the city of Warwick, and lies to the north of what is now the M42 London/Birmingham motorway; it is adjacent to the Grand Union Canal and also the A41 Warwick to Birmingham road. It has grown up from a general farming area of scattered settlements which in places have become nucleated and to some extent focused around the canal.

3.1.2 The site of the main hospital building is on a gentle slope that runs from the north to the south and there is a separate, somewhat slighter, gradient from the west to the east. Generally the area surrounding the hospital was laid out in what could be classed as a park land type setting with large mature trees, shrub beds and large areas of formally mown lawns.

## 3.2 HISTORY OF THE CENTRAL HOSPITAL BUILDING

3.2.1 The construction of the hospital was the result of an Act of Parliament that required the establishment of local mental health facilities. Prior to its construction people who were committed were sent to asylums or other correction houses in Coventry or as far away as Gloucester. The development of the hospital was in the hands of a group (or committee) of worthies and doctors who were set up to build a new pauper lunatic asylum for Warwick and the region. Prior advertisements were placed in local newspapers, whilst they were looking for the site, until finally in 1847, agreement was reached to purchase the site of Hatton Hospital from the estate of the Earl of the Warwick for the sum of £4,802 5s. 5d.

3.2.2 As part of the land purchase Mr. John Moore (surveyor) was paid the sum of £4 8s. 0d. to produce a plan of the site at Hatton and then later in 1848 he was asked to produce a detailed survey of the site, which was presumably an extension of his earlier work. Meanwhile monies were raised for the building of the hospital by means of mortgages and indentures, which in due course raised sufficient funding to enable a start on the construction of the building.

3.2.3 A firm of Architects, Messrs. Harris and Francis, were commissioned to draw up the plans and these were vetted by the committee, and amongst others a Dr. John Connolly was paid £50 for his technical assistance in selecting the most suitable plans for the proposal. The architects were then commissioned to draw up more plans and supervise the works of the building.

3.2.4 The building works commenced properly in 1849 using a contractor to supply labour and some materials whilst the employer purchased other common materials such as bricks, stones, sand, etc. The work was undertaken under a central controlling contractor (Mr. William Heritage) who provided a price


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based on plans and specification for the works and the whole project was overseen by the architects.

3.2.5 Considering the scale of the project, the work proceeded well so that by the 10th of June 1852 the minute books for the building committee record that the lightning conductors had been put up on each of the ventilation turrets. This demonstrates that the ventilation scheme was planned as an integral element of the building from the outset. In 1854 the building committee was able to report to the local magistrates that at Pentecost (Whitsun) of that year the hospital was complete and able to accommodate a full level of patients.

3.2.6 It appears that the heating and ventilation system had inherent problems, because in 1859 a substantial modification of the heating system was put out to tender and was won by contractors, Robert Crossland and Charles Ponting. The modification comprised additional heating circuits and pipe runs on the ground floor together with extra balancing systems and calorifiers added in.

3.2.7 The hospital complex was considerably extended several times over the next decades, furthermore over the years various schemes were put forward to completely redevelop the site as a hospital. New extensions were added to the core block as well as links and other alterations. However, the basic core and construction of the central hospital building appears to have remained very much as it was originally built.


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# 4. FABRIC SURVEY

## 4.1 ROOF STRUCTURE

4.1.1 The design of the roof structure and ventilation system, reflected the constructional plan of the main superstructure. The general arrangement of the wings comprised small rooms or cells along one side (approximately half of the width of the wing), with wide corridors and open wards along the other side. Because of the closed cell structure, the side with the small cells could be brick vaulted between the walls, and this provided a solid construction base to the area of the roof space against the central dividing wall. As a consequence the main collector ducts of the ventilation system ran along this side of the roof space, on top of the solid surface. The wider corridors/wards had ceilings of curved corrugated metal sheeting which spanned from the central wall to the external walls of the building with the ribbing following this curve. The ends of the sheeting were constrained by mass brickwork at either end, and the strengthening effect of the ribbing produced a reasonably strong ceiling, but one which was cheap to build.

4.1.2 **Truss construction:** The main pattern of trusses used throughout the roof space, both within the main section and in the two external corners were all of a king rod truss type. This is the same basic pattern as a king post truss, but relies on a tension rod to replace the traditional compression post. They were all constructed of angle iron with cast iron connections at the truss nodes.

4.1.3 The primary rafters of each truss, together with the diagonal struts, were formed from 'T' section angle iron whilst the central tie rod and the bottom chord of the trusses were made of metal rod. The rod was connected to the cast iron coupler at the head by means of a tapered cotter pin and at the base it was connected to the bottom chord by means of a nut and threaded end. At this point it also passed through the bent toes of the side struts, where these had been formed round to overlap each other. Cast iron shoes connected the bottom of the primary rafters to the bottom chord, and again cotter pins were used to make the connection between the shoes and the bottom rod. With the exception of the connection at the tongue of the gusset plate at the strut to rafter node (which used rivets), all other connections through the roof trusses were made with metal bolts to the shoes and gusset plates.

4.1.4 There was a slight variation to the design of the trusses over the upper corner buildings, which were of a somewhat heavier construction. Here, the bottom chords of the trusses were formed of cast iron beams that spanned across from one side of the building to the other. These batten chords also acted as the carrying beams for brick vaulting in the ceilings which spanned across between them.

4.1.5 Within the main roof areas there were half trusses, which had a stressed single side arrangement with no direct bottom chord or tie to the opposite side to complete the traditional triangular pattern. In these cases they relied on a


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tension brace midway between the tops (ridge) and the foot (wall head). This tension brace was formed with a metal rod from a gusset plate at the top, through a central brace bracket and then back down to the floor bracket. In some locations there were also tie rods installed which connected to diagonally positioned ceiling height ties that connected to wall plates or to other posts.

4.1.6 At the wall head the truss feet were secured by means of the previously mentioned, cast iron foot bracket. This was secured over the top of a metal plate (possibly the top of a 'T' section angle iron set vertically into the wall head) by means of an overlap shoe and cotter and wedge pins in a similar manner to that used elsewhere within the truss construction. This would help to ensure that there was no risk of wall head to truss differential movement as all elements would have been tightly held together.

4.1.7 There were no form of purlins or other major structural members running through the roof to form or provide any form of lateral restraint. The only exception to this was at the eastern end of the southern wing where there was some additional diagonal wind bracing added to the roof structure. Most of the restraint between the trusses themselves was provided by the slating battens or laths.

4.1.8 All of the steel work appears to have been painted with a red coating similar to red lead oxide; however, no analysis work was undertaken to firmly establish this. The painting was probably done at the time of the installation of the roof, as all the tiling battens and all the main trusses were also painted. Judging by the amount of rusting within the structure, together with the dust and dirt accumulation, as well as the lack of overpainting to other areas, it can be suggested that there has not been a subsequent repainting within the roof space.

4.1.9 **Slate fixings:** The slate battens (except for the three uppermost around the ridge) all consisted of metal angle irons which were riveted to the principle rafters and, ran through between all of the trusses. The three exceptions were at the very top and consisted of timber battens which ran through between trusses in a similar manner. The fixing of all the slating to the lathing was by means of copper strip which was fixed through a hole in the slate and then taken back under and bent and hooked over the lath.

4.1.10 The roof is covered with a type of blue slate which is colloquially known as Welsh slate, and generally originates from the Snowdonia area. Within the specification for the works these were actually nominated as being best Bangor Duchess slating to be nailed in position. However, because of the change in construction techniques for the lathing this also necessitated a change in the fixing methods of the slates.

## 4.2 VENTILATION SYSTEM

4.2.1 The ventilation system was installed as an integral part of the heating system for the whole hospital and was designed to operate as a form of natural air


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conditioning. It relied on the fact that hot air rises, causing a differential pressure gradient with the cooler air at a higher level within the building. The system provided natural stack ventilation and worked in a similar way to a chimney which draws smoke up from an open fire or to nineteenth century ventilation chimney for mines. It was a form of ventilation which came to be used quite widely in many large nineteenth century institutional buildings, where windows could not be readily opened, the most notable of these being some of the larger prisons such as Dartmoor and Pentonville.

4.2.2 The basic heating system comprised hot water flowing through large diameter pipes or batteries of smaller diameter cast iron pipes, which ran just below the floor level and through other floor service ducts. The water for this was fed from a large centralised boiler room. Air was allowed to be warmed within the heating ducts and rose up through ducts formed in the base of the walls on each floor, where it filtered into the rooms by means of low level grilles (300 - 450 mm above floor level). This in turn warmed the room and convection caused the hot air to rise towards the ceiling. Just below the ceiling of each of the small rooms, and also in some of the larger open wards or wide corridors, there were further grilles. These were at the base of another series of ducts built within the core of the walls, which rose up through the building to the roof space of the hospital. At the top of the walls, within the roof space, the ducts were connected to a manifold which collected the fetid air coming from the rooms below and transferred it to large central collecting ducts. The ducts ran through each of the wings back to the base of large ventilation chimneys in each of the extreme corners (the south-west and north-west).

4.2.3 Convection and differential air pressure caused the warm air to rise up the chimney to a level above the roof, where it then dissipated into the general air flow around the building. The upward draught would have been assisted by normal wind flow at the top of the chimney causing further pressure reductions at the head and so improving air flow through the system.

4.2.4 A general lack of heating within the building and scarcity of maintenance to the ventilation system over recent years, has resulted in many of the extract ventilation grilles either being plastered over, sealed off, painted up, or otherwise have their efficiency considerably reduced. It was therefore not possible to undertake a representative air flow test within the base of the ventilation stacks (where access could be gained); however, it was noticed that there was a significant draught being produced even on days with little background wind. It is therefore suggested that when this system was first installed and working properly it could have been very efficient.

4.2.5 **Roof Space Ventilation Ducting:** Within the two sections of the roof to the north and south of the central tower the general layout of the ventilation system was similar. In both roofs a central spine or collector duct ran just off centre of the individual wings and was positioned on the top of the solid (brick) floor over the small cell rooms below. These ducts ran from each end of the wings


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towards the outermost corners (north-west and south-west) where they then rose and entered into the upper roof spaces. From there they ran to the western side of the building where they entered into the bottom of the brick ventilation chimneys. These chimneys were outside the roof space and were individual, free standing structures with square bases and octagonal towers above and were built of the same brick and stonework as the main hospital buildings.

4.2.6 The collector ducts were somewhat different, however, in the north and south wings. In the northern wing the main collector duct was positioned in such a way that it was very close to or over the head of the risers that came up through the central dividing wall from the floors below. As a result the collection manifolds were just small brick extensions from the side of the main duct with the occasional longer run of duct in large diameter drainpipe where this spanned over the metal roof. These in turn then connected to smaller brick housings over the top of the risers in the more remote positions. By comparison the head of the riser ducts in the southern wing were a little way from the position of the main collector duct and were all connected together by means of glazed vitrified pipes, similar to the remote connections in the northern roof.

4.2.7 As previously mentioned, the main duct and also the collection manifolds on the top of the riser ducts were of brick construction. These were laid stretcher bond and raised off either the head of the walls above the riser ducts, or from the solid floor in half brick thick walls. The top of the ducts and manifolds were originally covered with stone slabs but in places these appear to have been replaced with concrete slabs or cast in-situ concrete, possibly where damage has occurred. Because of this method of construction access to the interior of the ducts was severely limited, except where an occasional top slab had been removed; however, these limited access points into the ducts did enable an examination, sufficient to confirm the type of construction.

