Historic Buildings Assessment

Base Court VI, Hampton Court Palace

Historic Buildings Investigation and Recording

oxfordarchaeology
southsouthsouth

September 2015

Client: Historic Royal Palaces

Issue No: 1
OA Job No:5825
NGR: TQ 15695 68457

Client Name:	Historic Royal Palaces
Document Title:	Base Court VI, Hampton Court Palace
Document Type:	Historic Buildings Investigation and Recording
Issue Number:	1
Grid Reference:	TQ 15695 68457
OA Job Number:	
Site Code:	HCP113
Invoice Code:	HCP113BS
Prepared by:	Deirdre Forde
Position:	Historic Buildings Archaeologist
Checked by:	Ben Ford
Position:	Project Manager
Approved by:	Julian Munby Signed.....
Position:	Head of Buildings Department
Date:	September 2015
Document File Location:	C:\Users\victoria.hosegood\AppData\Local\Temp\Base Court VI Official.odt
Illustrated by:	Victoria Hosegood

Oxford Archaeology

Janus House

Osney Mead

Oxford OX2 0ES

t: (0044) 01865 263800 e: oasouth@oxfordarch.co.uk

f: (0044) 01865 793496 w: www.thehumanjourney.net

Oxford Archaeology Limited is a Registered Charity No: 285627

Base Court VI, Hampton Court Palace

Historic Buildings Investigation and Recording

Written by Deirdre Forde

Table of Contents

List of Figures

Report Plates

Base Court VI, Hampton Court Palace

Summary

Oxford Archaeology (OA) was commissioned by Historic Royal Palaces to carry out an archaeological investigation and buildings recording during conservation works around and within the range between Base Court and Clock Court to the south of the Anne Boleyn Gatehouse. This follows previous investigations by Oxford Archaeology of the Anne Boleyn Gatehouse itself (The Anne Boleyn Gatehouse, 2009), The area of the Buttery to the immediate north of the Great Hall (Buttery Roof Stair Conservation, 2014) and the range immediately to the north of the Anne Boleyn Gatehouse (Base Court V, 2015).

The main objective of this investigation was to enhance our understanding of this area of the palace through a thorough investigation of the elevations as well as their associated roof structures and the arrangements within the range. Investigation of the brickwork in the elevations has re-affirmed what was already believed about their sequence of construction and has enhanced as well as supported the brick typology survey created by Daphne Ford for English Heritage (Ford 1991). The range immediately to the south of the Anne Boleyn Gatehouse was built by Cardinal Wolsey around an earlier existing Daubeney structure on the Clock Court side. This was subsequently truncated and the range was altered by Henry VIII. Through past investigation of the Great Hall and adjoining structures to the north (Oxford Archaeology 2012, 2012 & 2015), we have identified more than one phase of building during Henry VIII's tenure at the palace, as well as reuse and alteration of various parts of Wolsey era structures. This is clear in the two phases of the Henrician addition to the Roof 4 area to the south west of the Wolsey range. Previously undetected phases of Tudor brickwork, not apparently attributable to Henry VIII were also recorded and have been added to the construction history of the range.

The roof structures of this range have been altered greatly, mainly in the late 16th, 19th and 20th centuries. The remains of primary roof structures survive in situ under Roof 1 to the immediate south of the Anne Boleyn Gatehouse and in the Roof 4 area to the south west of the range. All other roofs are later additions or reused and reassembled structures. The interior of the range was subject to extensive renovation works during the 20th century for the purpose of updating the apartments within. Consequently, the original and later historic arrangements have largely been lost or cannot be interpreted.

1 INTRODUCTION

1.1 Background

1.1.1 Oxford Archaeology (OA) has been commissioned by Historic Royal Palaces to carry out an archaeological investigation and buildings recording during conservation works around and within the range to the south of the Anne Boleyn Gatehouse. The current project hopes to increase our understanding of evolution of this area between Clock Court and Base Court within this context primarily through the investigation of their exterior elevations and roof structures.

1.1.2 The methodology closely follows previous investigations undertaken by OA, such as the Buttery Roof Stair Conservation and Base Court V.

1.2 Aims and objectives

1.2.1 The main aim of the project was to take the opportunity afforded by the conservation works to record features or areas of the Clock Court and Base Court range, and their associated buildings, which were either temporarily exposed or made temporarily accessible by the scaffolding. The recording will cover elevations associated with the range such as the south face of the Anne Boleyn Gatehouse and adjacent chimneys and parapets.

1.2.2 Conservation work and the associated archaeological recording and analysis has the potential to provide valuable information concerning the precise phasing and date of construction of these buildings. The main objective of the project is to add to our existing knowledge of the range between Base Court and Clock Court, which is informed by past investigations of the area around the Great Hall and the range to the north of the Anne Boleyn Gatehouse.

1.3 Methodology

1.3.1 The site recording consists of three main elements: a drawn record, a descriptive, written record and a photographic record (detailed further below). Particular attention was paid to elements that had the potential to enhance our understanding of the construction history of the range and how it relates to the wider construction history of Base Court and Clock Court. Any evidence relating to the primary or historic use was recorded and interpreted to inform the overall understanding of the site.

1.3.2 The photographic record is intended to act as a general record of the historic building. It includes both general shots (exterior and interior) of accessible areas as well as detail shots of items/features of archaeological significance.

1.3.3 The drawn record comprises annotated scaled drawings to explain, describe and interpret the building and archaeological features in terms of construction, development and phasing. They include plans and elevations.

1.3.4 The written record provides additional descriptive analysis of the building, in terms of its architecture, setting, construction, development and use. It provides a detailed description of the range in terms of phasing, relationship with other parts of the complex, evolution, significance and construction.

1.4 The Brick Typology

1.4.1 A brick typology for Hampton Court was produced following extensive research by Daphne Ford for English Heritage (Ford 1991). After surveying, coupled with building works archive and excavation records research, each elevation of the palace was phased

and allocated a brick type (listed from A to W in chronological order). These were presented on a series of phased elevations numbered AS2/98 – AS2/124 and brick data type sheets setting out the description of each brick and the associated mortars. The Typology elevation AS2/111 and the associated brick data sheets C, Q and T were used as a base for this report along with visual inspection during the course of the conservation works.

1.4.2 The recording of brickwork for this investigation involved the completion of OA brick data sheets. These ensured that all categories included within the typology were accounted for during investigations, and enabled easy cross referencing to the brick typology as well as other elements of the recording programme (photographic, drawn and written).

1.4.3 The following information was included in the sheets:

- Brick measurements- arris to arris, width and depth (in cm).
- Brick type and date- according to the typology.
- Description/ Features- description of brick colour, inclusions, diaperwork, etc.
- Bond and pointing.
- Mortar.
- Further comments.

1.4.4 Previous research by OA on brickwork projects at Hampton Court has produced results generally comparable with the Typology, the only difference occasionally occurring within the measurements as the archaeological recording includes measuring brickwork after the raking out process. Areas of brick in the current study have been identified using the Typology coding, however bricks of the same type may make up different phases of construction in the Great Hall court. These are identified and explained within the written description (*See Section 3*).

1.4.5 The following is a short description of each brick type identified in the Great Hall Court as outlined in the Hampton Court Brick Typology by Daphne Forde. For the Brick Typology spreadsheet with dimensions, see Appendix C.

1.4.6 **Brick Type A** This is a pre-Wolsey and Wolsey stock brick which pre-dates 1528. The bond is English but adapts to diaper work if necessary. It is usually orange or brown in colour with a very uneven, friable surface with occasional pebble inclusions. Straw imprints and stock impression can occasionally be seen on the brick. The original mortar for this brick type is usually a fine textured, creamy sandy coloured lime mortar with frequent large lime granules. Occasionally the bed mortar is a rich-brown, very sandy mortar. The mortar, where well preserved, is double struck.

1.4.7 **Brick Type C** This is a Henrician stock brick and the most common brick type in the Great Hall Court. It dates from 1529 to 1566. The bond is English but adapts to form diaper work if necessary. The colour varies from brown orange to dark orange or dark rose (maroon) and it has a very uneven, friable surface with occasional pebble inclusions. It has no frog and the stock impression can be seen on the brick. Random vitrified bricks are included and degrees of vitrification varies. The original mortar varies from a sandy colour to grey/white and is fairly friable with lime granules. The mortar, where well preserved, is double struck.

1.4.8 **Brick Type I** These are bricks dating to the late 17th and early 18th century and were selected by Wren during his work at the palace for their rich, dark colour. They have hard

uneven surface texture with a slight gold patina. They are coursed in both Flemish and English bonds, depending on location and pointed with a pale sandy lime mortar, gritty in texture, with occasional lime granules. They are found in patches in the east facing range of Clock Court as well as the King's Stairs in Fountain Court and the Round Kitchen in Round Kitchen Court.

1.4.9 **Brick Type Q** This is known as a "washed stock" or "grey stock" brick and dates from the late 18th to the 19th centuries. The bond can be English or Flemish, depending on which is necessary to bond it to earlier brickwork. It can be pale yellow to ochre or pale rose to wine in colour and has a very hard, smooth surface with a sharp arris. Bricks feature a rudimentary frog of uneven shape particles of cinders. They are never vitrified and the brick features striations left by the strike. The original mortar is a white/ grey cementitious mortar with flat, occasionally penny rolled or scored, mortar.

1.4.10 **Brick Type T** This is a red face brick dating from the 19th century. The bond can be English or Flemish. It is a rich orange/ brown and the surface is hard and uneven (unless rubbed) with a sharp arris. The frog is unknown and there is no vitrification. Original mortar is a gritty, hard grey/ white lime mortar and is penny pointed.

1.4.11 **Brick Type V** This is a late 19th century to early 20th century stock brick. It varies from orange and pale rose to light brown in colour and has a rough friable surface texture with particles of dark orange and pale orange clay. It is generally coursed in an English bond and features a grey, gritty lime bedding mortar and a grey, gritty cementitious surface mortar.

Please see Appendix B for Brick Typology Sizes

1.5 OA Brick Keys

1.5.1 **Introduction** Areas of historic brickwork that are not apparently identifiable to the Brick Typology have also been recorded within its convention and given their own key. Further to this, areas of brickwork where historic brick types have been extensively reused, or areas where one brick type has been heavily repaired with another type have been given their own key in an attempt to identify significant phases of work.

1.5.2 Various bricks that have been studied and recorded during OA's investigation of the elevations surrounding and associated with the Great Hall and the Base Court, Clock Court range are modern, dating to the mid to late 20th century, and therefore are not identified by the Brick Typology. An attempt has been made to phase some of the more prominent types for the purposes of an enhanced survey. They have been recorded in accordance with the conventions of the Brick Typology.

1.5.3 **Historic Brick** The area in and around the range features bricks that clearly date to the Tudor period but are not immediately identifiable as Wolsey or Henry VIII bricks. They differ very subtly in colour and/or dimensions, or their difference my be indicated by subtle changes in mortar, brick patterns or straight joints. These have been given their own key and are known as Tudor Brick of Undetermined Date.

1.5.4 The second type of brickwork identified is one that is associated with the later Bay 3 in Roof 2. Dendrochronological sampling has dated this by to the 1590s so these bricks are ostensibly part of a phase of works that was carried out during Elizabeth I's reign, a phase that has not been identified elsewhere in the palace. These have been added to the key and are called Elizabethan Brick.

1.5.5 Where historic bricks are reused or represent a different phase with the same brick type, they are represented in the key with hatching.

1.5.6 **Modern Brick** Modern brick generally dates to the 20th century and appears in the brick typology as white on the elevations (with the exception of Brick Types V and W, both dating to the late 19th and early 20th centuries). However, various types appear on the elevations of this range. There many varieties but two commons types have been identified in this area. The first is a brick associated with the extensive 1930s renovations and alterations to Apartment 30. It is a bright orange brick with a moderately rough surface texture and a sharp arris. The mortar is a hard, compact cream coloured lime mortar. It is generally found at parapet level both on the exterior and the interior.

1.5.7 The second, a 1950s/1960s stock brick with straw marks, which appears as a uniform brick of dark reddish brown to rose with occasional vitrified bricks. The mortar is a yellowish cream hard lime mortar and both the lack of a cement mortar and the general roughness of the brick type suggests that the refacing work was an attempt to be more sympathetic with the older brick types. These are seen in patches on the inner parapets and elevations of the range.

2 HISTORICAL BACKGROUND

2.1 The Area to the south of the Anne Boleyn Gatehouse

2.1.1 The three story range to the south of the Anne Boleyn Gatehouse is a part of a larger range that separates Base Court and Clock Court. This is an area that has traditionally been associated with its use as Grace and Favour apartments. Cardinal Wolsey is accredited with the plan of much of what we see today, dating to the early 16th century, although much of his work is thought to have been altered by Henry VIII's subsequent redesigning of the palace for his purposes just a few years later. During William III's reign, Sir Christopher Wren designed many of the apartments that exist today along the south and east fronts but, despite his colonnaded range abutting it, the exterior of the range between Base Court and Clock Court have been relatively unchanged by his work. However, it is unlikely that the interior survived unchanged, particularly in the centuries subsequent to this.

2.1.2 A plan of the palace as completed for William III with locations of lodgings marked according to 1702 Lodgings Survey shows a Mr Vice Chamberlain in Apartment 30 and a Mr Boyle in Apartment 36. Throughout the 18th and 19th centuries, lodgings were granted within Hampton Court Palace to a succession of increasingly less privileged people, mainly the widows of esteemed servants or those in the military who had served overseas (Thurley, 2003). Alterations would have been made as apartments changed hands and until the 20th century, the responsibility for renovation and redecoration beyond essential maintenance lay with the occupant. Apartment 30, was at the time considered to be one of the most fashionable and expensive transformations. This apartment, The Offley Shore Apartment, still retains its Arts and Crafts Tudor interior, fitted in 1936. The wood panelled room on the first floor to the north of the Archaeology Room is a fine surviving example of this work. Today the first floor of this apartment is largely used as storage and staff quarters for the shop on the ground floor. The second floor houses a large utilities room at the south end and the northern half remains unoccupied but relatively unchanged.

3 Description of Elevations

3.1 Introduction

3.1.1 As a part of the archaeological recording and investigation of the area undergoing conservation work, the elevations were examined before and after raking out. Historic brickwork was recorded and mortar samples were taken from areas of significance. The area of investigation included the following elevations:

- The west facing elevations of Base Court to the south of the Anne Boleyn Gatehouse and their internal parapets
- The east facing elevations of Clock Court, to the south of the Ann Boleyn Gatehouse, and their internal parapets
- The south facing elevation of the Anne Boleyn Gatehouse
- The internal elevations under Roof 4
- Adjacent small areas of brickwork within and relevant to the area of investigation, including chimneys and return elevations

3.2 Description of Base Court Elevations (Plate 1)

3.2.1 **Base Court - West facing Elevation Part 1** (Figures 3 - 7) This is the west facing elevation of Base Court to the immediate south of the Anne Boleyn Gatehouse and it is part of the three storied range between Base Court and Clock Court (Plate 2). It stands to a slightly lower height than the west facing elevation immediately to the north of the Anne Boleyn Gatehouse, which was heightened in the 17th century (Oxford Archaeology 2015). Like the north elevation, it has a plinth with stone coping, two string courses and a crenellated parapet. The ground floor features three two-light Tudor casement windows and a stone four centre arched Tudor doorway to the extreme right. Above this, in the centre first floor are two large four-light Tudor windows and to the extreme right is wider but more squat twelve-light Tudor window. To the extreme left of the second floor is a six-light Tudor window to the left of this are two three-light Tudor casements with a smaller one-light window in between them. The parapet over the six-light window is higher than the rest of the elevation and has a flush chimney breast with two ornate Victorian chimneys. Interestingly, the lower section of parapet to the right of this features a brick hood mould that extends over all three windows. This elevation had been extensively repointed with a 19th century black ash mortar to the level of the parapet where it changed to a hard beige mortar with pebble inclusions.

3.2.2 The primary brickwork of this elevation is the Wolsey stock brick, Brick Type A, characterised by its almost unbroken diaper work and creamy lime mortar with large lime inclusions (Figure 5, Plate 3). This extends to window sill level of the second floor where the diaper work ends and there is a change in the mortar. On the left hand side of the first floor, where the diaper work is broken, there is a patch of rough pale grey lime mortar with speckle inclusions, which is a characteristically 19th century mortar. Although the bricks are very similar to those around them, they may be reused and it is possible that this is the location of a lost roundel (Area of purple brick in Figure 5). This feature is at roughly the same height as those on the Ann Boleyn Turrets. Another patch of this mortar is found around earlier bricks just under the string course and both areas may simply represent areas of minor repair.

3.2.3 Above the second floor window sill level, the brick work changes Brick Type B, a later Wolsey stock brick, where the section of parapet on the left hand side is higher (Figure 6). The deeper set mortar here is a smooth creamy brown lime mortar with large lime

inclusions. This has been heavily repointed with a coarse pale grey lime mortar with dark speckle inclusions. A large Victorian chimney faced with T type bricks protrudes from this section of parapet and this mortar is likely to date to its addition. Underneath the chimney is a straight joint (Plates 4 & 5), creating a division between the brickwork directly below it and that to the left under the parapet. Under the chimney, the presence of the Victorian mortar becomes more dense and in places, is behind the facing bricks. It appears that B type bricks were removed and replaced with Victorian mortar at the time that the chimney was built into the wall. The one crenellation over the B type brickwork is a 1930s rebuild.

3.2.4 To the right of this, under the lower section of parapet, the brickwork changes to Henry VIII's Brick Type C under the brick hood mould and to Brick Type V, a later 19th century or early 20th century refacing brick, above it. The hood mould itself appears to be contemporary with Brick Type C underneath it as it is set with the same mortar. There is a small area of the rough grey lime mortar associated with T type bricks over the lintel of the window on the left under the hood mould (Plates 6 & 7).

3.2.5 The plinth of this elevation is faced with Brick Type I and is pointed with a hard grey cementitious mortar. T type bricks appear throughout the elevation as small repairs, sometimes as a single brick insert and there is an area of patching over the doorway in the ground floor.

3.2.6 *Inner Parapet* The crenellations of the east facing inner parapet, like the exterior, are faced with Brick Type V (Figure 7). The interior of the Victorian Chimney has a primary phase of brick Type B but the upper courses are partially rebuilt and refaced with Brick Type T. To the right of this is the remains of a small brick gable that has a primary phase of B type bricks. Unusually, the 1930s rebuild over this stays true to the formation of the small gable and may represent some early 20th century conservation work

3.2.7 **Base Court – West Facing Elevation Part 2** (Figures 3 – 4 & 8 - 10) This Elevation is located in the south east corner of Base Court and is to the immediate south of the West facing Elevation Part 1, separated from it by a turret (Plate 8). It stands to two stories with a crenellated parapet and one string course above the second floor windows. The ground level inside the range is lower for this elevation and the plinth and windows of the ground floor are lower than those of the West facing elevation Part 1 (Figures 4 & 8). There are two two-light Tudor casement windows and one one-light window to the extreme left. The windows in the second floor have the same sill level as that on the extreme right in the West Elevation Part 1 but are taller. On the left is an eight-light Tudor window and on the left is a four-light window that is Tudor in style but has different dimensions to the other windows in the range, indicating that it may be a later insertion.

3.2.8 The primary brickwork on this elevation is Brick Type A with its characteristic creamy lime mortar with large lime inclusions, but diaper work here is much more broken up than on the West Facing Elevation Part 1. Type V bricks appear again on the crenellations but unlike other west facing elevations, there is no clear change in brickwork from the earlier type (Figure 9). Instead we have what appears to be a mixture of reused A type bricks and V type bricks above the string course, with V type bricks becoming more numerous as they carry upwards (Plate 9). The crenellations are almost entirely faced with V type bricks.

3.2.9 The window in the right hand side of the ground floor appears to have been inserted with a mix of Tudor bricks, suggesting that it may be a Henrician insertion into a Wolsey elevation. The mix of bricks used to insert the window above it in the second floor

includes Q type bricks, meaning that it is likely to date to the late 18th or early 19th centuries and may explain its unusual dimensions compared to other windows across the range.

3.2.10 *Internal Parapet* The east facing internal parapet West Facing Elevation Part 2 is faced with Brick Type V on the crenellations and refaced with a 1930s facing brick below this. The large chimney breast that supports chimneys E251, E252 and E253 to the left of the crenellations represents a variety of phases (Plate 10). Its primary phase is Wolsey Brick Type A meaning that it is contemporary with the range. It was altered in the 19th century as evidenced by the Victorian facing brick, Brick Type T. This would have been when the large ornate chimneys were added. The pitched roof that abuts the north side of the chimney (Figure 10) is built with the 18th and 19th century stock brick, Brick Type Q. Some refacing has occurred with a modern straw imprint brick dating to the 1950 – 60s, and within this is the impression of what appears to be a pitch, perhaps from a previous roof structure. The facing seems to respect the impression, with straw imprint bricks appearing to be cut to fit against it, suggesting that it is a structure that pre-dates them.

3.2.11 **Turret** (Figures 11 & 12) The turret that separates the two Base Court elevations features a plinth, two string courses and a crenellated parapet, characteristic of the rest of the range. In the north west facing elevation are two small one light Tudor casement windows and in the west and south facing elevations are smaller one light windows. The turret has been subject to a lot of heavy repair work particularly in the 20th century. Its primary phase of brickwork is Brick Type B, meaning that it may represent a secondary phase of works to the range. Type B bricks survive in patches above the plinth and below the parapet. The upper part of the turret, including the entirety of the parapet, is faced with Brick Type V (Plate 11). The plinth, and large areas of the central section have been refaced with a modern 20th century brick. In places, individual bricks with broken faces have been plastered over with a render comprising heavily of brick dust. This has faded over time creating an incongruous pink colour (Plate 12).

3.2.12 **Base Court Range Discussion** These two elevations, when viewed as one, shows Wolsey's primary Brick Type A reaching the same height across the range. Above this, immediately to the south of the Anne Boleyn Gatehouse, we have what appears to be a second phase of Wolsey's work, represented by the raised parapet faced with Brick Type A. The turret has a primary phase of B type bricks also and so is probably a part of this secondary phase. There is no evidence to suggest that the area of Henry VIII's bricks is a replacement or reconstruction of a Wolsey wall at this height but it is possible. Besides the Victorian addition to the chimneys and other areas of repair, the crenellations represent a significant phase of works in the late 19th and early 20th centuries. Some minor areas of rebuilding and refacing with a 1930s brick show sensitivity to more historic brickwork and can be seen in areas on the Clock Court side of the range also.

3.3 Description of Clock Court Elevations (Plate 13)

3.3.1 **Clock Court – East facing Elevation Part 1** (Figures 4 & 13 - 21) This elevation is the southern most east facing elevation of the range between Base Court and Clock Court. It is abutted by the 17th century Wren colonnade that extends across the south side of Clock Court (Plate 14). It is a three storey crenellated elevation with a large, stepped chimney breast with one Victorian chimney protruding from it on the right hand side where it meets the East facing Elevation Part 2. The ground floor to the right of the colonnade is featureless except for the brick plinth with stone coping. In the first floor, between the colonnade and the chimney breast, is a four-light Tudor window (Figure 14). In the second floor are three four-light Tudor windows and one two-light Tudor window. Two of these overlook the colonnade. The string course, which separates the

first floor from the second floor, terminates at the balustrade of the colonnade but appears again under the southern most window (Figure 15).

3.3.2 This elevation, for the most part, has a visible primary phase of Wolsey stock brick, Brick Type A, although older bricks were revealed behind the face in places. A part of what appears to be the corner of east and south east facing elevations of a turret were revealed behind the external brickwork just above the plinth on the right hand side (Plate 15). This area had recently been faced with modern bricks (lower right hand side of Figure 14). The corner is ostensibly associated with the sunken Daubeney era 'garderobe' behind this wall and reached from the ground floor shop within the range. The external A type brickwork is characterised by its extensive diaper work and creamy coloured lime mortar with large lime inclusions. Above the level of the window lintels in the second floor, there is a clean break in both the brick type and the mortar type where it changes to Henrician brickwork. This is the Tudor Brick Type C and its characteristic creamy brown lime mortar with pebble and lime inclusions. On the extreme left of the elevation, over the Wren colonnade, an embrasure for an early crenellated parapet is visible in the brickwork (Figure 15), indicating the height at which Wolsey's elevation rose to and where it was subsequently built around and extended by Henry VIII. It is also worth noting that between the two windows to the left of the chimney breast, and immediately left of the chimney breast itself, are series of closers, small bricks, in the brickwork (outlined in red in Figure 15). These are similar to the closers at either side of the embrasure and may mark where others were located and obscured by later window insertions. Furthermore, a very narrow strip of Brick Type C can be seen on the left side of the Chimney breast, between it and the Wolsey panel of brickwork, which perhaps represents the remains of an embrasure. The ground floor features what appears to be an opening blocked with Brick identifiable to the Tudor period but not immediately identifiable to either Wolsey or Henry VIII phases of works. Here the diaper work is broken and both the brick and the mortar appear to be Henrician. At plinth level, the C brick partially continues but it is obscured by refacing with Brick Type I, a Wren stock brick and Brick Type Q, a large yellowish late 18th and early 19th century stock brick. The chimney breast, although subject to Victorian alteration, largely appears to be constructed with Brick Type C.