4.2.8 Where the main duct rose vertically, and there was a need to span across from one spot to another at a high level, the ducts were still built of brickwork but with stone slab bases supported on steel sections.

4.2.9 The sizing of the connector pipe work, from the riser manifolds to the main collection duct, had evidently been considered quite carefully as the pipe diameters vary considerably. In some places several sections of pipe had been used and placed side by side to provide the best air flow characteristics, rather than use just a single pipe. This would suggest that when the system was installed considerable thought had been given to airflow characteristics and dynamics so as to size these ducts in the best way possible. Generally these were all laid as they would be for traditional drain pipes with mortared joints at the spigots of the pipes. Overall the pipework system appeared to be very much as it was installed using a salt glazed pipe and there was little or no evidence of replacement or renewal having been undertaken.

4.2.10 To maintain the efficiency of the system mineral fibre insulation quilts had been dressed over the manifolds, collector and main ducts so as to avoid heat loss and so increase the convection currents. This would also prevent the risk


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of condensation forming within the ducting and the subsequent problems of damp entry into the building.

## 4.3 BUILDING AND ROOF DEVELOPMENT

4.3.1 There is little documented evidence for the later development of the hospital, and this is exacerbated by a succession of builds over a short period, which means that it is difficult to determine, even on stylistic grounds, which part of the building was added at a particular time. This is especially so for the first two decades following the original construction; however, after that there are more distinctive changes of building technique, materials used and architectural styles which help to date the works, albeit in only very general terms.

4.3.2 Because of the continued development that has taken place in and around this building over the years, it is difficult to achieve a reliable understanding as to which parts of the building were original. However, the roof structure and ventilation system appears to have a uniformity of style and design which suggests that most of this was installed as a single operation during the initial construction phase. The large ventilation flues on the exterior of the building were clearly constructed as part of the main building; they are shown on the engraving of 1852 (fig. 2) and were documented in the construction minute books (CR 1664/1). Certainly the evidence would suggest that the roof and the ducting were constructed at the same time; in many places the positioning of truss components had been built in or otherwise absorbed within the brick construction of the ducting. In other locations the trusses were positioned in such a way as to make allowance for the positioning of the air handling ducts.

4.3.3 The trusses were constructed as a single pattern item in general terms, and there were only some standardised modifications undertaken where part or half trusses were necessitated by the shape of the roof. This was particularly so at intersections between various parts of the roof where the roof changed directions or where other sections of the roof merged with it. There is no indication of any trusses that vary from the basic pattern, and which could reflect a subsequent addition to the roof.


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# 5. DISCUSSION

## 5.1 METAL TRUSS AND ROOF CONSTRUCTION

5.1.1 The original specification for the building works (20th June 1849) originally called for a timber roof to be constructed over the main hospital blocks and this was to have had a king post type of timber truss. However, from the survey evidence, it would appear that the metal trusses were installed at the time of construction; some of the bottom ties of the trusses have been incorporated within the brickwork of the ducting and drawings produced for alterations to the property in 1864, show metal trusses forming the roof. At present there is no ready explanation for this evident departure from the original specification, though it might have been considered that in an asylum, metal trusses reduced the fire risk.

5.1.2 Generally the metal roof structure formed a very well considered and designed architectural feature. By comparison with a timber roof, it considerably reduced the dead loading that was applied to the head of the walls. Because of the rigidity and fixing methods for the joints, it also significantly improved the overall stability of the structure and therefore reduced the risk of roof spread due to movement, which is frequently found within a traditional timber roof. As a result it would have allowed for a somewhat slimmer section of wall to be used below the roof with a consequent saving in bricks, mortar and stone and would have had a corresponding cost reduction in building. Similarly the use of the riveted metal tying laths for battens produced a roof which in itself would have been quite dimensionally stable and somewhat resistant to wind and other external forces loading on to it. The whole structure would virtually have formed an integral space frame.

5.1.3 From late nineteenth century building construction text books, the use of metal and cast iron trusses are quite common particularly from the second quarter through to the third quarter. After that time cast iron fittings started to decrease in use as they were considered to be unreliable, prone to damage (particularly during construction) and cheaper flat plate gusset connections became more popular. The use of cotter pins (or wedge tapers) was by then a hangover from the early days of cast iron construction, which in turn had been derived from timber construction. The bottom chords of the main roof trusses also showed signs of relatively early metal roof techniques, in as much as they were forged from square section bar to form the rounds; this can be seen from the widening in the centre of these where protection to the king rod is made. As time and techniques improved within the metal fabrication industry these central forgings were generally replaced by bolted or pin connection, similar to that found at the ends.

5.1.4 The roof trusses are interesting in as much as that they are relatively late in date by comparison with other paralleled cast iron examples. Therefore we are only seeing certain large cast iron members together and the node connectors


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were used with the introduction of lighter metal angle iron sections to form the trusses. This became a more common practice in the years to follow.

5.1.5 The roof structure and ventilation system, considered together, include a number of fairly innovative techniques for the time, which include the use of the curved corrugated sheeting for the ceilings, and in its day the hospital would have been a high tech structure. Many of these systems, such as the stressed skin curved metal ceilings, were only occasionally used until well into the twentieth century when the properties of materials were better understood. It could be suggested, therefore, that the Anderson Shelter of the Second World War was a direct descendant of the Hatton hospital form of curved ceilings.

## 5.2 VENTILATION SYSTEM

5.2.1 As with many large institutional buildings, this one does not appear to have been the subject of regular maintenance, particularly in the area of the roof and has therefore sustained a corresponding degree of structural decay. The administrators of the hospital would have been more concerned with the day to day running of the building, the care of the in-mates, but would not necessarily have had a thorough understanding of the principles behind the ventilation system. As a result it has clearly suffered from a reduction in efficiency through neglect of the intake and extract grilles to the ventilation system which were required to ensure that the system worked adequately.

5.2.2 Air handling systems such as this are now being used in modern large commercial properties, but now have the advantage of localised and zone controls so as to regulate air flow from different areas, adjust heat input and control waste heat. This would reduce the effect of draughts which was a problem of the Victorian system, by virtue of its somewhat primitive nature. As such the Hatton Hospital system would have met most of the requirements of an air conditioning system for modern large buildings in line with the requirements of the Montreal Protocol in respect of low energy and refrigerant use.


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# APPENDIX 1
# Project Brief


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# APPENDIX 2
# Project Design

Lancaster
University
Archaeological
Unit

**May 1996**

## HATTON HOSPITAL, WARWICK

## FABRIC SURVEY
## PROJECT DESIGN

***Proposals***

*The following project design is offered in response to a brief provided by English Heritage, and submitted by Peter Bromwich and Company, dated 12th March 1996, for a Fabric Survey in advance of the development of the Grade II Listed Central Building at Hatton Hospital, Warwick.*


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## 1. INTRODUCTION

This project design is offered in response to a request for a fabric survey of the roof and ventilation system of the Grade II listed central building at Hatton Hospital, Warwick. The survey is a condition within the Planning Permission and Listed Building Consent in advance of re-roofing of the hospital building as part of a housing development.

The roof and ventilation are original elements of the County Asylum, which was built in 1852 and was added to in 1871-2; it was subsequently converted into a hospital. The roof has a wrought iron truss construction which incorporates considerable symmetry of construction.

Lancaster University Archaeological Unit (LUAU) has considerable experience of the archaeological survey of sites and monuments of all periods, having undertaken a great number of small and large projects during the past 15 years. LUAU has particular experience in the archaeological recording and analysis of standing ancient monuments and historic buildings and the evaluation of sites as part of the planning process. Projects have been undertaken to fulfil the different requirements of various clients and planning authorities, and to very rigorous timetables. LUAU has the professional expertise and resources to undertake the project detailed below to a high level of quality and efficiency. LUAU and all its members of staff operate subject to the Institute of Field Archaeologists' (IFA) Code of Conduct.

## 2. OBJECTIVES

The following programme has been designed in accordance with a brief, supplied by Mr John Yates, Inspector of Historic Buildings for English Heritage (18th Sept. 1995), to provide a fabric survey of the roof and ventilation system of the Central Building of Hatton Hospital, prior to the roof replacement. The required stages to achieve the project objectives are as follows:

### 2.1 Documentary Study
To undertake historical research, using primary sources to establish the history of the building and an architectural context for the roof.

### 2.2 Fabric Survey and Recording
Execute a fabric survey to record a typical metal truss, typical constructions, details of the wall plate and slate fixings. To undertake a plan of the roof complex and former ventilation system.

### 2.3 Survey Report
A written survey report will assess the significance of the data generated by this programme within a local and regional context.

## 3. METHOD STATEMENT

In line with the objectives and stages of the archaeological work stated above, the following work programme is submitted.

### 3.1 Documentary Study

The work will rapidly assess the full range of potential sources of information. It will include an appraisal of the relevant Sites and Monuments Record as well as appropriate sections of hospital, estate and architectural records as may reasonably be available. Any photographic material lodged in either the relevant Sites and Monuments Record or the relevant Record Offices will also be studied. Published documentary sources such as the relevant volume of Pevsner's Buildings of England series and any other volumes of hospital architecture available will be examined and assessed. This work will involve visits to the County Record Office in Warwick and the Birmingham Central Library, Archives Division. The RCHM(E) has recently undertaken a thematic study of hospitals and therefore the NMR will also be consulted.

### 3.2 Fabric Survey and Recording


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The brief requires the recording of the roof and ventilation system that extends over the main central building, the northern wing and half the southern wing. In accordance with the provided brief it is proposed to undertake the following:

*3.2.1 Roof Structure*

- A general photographic record of the *in situ* roof structure would be generated, to include detail shots of relevant and significant features. The photography would incorporate a mixture of monochrome, colour prints and transparencies as appropriate.

- Survey and record, using hand survey techniques, an example of a typical metal truss within the building, along with the appropriate connections, construction details of the wall plate and details of the slate fixings. A lay out plan of the roof structure will be generated at an accuracy equivalent for a 1:500 output, using a combination of hand and instrument techniques. The instrument survey would be undertaken with respect to a survey control established by closed traverse and maintained to an accuracy of +- 0.03m.

- The drawings from the truss survey would be digitised into a CAD system to enable 2D and 3D modelling of the structures; the form of the overall roof structure will be generated as an isometric 3D representation. The 2D drawings will be output at 1:500, and 1:20 with details at 1:5 as appropriate. Because of the use of a CAD system, the drawings can be output at alternative scales as required.

*3.2.2 Ventilation System*

- A general photographic record of the above ceiling ventilation system *in situ*, to include detail shots of relevant and significant features. The photography would incorporate a mixture of monochrome and colour prints and transparencies as appropriate.

- Survey and record the plan layout of the above ceiling ventilation system within the building using a mixture of hand and/or instrument survey techniques.

- The drawings from the above ceiling ventilation system survey would be generated within a CAD system to enable 2D and 3D modelling of the structures. The drawings will be output at 1:100, and 1:20 scales as appropriate. An isometric reconstruction of the ventilation system will be generated to explain the operation of the system.

*3.2.3 Recording*

The drawn records for the building will include:

i) detailed plan of the roof layout at 1:500 (minimum), incorporating the detailed wall plate.

ii) drawing of a typical truss at 1:20 as well as detail at the right-angled junctions of the buildings.

iii) drawing of the appropriate typical connections and the details of the slate fixings at 1:5.

iv) Isometric 3D reconstruction of the roof structure.

v) Plan layout of the ventilation system at 1:100, incorporated both with the roof and in isolation.

vi) 1:20 detailed plan of ventilation system.

vii) Isometric 3D reconstruction of the ventilation system to explain the operation of the system.

The photographic record of the building will include:

i) general internal coverage.


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ii) close-up views of architectural details (structural details only)

### 3.3 Survey Report

*3.3.1 Archive*

The results of Stages 3.1-3.2 above will form the basis of a full archive to professional standards, in accordance with current English Heritage guidelines (*Management of archaeological projects*, 2nd edition, 1991). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. The deposition of a properly quantified, ordered, and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the Institute of Field Archaeologists in that organisation's Code of Conduct. The expense of preparing such an archive is part of the project's cost, but only represents a very small proportion of the total. This archive will be provided in the English Heritage Central Archaeology Service format, as a printed document, and a synthesis (the evaluation report and index of the archive) will be submitted to the relevant Sites and Monuments Record. The textual archive will be provided both as a printed document and on computer disks, for inclusion in the client's records.

All drawings will be produced on dimensionally stable drafting film on standard 'A' size sheets and in metric format. Each sheet will be fully titled. Line thicknesses will be chosen to allow for ease of duplication and/or reduction. Particular attention will be paid to achieving drawings of the highest quality and accuracy. Where appropriate, drawing conventions for plans and cross-sections will follow the general guidelines as issued by the RCHME's *Recording Historic Buildings: A Descriptive Specification* (2nd edition, 1991).

*3.3.2 Report*

Two bound and one unbound copies of a written synthetic report will be submitted to the client which will be delivered within two months of completion of the site survey. The report will present, summarise, and interpret the results of the programme detailed in Stages 3.1-3.2 above, and will include a full index of archaeological features identified in the course of the project, with an assessment of the overall building form. It will incorporate appropriate illustrations, including copies of the buildings' plans and elevation drawings, all reduced to an appropriate scale. The report will also include a complete bibliography of sources from which data has been derived, and a list of further sources identified during the programme of work. The report will summarise the history of the site, and will assess the significance of the archaeological and architectural evidence. It will also make an assessment and statement of the actual and potential significance of the structure. The report will be in the same basic format as this project design. A copy of the report can be provided on 3.5" IBM compatible disk in either ASCii or Word for Windows format.

### 3.4 General Conditions

*3.4.1 Access*

It is assumed that the client will enable adequate access for the provision of the survey and ensure adequate security arrangements during the enactment of the survey. It is understood that site (office) accommodation and toilet facilities can be provided by the client within the hospital during the period of field survey. Temporary lighting, safety and portable access equipment will be provided by LUAU.

*3.4.2 Health and Safety*

Full regard will, of course, be given to all constraints (services) during the survey, as well as to all Health and Safety considerations. The Unit Health and Safety Statement conforms to all the provisions of the SCAUM (Standing Conference of Unit Managers) Health and Safety manual, as well as the Lancaster University Health and Safety Statement. Risk assessments are undertaken as a matter of course for all projects, and will anticipate the potential hazards arising from the excavation of possibly leprous funerary remains. The Unit Safety Policy Statement will be provided to the client, if required. It is understood that LUAU will not be the lead contractor on site during the works programme and therefore is not obliged to provide to provide a health and safety plan as required by CDM regulations. LUAU reserves the right to omit the recording of architectural detail, if safe access can not be provided for the survey of that detail.


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As no copy of a ConDm tender safety plan is provided it is assumed that there is no asbestos or other hazardous material within the roof spaces or working locality and consequently there is no provision for appropriate protective clothing / breathing equipment.

*3.4.3 Confidentiality*
The report is designed as a document for the specific use of Peter Bromwich and Company, A C Lloyd and English Heritage, for the particular purpose as defined in this project design, and should be treated as such; it is not suitable for publication as an academic report, or otherwise without amendment or revision. Any requirement to revise or reorder the material for submission or presentation to third parties or for any other explicit purpose can be fulfilled, but will require separate discussion and funding.

*3.5.5 Project Monitoring*
Any proposed changes to this project design will be agreed with Peter Bromwich and Company and English Heritage, as required. A preliminary meeting with a representative of Peter Bromwich and Company will be arranged at the outset of the project. Further meetings to review the progress of the work will also be required.

## 4. WORK TIMETABLE AND RESOURCES

### 4.1 Phasing

It is envisaged that the various stages of the project outlined above will fall into three distinct phases, which would follow on consecutively, where appropriate.

The phases of work would comprise:

***i Documentary Study***
3 days (desk-based)

***ii Fabric Survey and Recording***
3 days (on site)

***iii Survey Report***
2 days (desk-based).

LUAU can execute projects at very short notice once an agreement has been signed with the client. The project (field work, report and archive) is scheduled for completion 2 months from the completion of the field work.

The project will be under the project management of **Jamie Quartermaine, BA Surv Dip MIFA** (LUAU Project Manager) to whom all correspondence should be addressed. All Unit staff are experienced, qualified archaeologists, each with several years professional expertise. The main element of survey work will be sub-contracted to Hill Beild Associates, Chartered Building Surveyors who have considerable experience of this form of building recording and analysis, and has worked closely on a number of projects under the LUAU's management.


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# ILLUSTRATIONS




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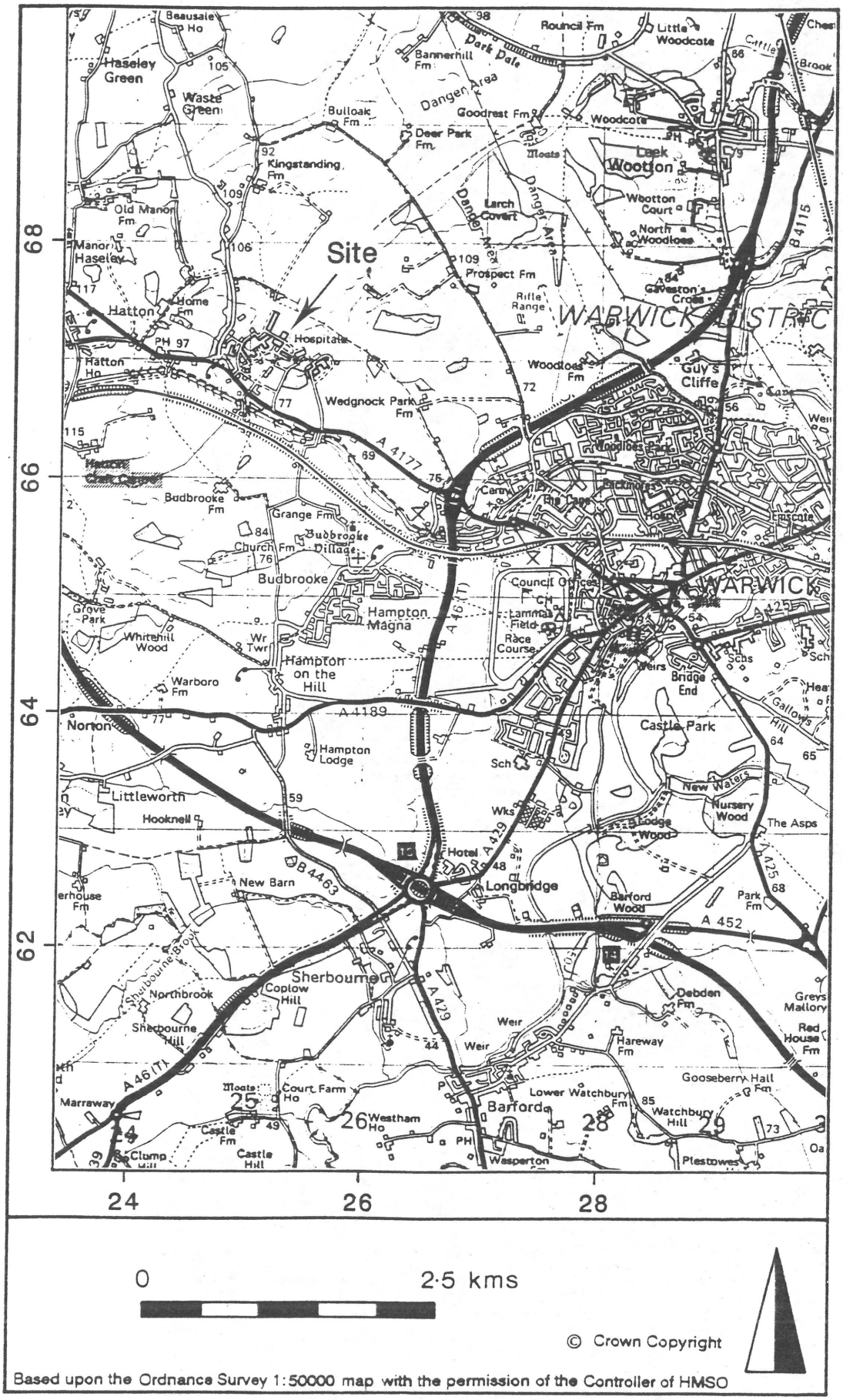