3.3.3 Later alterations to this elevation were made in the 17th, 19th and 20th centuries. Part of the plinth closest to the colonnade is refaced with Brick Type I. Where the Wren colonnade abuts the range, it appears that the window in the first floor was made narrower to accommodate it. Between the parapet and the four light window, there is an infill of Brick Type I. Within this is a patch of Brick Type Q, a large yellowish late 18th and early 19th century stock brick, and smaller patch of modern brick. Brick Type Q is also present in the upper levels of the chimney breast where it appears to have been rebuilt, partially on its sides and entirely at parapet level. The moulded brick 'steps' of the chimney breast, as well as the corbelled base, are built with the more refined Brick Type T. The chimney itself has a large ornate Victorian pot. T bricks are present in a large panel of refacing just behind the balustrade also and extend from the roof of the colonnade to the parapet, facing a large merlon that fronts an interior chimney stack. Behind the right straight joint of this panel of brick, where it meets Henry's Brick Type C, a time capsule was removed that dates to 1879 (See Section 8). On the left side of the panel, the T bricks are roughly sewn into the A and C type bricks that they meet but, unusually, a straight line of them stand proud slightly from this change in brickwork (Plate 16). It is at this point that the southernmost stretch of string course terminates.

3.3.4 The merlons of the crenellated parapet, except where T bricks are present, are faced with a modern 1930s brick.

3.3.5 *Internal Parapet* The west facing internal parapet of East facing Elevation Part 1 is largely faced with a 1930s facing brick, with the exception of the interior of the chimney stack, which is faced with Brick Type T (Plate 17). A small triangular are on the right hand is made up of a mixture of these 1930s bricks and some reused Tudor bricks (Figure 16).

3.3.6 **Clock Court – East facing Elevation Part 2** (Figure 13, 17 - 21) This is the east facing elevation of that part of the range which is immediately to the south of the Anne Boleyn Gatehouse and stands proud from the East facing Elevation Part 1 by approximately 1.5m. It is the section of range that includes the Henry insertion where Daubeney's range existed before (Plate 18). Like the East facing Elevation Part 1, it is crenellated and has a brick plinth with stone coping. It also has two string courses. It is dominated by huge chimney breast that extends from ground level to the height of the crenellations on the left hand side and features four large Victorian chimneys (Figure 13). The chimney breast increases in width from the ground to the top and there are ornate Victorian corbels where it steps out. There is a Tudor stone doorway in the centre of the ground floor and to the right of this is a two-light Tudor casement window. To the left of the chimney breast is a small one-light Tudor window. In the first floor are a large four-light Tudor window and a large eight-light Tudor window. Above this in the second floor to the extreme right, is a smaller four-light Tudor window. Another smaller chimney breast with one Victorian chimney protrudes from the centre of the crenellated parapet. It is interesting to note that one of the Victorian chimneys is 19th century in style, unlike the others in the surrounding area, which appropriate the Tudor style.

3.3.7 Like the East facing Elevation Part 1 to the south, this elevation has a surface primary phase of Wolsey bricks, the earlier Daubeney phase being represented by the Henrician infill (Figures 17 &18). During works, when an outer skin of bricks was removed from the east face of the plinth of the large Henrician chimney stack, a small vault was revealed. The small brick vault is approx 1.2 metres in length and springs from the east face of the stack, westwards just behind a single course of brick on the south face. The shallow arch is approx 0.5 metres deep from south to north and abuts a brick wall on the north side (Plate 19). The south side has rubbly brick infill with lumps of both lime mortar and cement where work has been carried out to the south face of the plinth. The bricks of the vault and the north wall are a rich orange colour with a rough surface and blunt arris. The mortar is a coarse brownish cream lime mortar with large lime inclusions. The cavity was filled with layer of brick rubble and mortar under which was a dark silty deposit with a frequent pebble inclusions and occasional water rolled stones. The surface of the natural was not reached. This feature is immediately adjacent to the corner of the turret exposed in East facing Elevation Part 1, and immediately to the east of the ground floor Daubeney 'garderobe', suggesting it may be a supporting arch for this area of contiguous features of Daubeney's range (Plate 20).

3.3.8 This primary brickwork is characterised by its extensive diaper work and creamy coloured lime mortar with large lime inclusions (Plate 21). It is represented by an area on the left hand side of the elevation, immediately to the south of the Anne Boleyn Gatehouse, and reaches to where a straight joint runs from the ground floor Tudor door, stretching to a slightly lower height than the Wolsey brick in the southern elevation (Figures 17 & 18). This straight joint is where it would have met the protruding east west orientated Daubeney range. Again, the remains of crenellations are visible (Plates 22 & 23). The 'sill' level of the two existing embrasures are roughly the same height as that in the extreme south of the range but the merlons seem to have been truncated (Figure 18). On the right hand side of the second floor, closest to the Anne Boleyn Gatehouse, the brickwork carries up again and reaches the modern facing on the parapet. The brickwork

in the area appears to be Brick Type A but at the point that the diaper stops, a panel of bricks that appear to be Tudor with a 19th century grey speckled mortar has been inserted, probably reused. The upper right hand corner, over the window lintel and under the modern refacing of the parapet, is Brick Type A, indicating the height to which his range reached in this place and mirroring the higher Wolsey brickwork directly behind it in Base Court (See 3.2.1). The remains of a chimney stack can be seen on the interior of the parapet and the insertion of the brickwork in the 19th century may obscure an obvious scar on the exterior where a chimney breast was removed.

3.3.9 The enormous chimney stack extending from ground to parapet that dominates the left hand side of the elevation, and the strips of brick work at either side between it and the Wolsey brickwork, are a Henry VIII insertion and have a primary construction of Brick Type C. This section is where Daubeney's earlier house intersected Wolsey's range and was subsequently truncated by Henry VIII to create this relatively flush west side of Clock Court. The chimney stack is of such a size that it has its own brick plinth and the three string courses of the elevation carry around it. Below the second floor string course, the brickwork is discernibly C type bricks to either side of the chimney. Above the second floor string course, and over the Wolsey brick in the second floor, the brickwork is less identifiable. The second floor panel of brickwork to the left of the chimney is very like Brick Type C in dimensions and texture. It's mortar also is indistinguishable from the characteristic C type brick mortar. However, the bricks have a distinctive slight plum colour that distinguishes them from other C type bricks in the elevation. On the right side of the chimney, it was originally thought that Henry's brickwork extended up and over Wolsey's, but this may not be the case. In the second floor in the corner between the string course and the chimney is a triangle of brickwork that is slightly more plum coloured than those above (Plate 24, lower left hand side). While there is no discernible difference in the mortar to those above it, the difference in mortar can be seen in the Wolsey brickwork, which appears to respect it and extends in an incline over it. The brickwork over this, that which is built over and around the Wolsey crenellations, is very similar to the C type bricks below. However, the dimensions of the bricks are slightly but consistently smaller. The coursing is also subtly but discernibly looser. It may be a coincidence or a different phase of Henry's work in the area or it may possibly post-date Henry's tenure at the palace.

3.3.10 As well as the panel of reused brick in the Wolsey elevation, there are several areas of late 18th and 19th century alteration. Most notably, a roundish area of what appears to be a Tudor and Victorian brick mix infill between the windows in the first floor (Figure 17, Plate 25). The later brick is Brick Type T, and surrounding this feature is a scattering of Brick Type T replacements. The mortar is a hard pale grey lime mortar with small dark speckle inclusions, which is a very common 19th century mortar type. This was perhaps the location of a roundel that has since been removed.

3.3.11 The top and upper sides of the large chimney stack have been rebuilt with Brick Type T and the small chimney breast in the parapet to its left is entirely faced with Brick Type T. Other small patches of Brick Type T exist around the door and windows in the ground floor and there is a large area of Brick Type Q towards the right side of the ground floor that may represent a blocked opening. The crenellated parapet is faced with 1930s bricks and modern bricks of an undetermined date appear in the plinth (Figure 18).

3.3.12 The south facing return elevation between the two east facing elevations has a primary phase of Henrician stock brick C below the upper string course. Above the brickwork is Tudor but like that around the corner on the east facing elevation, it changes subtly,

possibly representing a later phase. Above this, parapet level is faced with 1930s bricks (Figure 19).

3.3.13 *Internal Parapet* Pre Wolsey and Wolsey Brick Type A exists here in a small area behind the Wolsey brickwork at this level on the exterior (Figures 18 & 20, Plate 26). The straight joint on the interior follows the straight joint on the exterior. The large chimney stack has a primary phase of Brick Type C with the upper courses refaced in Brick Type T (Figure 21). Some minor replacement has been carried out with the 1950-60s straw imprint brick, which also appears in a panel in the parapet to its immediate right. The crenellations and the area between the chimneys has been refaced with 1930s brick and the smaller north chimney and the area between it and Brick Type A have been faced with a variety of historic bricks reused with a cementitious mortar. To the immediate right of the large southern chimney, under the straw imprint bricks, are three courses of Brick Type C (Figure 21). The brickwork below this is discernibly Tudor but too irregular to identify confidently, although it may be associated with the Tudor bricks of undetermined date on the exterior. A small elevation of brickwork that extends between the parapet and Roof 2 appears to be the same as that on the exterior elevation that is associated with Elizabeth I (Figure 22). The west principal rafter of Truss 3, part of Roof 2 that has been dated to the 1590s, is built into it (See 4.3). The brickwork it abuts, under the south gable of Roof 2, is Brick Type C.

3.3.14 **Clock Court Range Discussion** The East facing Elevation Part 1 and Part 2 need to be viewed as one continuous elevation in order to understand the sequence of events in this range. Three main phases of construction are immediately identifiable. We know that Daubeney's house, which faced the Thames, was orientated east to west along the south side of the existing Clock Court (The recreated footprint of which can be see in the cobbles today), and that Cardinal Wolsey built the existing range running north to south against it, abutting it at either side. Henry VIII's phase of construction is believed to be represented by the heightened crenellations and the panel in the centre where he truncated the remains of Daubney's range to create an almost flush elevation. The archaeological investigation, however, has revealed some anomalies in the mortar and brick types that may represent phases previously unaccounted for, most notably, the raising of the crenellations on East Facing Elevation Part 2. Just above the string course, where Henry VIII's phase is believed to have risen up and over Cardinal Wolsey's, there is activity in the brick work and subtle changes in mortar types that may suggest that it is a later phase to the one below. We know that Henry VIII carried out extensive works to the palace during his tenure and more than one phase has been identified during the archaeological investigations coinciding with the ongoing conservation works (Oxford Archaeology, 2012 & 2015). The subtle differences in the second floor panel of brick to the left of the large chimney stack, and the small triangle of anomolous bricks to the right of it, may simply represent later phases of work attributable to him. However, the discovery of timbers in the roof structure, dated to the 1590s through dendrochronological analysis (See Section 4.3), tells us that there was activity in this area at the time. It is possible that this area is a previously unidentified phase dating to Elizabeth I's reign.

3.3.15 As well as the sequence of events, the arrangement of brickwork may tell us something about the construction of previous structures. The small triangle of brickwork, and the incline of Wolsey brickwork over it, might suggest that Wolsey's range was built over a pitched Daubney roof, and that these bricks are an infill after its removal. No such impression is left in brickwork at the left hand side of the chimney but it is perhaps entirely obscured by the panel of Tudor bricks of undetermined date.

3.4 Description of Adjacent Elevations

3.4.1 **South Face of the Anne Boleyn Gatehouse** (Figure 23, Plate 27) The Anne Boleyn Gatehouse was previously surveyed by Oxford Archaeology in 2009 (Anne Boleyn Gatehouse, Hampton Court Palace, Historic Building Recording and Investigation).The south face is included here because of its relevance to the range it overlooks. Like the west and east facing elevations of the range, its primary phase of brickwork is the pre Wolsey and Wolsey era Brick Type A. Just over the roof line of the abutting Roof 1 gable, there is a large patch of Brick Type T. The window about the string course and the chimney appear to be late 18th or early 19th century additions. The entirity of the chimney and the segmental arch of the small casement window are both built with Brick Type Q. The 1950s/60s straw imprint bricks appear in patches and other modern bricks of undetermined date may be associated with the conservation works to the Anne Boleyn Gatehouse in 2009.

3.4.2 **Mantegna Lift** (Figure 24) During works, the Mantegna lift was added to the investigation when some necessary repair work was carried out on its brickwork. The Mantegna lift is the exterior crenellated parapet at the extreme south of the range between Base Court and Clock Court and the confines of the scaffolding allowed for the survey of twenty two courses of brick (Plate 28). The lift has stone coping on its crenellations and the primary brickwork is the Pre Wolsey and Wolsey stock brick A. A small straight joint appears at the far left of the area of investigation (Plate 29). These bricks are A type bricks also but some of them may have been reused. Some modern repair work have been carried out on the merlons.

3.4.3 **Chimney E234** (Figure 25) Chimney E 243 is a Henrician insertion into the Wolsey Range. Due to its instability, it was dismantled during works. The large chimney pot was Victorian and the moulded brick on it upper exterior was the Victorian Brick Type T (Plate 30). The interior of the chimney as well as its base, visible as far down as the interior of Roof 4, are Henrician Brick Type C (Plates 31 & 32).

3.5 Roof 4 Brick Elevations (Figures 3, 26 – 28 & 34)

3.5.1 Roof 4 was added to the current investigation when a void in the south facing pitch was opened due to repair works. The space was previously inaccessible and relatively unknown. A sketch plan, appearing to date to the 1980s or 1990s was found in the Hampton Court Palace archives, suggesting that it was probably subject to a brief archaeological inspection during its last repair. It is located in the south west corner of Clock Court, behind the end of the east wall of Roof 3 (See Section 4) and the south wall overlooking the colonnade (Figure 3). It consists of an east roof space over a rounded stairwell (PF046) and a west roof space over a small square lobby leading to the Wolsey Suite (PF046A). A pitched lean-to roof covers both spaces, descending north to south and resting on the valley between it and the pitched roof the Wolsey Suite. The west and east spaces are divided by a north south orientated dwarf wall and each space has its own individual timber 'floor' structure, discussed further in Section 4. This area and its brick elevations represents clearly the addition to and heightening of the range by Henry VIII over and around a Wolsey structure.

3.5.2 **North and North West Elevations** The north side of the space is divided into three elevations (Figure 26, Plates 33, 34 & 35). The east and west north elevations are divided by an elevation that kinks, facing south east (Figure 34). Crenellations are visible in all three elevations and due to the sheltered situation of the space, and mortars are brighter and paler. The north elevation on the west side of the space has two clear crenels within A type brickwork. As the C type bricks that infill them are slightly smaller, the coursing on the left side is filled with tiles where it meets the top of the

crenel (Plate 36), and then built over with C type brickwork to roof level. The south east facing 'kink' elevation and the north wall on the east side are primary Henrician additions that respected the height of the Wolsey cenellations. Each has one crenel present in the primary C type brickwork (hatched in Figure 26), subsequently infilled and built over with a secondary C type brickwork, contemporary with Henry VIII's heightening of the range. The space is divided by the dwarf wall that meets and is built into a buttress that abuts the right hand of the north elevation on the west side. Both the wall and the buttress are a part of the primary Henrician addition.

3.5.3 **East Elevation** The east elevation, like the north elevation on the west side, features two crenels within an earlier C type brickwork and these are infilled with later C type bricks as part of the heightening of the range (Plate 37, Figure 27, earlier phase is hatched). The pitch of the roof structure abuts this wall and the triangle of brickwork over the roof and under the existing exterior crenellations was also surveyed (Plate 38). These are the later Brick Type C with minor modern brick repairs. The interior of the crenellations have been refaced with 1930s bricks.

3.5.4 Mortars, although paler than those in exterior walls, are consistent with brick types, both A and C being creamy lime mortars with lime inclusions but the Henrician types are more brown with more dark inclusions.

3.5.5 **West Elevation** The north wall on the west side terminates where it meets the west elevation with a clean straight joint. The west wall, appears to abut the brickwork it meets on the south elevation. All are Wolsey era walls built with Brick Type A but may not all be of the same phase. The west elevation, like the north and east, features an infilled opening (Figure 27, Plate 39). Here, however, the dimensions are such that it may have once been a door opening into the space or onto the roof. The Brick Type C that infills the opening and heightens the wall is set back from the primary wall and is sewn into and contemporary with the secondary C type brickwork of the north wall.

3.5.6 **The South Elevation** The south elevation features both Wolsey and Henry VII phases. On the west side of the dividing wall, two large rubbly areas of brick have been broken back, presumably to accommodate the area being raised and the addition of the Henrician chimney stack, E243, which cuts what is left of this structure (Figure 28, Plate 40). That on the right hand side of the chimney has been completely broken back but the structure is still discernible in that on the left. The under side of this structure rises over the tie beam and joists of the timber structure below it (See Section 4.5 for discussion of timbers) before being broken off. Furthmore, the underside has a heavily mortared face and perhaps represents a brick vault that this space once accommodated (Plate 41). The large, heavy nature of the timber structure it rises over may have been built in such a way to support it.

3.5.7 The chimney stack, E242, in the south east corner and the stretch of wall between it and the south side of the dividing wall are Henry VIII in date (Plate 42). The remains of a string course exist on the north face of the chimney stack and on the corner where the chimney stack and the south this wall meet (Figure 28). The chimney stack abuts the south end of the east wall where there is a straight joint, suggesting that both the chimney and wall belong to the secondary phase of Henry VIII's work in this area.

3.5.8 **Roof 4 Elevations Discussion** There is a clear division here between the ealier Wolsey structure and the later Henry VIII additions. Structural elements lower in the walls on the north and east sides, as well as the evidence of brick vaulting on the south side show where a much lower roof existed before Henry VIII heightened the space. The evidence of brick vaulting and an inclined step in the lower part of the north wall in the west space

(Figure 26, Plate 43), along with the opening in the west wall that possibly gave access to the area, suggest that there was a heavy low roof suitable for walking on. The dimensions of the structure itself, from ground to roof level, are like that of a heavy square crenellated turret or tower and this area perhaps functioned as a look out point.

3.5.9 Henry VIII's addition of a round stair turret onto the east side of this structure created the east roof space but this may have had a similar low roof as evidenced by the impression of a roof line and sockets for timbers in the primary Henrician brick work on the north west, north and east sides (Figures 26 & 27). It was perhaps not until the range was heightened by Henry VIII at a later date that this area was opened up to form the roof space that now exists.

See Section 4.5 for a discussion of this space and the relationship of the brickwork to the roof structures

4 Description of Roofs

4.1 Introduction and general description

4.1.1 The area of investigation is made up of three distinct roof structures, none of which is related to the others in construction or phase. To the north is the Anne Boleyn Gatehouse, and they cover the range between Base Court on the west side and Clock Court on the east side. This would have been a very high status area of the palace throughout much of its history and was at one time grace and favour apartments.

4.1.2 For ease of description, the roofs have been numbered 1 to 3. **Roof 1** is the structure immediately south of the Anne Boleyn Gatehouse over Apartment 30, **Roof 2**, to its immediate south, is also located over Apartment 30, and **Roof 3**, the southern most roof, covers a modern, low ceilinged utility room that was previously a part of Apartment 36.

4.1.3 During the course of the investigation, another roof space, immediately to the east of the south end of Roof 4, was opened and investigated. This led to a detailed recording of its roof timbers as well as its brick elevations (described above from 3.3.15). This space is referred to as Roof 4 and is located over a rounded stairwell (PF046) and a small square lobby leading to the Wolsey Suite (PF046A).

4.2 **Roof 1** (Figure 29 & 30)

4.2.1 Roof 1 was built in the 1930s over Apartment 30 and houses a large water tank (Plate 44). It is a gabled roof orientated north to south and abuts the Anne Boleyn Gatehouse on the north side. This structure replaces an east west orientated gabled roof, the remains of which can be seen on the interior of the Base Court parapet to the west (Figure 7). The roof is made up of two bays, Bay 1 and Bay 2, and three trusses, numbered Trusses 1 to 3 north to south.

4.2.2 The trusses are made up of king posts, sitting on tie beams and supporting the ridge plank. The principal rafters sit on the tie beam and meet the jowled heads of the king posts. Braces from the jowled ends of the king posts support the principal rafters (Plates 45 & 46). Much of the structure is held together with bolted and forelocked iron straps. Trenched purlins sit on the Principal rafters and the common rafters, which are nailed to the ridge plank, are trenched to meet the purlins.

4.2.3 Bay 2 contains the large water tank and the roof is structured to support its weight. The tank abuts a central planked partition formed by Truss 1 and both Truss 2 and 3 are situated at the south end of the roof. Truss 2 is laid diagonally (Plate 44). It meets Truss 3

at the east side but is orientated towards the north on the west side. All three trusses support the north south orientated horizontals on which the water tank sits.

4.2.4 This roof is probably contemporary with the 1930s brickwork on the parapets at either side and with the extensive renovation work done to Apartments 30 and 30A at either side of the Anne Boleyn Gatehouse in the 1930s (Oxford Archaeology 2015). No carpenter's marks were detected on this roof structure.

4.2.5 Remains of the previous east west orientated roof can be seen below the existing structure, the brick gable of which survives in the internal parapet of Base Court (Figure 10). The wall plate and its supporting posts survive as well as some studs under the south gable of the later structure (Plates 47 & 48). Notches for rafter feet on the top side of the wall plate reveal their original positions (Plate 49). The posts of this structure appear to be an integral structural feature of the range itself and mark what appears to be an original bay, the remains of which are apparent in the first and second floors (See 4.6). Dendrochronological sampling revealed a date of 1515-16 for this earlier structure.

4.3 Roof 2 (Figures 29 - 33)

4.3.1 Roof 2 is situated to the immediate south of Roof 1, over Apartment 30 on the higher, northern half of the range between Base Court and Clock Court (Figure 29 & 30, Plates 50 & 51). It is a gabled roof orientated north to south and it is the oldest existing roof structure on the range.

4.3.2 Roof 2 is made up of four trusses over three bays with principal and common rafters featuring pegged bridle joints at their apex. Each bay has rows of modern joists running east to west and tenoned into a central spinal beam, which in turn are bolted onto the tie beams of the trusses with heavy iron straps (Figure 30). The joists are nailed into common rafters in Bay 3 and join the lower purlins with bird's mouth openings in Bays 2 and 3. Bay 3 at the north end of the roof is of a visibly different construction to Bays 1 and 2. It has one row of purlins and Bays 1 and 2 have two, one at joist level and one slightly higher than those in Bay 3 (Figure 31). Each bay has an intermediary collar that joins with the purlins on each side with a bird's mouth opening. The west principal rafter of Truss 4 sits into the wall plate of the south gable with a pegged bridle joint (Plate 52) but all other principal rafters as well as all common rafters descend below joist level, under the valleys between the roof and the outer Base Court and Clock Court parapets (Discussed further in 4.6). The east principal rafter of Truss 4 is built into the wall below it. All purlins are tenoned into the principal rafters with characteristically Tudor diminished haunch tenons (Plate 53). The purlin on the west side of Bays 1 and 2 carries through past Truss 2 and is joined with Trusses 1 and 3. Bay 1 and 2 have individuals purlins on the east side. Interestingly, where the rafters meet the purlin on the exterior of Bays 1 and 2, many of them have deep cuts for the purpose of making them more pliable and allowing them to bend to meet at the apex (Plate 50).

4.3.3 Bays 1 and 2 are clearly an earlier reused structure that features decorative chamfered and painted timbers. All principal rafters, except those in Truss 4 and the east principal rafter of Truss 1 are painted. The east purlins of Bays 1 and 2 as well as the west purlin of Bay 1 and a lower rafter in Bay 3 all have the remains of colourful medieval paintwork on them. Paintwork is in the form of characteristically medieval chevrons and painted chamfers (Plates 54 & 55). Nails in grooves that possibly held cloth hangings to the timbers also survive (See Section 6 for full discussion). The west principal rafter and the tie beam of Truss 1 both have clear evidence of reuse. The north face of the principal rafter is trenched at right angles where it seems it would have had timbers fitted into it or lapped over it (Figure 32, Plate 56). In a raised area between trenching, the mortise for a

purlin still survives, which means that a bay would have original extended from this side of the principal rafter. There are chisel stamps dating to the reassembly (See 4.3.5) in two of of the trenches suggesting that they may be associated with a structure that was in place on this side before the construction of the 20th century Roof 1. The tie beam associated with it also has two redundant mortises and a diagonal trench cut into it (Plate 57). The south faces of the principal rafters of Truss 3 also have evidence of reuse in the form of redundant mortises for purlins at the level of the purlins in Bays 1 and 2, which may mean that the earlier roof extended further than two bays. Trenches for wind braces appear in the painted purlins of the earlier structure (Plate 58). It is possible that the earlier roof in its original form was larger with a greater distance between timbers, necessitating wind braces and two rows of purlins for stability.

4.3.4 Bay three is almost entirely made up of later elements, with the exception of the unpainted chamfered west principal rafter of Truss 4 and the painted lower rafter on the west side. A notable feature of Bay 3 is that there are lower and upper rafters, tenoned into the purlins with diminished haunch tenons, resembling a joist and tie beam structure (Plates 59 & 60). The rafters are flush with the exterior, as they would be in a floor, and set back from the interior of the purlin. Such a deviation in design in an addition to a reused roof structure is unusual in the palace. The configuration of the current roof space and the addition of rough, un-worked timbers suggests that the structure as it currently exists was never meant to be exposed on the interior.