Fig.1 Location plan

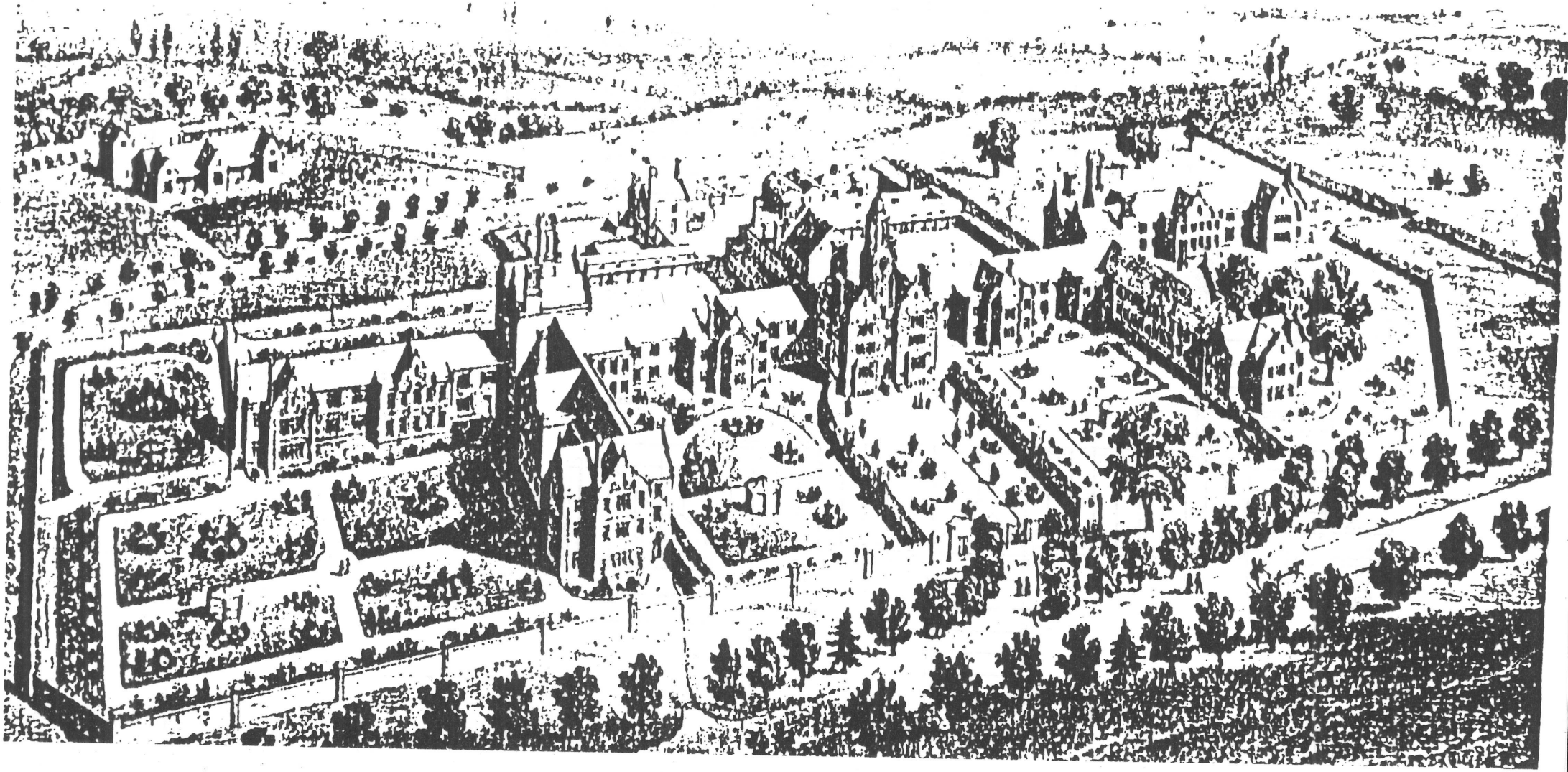
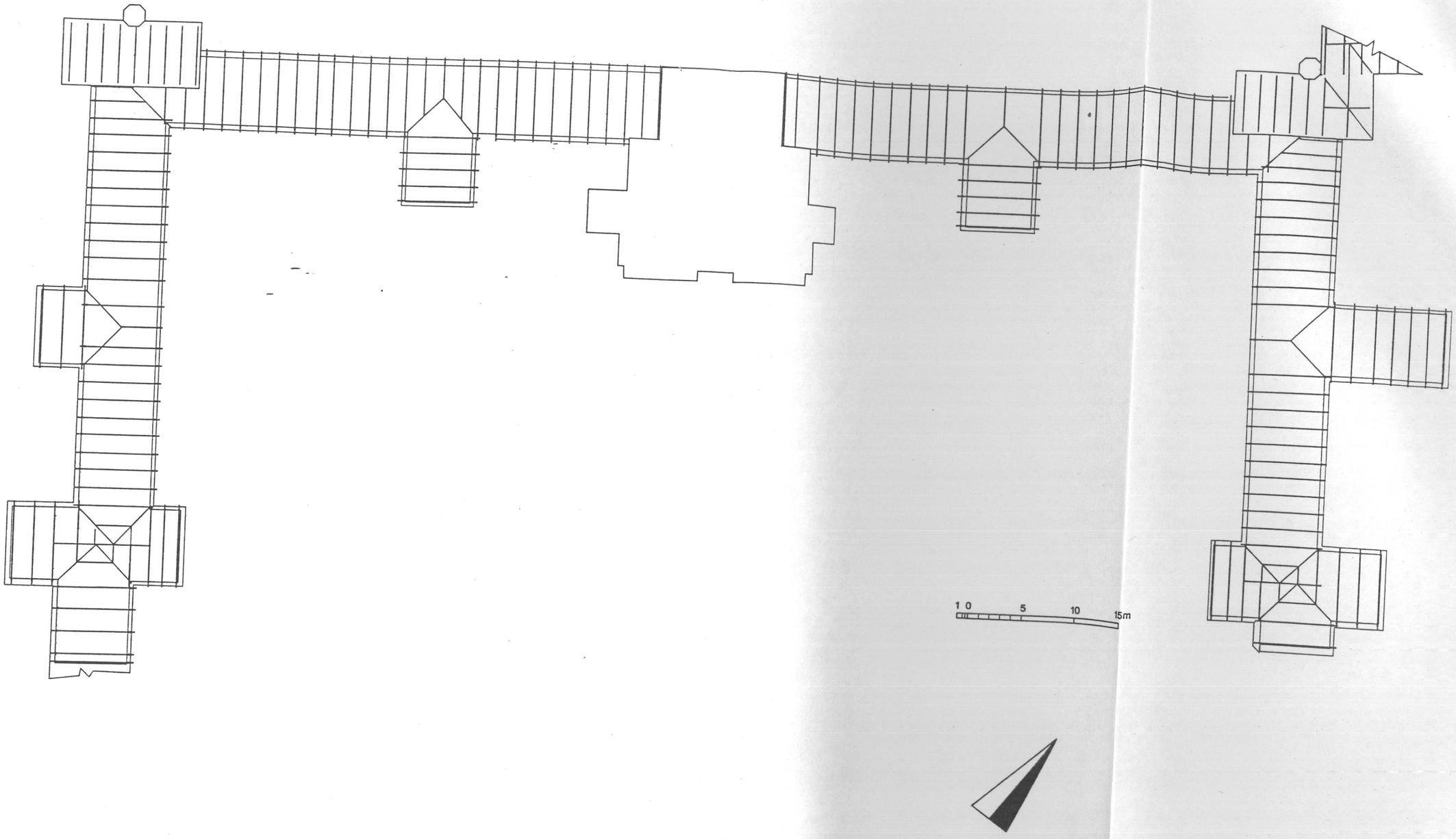
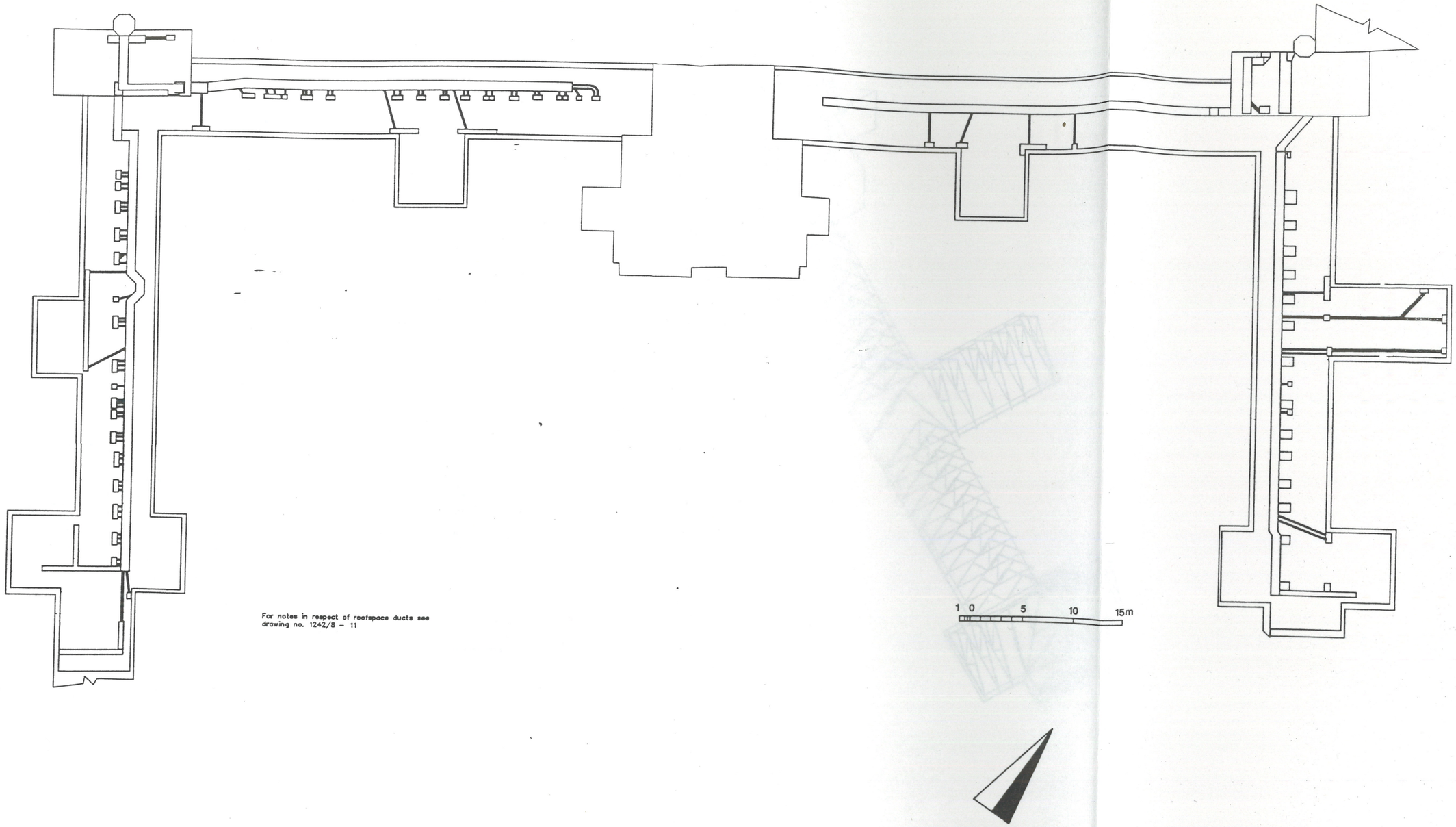


Fig 2. 'Birds Eye view' engraving of Hatton Hospital, dated to 1852



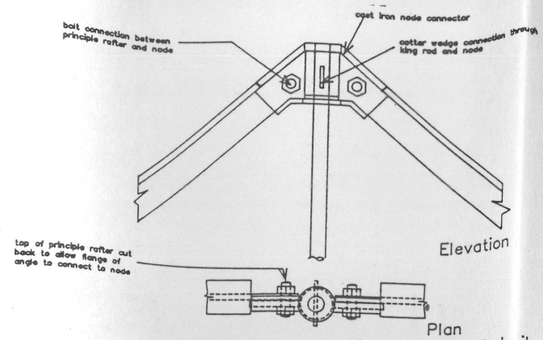

| | | | |
|---|---|---|---|
| Lancaster University Archaeological Unit<br>Storey Institute<br>Meeting House Lane<br>Lancaster | Overall Plan of Roof Trusses<br>Main Building<br>Hatton Hospital<br>Hatton, Warwick, Warwickshire | Scale | 1 – 200 |
| | | Date | August 1996 |
| | | Drawing No. | 1242/1 |

Fig 3. Overall plan of roof trusses

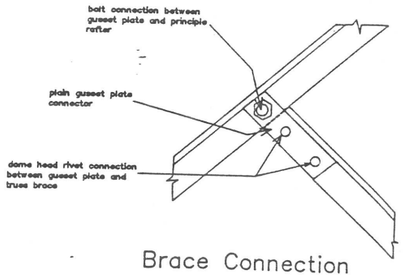



| | | | |
|---|---|---|---|
| Lancaster University Archaeological Unit<br>Storey Institute<br>Meeting House Lane<br>Lancaster | Overall Plan of Roofspace Ventilation Ducting<br>Main Building<br>Hatton Hospital<br>Hatton, Warwick, Warwickshire | Scale | 1 – 200 |
| | | Date | August 1996 |
| | | Drawing No. | 1242/2 |