4.3.5 Carpenter's marks support the premise that the roof is built from two distinct structures, one reused and one an addition to it. Earlier scratched marks, which were common in the medieval period appear on timbers throughout the structure. These are in order on the south faces of lower west rafters of Bay 3 (Plates 61 - 63). Scratch marks on common rafters in Bays 1 and 2 appear on the north face and are sometimes in order but more often not (Plates 64). Tagged chisel marks that probably date to the reassembly appear on the south side close to the apex on common rafters throughout the roof but not in order (Plates 65 & 66). They probably functioned to keep pairs together. Chisel marks, likely dating to the reassembly of the roof are stamped into the chamfers of painted principal rafters and purlins to keep them in order and are numbered 1 to 3 from north to south with tags on the east side (Plates 67 & 69). A beaked softwood intermediary collar in Bay 1 features a post-medieval Baltic mark (Plate 70).

4.3.6 Earlier dendrochronological dates for this roof show that the painted timber structure is contemporary with the earlier structure under Roof 1. Felling dates of 1515-16 suggest that the roof was originally constructed early in Cardinal Wolsey's tenure at the palace. Later timbers produced dates between 1589 and 1592, meaning that the roof was reassembled using these later elements prominent in Bay 3 no earlier than 1592. This puts the reassembly of the roof comfortably within Elizabeth I's reign and may support the attribution of the later Tudor brickwork on the parapet of Clock Court to her tenure (See 3.3.14).

4.3.7 Modern elements, such as the joist and spinal beams appear contemporary with Roof 1, the bolting and forelock joinery being the same. Bay 3 featured a modern purlin bolted to the upper rafters and Truss 3 is supported with a modern king post and diagonal braces as well as large iron straps and bolts (Plate 71). Much of the joist level timbers of the roof structure are 20th century in date with the notable exception of the spinal beam in Bay 3, which is original to the structure.

4.4 Roof 3 (Figures 29 & 33)

4.4.1 The south gable of Roof 2 overlooks a 19th century lean-to roof to its immediate south, Roof 3, roughly dated to 1937 – 38 through dendrochronological sampling. The roof is made up of an even row of 43 common rafters, running north to south and descending from a timber ledge on the inner parapet of Clock Court to the lower parapet of Base Court (Plate 72). Rafters are half lapped onto a rail nailed to the inner Clock Court parapet (which is Henrician Stock Brick C within the roof space), that is further supported with timber corbels in the brickwork, held in place with forelocks. The rafter feet are scotched and nailed onto a timber wall plate to the west, which in turn sits on an inner brick wall. This inner brick wall create a cavity wall with the outer Base Court parapet wall. The south end of the roof is hipped where it meets the Mantegna Lift. Each rafter has an individual joist that is nailed to its side and stretches to a lower timber rail nailed to the inside of the Clock Court parapet wall. Here joist are tenoned into a simple mortise in the rail. A purlin that runs the length of the roof is supported to the north by the brick work under the south gable of Roof 2 and by intermediary diagonal struts supported by the lower rail. Joinery in this roof is simple and mainly consists of simple lapped timber ends and nails. No carpenter's marks were detected on this roof structure.

4.4.2 The roof sits over what is currently a utility room in the second floor of this part of the range but the lean-to nature of the roof shows the difference in heights of the parapets between Clock Court and Base Court. Before Henry VIII raised the Clock Court parapet, they existed at similar levels. Although this roof covers the area of Apartment 36, there are no existing structural features to suggest that the parapet was raised for the purposes of created more space behind it and the current roof may replace a similar lean-to roof.

4.5 Roof 4 (Figures 28 & 34)

4.5.1 **The Lean-to Roof** The Roof 4 area is made up of an east and a west space, as discussed in section 3.5. The lean-to roof of Roof 4 is a simple structure that covers the entire area between the north facing parapet and the valley between it and the roof of the Wolsey Suite with one purlin running east to west between the east elevation and the west elevation, the east wall of Roof 3 (Plate 73). The lower rafters are tenoned into the purlin rather than resting on it and the rafter feet sit on a timber wall plate in the south side of the space. The two Henrician chimneys extend from the south side of the roof space and the roof structure is built around them. The first three upper rafters from the west are contemporary with, and align with the lower rafters but all rafters to the east of this are narrower misaligning modern timbers. Upper rafters rest against supporting timbers built against the north walls. Three diagonal struts that sit in the brickwork of the north elevations support the purlin. The purlin and the sixth lower rafter from the east have carpenter's marks. The purlin features what appears to be two Roman numerals, III and II in close proximity. The rafter features a short series of Baltic marks, gauged with a race knife (Plate 74). The timber has clearly been cut in half following its import. The lower rafters and purlin are perhaps 18th or 19th century in date with an upper rafters a 20th century alteration.

4.5.2 **The West Space** The West Space is roughly square in plan and features tie beams against the west wall and the dividing wall to the east, with wall plates and five joists running between them (Plate 75). The joists are approx 0.12m x 0.09m and the wall plates and tie beams are approx 0.2m x 0.2m, and sit on a lath and plaster surface (Figure 34). The joists meet the tie beam with central tenons with diminished shoulders. The tie beams sit into the wall plates with large open dove tail joints that were unfortunately heavily degraded at the time of survey (Plates 76). Mortises in these dove tail joints are sloped, so as to receive principal rafters. This along with the impression of notches for rafter feet

in the wall plates would suggest that it was a low gabled roof orientated east to west. The remains of the brick vaulting on the south side, raising from south to north (See 3.5.6) would support this. Carpenter's Marks appear on the west face of the east tie beam and correspond with marks on the north faces of the joists. They are in the form of Roman numerals, II, III, III, V, running north to south. The timbers are built to fit this space and the roof as a whole was built as if to take weight. As discussed above, it perhaps functioned as a platform for a look out post and is original to this structure. Dendrochronological sampling produced rough dates between 1492 and 1524 for this structure (See Section 5)

4.5.3 **The East Space** The east space is irregularly shaped due to the narrow north west elevation and the inserted Chimney E241 in the south east corner (Figure 34) but is roughly rectangular. The rounded wall plate of the stairwell that the structure is built around, is visible on the east side (Plate 77). Nine joists run east to west across the east space over a lath and plaster surface. They are supported by the brick wall plate on the east side and the Henrician dwarf wall on the west side. Two are supported by E241. The joists are approx 0.09m x 0.07m in dimensions. Amongst other dates, a precise felling date of 1534 was produced from one of these joists. No carpenter's marks were detected.

4.6 Discussion of Roof Structures

4.6.1 Structures original to the Wolsey range exits *in situ* under Roof 1 and in the East Space of Roof 4. These timbers, although now existing without their upper structures, appear to have been designed and built for the position that they currently occupy. The room under Roof 1 in the second floor, now a bathroom, occupies the same area and may be evidence that this is an original bay within the range. Timber framing is exposed in the south side of the wall under the division between Roofs 1 and 2 (Plate 78) But it is unclear how much of this would have been modified at the time of the relocation of Roof 2. Below Roof 1 in the first floor, the arrangement changes, and a passage and part of a staff room exist, but it is clear that this range was extensively altered in the 20th century. Any evidence of its arrangement in the medieval period is likely to have been lost.

4.6.2 Roof 2 is very likely to be original to the range but it has been largely modified and its location has changed. If the Wolsey range was heightened, as evidence by the brickwork in the Base Court and Clock Court elevations, it is possible that the earlier elements are a roof that was designed and constructed for the range and raised at a later date, reassembled with the addition of Bay 3. The painted timbers of the original roof structure would have been exposed and perhaps were a feature of a high status space within the range. The configuration of the current roof space and the addition of rough, un-worked timbers suggests that the structure as it currently exists was never intended to be seen in its new location. The existence of the single painted rafter in Bay three suggests that the earlier roof may have had a full set of painted common rafters. The feet of the principal rafters can be seen in the room underneath the north end of Roof 2, featuring the exposed timbers. Here they sit on timber corbels (Plate 79), with the exception of the north corner trusses, which sit on posts, again, possibly marking a medieval bay. The ends of the rafters are not visible but they may sit on a timber rail behind the plaster of the wall. Truss 3 of Roof 2 marks the south wall of a small room to the south of this room. Here we see the 20th century truss, which supports it. Its construction is similar to those in Roof 1 and is likely to be contemporary (Plate 80).

4.6.3 The turret in on the Base Court side marks the north end of Roof 2 and this seems to be an original division within the range. On the first floor, the turret opens into what is know as the 'Archaeology Room', with a dividing wall to the immediate north of the doorway. In the north east corner of this room are several features believed to be fabric original to

Daubeney's range (Plate 81). In the corner is the remains of what is believed to be part of a garderobe and to it's immediate right, in the east wall, is large fireplace with the remains of a Daubeney revealing arch exposed behind the plaster. This sits over the ground floor 'garderobe' accessed from the shop, as well as the exposed remains of a turret and small vault behind the brickwork in Clock Court.

4.6.4 The arrangement of the other rooms in the range, for the most part, is lost due to the extent of 20th century alteration, including Roof 3 and the utility rooms it covers. The panelled room on the first floor to the north of the archaeology room, and the Tudor style carpentry of the passage beyond it, are examples that show an attempt to retain a medieval character within the apartments. How much of the actual medieval arrangement of the rooms was retained, however, is open to speculation.

5 Summary of Dendrochronology *by Dr Daniel Miles*

5.1 Results

5.1.1 **Roof 1** Few timbers survived from this roof – the members above the wall plate having been replaced in softwood probably in the last century. At first a south wall plate mortised for close studding survives, which gives the position of the common rafters as well. Whilst the south-eastern corner post (**hcp181**) has disappeared, it's ghost still survives in the adjoining brickwork. Two common studs were sampled, as was the wall plate, but none of the sequences dated. However, the south-west corner post was then uncovered which revealed some complete sapwood adjacent to the western brick flanking wall. It was not possible to sample this directly due to its orientation of with the walls, but multiple cores allowed the number of sapwood rings to be *counted* roughly from the end of the core to the bark edge, giving a *circa* **1515-1516** date range. This is exactly the same date as the dated samples from the painted timbers above. It was discovered that some wall framing still survived downstairs, and it is possible, with some careful measuring, that the western painted principal rafter **hcp185** might have originally been located below along with the halvings for the close studding still present. Sample numbers **hcp179** and **hcp180** have not been used in the hope that one day some bark edge samples will be uncovered below which will help to refine the understanding of this area.

5.1.2 **Roof 2** This roof, as reconstructed at it's present higher state, is clearly of the same configuration as its earlier reincarnation one storey lower down. Some of the principal rafters and purlins with elaborate painted decoration and mortices clearly show that it has been reused (samples **hcp185** and **hcp187**), as well as other timbers not painted but dating from the same period (**hcp181** and **hcp189**). Other painted timbers were not sampled due to the fact that the sample core would need to enter through the painted surface. Only the four timbers listed above dated to **winter 1515/16**, and with the exception of **hcp181**, the other three were combined to form the site master **HMTNCT10**, spanning the years 1384-1515. This suggests that this range was originally constructed just after Cardinal Wolsey took over Hampton Court in 1516 or very shortly afterwards. This makes the phase of work the earliest so far identified by Wolsey after his taking over the Palace in 1514.

5.1.3 In 1592 or shortly thereafter the roof was dismantled, leaving the north wall of Truss 1 below *in situ* where it has been partially exposed below. This is represented by eight timbers with precise felling dates which include three from the **winter of 1589/90**, two from the **winter of 1590/91**, and three from the **winter of 1591/2**. These precise dates plus one with a *circa* date of 1591-2 all suggest that the roof was dismantled and reconstructed in 1592, no earlier, using some stockpiled timber and other original painted

timberwork as identified above. Eight of the timbers were combined to form the site master HMPTNCT9, spanning the years 1466-1591. Whilst the internal matching for samples **hcp188** and **hcp194** was not good, they did match the depleted master at the indicated dates. Sample **hcp192** did not match with the other components of the site master HMPTNCT9 or the composite, but it is adequately dated individually to the **winter of 1591/2**, the Elizabethan rebuilding phase.

5.1.4 **Roof 3** Thirteen pine rafters was sampled from the length of this roof on two sampling visits. Very little cross matching was found between samples, which were predominantly from 'a' and 'b' cores from the same timbers. Only one timber dated individually, sample **hcp202a**. This was 256 rings long and dated, spanning the years 1508-1763. A second core of 271 years length was taken higher up from the outer edge of this sample but failed to match the 'a' core. So clearly there were areas if one or both cores which precluded the two sections from the same tree from matching. Only one other sample, **hcp199**, matched with the dated sample **hcp202a**, with a *t*-value of 6.94 at 1837. This sample had 197 rings and was the most similar in ring width to sample **hcp202a**.

5.1.5 Given that sample **hcp199** only matches with sample **hcp202a**, and not any of the other pine chronologies either from the Palace or elsewhere, throws into doubt the ring pattern for its last fifty years or so, and therefore the **winter 1837/8** felling date needs to be similarly considered to be a guide only.

5.1.6 Clearly the dendrochronology would suggest that the pine timbers used to construct this roof were sourced from a variety of places and little of it originated from the same location. Unlike the roof to the west end of the Great Hall, or to a lesser event the roof of the Great Watching Chamber, where some interrelation was noted, these timbers appear to be very diverse despite the small sample pool.

5.1.7 **Roof 4, West Space** Four joists were sampled from an assemblage of six joists within a perimeter frame on the west side of a lean-to roof, located at the southern end of the range south of the Anne Boleyn Gatehouse. The outermost joists were not considered suitable for sampling due to too wide ring widths and lack of sapwood, or was inaccessible due to the proximity of the adjacent brick wall. The four timbers sampled all had clear heartwood/sapwood boundaries, but no surviving sapwood. All timbers sampled had between 60 and 150 rings, making them potentially dateable. The timbers were initially labelled A – D, which were subsequently number **hcp224** – **hcp227** respectively. The perimeter beams were not sampled due to the fact that the orientation of the rings was such that the timber would need to be sampled downwards from the back, which was not possible due to the close proximity of the brickwork. In addition, the perimeter beams did not have any heartwood/sapwood boundaries and the timbers themselves were riddled with death watch beetle galleries, making the retrieval of intact cores problematic. It would have required many cores from each timber, causing unacceptable damage, and even if the sequences dated, without a heartwood/sapwood boundary, no felling date range could have been ascribed.

5.1.8 However, the joists all had assemble marks I – VI, with corresponding numbers on the east perimeter beam. There was no obvious signs of reuse, but with such short timbers such evidence might not be evident. The perimeter beams were all connected with a mortice and tenon joints, except for the north west corner where a single-sided lap dovetail was used.

5.1.9 Of the four timbers sampled, three dated individually, with less strong cross-matching between them. Samples **hcp225** and **hcp227** date with heartwood/sapwood boundaries of 1449 and 1440, giving felling date ranges of **1458-90** and **1449-81** respectively. Sample

hcp226 dated less well, as the last three decades were mainly exceptionally narrow. By removing the last 29 rings and running the sequence, now comprising 80 rings, the *t*-value matches are much improved, with many 6s and a 7 with a last measured heartwood ring of 1456. But by adding a further 29 rings, the actual heartwood sapwood boundary of 1483 is reached, which gives a felling date range of **1492-1524**. Now this date range is later than the other two ranges produced, and this can be probably be explained by the extremely narrow rings on sample **hcp126**. If the other two dated samples **hcp225** and **hcp227** had similar narrow sapwood rings, then the number of sapwood rings might well be higher than average. This would then produce a felling date range more closely aligned with the later range of **1492-1524** for sample **hcp126**.

5.1.10 The three dated samples from this roof (**hcp225**, **hcp226**, and **hcp227**) were all combined to form the 141-ring site master **HMTNCT11**, which dated very well, spanning the years 1136-1456.

5.1.11 The joists are interesting in their slightly variable width, and the use of diminished haunch tenons, set flush on the bottom face for a plastered ceiling. The tops were not set flush, and probably did not suggest that this structure ever supported a floor above.

5.1.12 **Roof 4, East Space** A series of nine narrower joists were laid east-west without a perimeter frame in the eastern section of the roof space, on the Clock Court side. A number of these had good ring sequences, but on further inspection, only two appeared to have a heartwood/sapwood boundary. These were both sampled, and were given temporary letters E and F, which were subsequently given the labelled **hcp228** and **hcp229**. These both dated exceptionally well individually, with last measured ring dates of 1474 and 1533 respectively. On further inspection, sample **hcp229** turned out to have not only a heartwood/sapwood boundary but the actual precise felling date of **spring 1534**. However, sample **hcp228** was correctly identified as having only a H/S boundary and this produced a felling date range of 1483-1515. This was subsequently revised using the OxCal procedure to **1487-1523**, on account of its narrow rings, but again this is still earlier than the 1534 felling date for the associated joist, and exceptionally narrow missing sapwood might again account for this disparity.

5.1.13 The two dated timbers were compare with each other, and although not high enough to suggest a same-tree origin, they did nevertheless match well enough to suggest a similar source. They were therefore combined to form the 209-ring site master **HMTNCT12**, which dated exceptionally well, spanning the years 1325-1533.

*Please see **Appendix C** for the Explanation of Terms and a Table of Tree Ring Dating and at Hampton Court Palace*

6 Roof 2 Painted Timbers

6.1 Introduction

6.1.1 All three bays of Roof 2 feature painted timbers, which date to the medieval period. Bays 1 and 2 appear to be the original painted structure with just one reused painted rafter in Bay 3. Many elements of the painted structure have been replaced but enough survive to discern the pattern of design throughout the roof structure. In all, there are nine timbers with surviving paintwork. These were individually surveyed and drawings as well as photogrammetry were produced. These are featured in Figures 35 to 44 of this report.

6.2 Description

6.2.1 The paint has a colour and style that is medieval in character and that along with its level of wear suggests that it is likely to date to the 16th century, like many of the primary structures in the area. The paintwork is arranged in a simple chevron design, with upward facing white and green arrows on the outward facing planes, which are flanked by red chamfers. The white chevrons that are visible are almost certainly a primer for the green paint that appears in traces on them. It is unknown what colour would have been between the green chevrons as no trace was detected. In the drawings (Figures 35 to 43), white has been used along side green and red, although these were often used as primers or base colours also. The colours that would have been represented on these timbers in the medieval period are open to speculation, however, an example of a building where medieval paintwork to timbers survives is Ightham Hall. Here the colours red, green and white were used in a chevron design. Yellow is also a prominent colour on medieval timbers and may have existed here with no trace left.

6.2.2 From what remains, we can tell that principal rafters and purlins were painted and there may have been two rows of purlins. The reuse of a single painted common rafter in Bay 3 suggest that at least some of the common rafters were also painted. Alternatively, this may be a truncated and reused purlin. These timbers would have originally been exposed rather than located in an enclosed roof Space, as it exists today. The configuration of the current roof space and the addition of rough, un-worked timbers suggests that the structure as it was reassembled was never meant to be seen.

6.2.3 As well as the paintwork, the timbers feature evidence of other decorative elements to the roof. Grooves within the chamfers of the principal rafters and in the underside chamfers of the purlins retain some small moulded nails. It is likely that these would have held cloth coverings or hangings in place.

7 Additional Lithographies *by Dr Ruth Shaffrey*

7.1 Introduction

7.1.1 A general survey of the walls of the east and west elevations of Base court VI were undertaken to establish where there were gaps in the lithological surveys previously prepared (Sanderson 2006). This revealed a number of gaps and additional recording was carried out on the elevations below. All other Base Court VI elevations had been completely recorded by Sanderson.

7.2 Base Court Elevations

7.2.1 **Lower west elevation of the Anne Boleyn Gatehouse** (Figure 44) The highest section of the archway had not been recorded. A movable scaffold was erected so that this survey could be completed. The main component of the underside of the arch was found to be Caen stone, however, there is a band of Wheatley limestone running through the arch. The arch also has a number of patched replacements, also Wheatley limestone and it is likely the two components are contemporary replacements of decaying Caen stone.

7.2.2 **Upper west elevation of the Anne Boleyn Gatehouse** (Figure 45) The underneath of the triple window has not been recorded but was still not accessible during this survey and remains unrecorded.

7.2.3 **Base Court – West Facing Elevation Part 1** (Figure 46) Block work around the window openings was recorded subsequent to some cleaning. These were found to include blocks of Caen stone, Bath stone (or possibly Taynton – the colour looks rather orange for Bath

stone, but might have suffered some discolouration) and Wheatley limestone. Wheatley limestone is the predominant stone in this section of the elevation forming the bulk of the window and string courses. However, there are lesser elements of Caen stone, Bath stone as seen during this phase of recording as well as Reigate stone and Clipsham stone as seen during previous phases.

7.2.4 **Base Court – West Facing Elevation Part 2** (Figure 47)A string course and parapet on the Turret had not been accessible during the 2006 survey and was therefore completed now. This was found to be formed entirely of Bath stone. Two blocks are a slightly different variety that is more orange in colour – this might be Taynton stone or a discoloured Bath stone.

7.2.5 **Inner parapet of Base Court – West Facing Elevation Part 2** (Figure 48) A Single block at the end of the elevation had not been recorded. It has now been identified as Portland stone. On the opposite face, the lower block is Bath stone and the upper block is Clipsham stone.

7.2.6 **Inner Base Court Turret Parapet** (Figure 49) Two missing blocks are of Clipsham and Weldon limestone. Clipsham is already present in this section. Weldon is not present but does occur in other parapet walls (see above).

7.3 Clock Court Elevations

7.3.1 **Lower east elevation of the Anne Boleyn Gatehouse** (Figure 50) The highest section of the archway had not been recorded. A movable scaffold was erected so that this could be completed. Two blocks were found to be Wheatley limestone and the remainder Caen stone. Both stone types had already been recorded as having been used elsewhere in the arch.

7.3.2 **Lower Clock Court – East facing Elevation Part 1** (Figure 51) A window at the top left of this elevation had not been recorded but is all of Bath stone, as with the other windows at the same height

7.3.3 **Upper Clock Court – East facing Elevation Part 1** (Figure 52) The blockwork around two window openings was recorded during this phase of work. Both openings are constructed of Bath stone entirely. A string course under the window is formed of mainly Weldon stone with one block of Clipsham. The parapet wall on the top of this elevation was recorded on another drawings

7.3.4 **Inner Clock Court Turret Parapet** (Figure 53) A section of the blockwork on this parapet wall has been recorded as Bath stone. This is in contrast to the other half, which was identified as Weldon limestone, but in keeping with other areas of Bath stone at the Palace.

7.3.5 **Lower Clock Court – East facing Elevation Part 2** (Figure 54) The string courses, windows and door surround had not been recorded on this elevation. The string courses were found to comprise a mixture of Bath stone and Wheatley limestone, which is in keeping with the previously recorded sections.

7.3.6 The doorway to the shop entrance is entirely made of Bath stone whilst the window above it is formed of Wheatley limestone. The window to the right of the shop doorway is made of a mixture of Caen stone and Bath stone.

7.3.7 **Upper Clock Court – East facing Elevation Part 2** (Figure 55) The blockwork around two window openings was recorded during this phase of work. Both openings are constructed of Bath stone entirely. A string course under the window is formed of mainly

Weldon stone with one block of Clipsham. The parapet wall on the top of this elevation was recorded on another drawings

7.4 Discussion

7.4.1 A discussion of the petrology of the stone types used in these elevations was prepared by Sanderson. Other than the replacement of Caen stone with Wheatley limestone in the large archway of the east elevation, which requires a separate comment, the patterns of usage are consistent with those observed by Sanderson and no other discussion is required.

*Please see **Appendix E** for Robin Sanderson's report on the Lithographies*

8 Watching Brief

8.1 Lintel

8.1.1 During works, a lintel was removed from the second floor of West Facing Elevation Part 1 in Base Court. This was removed from the three light window on the left hand side underneath the brick hood mould. Henrician C type bricks were removed and poles supported by the scaffolding were inserted into the wall (Plate 82). Some of these bricks had been removed and replaced in the 19th century as evidenced by the pale grey speckled mortar, characteristic of 19th century brickwork, that they were bedded into.

8.1.2 Once exposed, it was apparent that the lintel was badly degraded towards the centre where it seems to have suffered from rot due to dampness. It measured 0.12m x 0.14m in width and 2.2m in length. The brick behind the lintel are Henrician Brick Type C with large lumps of both C type mortar and the 19th century pale speckled mortar (Plate 83).

8.2 Time capsule

8.2.1 The maintenance of an area where Henrician C type bricks meets a large panel of 19th century Brick Type C in the parapet over the colonnade in Clock Court exposed a cavity. A tin coffee pot was removed from this and a large, very hard chunk of mortar was carefully extracted from the side of it where it was heavily degraded (Plate 84). Inside the coffee pot, a rolled up piece of newspaper was removed. Although the paper is too fragile to unroll, it is apparent from the visible letters and the type face that it is a copy of the Daily Telegraph dated to Tuesday September 8th 1870 and an article referring to the Siege of Strasbourg can be seen (Plate 85). Along with the newspaper, the can contained two moulded nails and a bone ring (Plates 86).

9 Conclusion

9.1.1 The main objective of this report was to enhance our understanding of this area of the palace through a thorough investigation of the elevations as well as their associated roof structures and the arrangements within the range. Investigation of the brickwork in the elevations has largely re-affirmed what was already believed about their sequence of construction but it has enhanced the survey created by Daphne Ford for English Heritage in 1991. It has also brought to light some areas that may represent new phases previously unrecorded which, although difficult to decipher, inform our increased understanding of the complexity of this specific range of the palace. Here, Daubeney, Cardinal Wolsey, and Henry VIII's houses meet each other and this important juncture may reveal a mark left on the palace by Elizabeth I also.