Fig 4. Overall plan of roofspace ventilation ducting



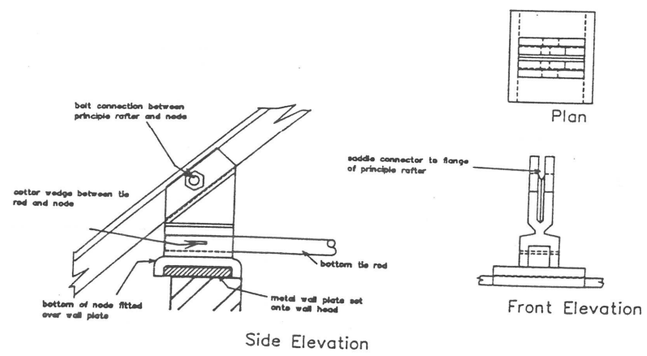

Top Node detail



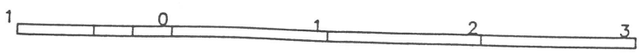

Brace Connection

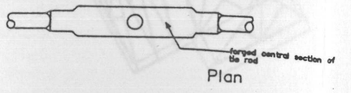


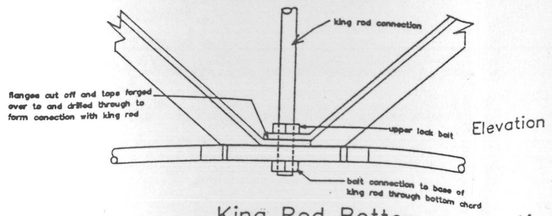

Main Truss




Principle Rafter / Bottom Chord Connection




King Rod Bottom Connection

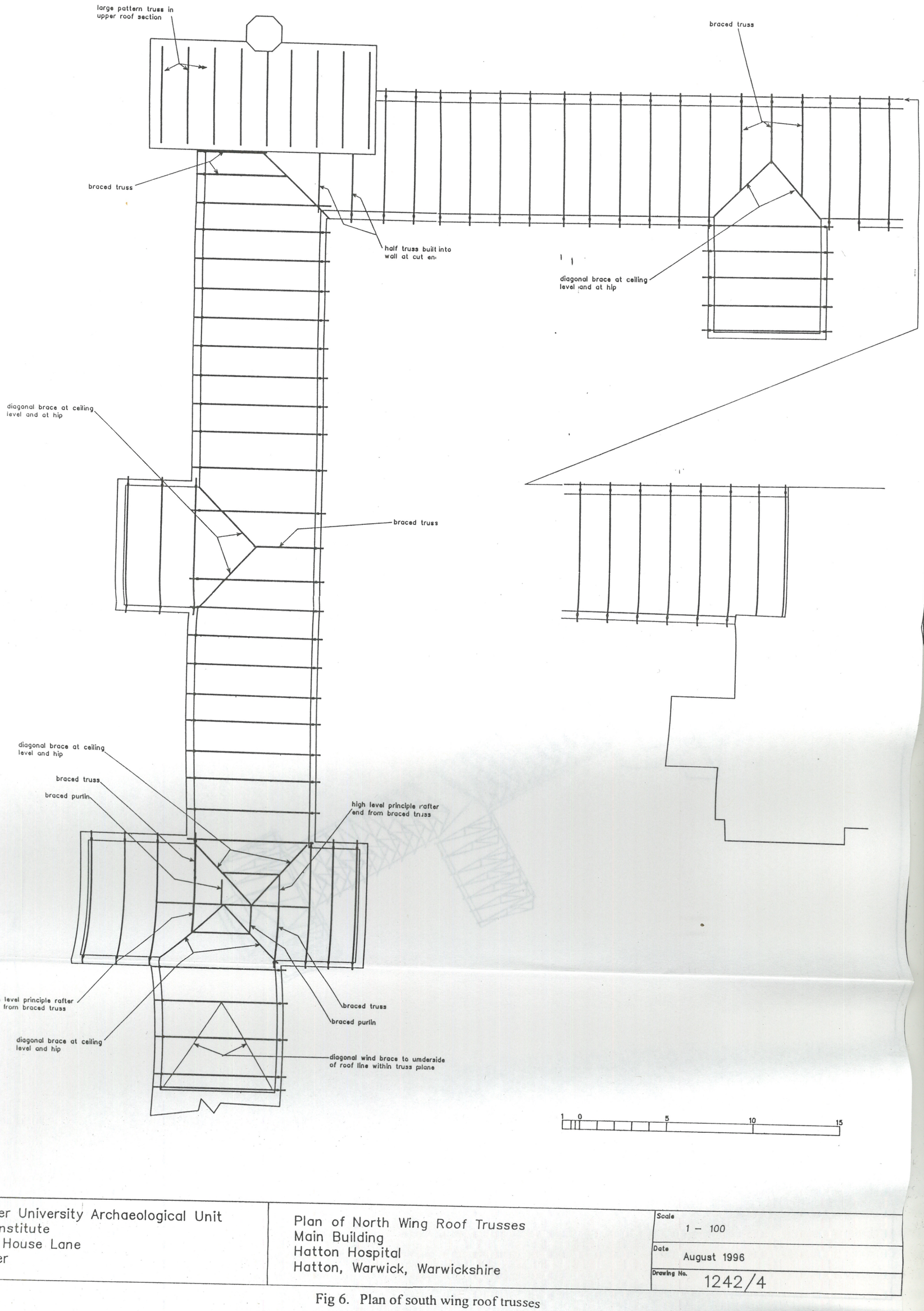
Lancaster University Archaeological Unit
Storey Institute
Meeting House Lane
Lancaster

Main Truss Showing Details
Main Building
Hatton Hospital
Hatton, Warwick, Warwickshire

Scale 1 – 20; 1 – 5;

Date August 1996

Drawing No. 1242/3




| | | |
|---|---|---|
| Lancaster University Archaeological Unit<br>Storey Institute<br>Meeting House Lane<br>Lancaster | Plan of North Wing Roof Trusses<br>Main Building<br>Hatton Hospital<br>Hatton, Warwick, Warwickshire | Scale: 1 – 100<br>Date: August 1996<br>Drawing No.: 1242/4 |

Fig 6. Plan of south wing roof trusses

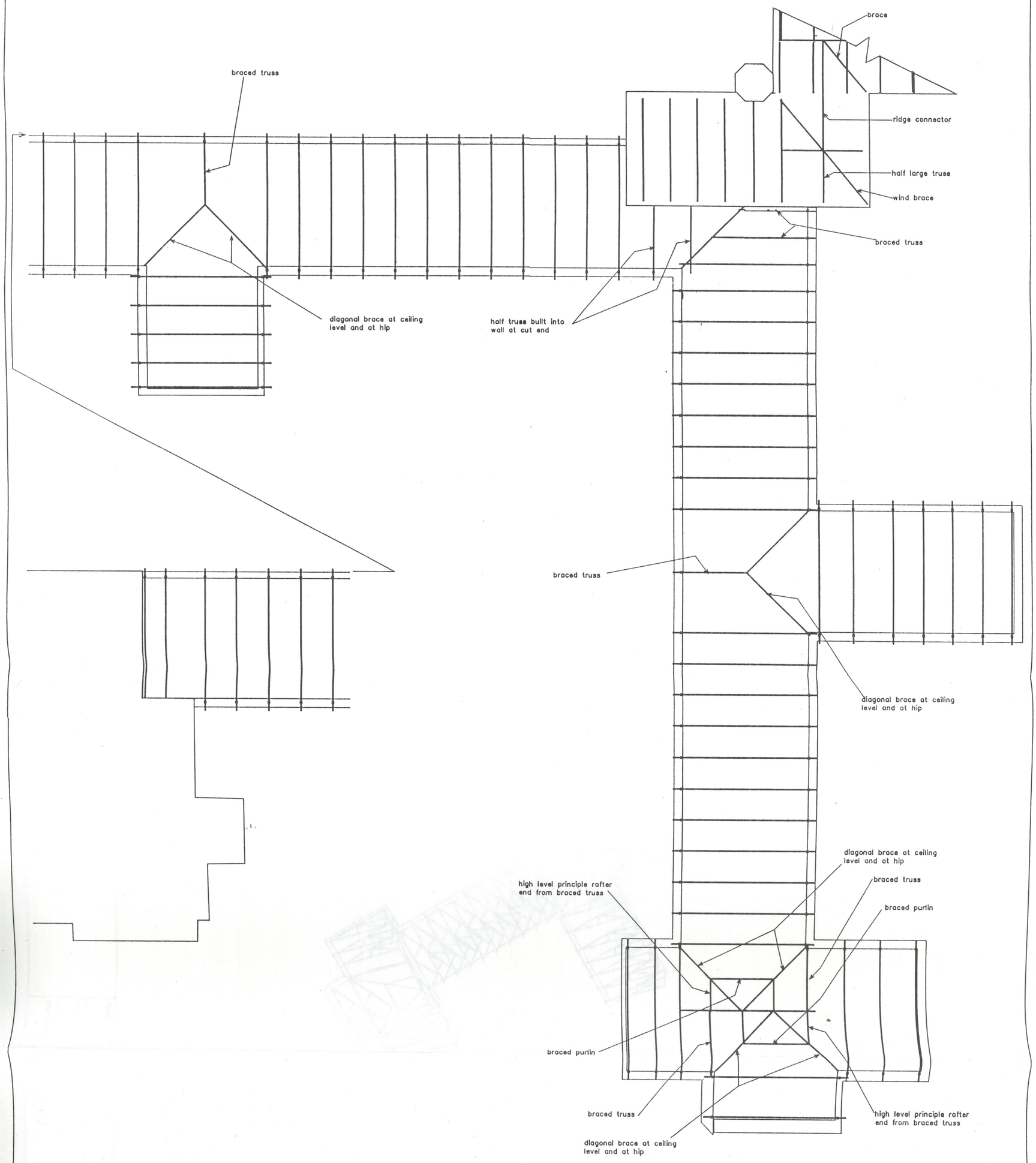
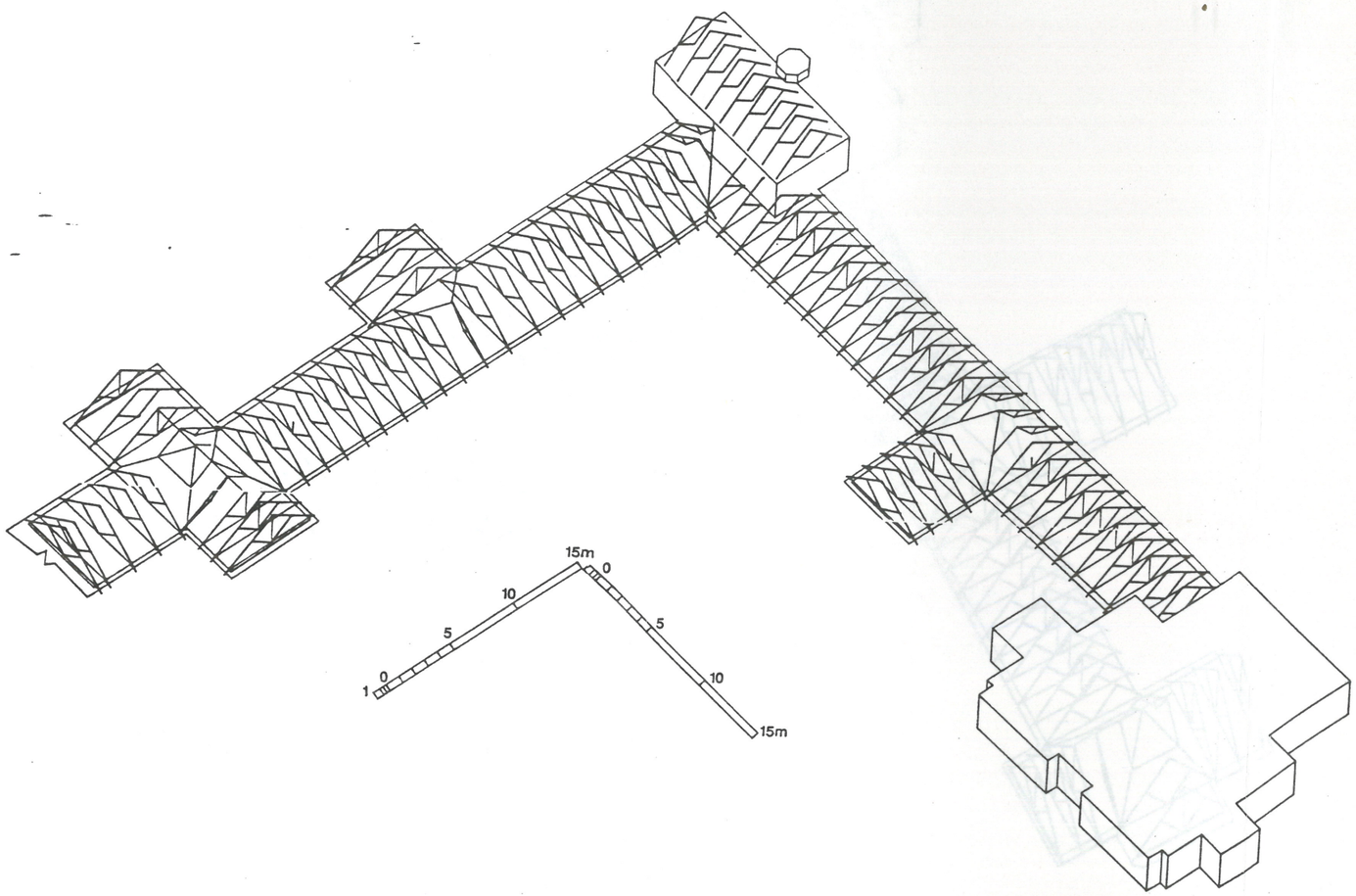



Fig 7 Plan of north wing roof trusses

| | | |
|---|---|---|
| Lancaster University Archaeological Unit<br>Storey Institute<br>Meeting House Lane<br>Lancaster | Plan of North Wing Roof Truss Plan<br>Main Building<br>Hatton Hospital<br>Hatton, Warwick, Warwickshire | Scale: 1 – 100<br>Date: August 1996<br>Drawing No.: 1242/5 |

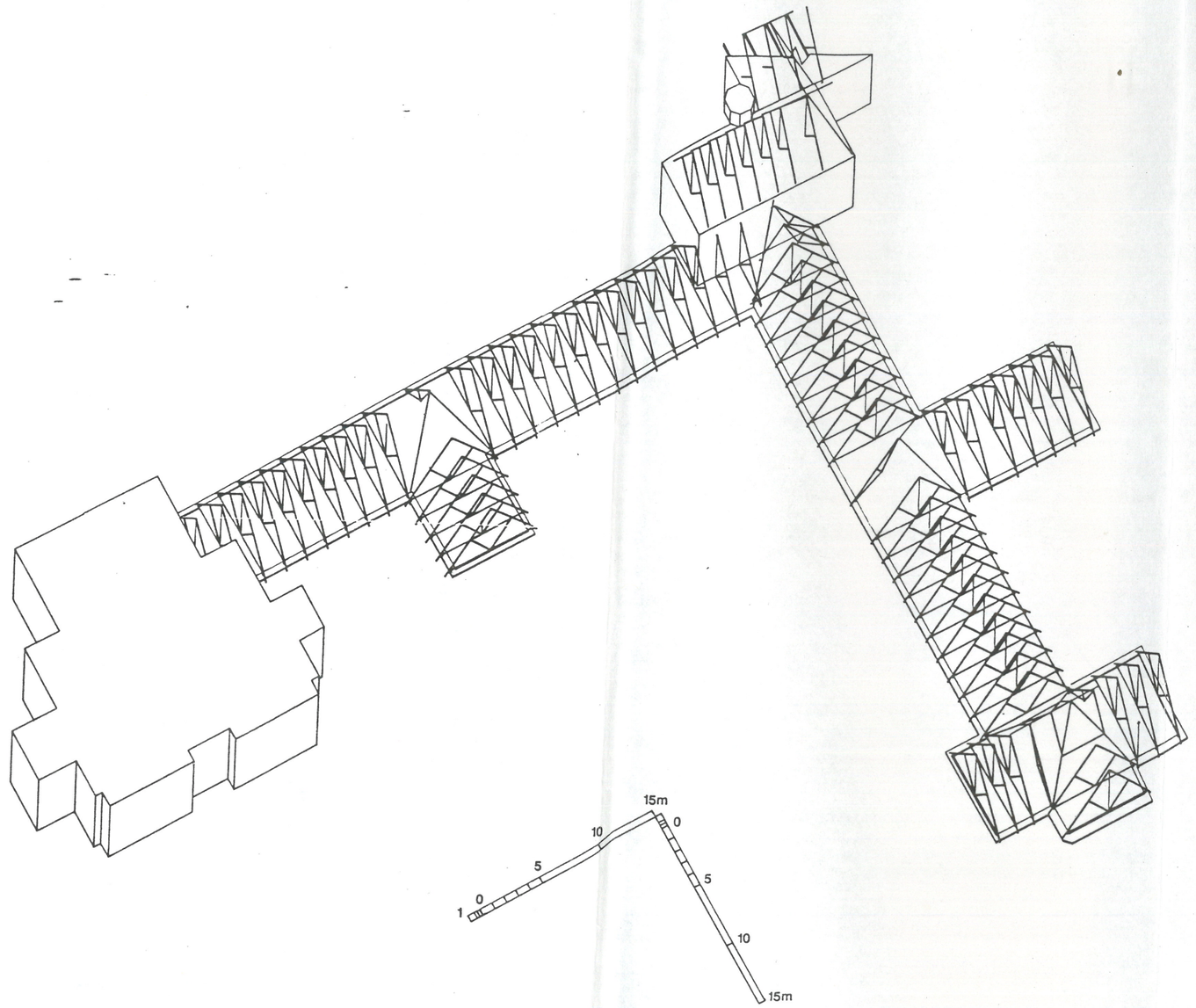



Lancaster University Archaeological Unit
Storey Institute
Meeting House Lane
Lancaster

South Truss Layout Perspective
Main Building
Hatton Hospital
Hatton, Warwick, Warwickshire

Scale 1 – 200
Date August 1996
Drawing No. 1242/6

Fig 8. South roof truss layout perspective




| | | |
|---|---|---|
| Lancaster University Archaeological Unit<br>Storey Institute<br>Meeting House Lane<br>Lancaster | North Roof Truss Layout Perspective<br>Main Building<br>Hatton Hospital<br>Hatton, Warwick, Warwickshire | Scale: 1 – 200<br>Date: August 1996<br>Drawing No. 1242/7 |

Fig 9. North roof truss layout perspective

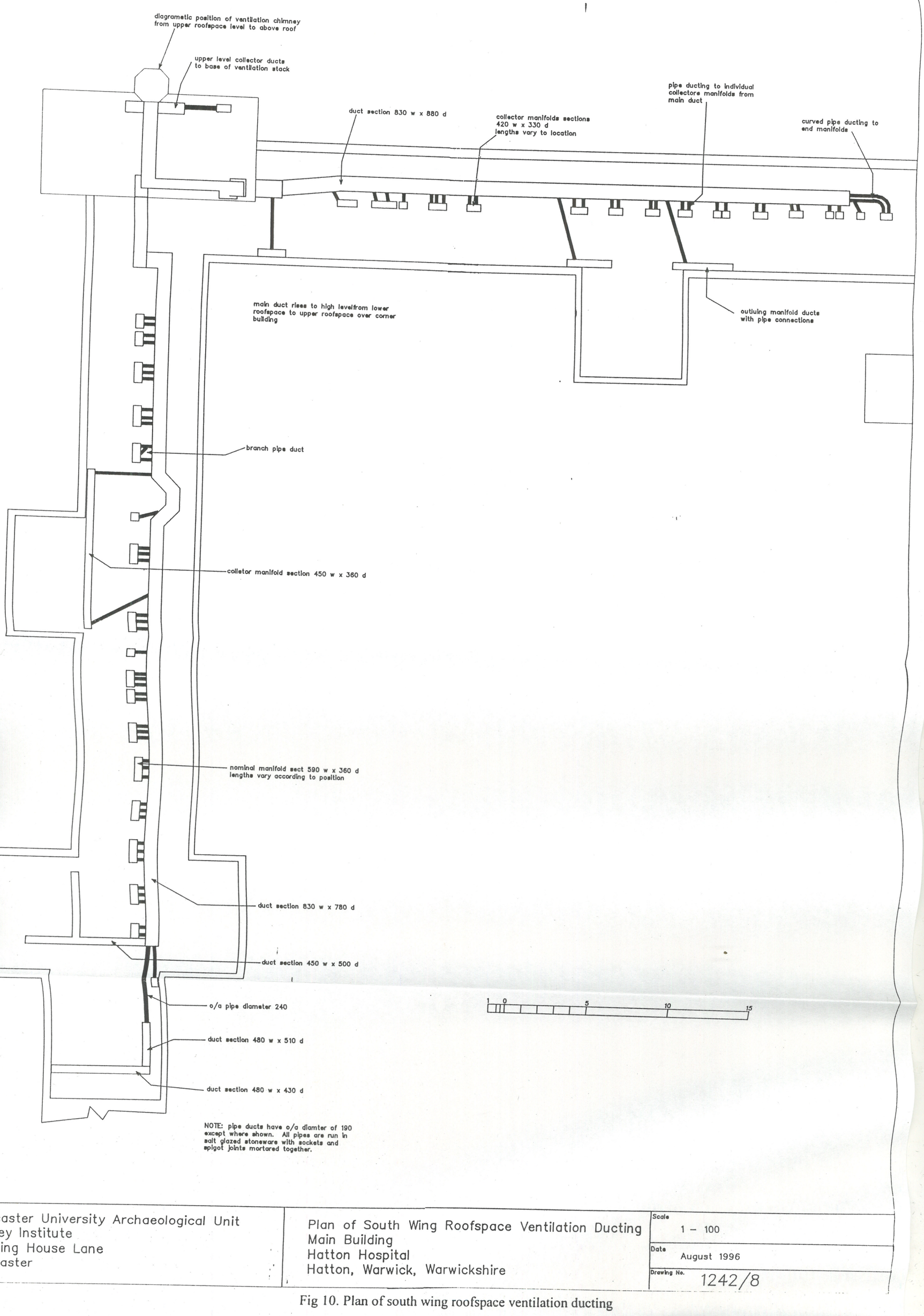
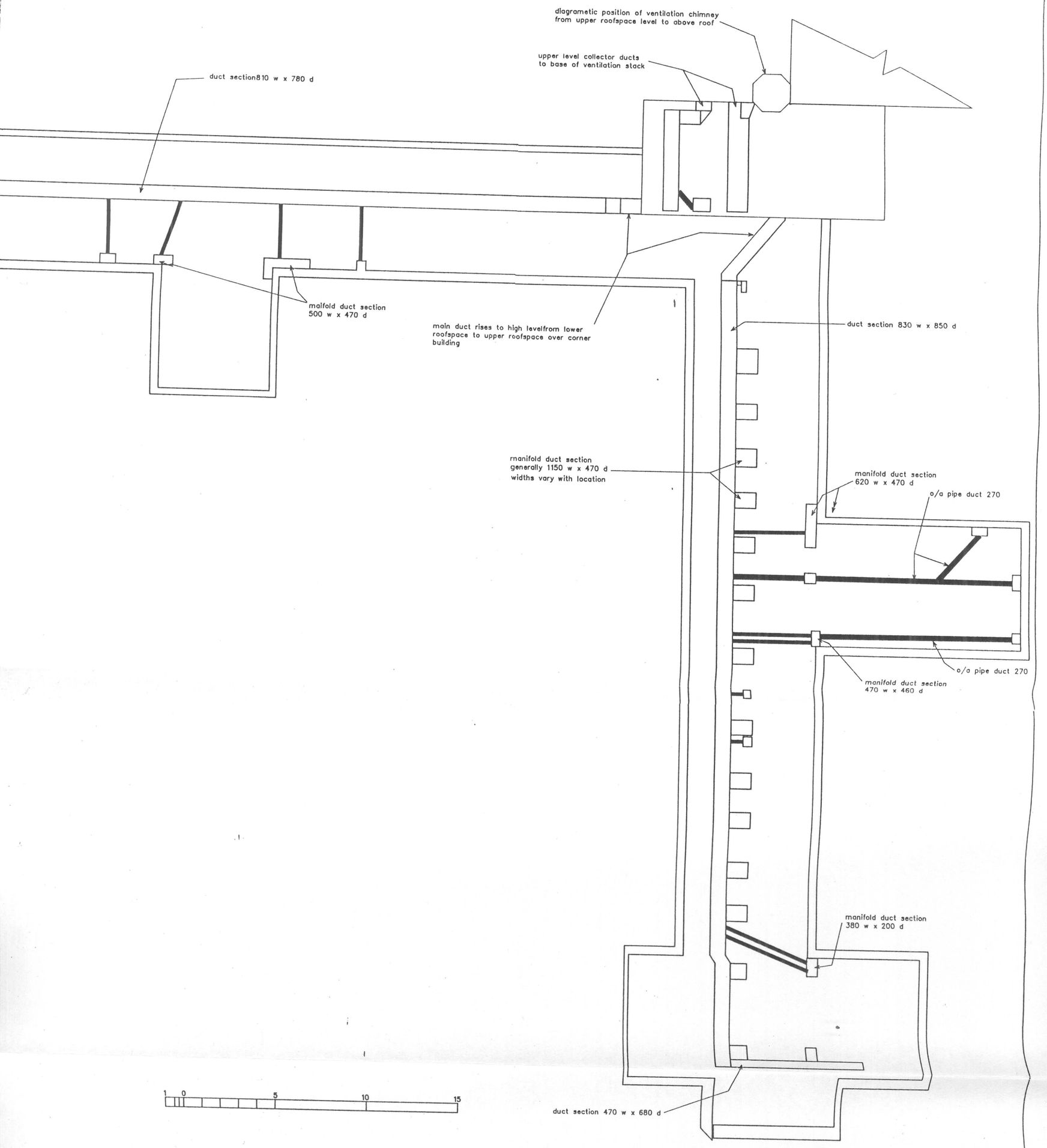