9.1.2 The range immediately to the south of the Anne Boleyn Gatehouse was built by Cardinal Wolsey around an earlier existing Daubeney structure on the Clock Court side. As well as the Daubeney fabric already visible in the ground floor shop and in the first floor 'Archaeology Room', the conservation works exposed more parts of his earlier east west orientated range in the ground floor, creating a series of contiguous features associated with his house. Cardinal Wolsey is very much a presence in his later north south orientated range, with large areas of the exterior elevations retaining their original brickwork. The roof structures, however, have been extensively altered. Primary Wolsey fabric survives *in situ* under Roof 1 to the immediate south of the Anne Boleyn Gatehouse and in the Roof 4 area to the south west of the range. All other roofs are later additions or reused and reassembled structures.

9.1.3 No roof structures dating to Henry VIII's work survives with the except for the nine joists in the east space of Roof 4. He did, however, make a large mark on the exterior elevations of the range under investigation. In Clock Court, Daubeney's structure was removed and the north south running range was in-filled in its place. He also heightened the Clock Court elevations at this time. Through past investigation of the Great Hall and adjoining structures to the north (Oxford Archaeology 2012, 2012 & 2015), we have identified more than one phase of building during Henry VIII's tenure at the palace, as well as reuse and alteration of various parts of Wolsey era structures. This is clear in the two phases of the Henrician addition to the Roof 4 area to the south west of the Wolsey range. Although there is no evidence to suggest that Henry VIII heightened the Base Court elevations, there are areas of Henrician brickwork. The Henrician brick hood mould in the second floor is a feature that does not exist anywhere else in the palace.

9.1.4 Previously undetected phases of Tudor brickwork, not apparently attributable to Henry VIII were also recorded and have been added to the construction history of the range. Most notably, the Tudor brickwork in the parapet levels of the East Facing Elevation, Part 2 in Clock Court. This is at the level and associated with the later timbers in Roof 2 behind it. These have been dated to the 1590s suggesting that this is a previously unidentified phase of works during Elizabeth I's reign.

9.1.5 The interior of the range was subject to extensive renovation works during the 20th century for the purpose of updating the apartments within. The apartments at Hampton Court Palace changed hands many times throughout the 18th and 19th centuries and would have been altered to some extent each time. Apartment 30 was last renovated in 1936 and still retains many of its fine Tudor Arts and Crafts interiors. However, the original and later historic arrangements prior to the 20th century changes have largely been lost or cannot be interpreted.

Deirdre Forde

September 2015

Appendix A. Bibliography

Published Sources

Foyle J *A Reconstruction of Thomas Wolsey's Great Hall at Hampton Court Palace*, in Architectural History, Vol. 45 2002

Thurley S *Hampton Court; A Social and Architectural History* 2003

Thurley S *The Sixteenth Century Kitchens at Hampton Court*, in The Journal of the **British Archaeological Association 1990, p1-29**

Unpublished Sources

Ford, D *Hampton Court Palace Brick Typology* - Elevations sheet AS2/116 and associated Brick Data Sheets, English Heritage(1991)

Oxford Archaeology *The Anne Boleyn Gatehouse, Hampton Court Palace; Historic Buildings Recording and Investigation* 2012

Oxford Archaeology *Base Court V; Historic Buildings Recording and Investigation* 2012

Appendix B. Brick Typology Sizes

Brick Typology Brick sizes (inches)

Type	Date	Length (Stretcher)
A	? - 1528	9.5 - 10.25
B	c.1522 - 1528	9 - 9.5
C	1529 - 1566	8.25 - 9.25
D	c.1536 - 1537	8.25 - 9.25
E	Late C16th to Early C17th	9.25 - 9.75
F	Mid C17th	9 - 9.5
G	Late C17th to Early C18th	8.375 - 8.875
H	Late C17th to Early C18th	8.5 - 8.75
I	Late C17th to Early C18th	8.5 - 9
J	Late C17th to Early C18th	8.25 - 9
K	Late C17th to Early C18th	8.5 - 8.75
L	Late C17th to C18th	8.25 - 8.75
M	Late C17th to C18th	6.00
N	1732	8.50
O	Mid C18th	8.25 - 9
P	Mid C18th	9.125 - 9.25
Q	Late C18th to C19th	8.5 - 9.5
R (rubbed)	C17th to C18th?	8 - 8.25
R (unrubbed)	C17th to C18th?	8.75 - 9
S	C19th	8.75
T	C19th	8.75 - 9.25
U	C19th	9.25 - 9.5
V	C19th to C20th	8.75 - 9.5

W	C19th to C20th	8.75 - 9.5

APPENDIX C. TREE RING DATING

HAMPTON COURT PALACE

Sample number & type		Timber and position	Dates AD spanning	H/S bdry	Sapwood complement	No of rings	Mean width mm	Std devn mm	Mean sens mm	Felling seasons and dates/date ranges (AD)
Buttery (Roof 1)										
hcp71	c	W upper purlin, Bay 4	1424-1502	1499	3+16mmC NM	79	1.40	0.45	0.147	1515-20
hcp72a	c	W principal rafter T3	1422-1497	1485	12	76	2.48	0.86	0.204	1515-17
hcp72b	c	ditto	-		13	27	1.79	0.46	0.173	
hcp73a	c	W lower purlin, Bay 3	1426-1516	1490	26C	91	1.42	0.77	0.178	Winter 1516/17
hcp73b	c	ditto	1421-1516	1491	25C	96	1.45	0.72	0.171	Winter 1516/17
hcp73		Mean of **hcp73a** + **hcp73b**	1421-1516	1490	26C	96	1.45	0.73	0.172	Winter 1516/17
hcp74	c	W common rafter 3/6, Bay 3	1370-1497	1497	H/S	128	1.32	0.54	0.212	1506-38
hcp75	c	W common rafter 2/6, Bay 3	-		5+20NM	47	1.97	0.49	0.247	
hcp76a	c	W common rafter 1/6, Bay 3	1467-1495	1495	H/S	29	2.73	0.80	0.225	1504-36
hcp76b	c	ditto	1477-1515	1497	18C	39	1.73	0.55	0.210	Winter 1515/16
hcp76		Mean of **hcp76a** + **hcp76b**	1467-1515	1496	19C	49	2.12	0.82	0.213	Winter 1515/16
hcp77	c	E common rafter 6/6, Bay 3	1458-1494	1494	H/S	37	2.22	0.92	0.225	1503-35
hcp78	c	E common rafter 4/6, Bay 3	-		11	46	2.79	0.98	0.226	
hcp79	c	Ceiling joist 14/17, Bay 3	1376-1485	1485	H/S	110	1.19	0.70	0.240	1494-1526
hcp80	c	Collar T2	1366-1468	1468	H/S	103	1.51	0.82	0.170	1477-1509
hcp81	c	W common rafter 4/6, Bay 2	1450-1501	1499	2	52	1.95	0.56	0.168	1508-40
hcp82	c	Ceiling joist 6/17, Bay 2	1405-1454	1454	H/S	50	2.42	0.86	0.266	1463-1495
hcp83	c	Ceiling joist 5/17, Bay 2	1407-1485	1485	H/S	79	1.78	0.80	0.294	1494-1526
hcp84	c	Collar T1	-		H/S	117	1.23	0.55	0.176	
hcp85	c	W lower purlin, Bay 1	1406-1495	1495	H/S	90	1.22	0.64	0.165	1504-1536
hcp86	c	E common rafter 3/5, Bay 1	1383-1481	1481	H/S	98	1.84	1.09	0.184	1490-1522
hcp87	c	E upper purlin, Bay 1	1449-1507	1500	7+8C NM	59	1.90	0.63	0.214	1515-16
hcp88a	c	E common rafter 1/5, Bay 1	1436-1528	1506	22	93	1.44	0.35	0.173	
hcp88b	c	ditto	1509-1529	1508	21	21	1.24	0.28	0.180	
* **hcp88**		Mean of **hcp88a** + **hcp88b**	1436-1529	1507	22	94	1.43	0.35	0.171	1530-35
hcp89	c	W common rafter 3/5, Bay 1	1422-1509	1506	3+17	88	1.50	0.35	0.187	1526-47
hcp90	c	W upper purlin, S extension Bay 1	-		3	77	1.88	0.82	0.214	
hcp91	c	E upper purlin, S extension, Bay 1	-			44	3.15	1.05	0.257	
hcp92a	c	Intermediate collar strut, Bay 1	1401-1495	1495	H/S	95	1.33	0.73	0.233	
hcp92b	c	ditto	1434-1533	1506	27C	100	0.93	0.27	0.232	Winter 1533/4
* **hcp92**		Mean of **hcp92a** + **hcp92b**	1401-1533	1501	32C	133	1.20	0.66	0.228	Winter 1533/4

Key: c = core; ¼C, C = bark edge present, partial or complete ring: ¼C = spring (last partial ring not measured) or C = winter felling (ring measured); H/S bdry = heartwood/sapwood boundary - last heartwood ring date; std devn = standard deviation; mean sens = mean sensitivity

Sample number & type		Timber and position	Dates AD spanning	H/S bdry	Sapwood complement	No of rings	Mean width mm	Std devn mm	Mean sens mm	Felling seasons and dates/date ranges (AD)
Staircase to Great Hall (Roof 2)										
hcp93	c	Collar T4	-		9	53	1.97	0.80	0.223	
* **hcp94**	c	N windbrace, W side, Bay 4	1446-1532	1505	27C	87	0.92	0.39	0.255	Winter 1532/3
hcp95	c	W principal rafter T4	1351-1478	1461	17	128	0.81	0.31	0.241	1479-1502
hcp96	c	S windbrace, W side, Bay 4	1433-1519	1500	19+14C	87	1.15	1.02	0.192	(Winter 1532/3)
* **hcp946**		Same-tree mean of **hcp94** + **hcp96**	1433-1532	1503	29C	100	1.18	0.94	0.220	Winter 1532/3
hcp97	c	Collar T3	1397-1493	1493	H/S	97	1.61	0.79	0.306	1502-1534
hcp98	c	W principal rafter T3	1427-1497	1497	H/S	71	1.76	1.03	0.285	1506-1538
hcp99	c	Tiebeam T3	-		H/S	35	2.69	0.85	0.116	
hcp100a	c	W purlin bay 3	1380-1454	1454	H/S	75	1.94	1.12	0.227	
hcp100b	c	ditto	1386-1469	1455	14+45-50C NM	84	1.53	1.00	0.206	
hcp100		Mean of **hcp100a** + **hcp100b**	1380-1469	1455		90	1.72	1.17	0.201	1515-19
hcp101	c	E purlin, Bay 3	-			92	1.98	0.69	0.201	
hcp102	c	Tiebeam T2	1442-1495	1495	H/S	54	1.95	0.65	0.178	1504-36
Kitchen (Roof 3)										
hcp103	c	E common rafter 3/4 Bay 3	1382-1483	1483	H/S	102	1.31	0.32	0.158	1492-24
hcp104	c	E common rafter 1/44 Bay 3	1340-1450			111	1.01	0.40	0.207	After 1459
hcp105	c	Collar T2	1437-1493	1490	3	57	2.27	0.60	0.199	1499-1531
hcp106	c	E common rafter 2/4, Bay 2	1399-1497	1497	H/S	99	1.40	0.32	0.180	1506-38
hcp107	c	W principal rafter T1	1418-1514	1496	18C	97	1.27	0.64	0.182	Winter 1514/15
hcp108	c	E principal rafter T1	1454-1514	1504	10C	61	2.28	0.67	0.171	Winter 1514/15
hcp109	c	Tiebeam T1	1445-1497	1497	H/S	53	2.55	0.70	0.168	1506-38
hcp110a1	c	Ceiling joist 4/13 Bay 1	1378-1433			56	1.51	0.50	0.177	
hcp110a2	c	ditto	-		3	48	1.13	0.22	0.155	
hcp110b	c	ditto	1386-1486	1486	H/S+19C NM	101	1.14	0.49	0.168	
hcp110		Mean of **hcp110a1** + **hcp110b**	1378-1486	1486	H/S	109	1.23	0.49	0.160	1495-27
West extension to Kitchen (Roof 4)										
hcp111a	c	E principal rafter, T1	1448-1501	1501	H/S	54	1.99	0.56	0.148	
hcp111b	c	ditto	1465-1526	1503	23¼C	62	1.34	0.31	0.154	
hcp111		Mean of **hcp111a** + **hcp111b**	1448-1526	1502	22¼C	79	1.62	0.54	0.155	Spring 1527
hcp112	c	W principal rafter, T1	-		H/S?	49	2.30	1.00	0.202	
hcp113	c	Tiebeam T1	1367-1429			63	2.54	0.88	0.214	After 1438
hcp114	c	Ceiling joist 1 from N	1374-1463			90	1.35	0.71	0.180	After 1516
hcp115	c	Ceiling joist 2 from N	1414-1507			94	1.51	0.49	0.169	(1522-54)
hcp116a1	c	Ceiling joist 4 from N	1364-1456			93	1.29	0.40	0.186	
hcp116a2	c	ditto	-			47	0.71	0.14	0.127	After 1521
hcp117	c	Ceiling joist 5 from N	1417-1514	1513	1	98	1.44	0.53	0.206	1522-54
hcp1157		Mean of **hcp115** + **hcp117**	1414-1514	1513	1	101	1.50	0.39	0.174	1522-54

Key: c = core; ¼C, C = bark edge present, partial or complete ring: ¼C = spring (last partial ring not measured) or C = winter felling (ring measured); H/S bdry = heartwood/sapwood boundary - last heartwood ring date; std devn = standard deviation; mean sens = mean sensitivity

Sample number & type		Timber and position	Dates AD spanning	H/S bdry	Sapwood complement	No of rings	Mean width mm	Std devn mm	Mean sens mm	Felling seasons and dates/date ranges (AD)
North Cloister										
hcp121a	c	S queen strut T1	-		H/S	68	2.48	0.85	0.259	
hcp121b	s	ditto	-		31	49	0.92	0.65	0.339	
hcp121		Mean **hcp121a** + **hcp121b**	-		31	99	1.83	1.13	0.276	
* **hcp122**	c	N purlin Bay 1	1423-1514	1513	1	92	2.06	0.67	0.181	1522-54
hcp123	c	Tiebeam T2	-		1	41	2.05	0.91	0.276	
* **hcp124**	c	S principal rafter T2	1420-1498	1498	H/S	79	1.98	0.62	0.160	1507-39
hcp125	c	N purlin Bay 2	1411-1509	1509	H/S	99	1.77	0.47	0.174	1518-50
hcp126	c	S queen strut T3	1415-1506	1505	1	92	1.45	0.29	0.148	(Spring 1534)
* **hcp127**	c	S purlin Bay 4	1432-1505	1505	H/S	74	1.60	0.53	0.185	1514-46
hcp128a	c	S principal rafter T5	1395-1501	1501	H/S	107	1.43	0.44	0.150	
hcp128b	c	ditto	1440-1500	1500	H/S	61	1.20	0.31	0.163	
hcp128c	s	ditto	1499-1533	1501	32¼C	35	0.71	0.19	0.175	
hcp128		Mean of **hcp128a** + **hcp128b** + **hcp128c**	1395-1533	1501	32¼C	139	1.26	0.50	0.163	Spring 1534
* **hcp129**	c	S queen strut T5	1424-1502	1502	H/S	79	1.75	0.48	0.162	1511-43
* **hcp130**	c	Collar T5	1388-1504	1503	1	117	0.90	0.34	0.169	1512-44
* **hcp1268**		Same-tree mean of **hcp126** + **hcp128**	1395-1533	1503	30¼C	139	1.33	0.47	0.156	Spring 1534
*** = HCPx7 Site Master**			**1388-1533**			**146**	**1.42**	**0.43**	**0.148**	

Explanation of terms used in Table 1

The summary table gives most of the salient results of the dendrochronological process. For ease in quickly referring to various types of information, these have all been presented in Table 1. The information includes the following categories:

Sample number: Generally, each site is given a two or three letter identifying prefix code, after which each timber is given an individual number. If a timber is sampled twice, or if two timbers were noted at time of sampling as having clearly originated from the same tree, then they are given suffixes '**a**', '**b**', etc. Where a core sample has broken, with no clear overlap between segments, these are differentiated by a further suffix '**1**', '**2**', etc.

Type shows whether the sample was from a core 'c', or a section or slice from a timber's'. Sometimes photographs are used 'p', or timbers measured *in situ* with a graticule 'g'.

Timber and position column details each timber sampled along with a location reference. This will usually refer to a bay or truss number, or relate to compass points or to a reference drawing.

Dates AD spanning gives the first and last measured ring dates of the sequence (if dated),

H/S bdry is the date of the heartwood/sapwood transition or boundary (if present). This date is critical in determining an estimated felling date range if the sapwood is not complete to the bark edge.

Sapwood complement gives the number of sapwood rings. The tree starts growing in the spring during which time the earlywood is produced, also known also as spring growth. This consists of between one and three decreasing spring vessels and is noted as *Spring* felling and is indicated by a ¼ C after the number of sapwood ring count. Sometimes this can be more accurately pin-pointed to very early spring when just a few spring vessels are visible. After the spring growing season, the latewood or summer growth commences, and is differentiated from the proceeding spring growth by the dense band of tissue. This summer growth continues until just before the leaves drop, in about October. Trees felled during this period are noted as *summer* felled (½ C), but it is difficult to be too precise, as the width of the latewood can be variable, and it can be difficult to distinguish whether a tree stopped growing in autumn or *winter.* When the summer growth band is clearly complete, then the tree would have been felled during the dormant winter period, as shown by a single C. Sometimes a sample will clearly have complete sapwood, but due either to slight abrasion at the point of coring, or extremely narrow growth rings, it is impossible to determine the season of felling.

Number of rings: The total number of measured rings present on the samples analysed.

Mean ring width: This, simply put, is the sum total of all the individual ring widths, divided by the number of rings, giving an average ring width for the series.

Mean sensitivity: A statistic measuring the mean percentage, or relative, change from each measured yearly ring value to the next; that is, the average relative difference from one ring width to the next, calculated by dividing the absolute value of the differences between each pair of measurements by the average of the paired measurements, then averaging the quotients for all pairs in the tree-ring series (Fritts 1976). Sensitivity is a dendrochronological term referring to the presence of ring-width variability in the radial direction within a tree which indicates the growth response of a particular tree is "sensitive" to variations in climate, as opposed to complacency.

Standard deviation: The mean scatter of a population of numbers from the population mean. The square root of the variance, which is itself the square of the mean scatter of a statistical population of numbers from the population mean. (Fritts 1976).

Felling seasons and dates/date ranges is probably the most important column of the summary table. Here the actual felling dates and seasons are given for each dated sample (if complete sapwood is present). Sometimes it will be noticed that often the precise felling dates will vary within several years of each other. Unless there is supporting archaeological evidence suggesting different phases, all this would indicate is either stockpiling of timber, or of trees which have been felled or died at varying times but not cut up until the commencement of the particular building operations in question. When presented with varying precise felling dates, one should always take the *latest* date for the structure under study, and it is likely that construction will have been completed for ordinary vernacular buildings within twelve or eighteen months from this latest felling date (Miles 2006).

Felling date ranges are produced using an empirical estimates using the appropriate estimate (Miles 1997). However, these can sometimes be reduced using a new sapwood estimation methodology which uses the mean ring width, number of heartwood rings, known H/S boundary date, and the number of surviving sapwood rings, if present (Miles 2006). These are used after the empirical range and are shown in brackets (OxCal followed by date range). Combined felling date ranges for a phase of building is shown at the end of the phase to which it relates.

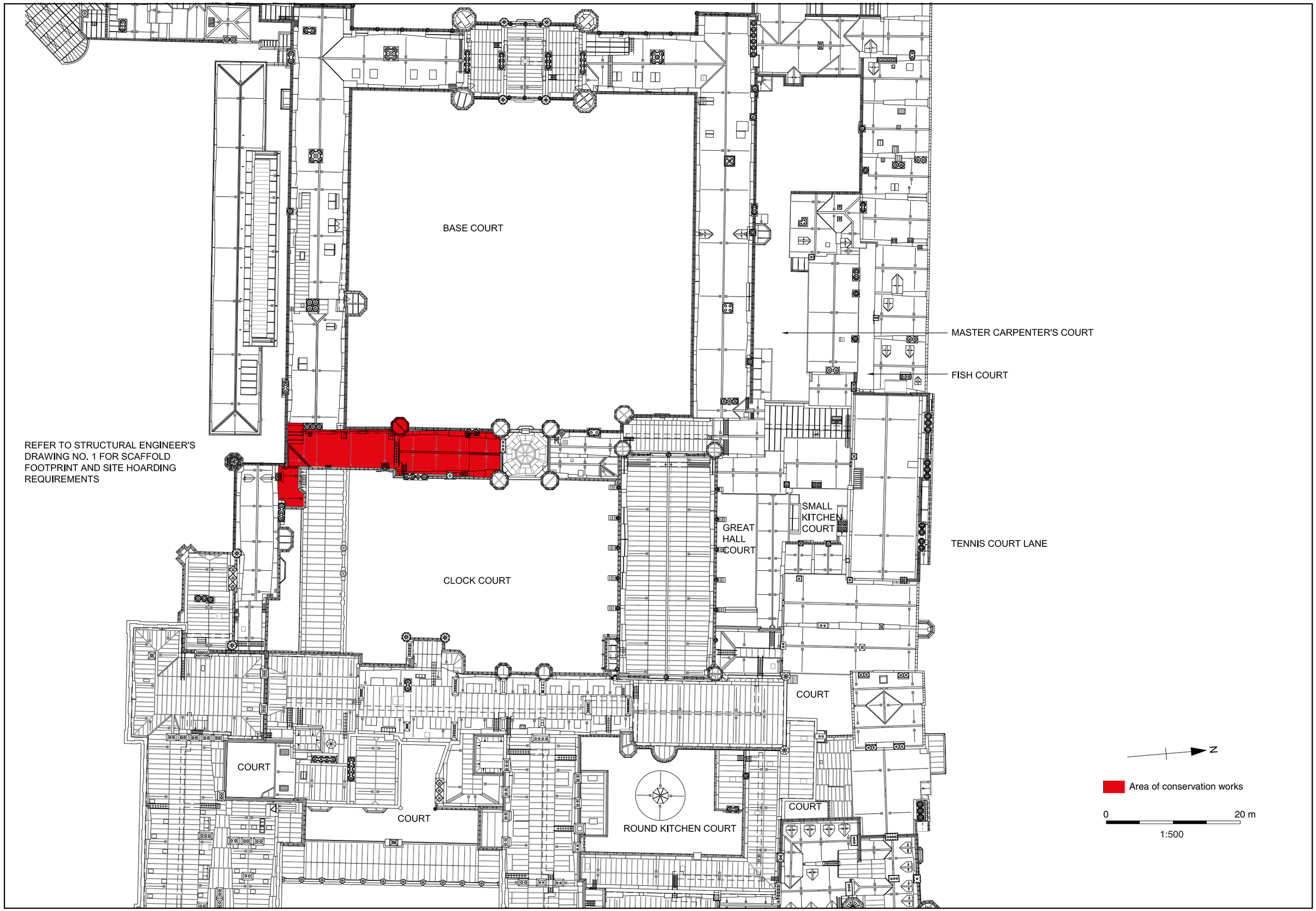


Figure 2: Plan of Hampton Court Palace showing area of conservation works

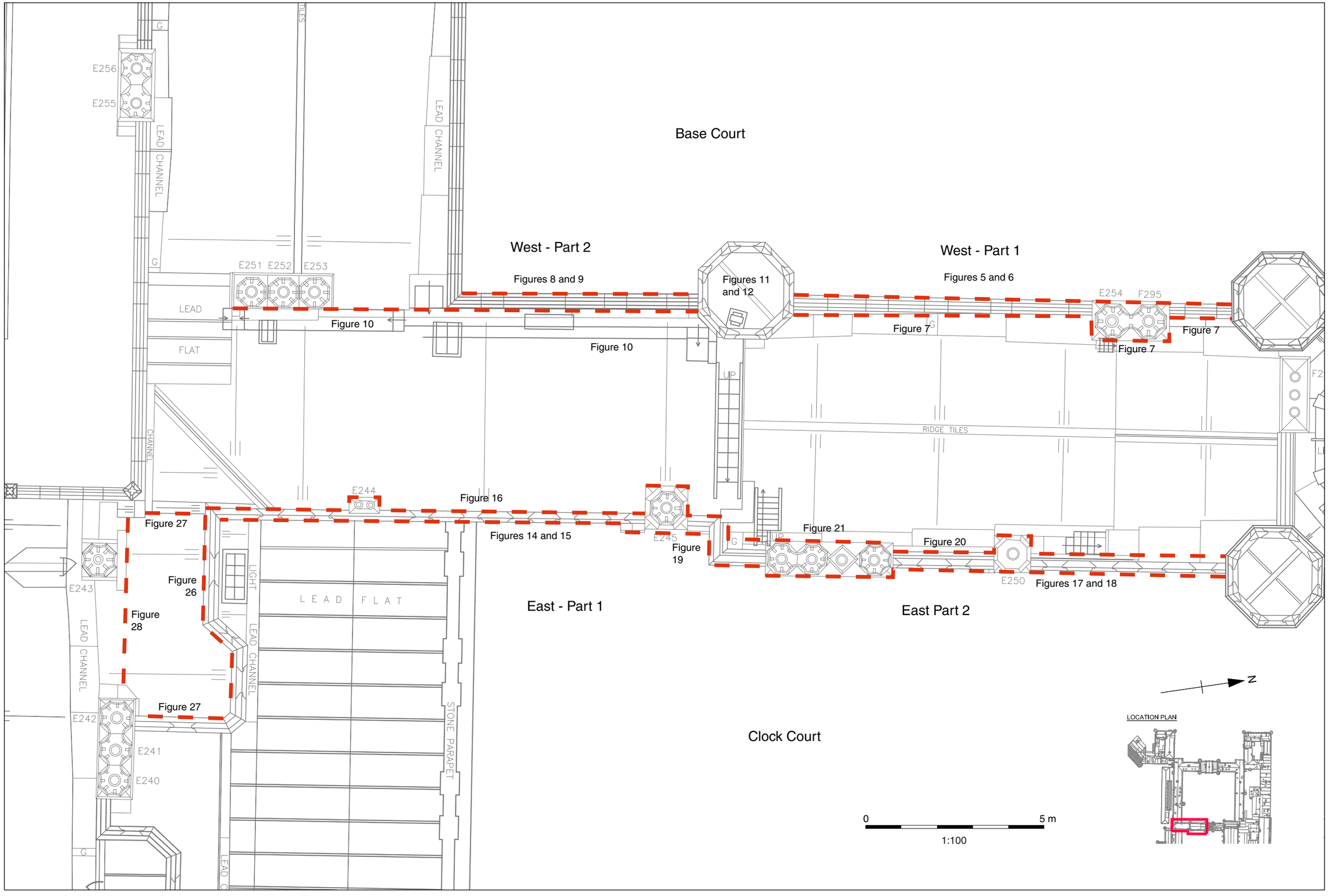


Figure 3: Plan of area of conservation works showing Elevation Figure locations

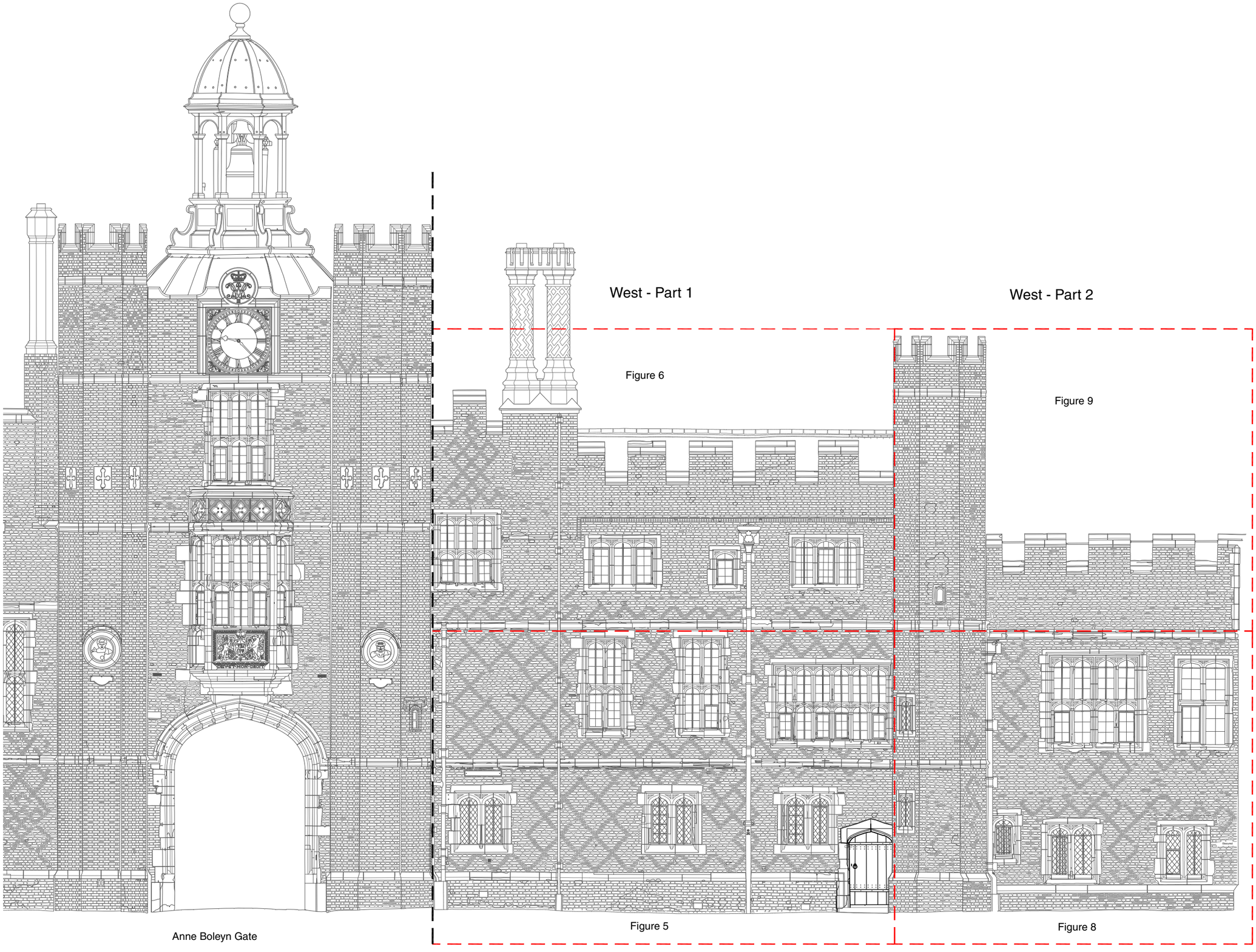


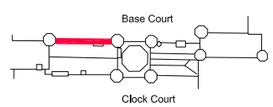
Figure 4: Base Court Elevations drawing key

Figure 5: Lower West facing Elevation of Base Court, Part 1

Pre Wolsey and Wolsey stock brick (A)
Wolsey stock brick (B)
Rebuilt Wolsey stock brick
Henrician stock brick (C)
18th and 19th century stock brick (Q)
c.19th century re-facing brick (T)
19th- 20th century stock brick (V)
1930's facing bricks
Vitrified brick
Stone work, Iron and undateable bricks

N

LOCATION PLAN



0 2 m

1:40

Figure 6: Upper West Facing Elevation of Base Court, Part 1

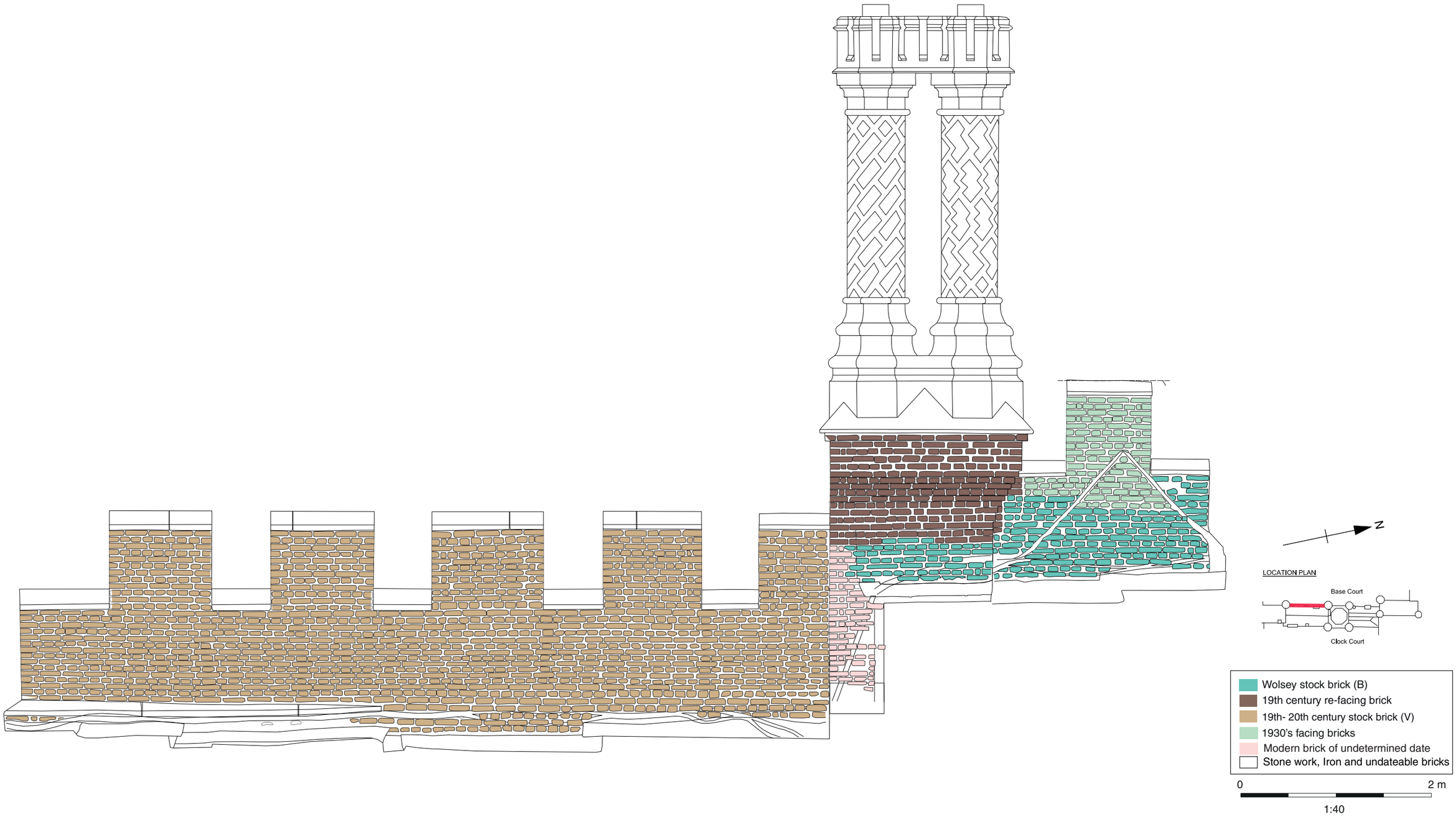
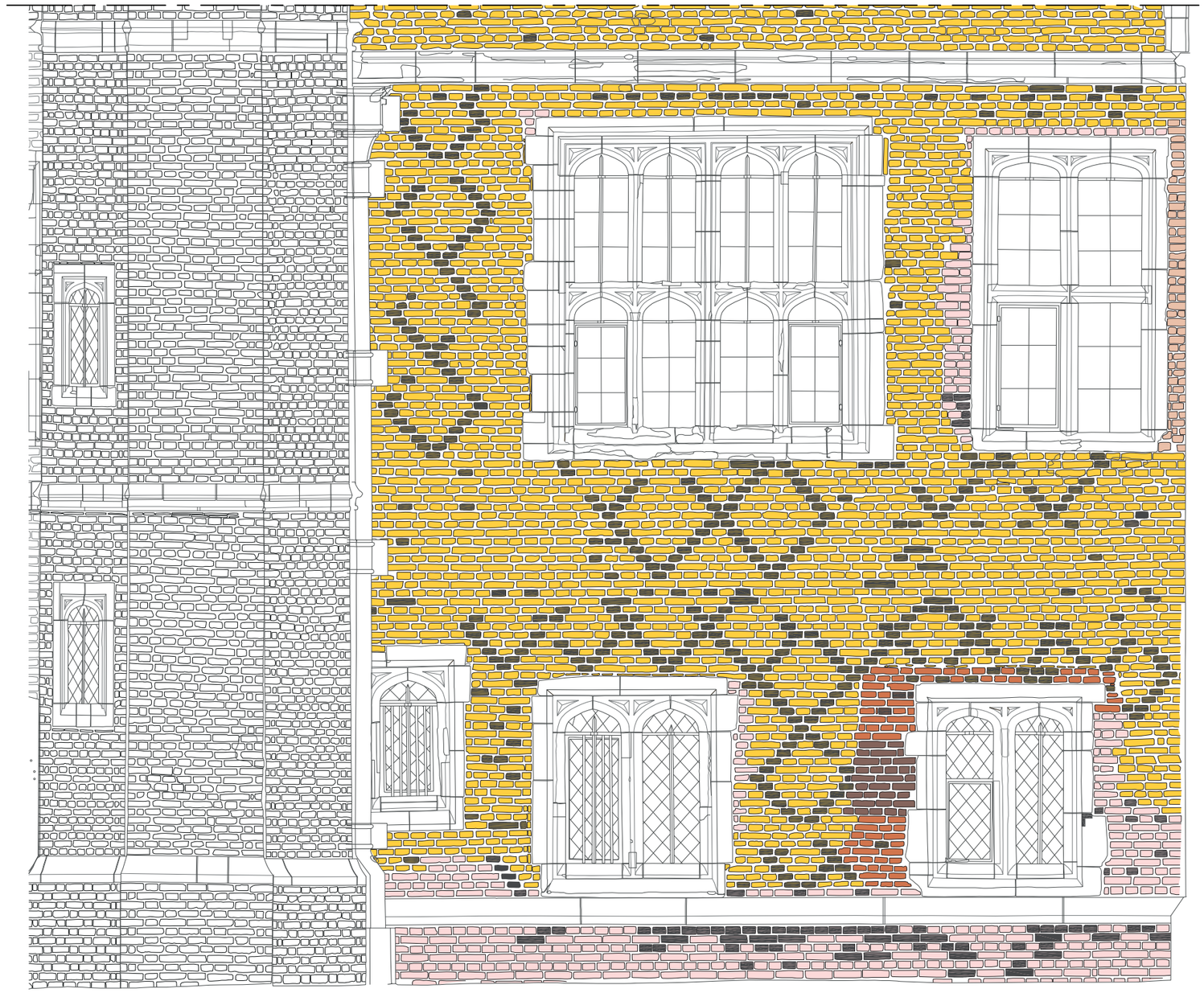
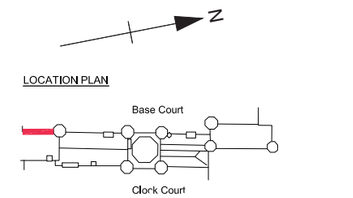


Figure 7: Inner parapet level of West Facing Elevation of Base Court, Part 1



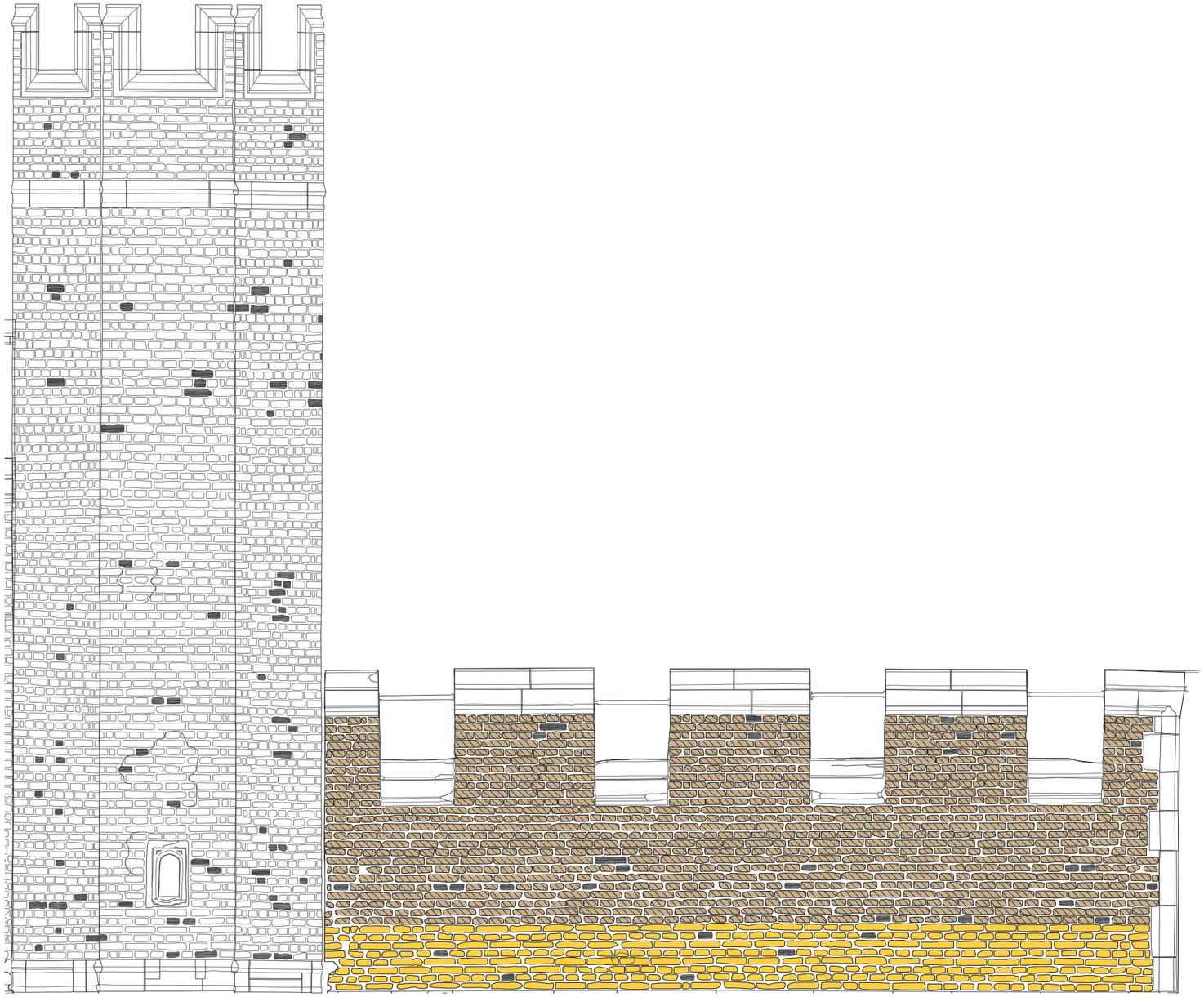


- Pre Wolsey and Wolsey stock brick (A)
- Henrician stock brick (C)
- c.19th century re-facing brick (T)
- 18th and 19th century stock brick
- Modern brick of undetermined date
- Vitrified brick
- Stone work, Iron work and undateable brick

0 2 m

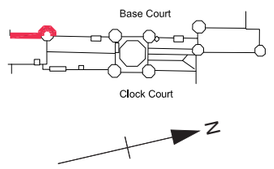
1:40

Figure 8: Lower West facing Elevation of Base Court, Part 2



Pre Wolsey and Wolsey stock brick (A)
19th- 20th century stock brick (V)
Vitrified brick
Stone work, Iron work and undateable brick

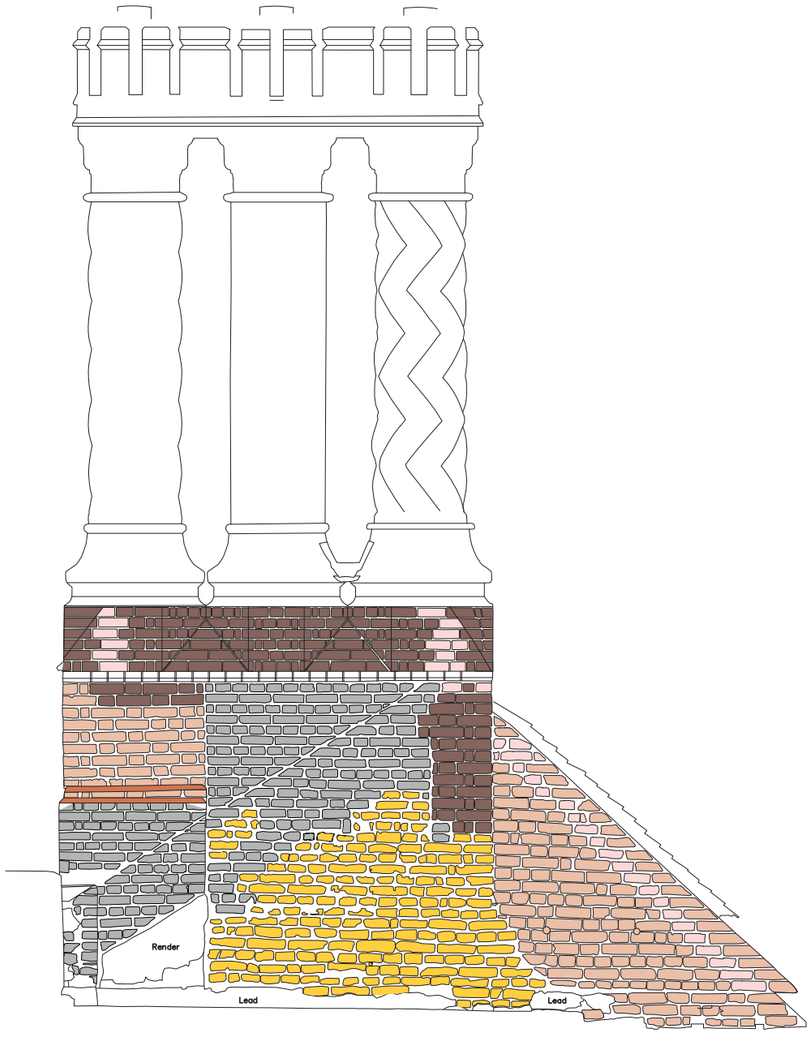
LOCATION PLAN



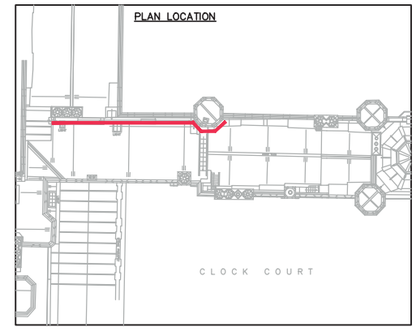
0 2 m

1:40

Figure 9: Upper West facing Elevation of Base Court, Part 2



Pre Wolsey and Wolsey stock brick (A)
Henrician stock brick (C)
18th and 19th century stock brick
c.19th century re-facing brick (T)
19th- 20th century stock brick (V)
1930's facing bricks
Modern straw imprint brick 1950's - 1960's repair
Modern brick of undetermined date
Stone work, Iron work and undateable brick



N

0 2 m

1:40

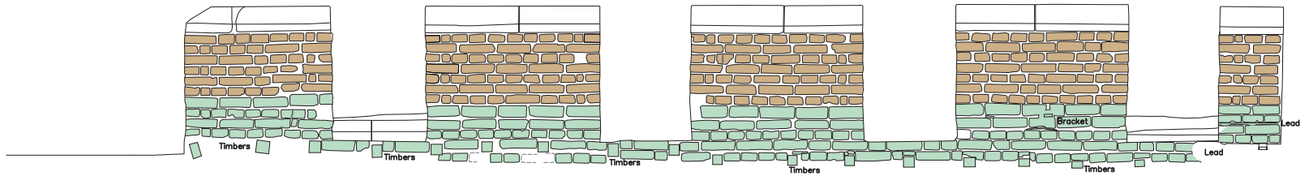


Figure 10: Inner parapet level of West Facing Elevation of Base Court, Part 2

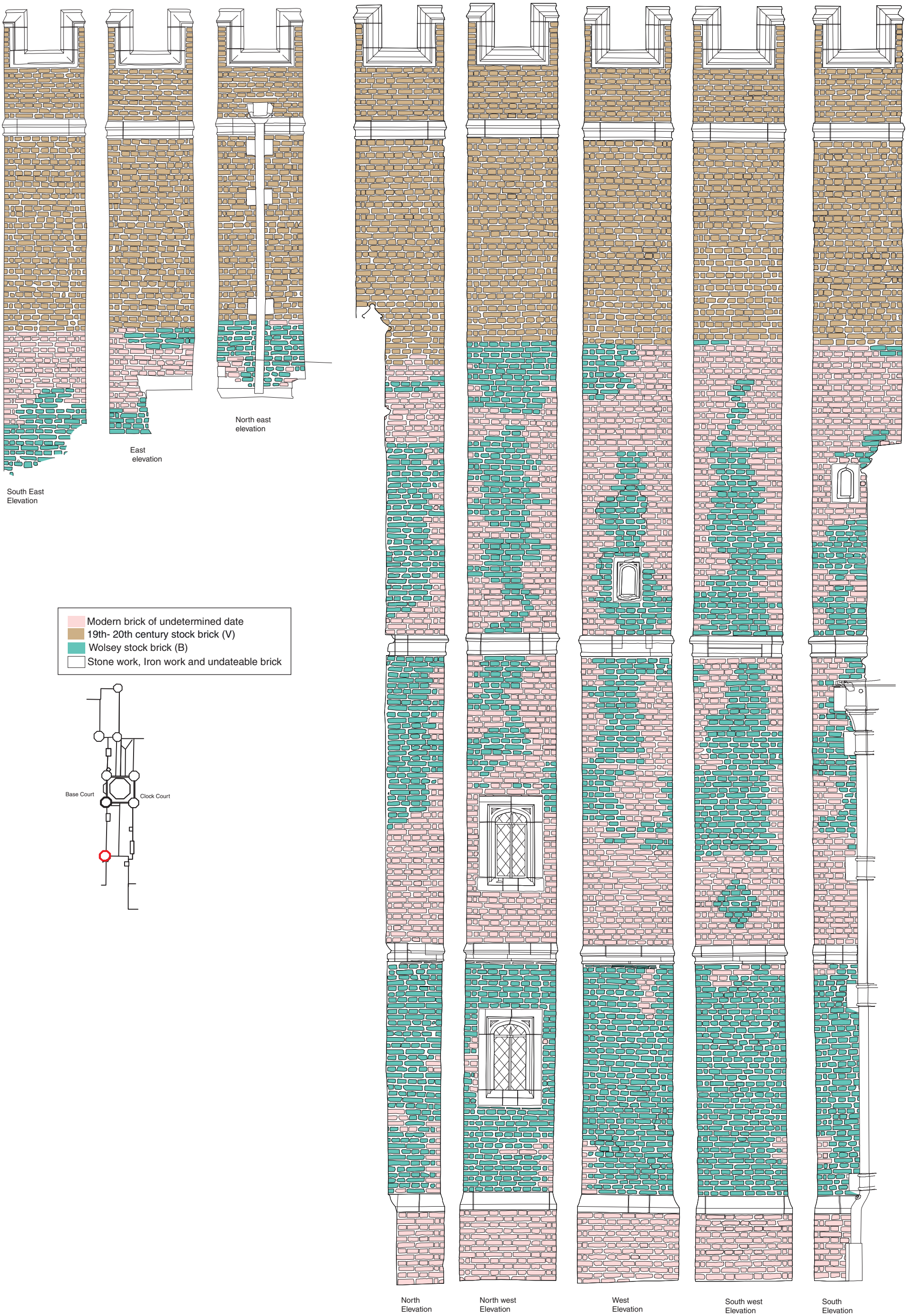
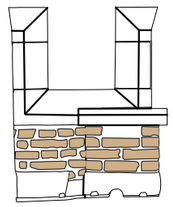
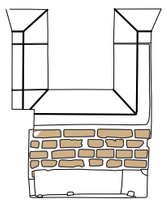