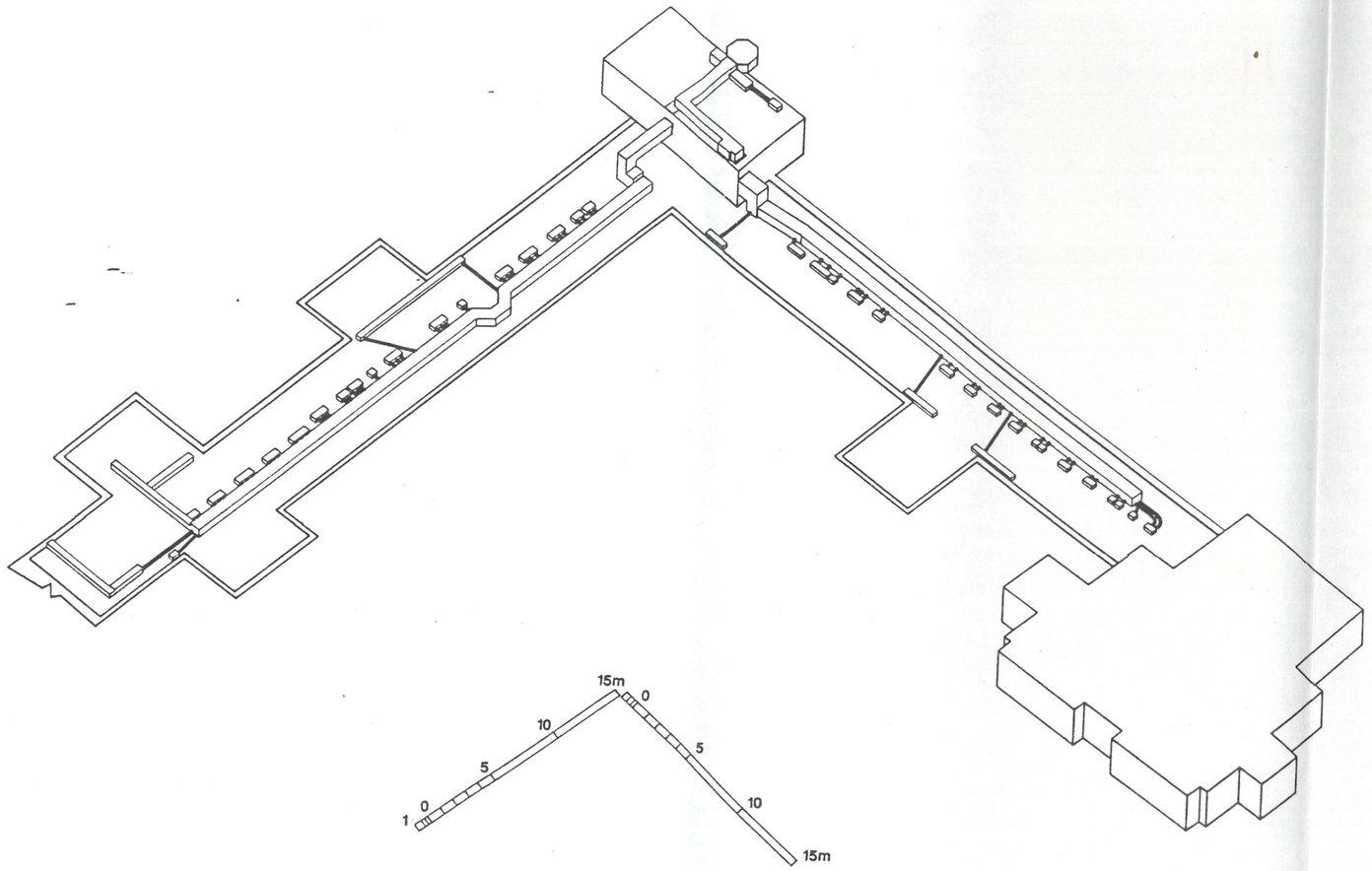

Fig 10. Plan of south wing roofspace ventilation ducting




NOTE: pipe ducts have o/a diamter of 190 except where shown. All pipes are run in salt glazed stoneware with sockets and spigot joints mortared together.

| | | |
|---|---|---|
| ancaster University Archaeological Unit<br>torey Institute<br>eeting House Lane<br>ancaster | Plan of North Wing Roofspace Ventilation Ducting<br>Main Building<br>Hatton Hospital<br>Hatton, Warwick, Warwickshire | Scale 1 – 100<br>Date August 1996<br>Drawing No. 1242/9 |

Fig 11 Plan of north wing roofspace ventilation ducting

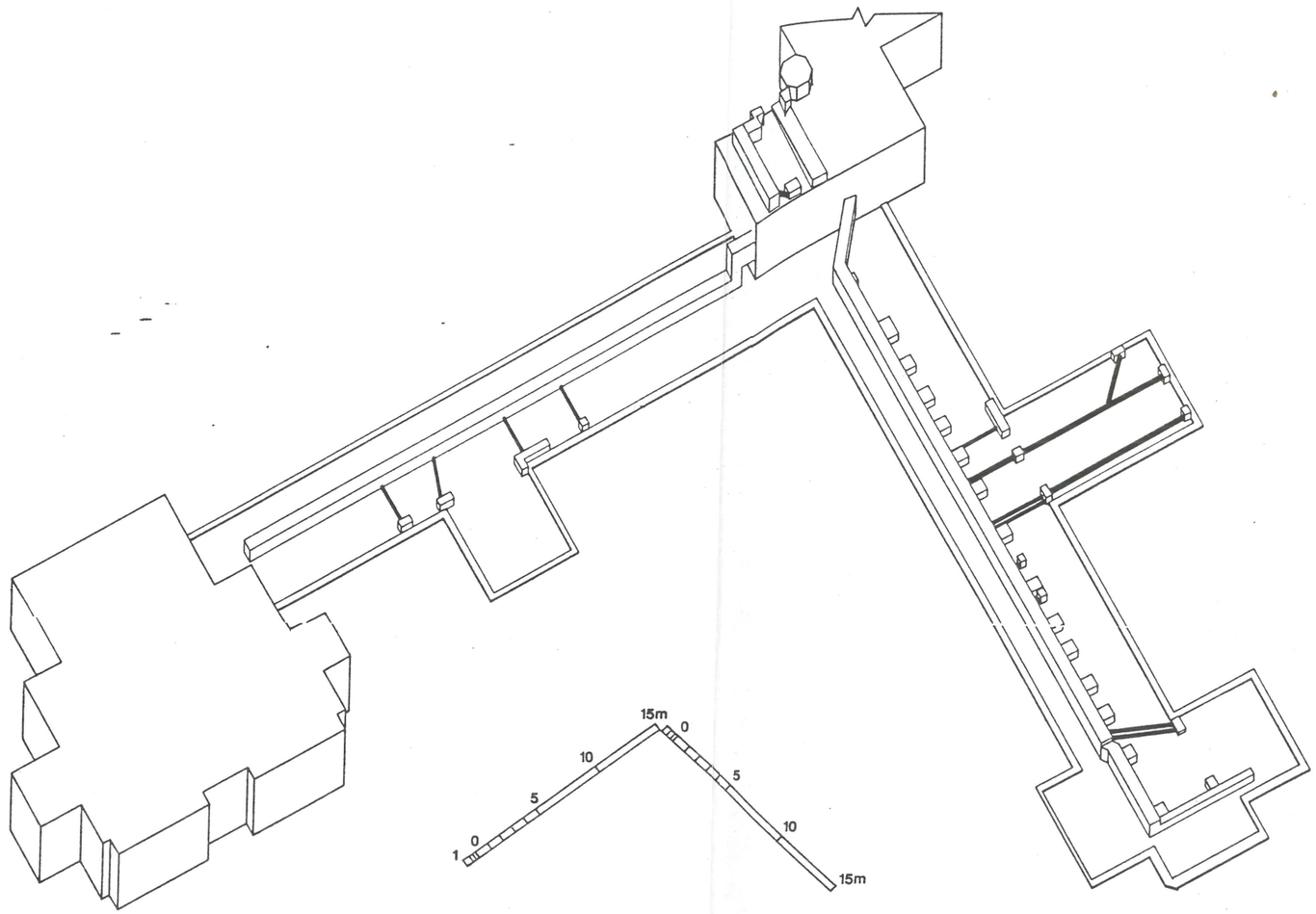



Lancaster University Archaeological Unit
Storey Intsitute
Meeting House Lane
Lancaster