Figure 11: Base Court Turret Elevation between west facing Elevation part 1 and 2

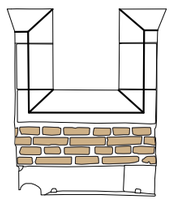
SOUTH TURRET



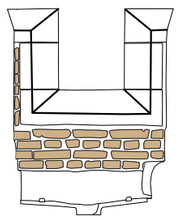
EAST
ELEVATION



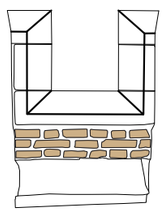
SOUTH EAST
ELEVATION



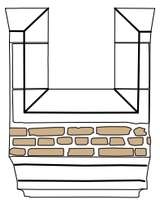
SOUTH
ELEVATION



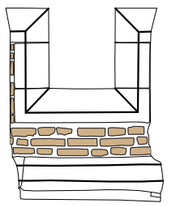
SOUTH WEST
ELEVATION



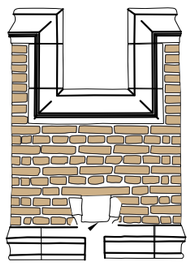
WEST
ELEVATION



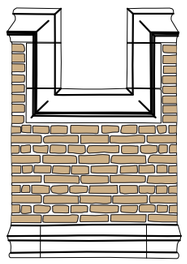
NORTH WEST
ELEVATION



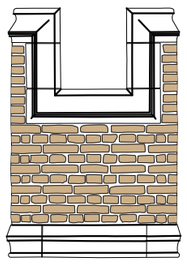
NORTH
ELEVATION



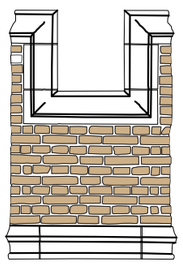
NORTH EAST
ELEVATION



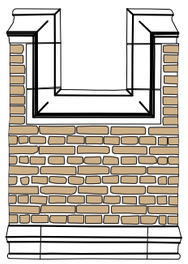
NORTH
ELEVATION



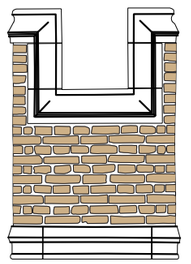
NORTH WEST
ELEVATION



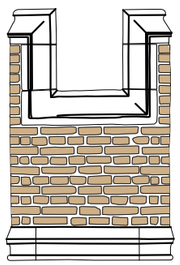
WEST
ELEVATION



SOUTH WEST
ELEVATION

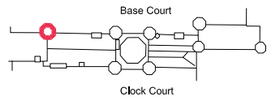


SOUTH
ELEVATION



SOUTH EAST
ELEVATION

LOCATION PLAN



19th- 20th century stock brick (V)
Stone work, Iron work and undateable brick

0 2 m

1:40

Figure 12: Base Court Turret Parapet Elevations

EAST ELEVATION OF WEST WALL OF COURT

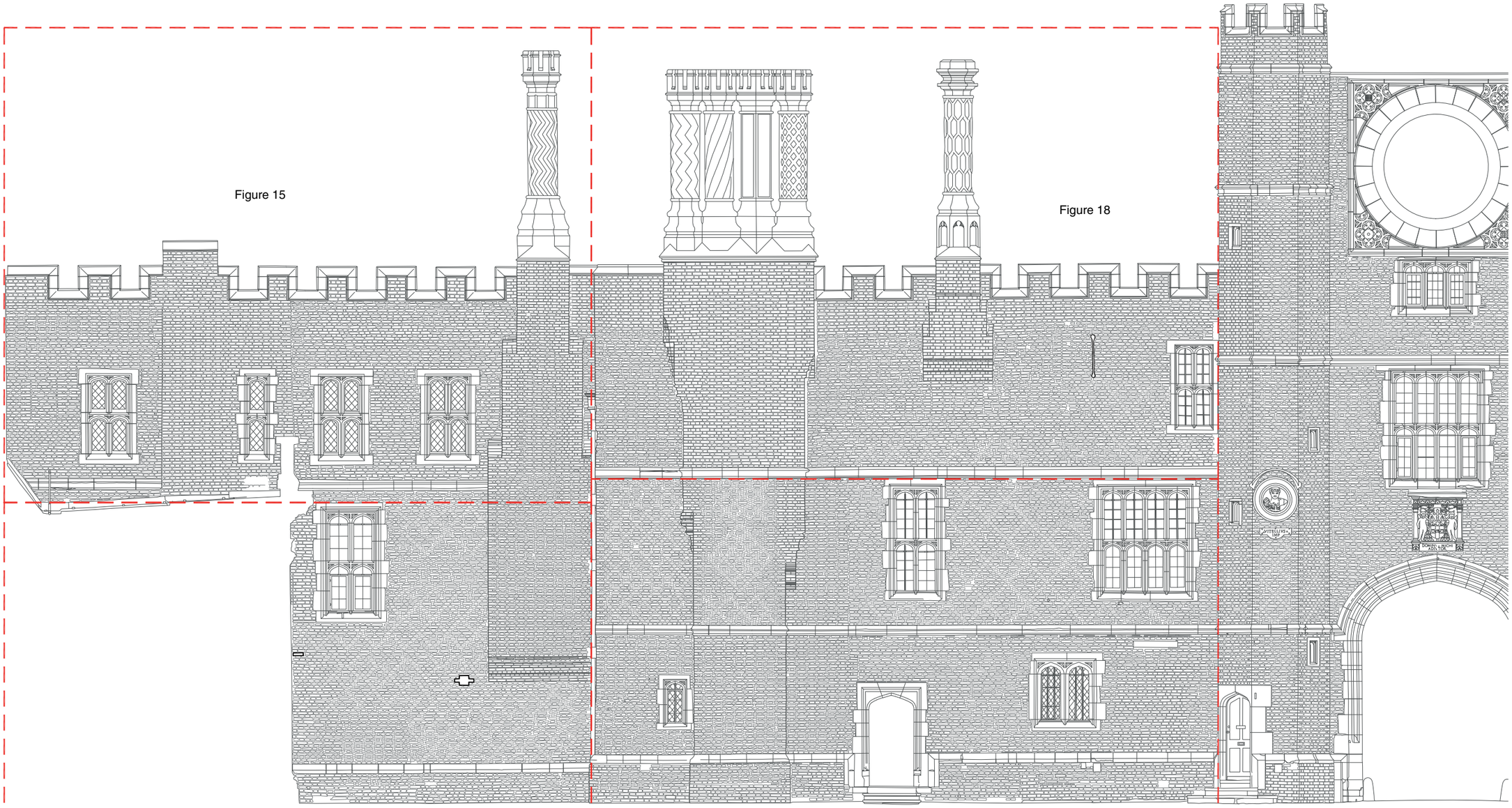
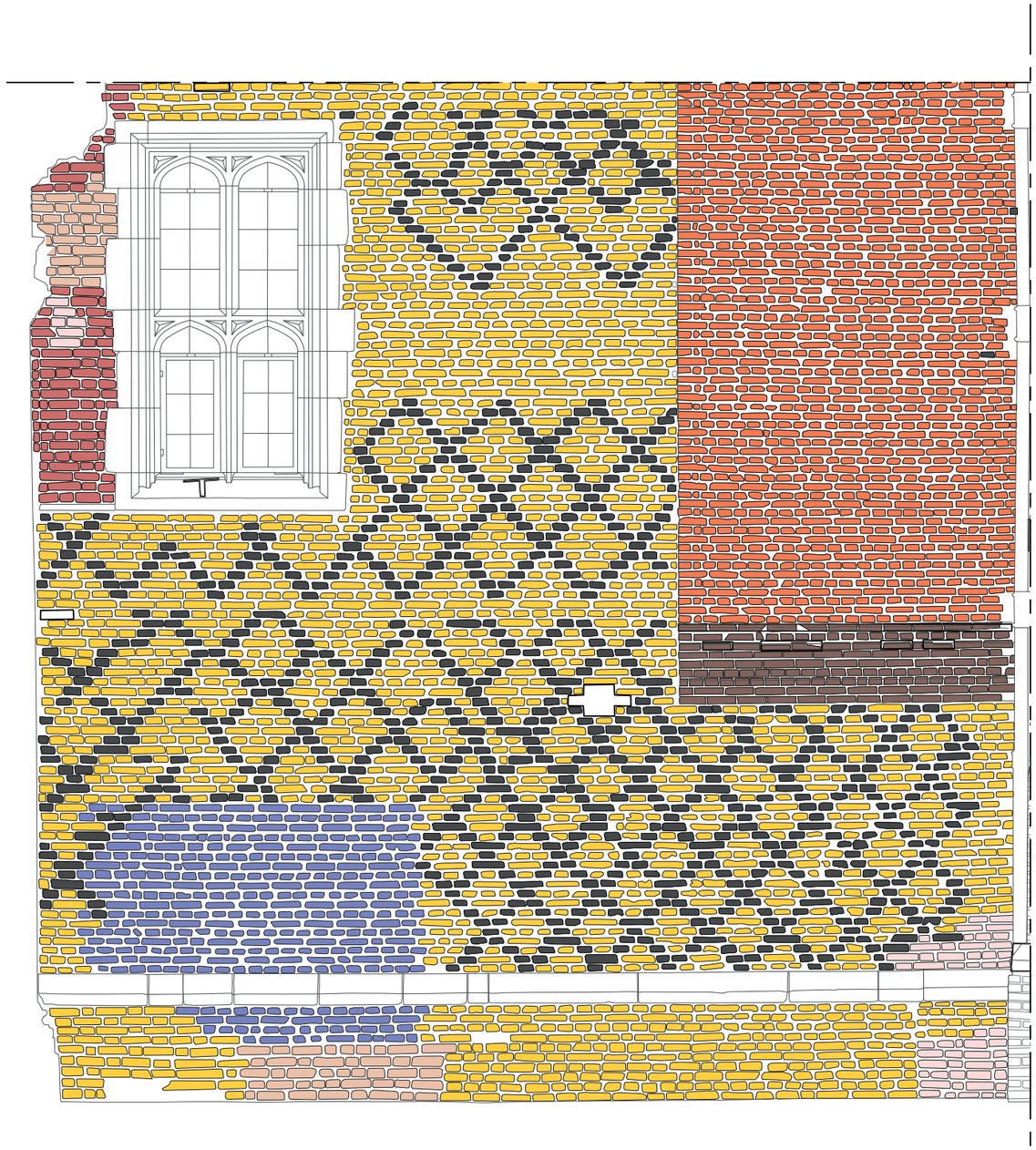
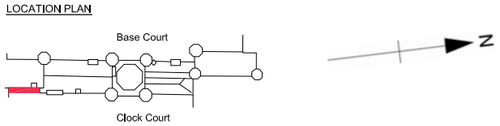


Figure 13: Clock Court Elevation drawing key



Pre Wolsey and Wolsey stock brick (A)
Henrician stock brick (C)
Tudor brick of undetermined date
Wren stock brick (I)
18th and 19th century stock brick (Q)
c.19th century re-facing brick (T)
Modern brick of undetermined date
Vitrified brick
Stone work, Iron work and undateable brick

LOCATION PLAN

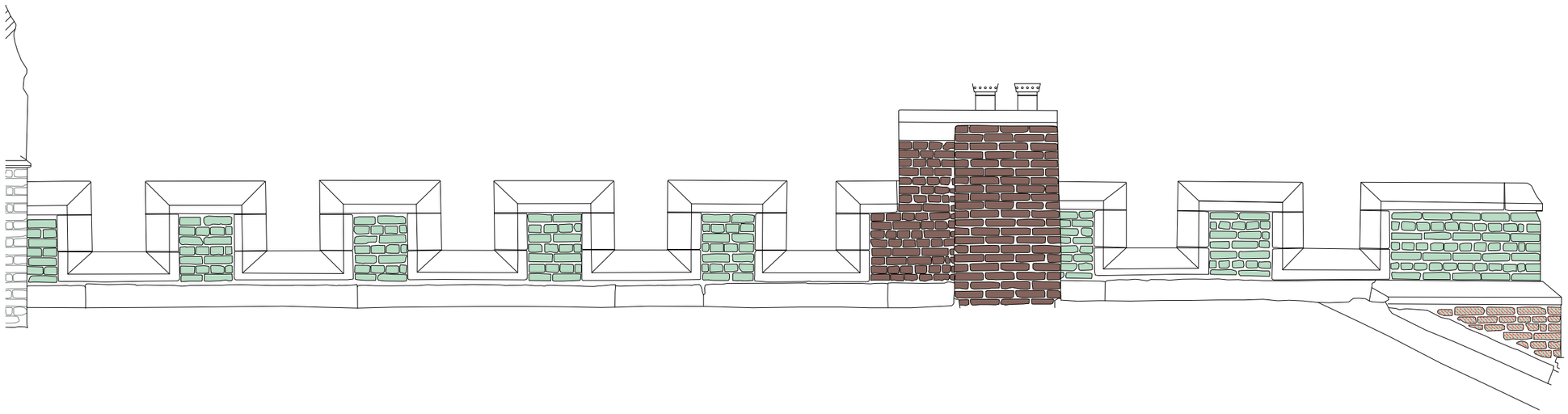


0 2 m

1:40

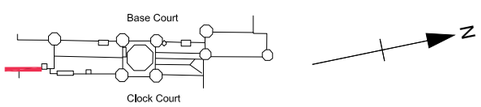
Figure 14: Lower East facing Elevation of Clock Court, Part 1

Figure 15: Upper East facing Elevation Clock Court, Part 1



c.19th century re-facing brick (T)
1930's facing bricks
Mix of 1930's facing brick and Tudor brick of undetermined date
Stone work, Iron work and undateable brick

LOCATION PLAN



0 2 m

1:40

Figure 16: Inner parapet level of East Facing Elevation Clock Court, Part 1

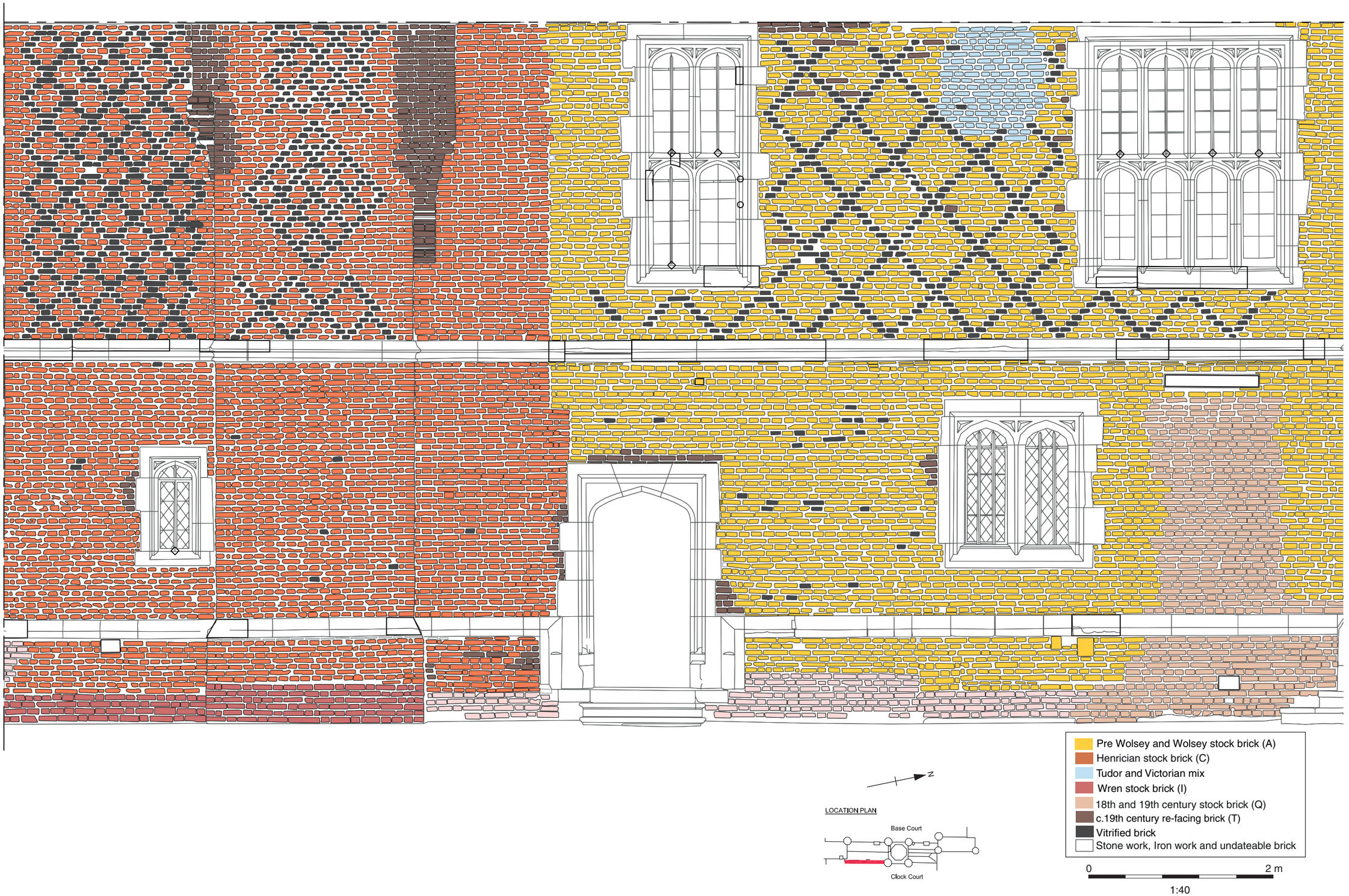


Figure 17: Lower East facing Elevation of Clock Court, Part 2

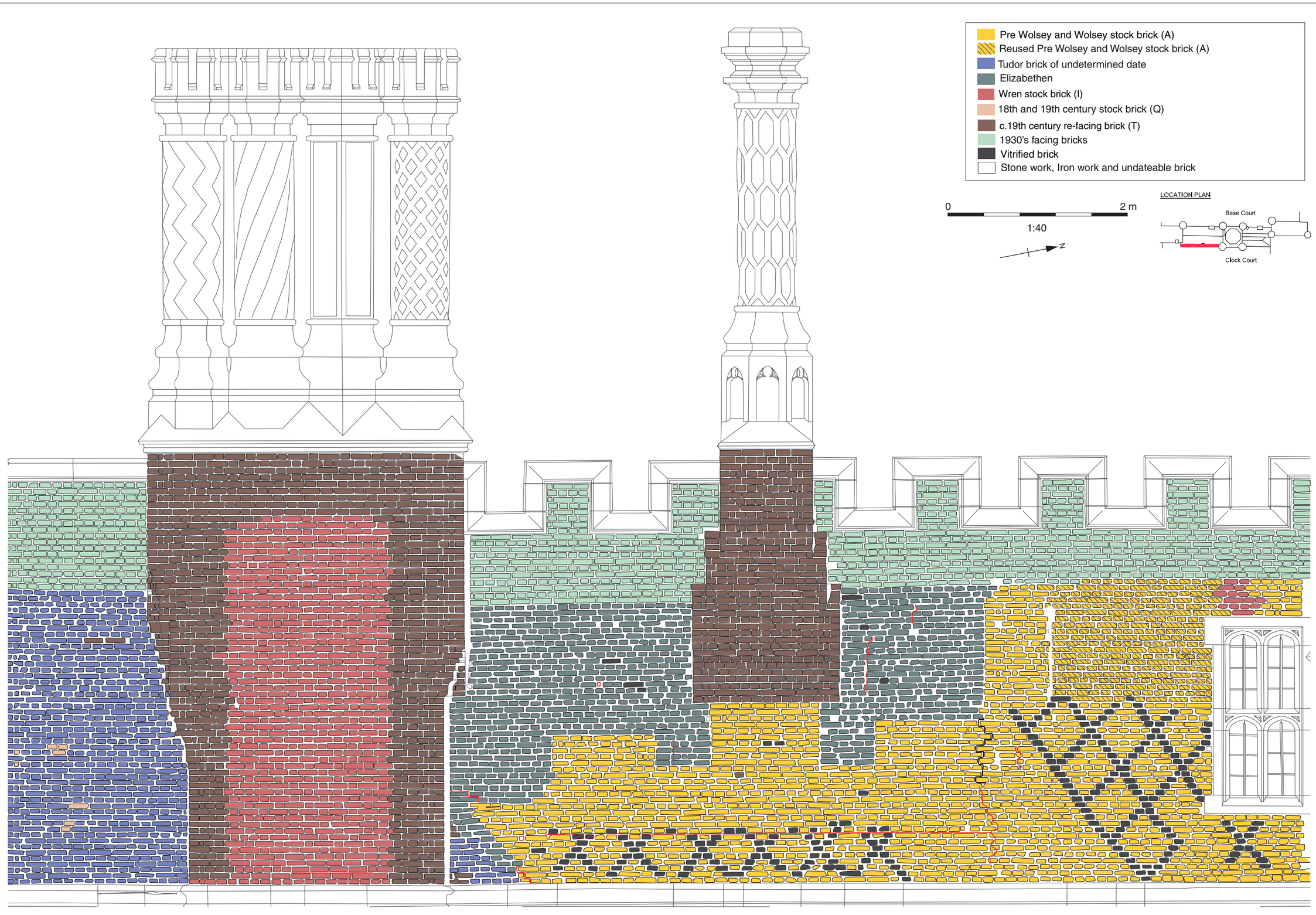
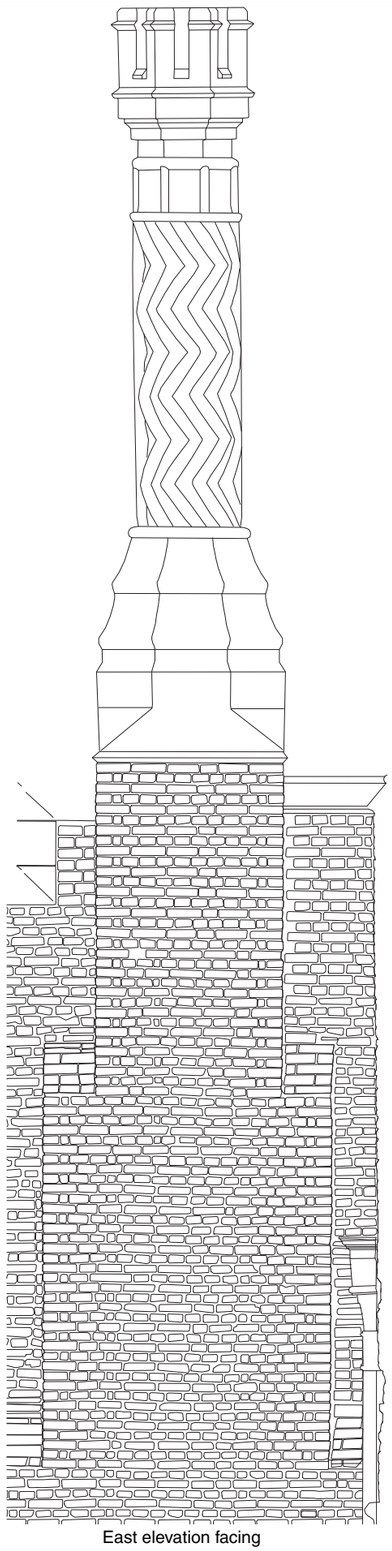
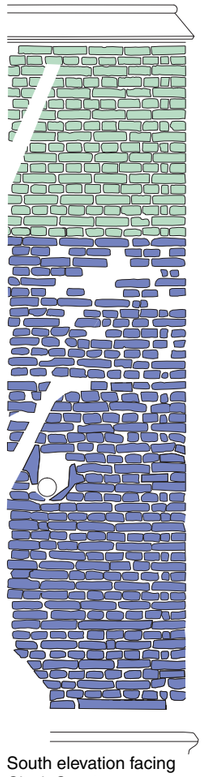


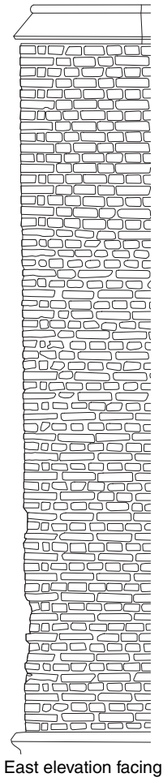
Figure 18: Upper East facing Elevation Clock Court, Part 2



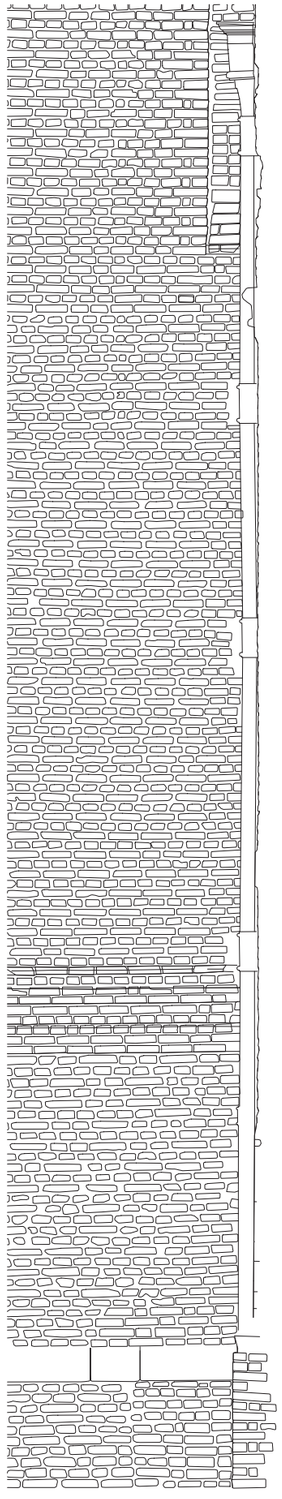
East elevation facing
Clock Court



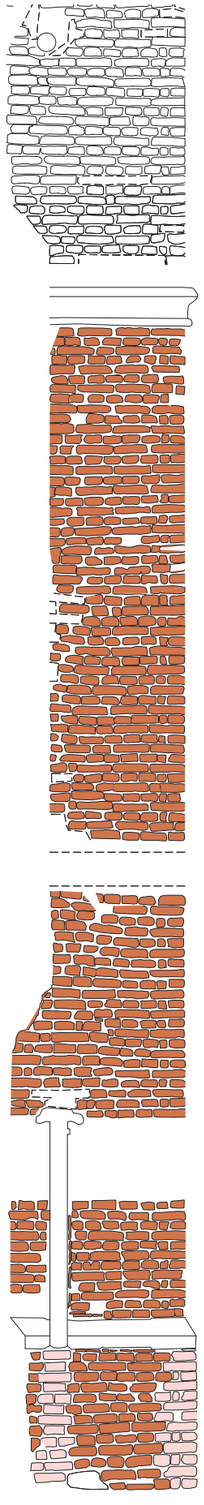
South elevation facing
Clock Court



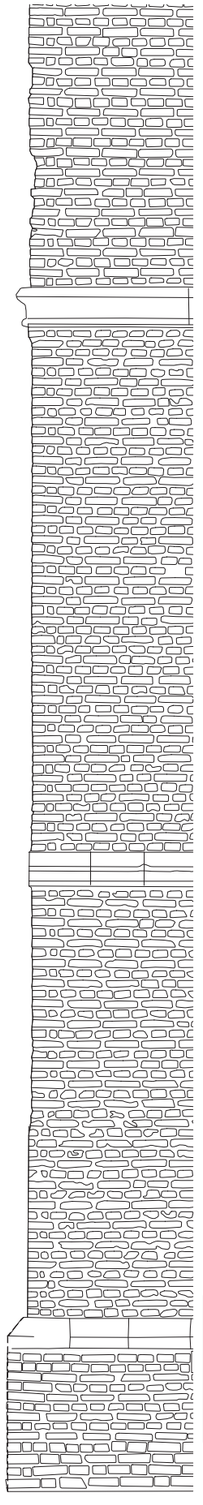
East elevation facing
Clock Court



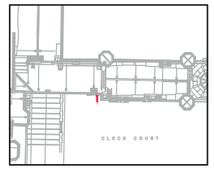
East elevation facing
Clock Court



South elevation facing
Clock Court



East elevation facing
Clock Court

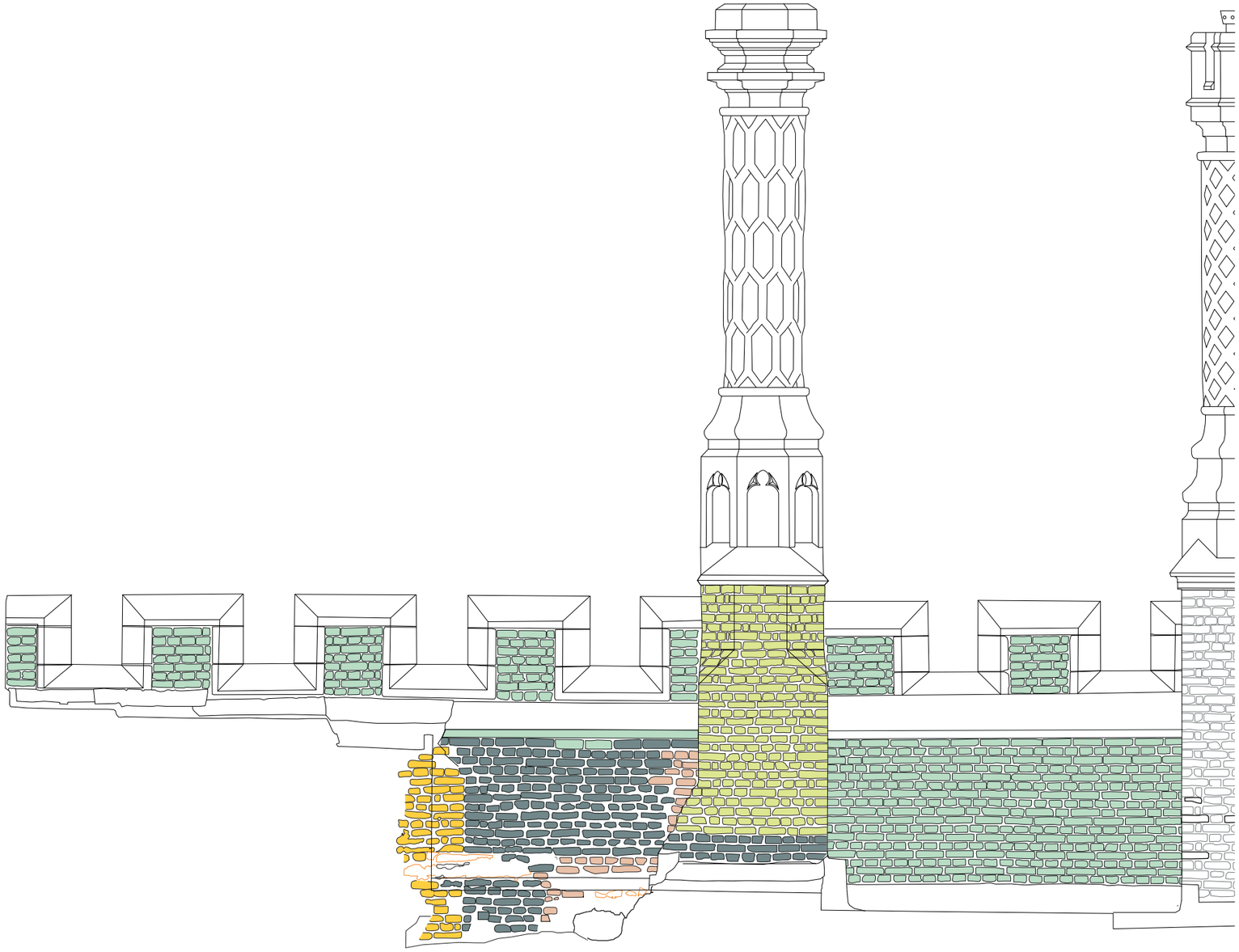


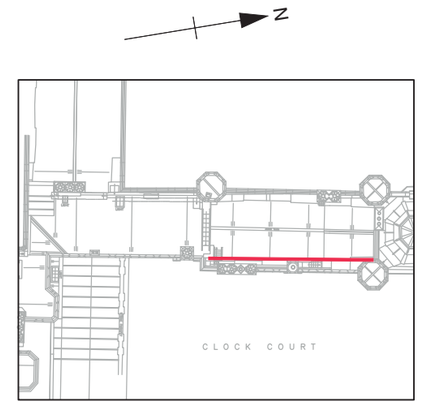
Modern brick of undetermined date
1930's facing bricks
Henrician stock brick (C)
Tudor brick of undetermined date
Stone work, Iron work and undateable brick

0 2 m

1:40

Figure 19: South facing elevation of East facing Clock Court range between Elevations Part 1 and 2



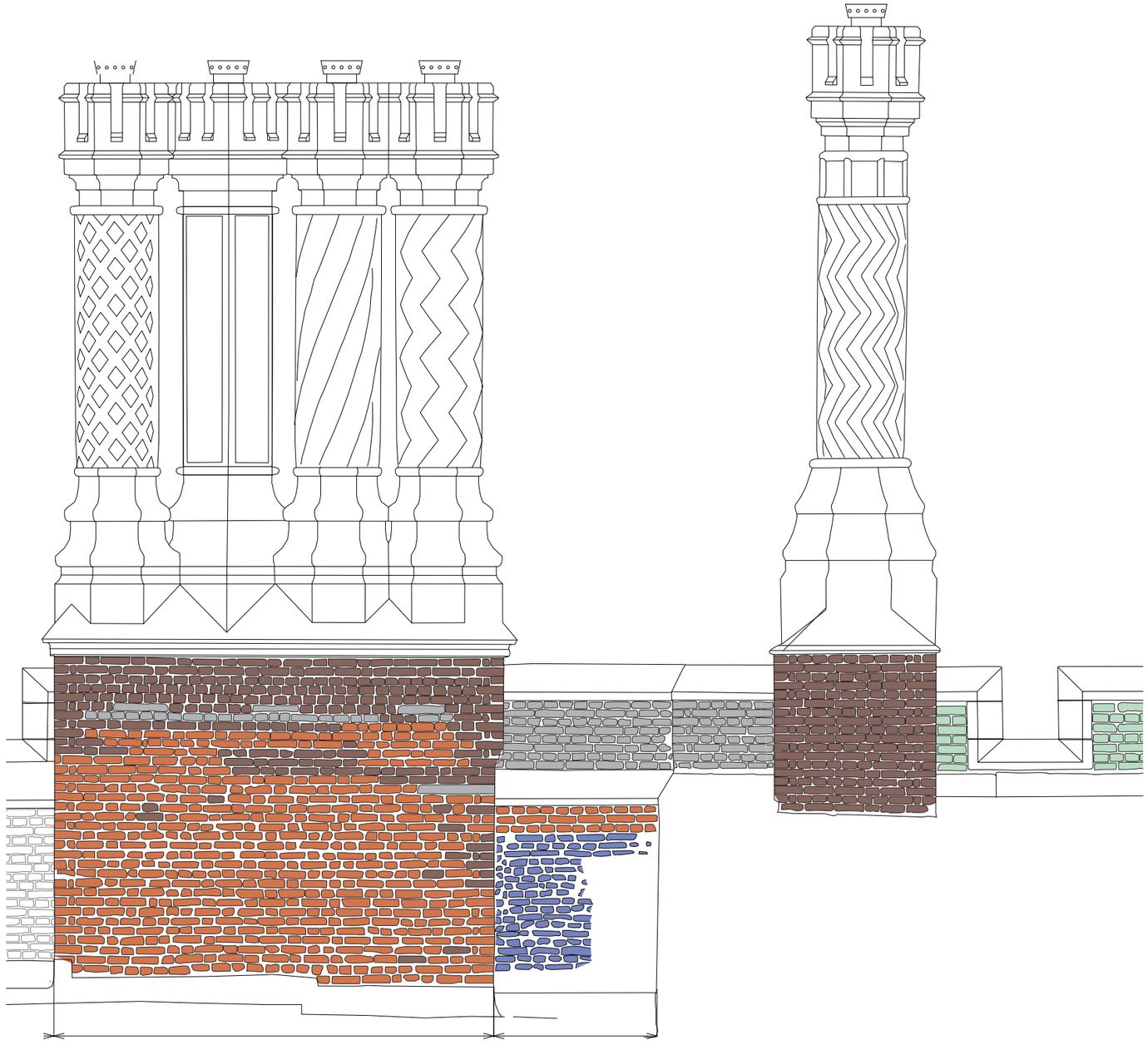


Pre Wolsey and Wolsey stock brick (A)
Elizabethen
18th and 19th century stock brick (Q)
20th century reface using a variety of historic brick
1930's facing bricks
Stone work, Iron work and undateable brick

0 2 m

1:40

Figure 20: North section of Inner parapet level of East facing Elevation of Clock Court, Part 2



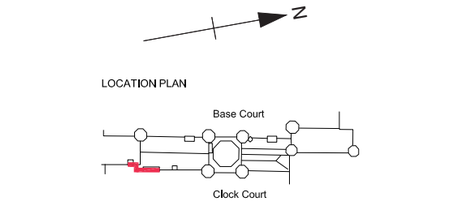


Figure 21: South section of Inner parapet level of East facing Elevation of Clock Court, Part 2

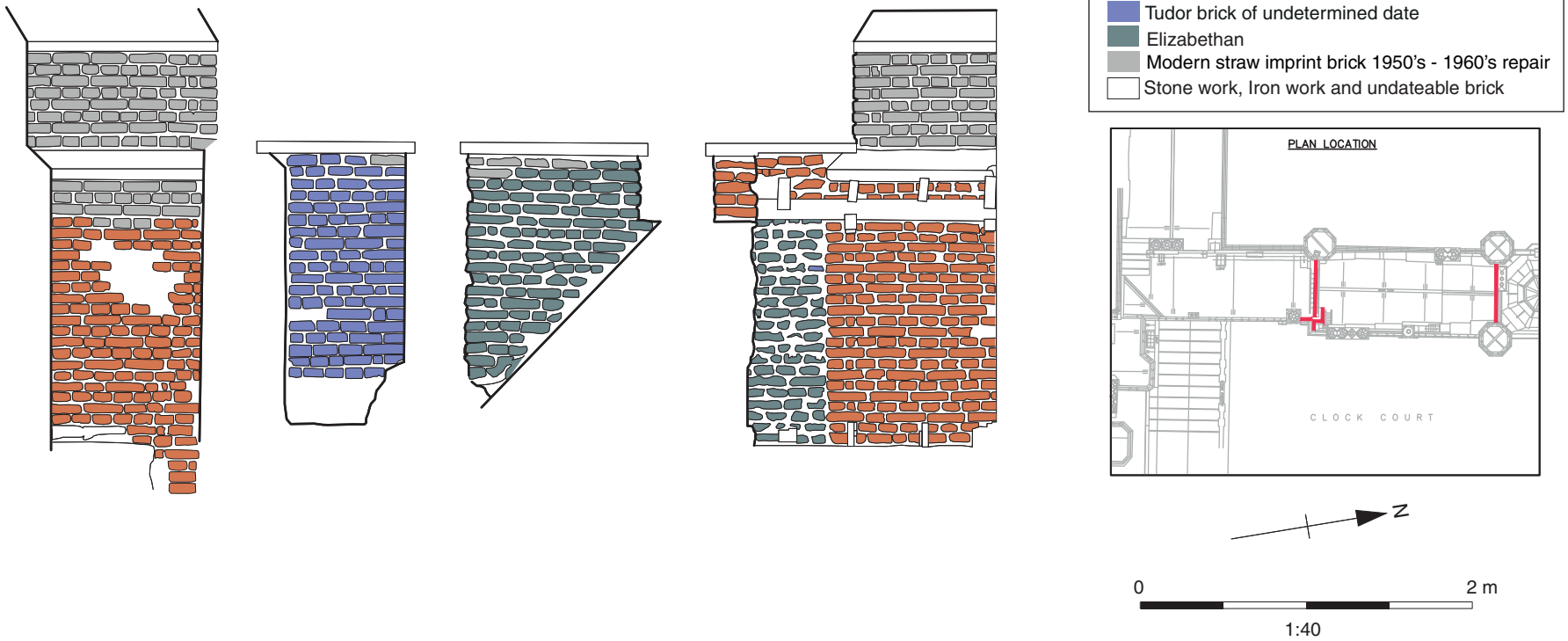


Figure 22: Inner parapet elevations

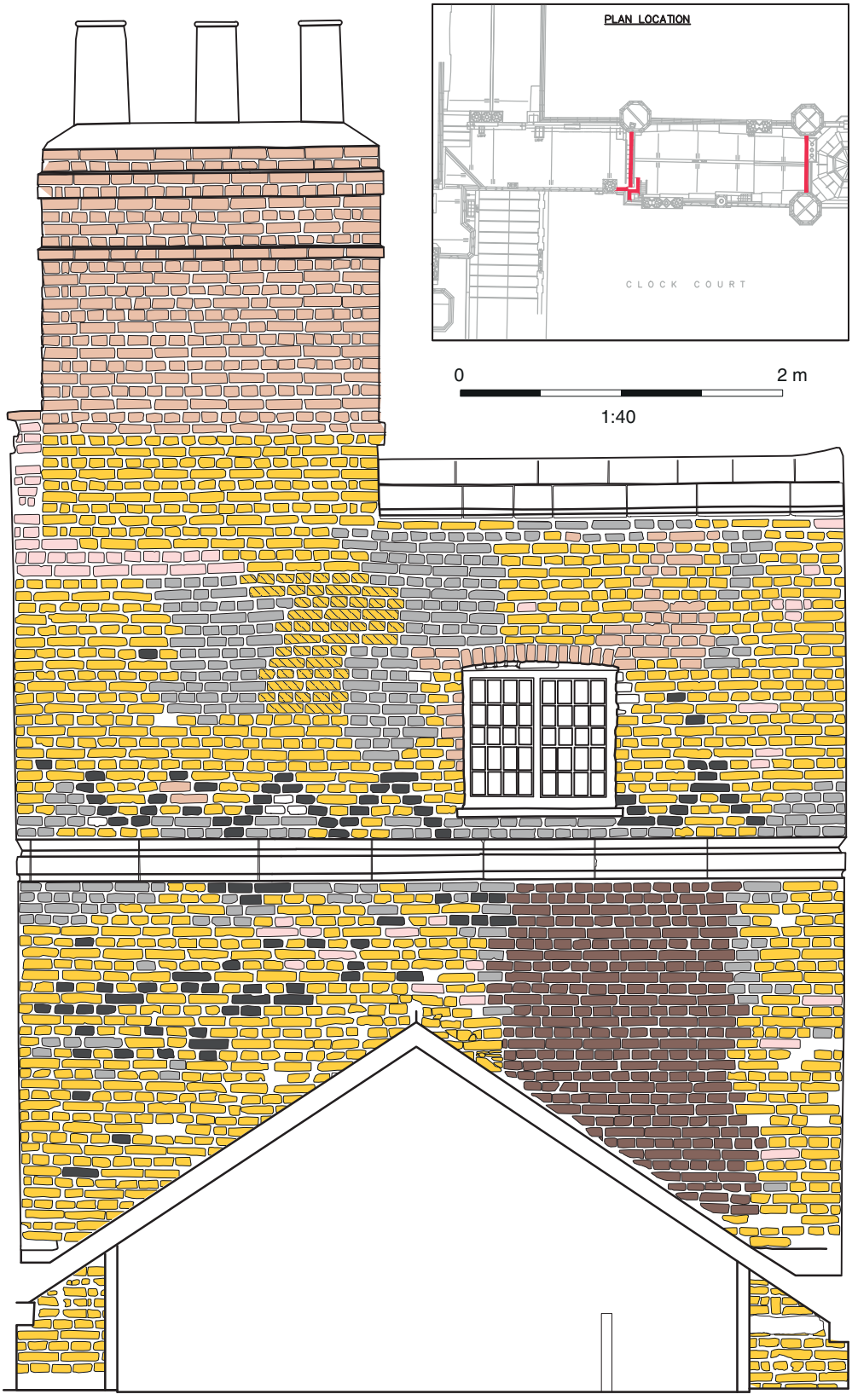
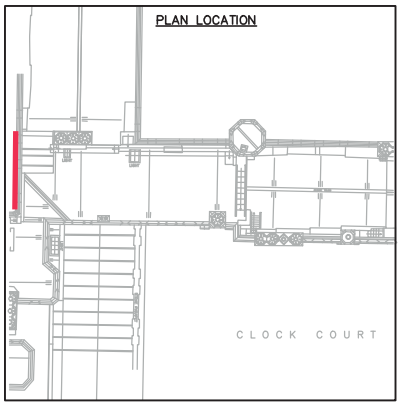


Figure 23: South face of Anne Boleyn Gatehouse showing section of Roof 1



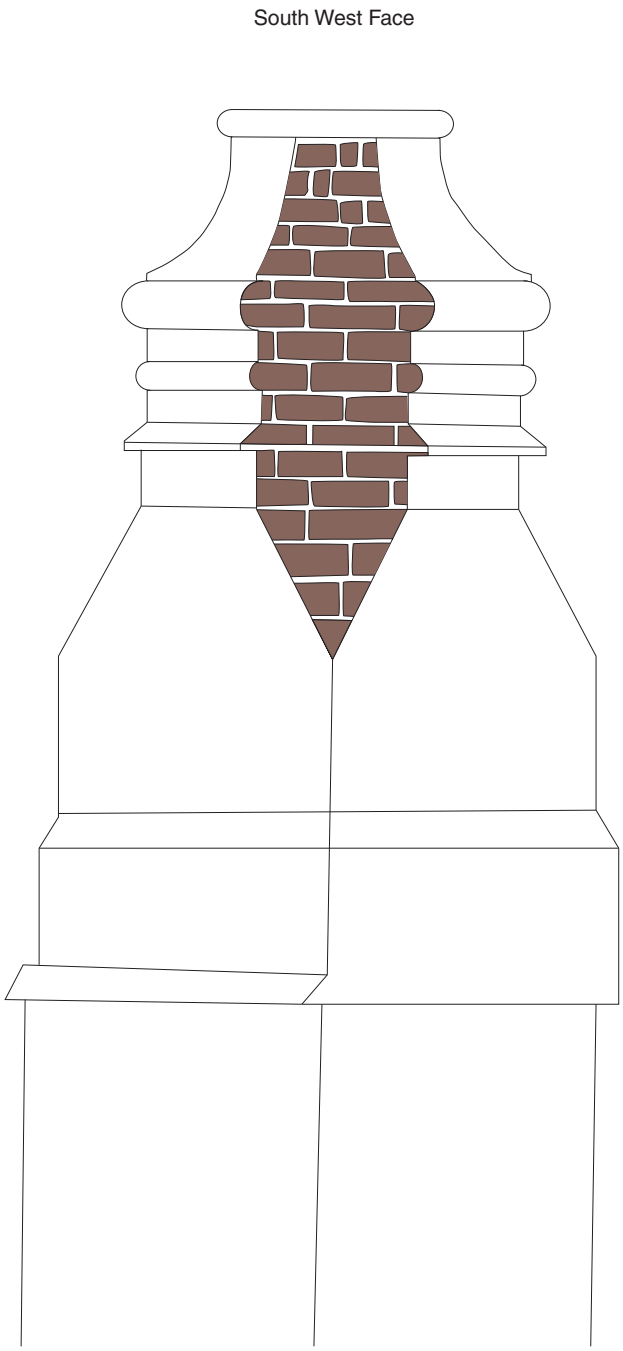
Pre Wolsey and Wolsey stock brick (A)
c.19th century re-facing brick (T)
Modern brick of undetermined date
Vitrified brick
Stone work, Iron work and undateable brick