South Roof Duct Perspective Layout
Main Building
Hatton Hospital
Hatton, Warwick, Warwickshire

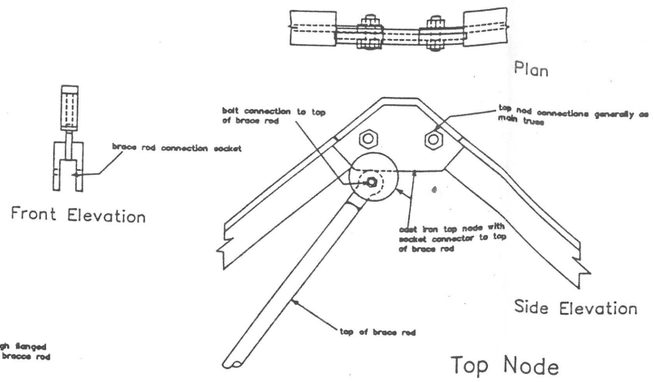
Scale 1 – 200
Date August 1996
Drawing No. 1242/10

Fig 12. South roof duct perspective layout

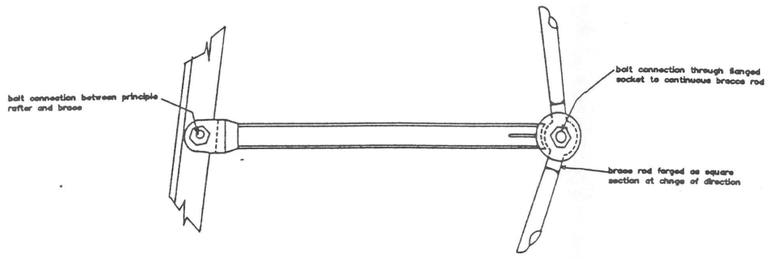



| | | | |
|---|---|---|---|
| Lancaster University Archaeological Unit<br>Storey Intsitute<br>Meeting House Lane<br>Lancaster | North Roof Duct Perspective Layout<br>Main Building<br>Hatton Hospital<br>Hatton, Warwick, Warwickshire | Scale | 1 – 200 |
| | | Date | August 1996 |
| | | Drawing No. | 1242/11 |

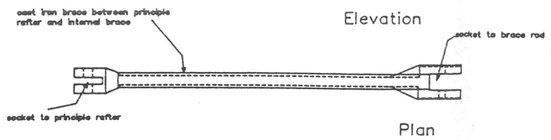
Fig 13. North roof duct perspective layout




Top Node

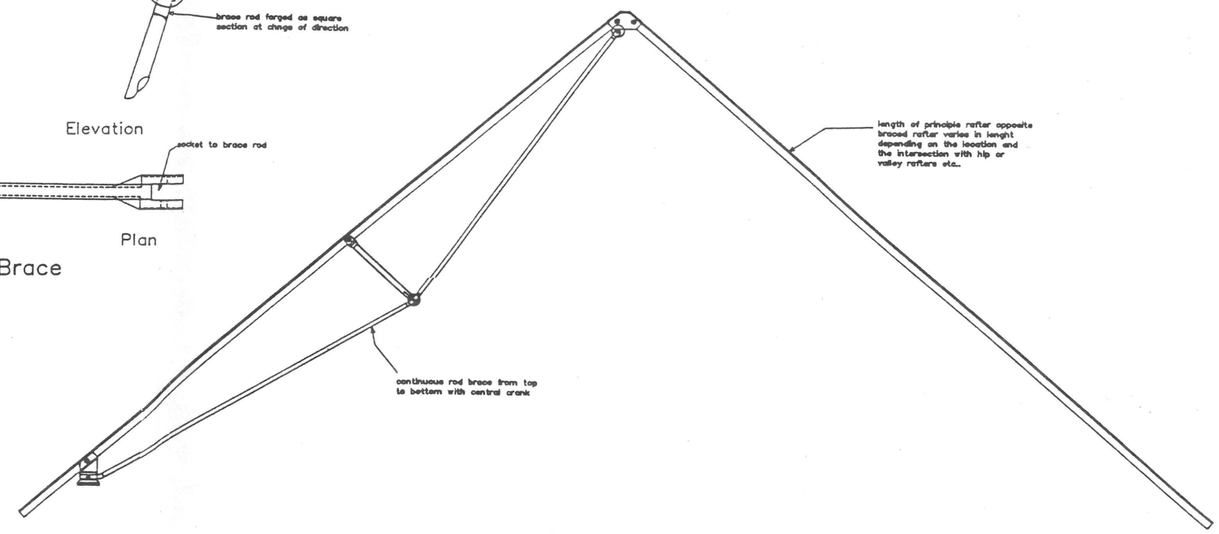



Elevation

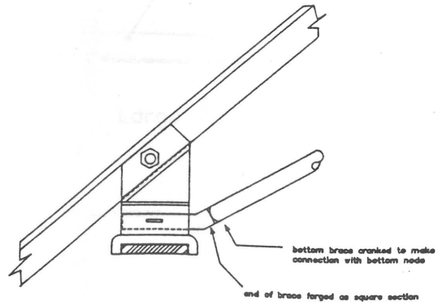



Plan

Central Brace




Braced Truss



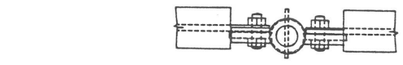

Principle Rafter / Bottom Brace Node

1 0 1 2 3

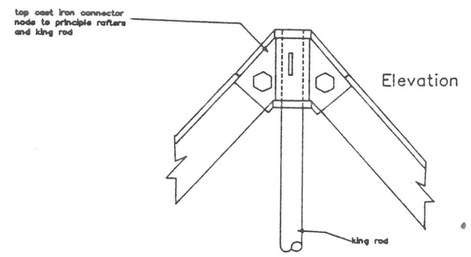
NOTE: braced truss is generally as the main truss pattern. This drawing to be read in conjunction with drawing No. 1242/3 for general notes.

| | | |
|---|---|---|
| Lancaster University Archaeological Unit<br>Storey Institute<br>Meeting House Lane<br>Lancaster | Braced Truss Showing Details<br>Main Building<br>Hatton Hospital<br>Hatton, Warwick, Warwickshire | Scale 1 – 20; 1 – 5;<br>Date August 1996<br>Drawing No. 1242/12 |

Fig.14. Braced truss showing details.

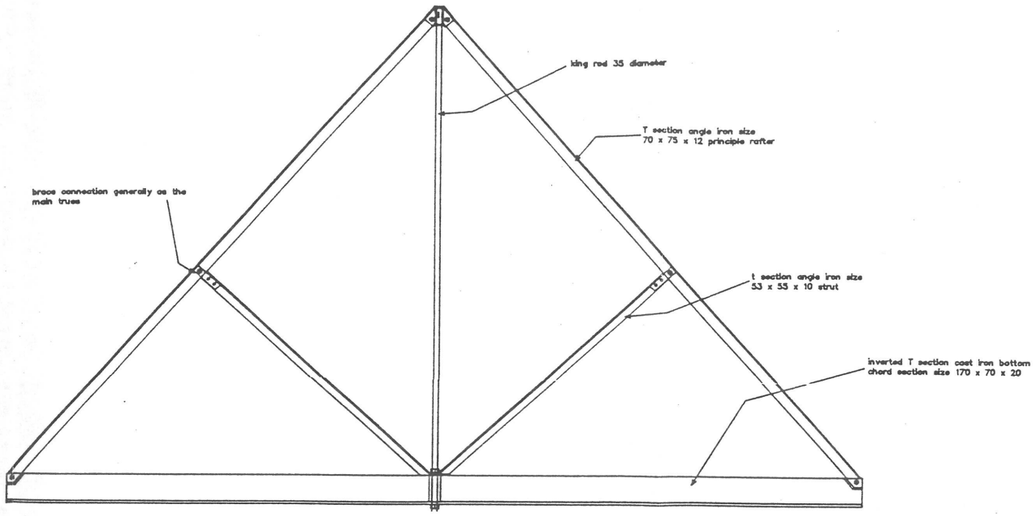


Plan

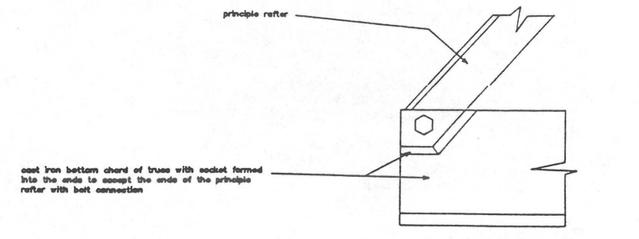



Elevation

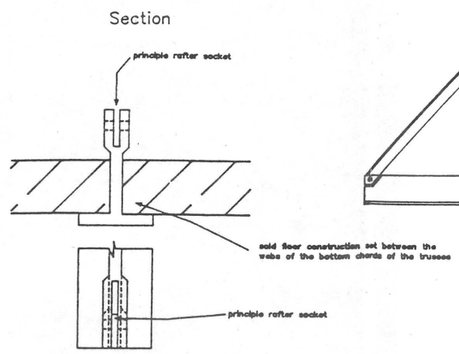
Top Node




Large Truss

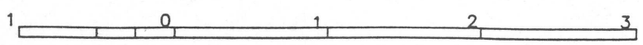



Side Elevation

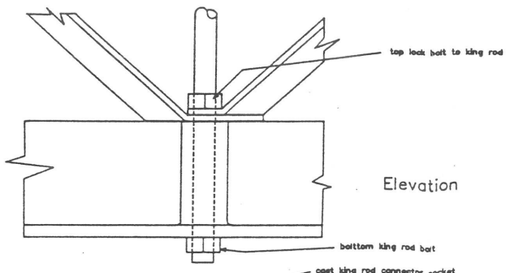



Plan

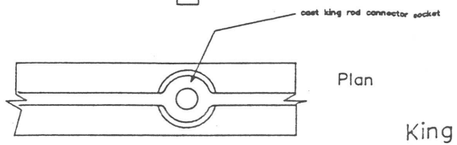
Principle Rafter / Bottom Chord Node




NOTE: large truss is generally as the main truss pattern. This drawing to be read in conjunction with drawing No. 1242/3 for general notes and construction details only




Elevation




Plan

King Rod Bottom Connection

| | | |
|---|---|---|
| Lancaster University Archaeological Unit<br>Storey Institute<br>Meeting House Lane<br>Lancaster | Large Truss Showing Details<br>Main Building<br>Hatton Hospital<br>Hatton, Warwick, Warwickshire | Scale 1 – 20; 1 – 5;<br>Date August 1996<br>Drawing No. 1242/13 |

Fig 15. Large truss showing details