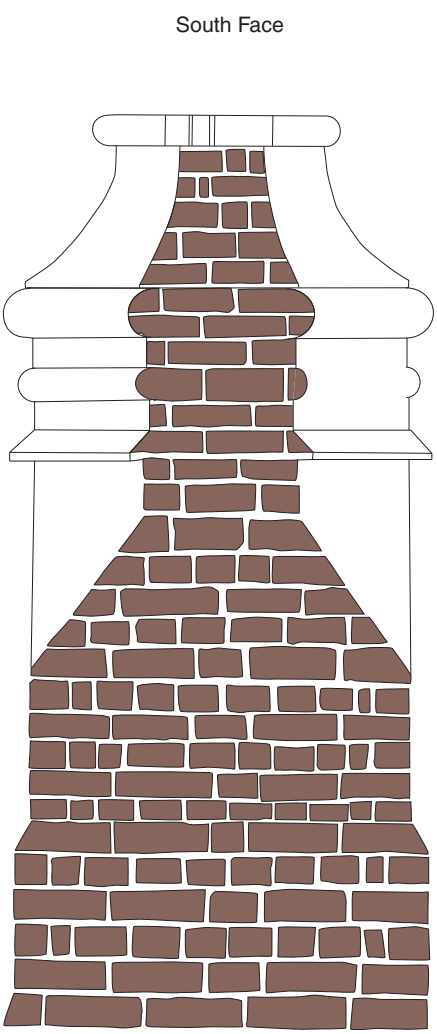
N

0 2 m

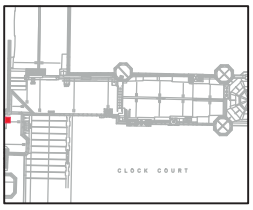
1:40

Figure 24: Mantegna Lift, upper crenellated elevation on south side of range





c.19th century re-facing brick (T)
Stone work, Iron work and undateable bricks



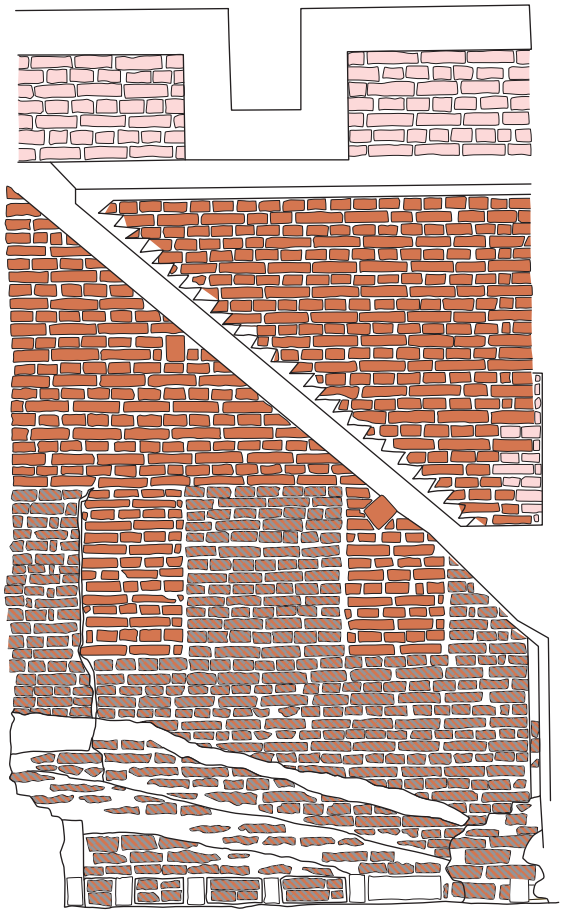
N

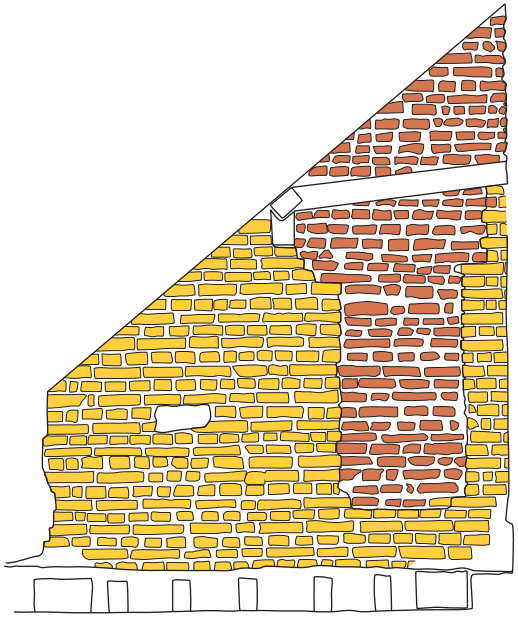
0 1 m

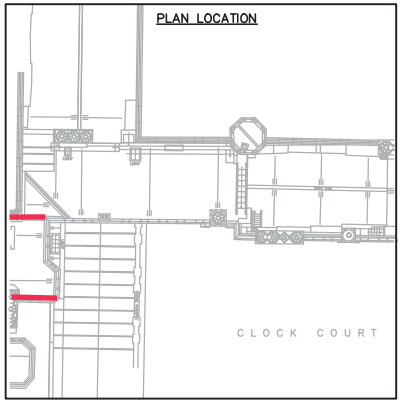
1:20

Figure 25: Chimney E243

Figure 26: Roof 4, north and north - west interior elevations







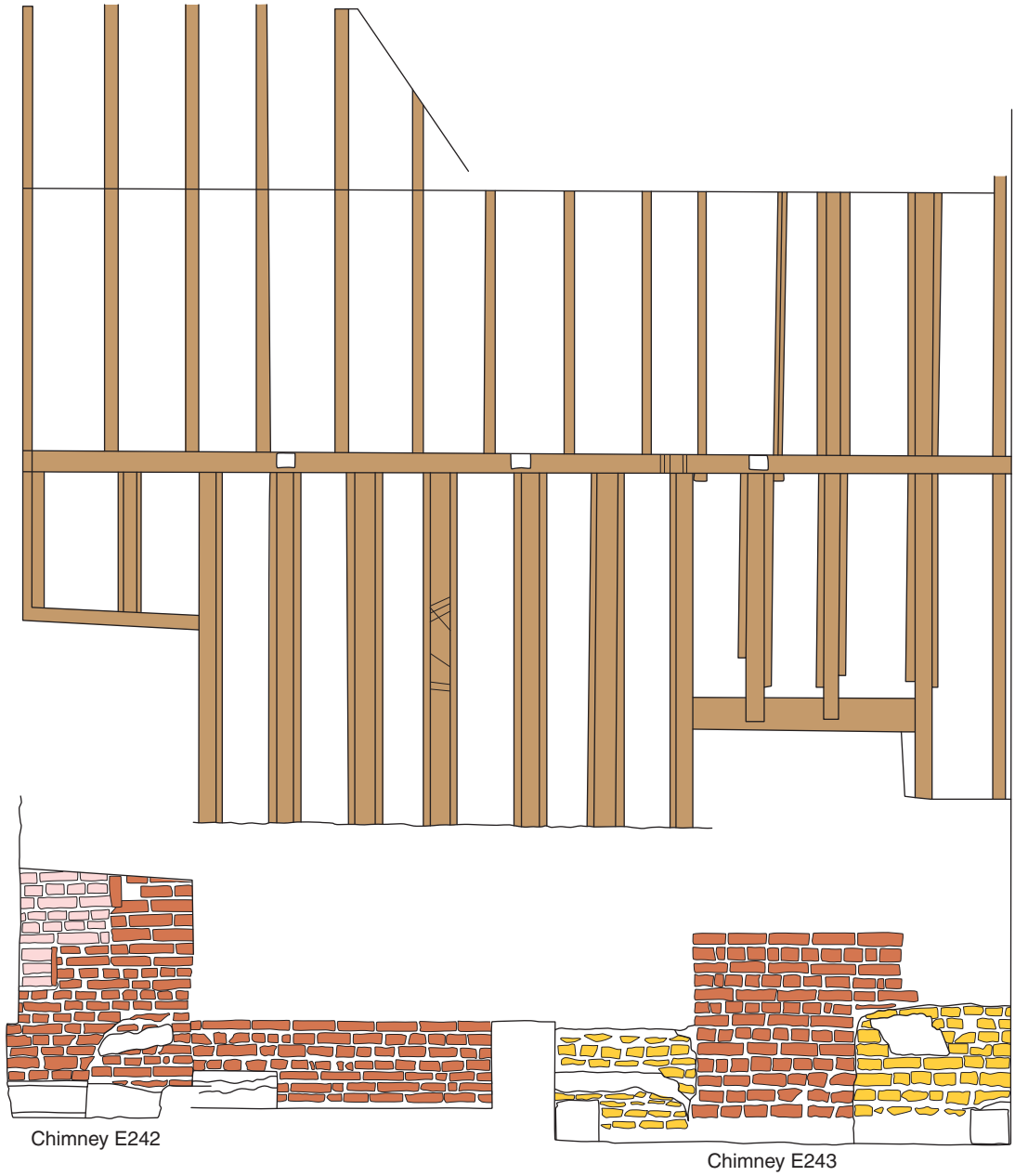
Pre Wolsey and Wolsey stock brick (A)
Primary phase Henrician stock brick (C)
Secondary phase Henrician stock brick (C)
Modern brick of undetermined date
Stone work, Iron work and undateable brick

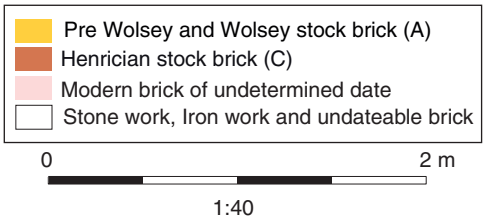
N

0 2 m

1:40

Figure 27: Roof 4, east exterior and interior elevations





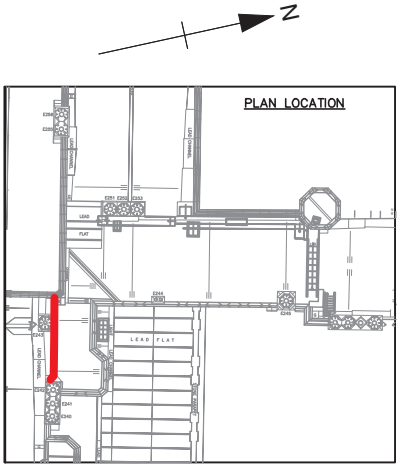


Figure 28: Roof 4, south interior elevation and east elevation of dwarf wall

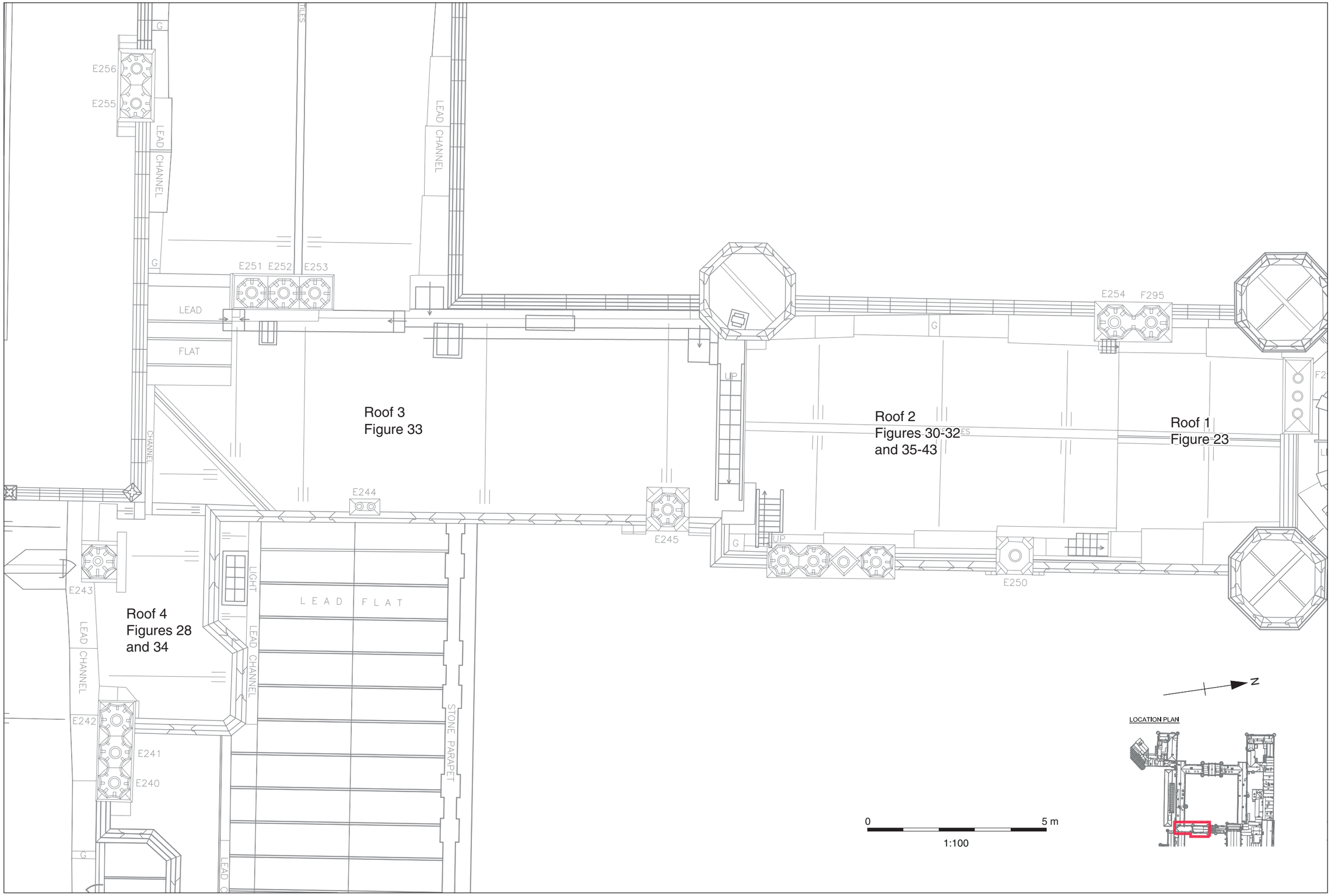
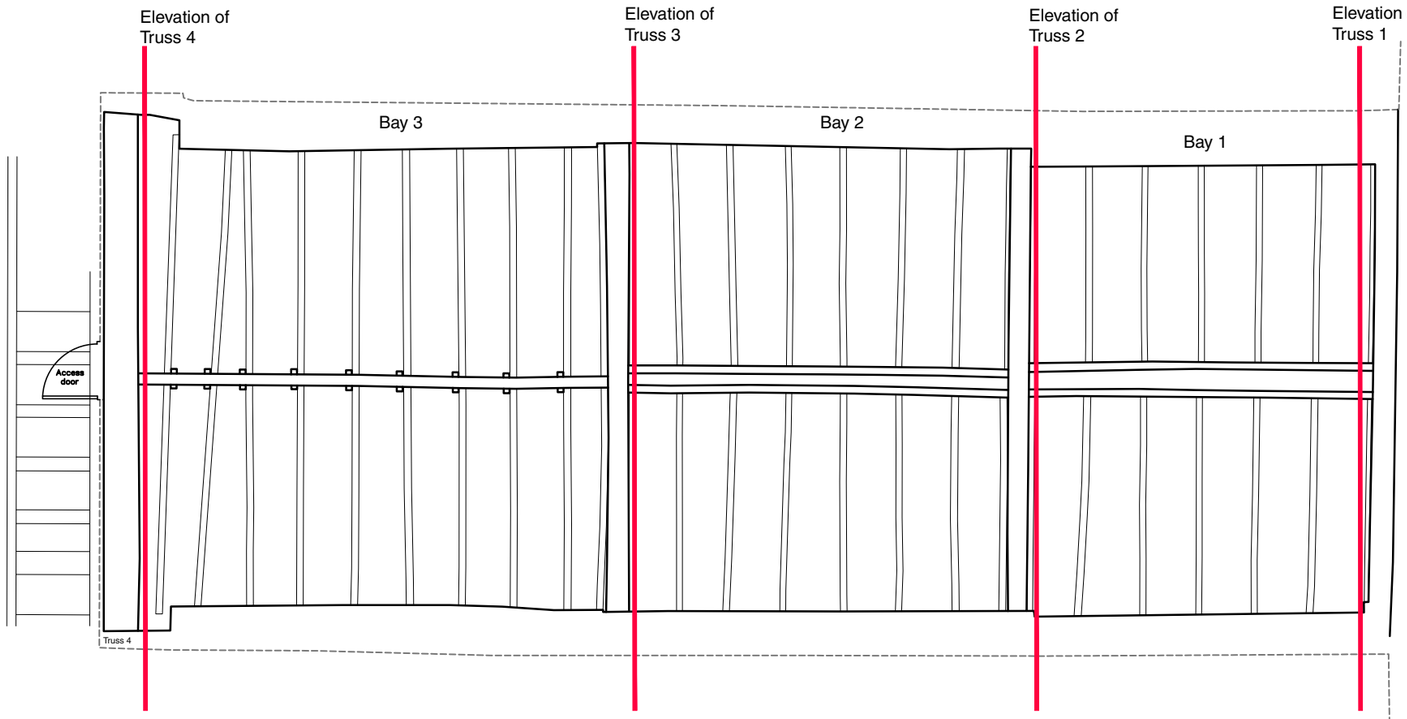
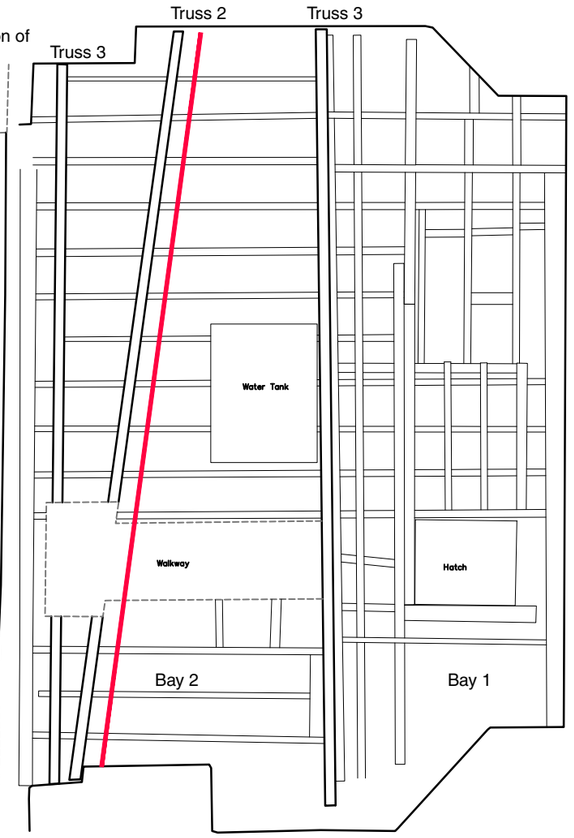


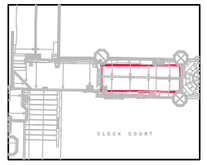
Figure 29: Plan of area of conservation works showing Roof and Figure locations



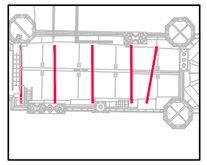


Roof 1

PLAN LOCATION

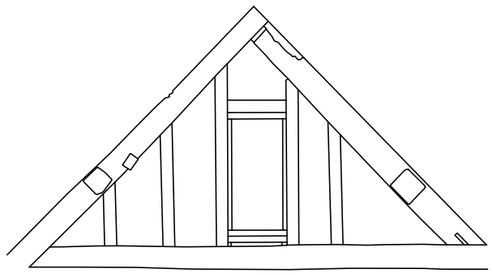


ELEVATION LOCATION

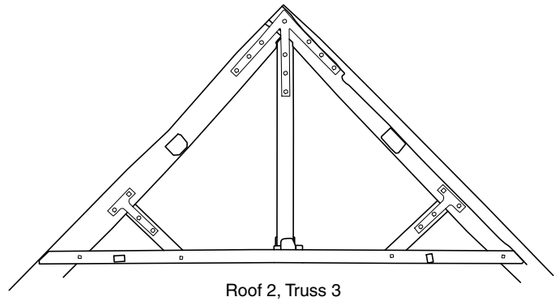


Roof 2

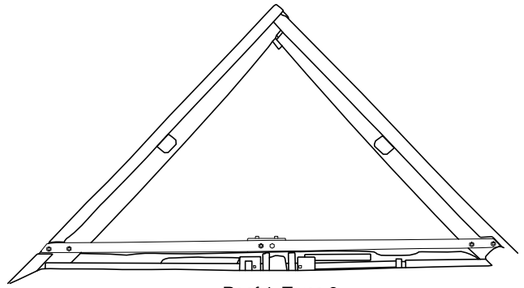
0 cm 2.5m 5m



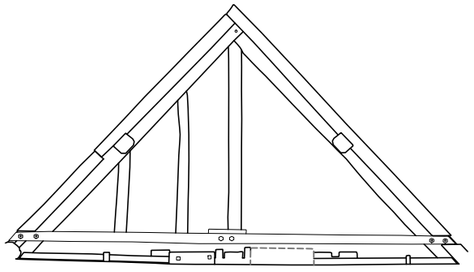
Roof 1, Truss 4
North Elevation



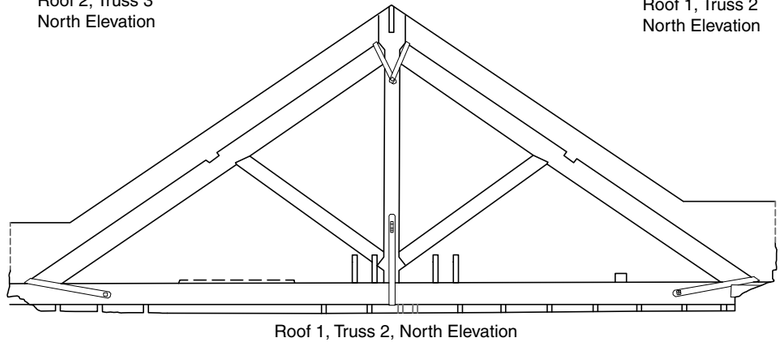
Roof 2, Truss 3
North Elevation



Roof 1, Truss 2
North Elevation



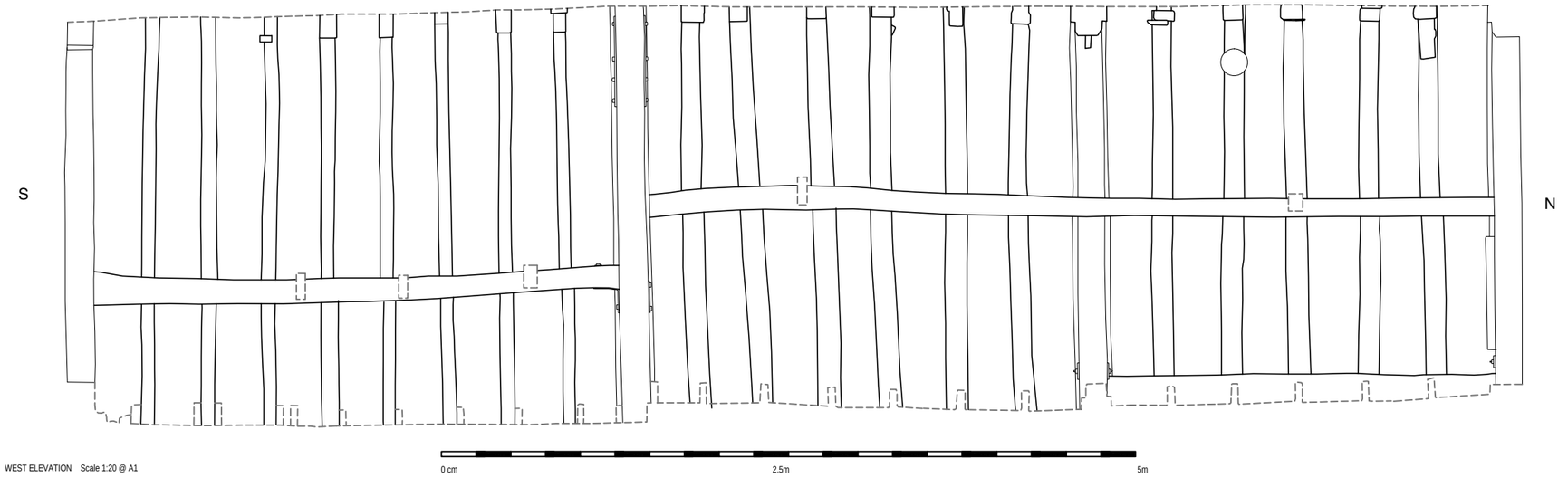
Roof 1, Truss 1
South Elevation



Roof 1, Truss 2, North Elevation

0 cm 2.5m 5m

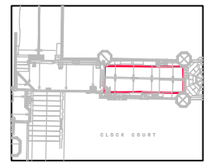
Figure 30: Roofs 1 and 2, plans and sections



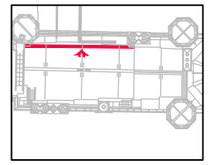
WEST ELEVATION Scale 1:20 @ A1

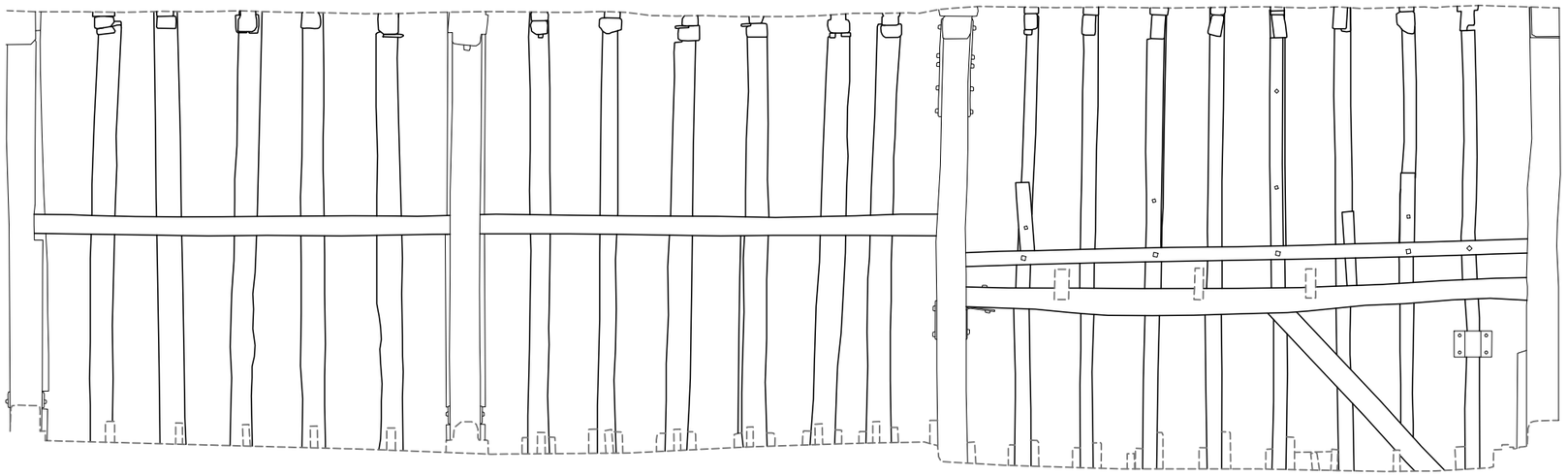
0 cm 2.5m 5m

PLAN LOCATION



ELEVATION LOCATION



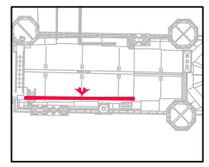


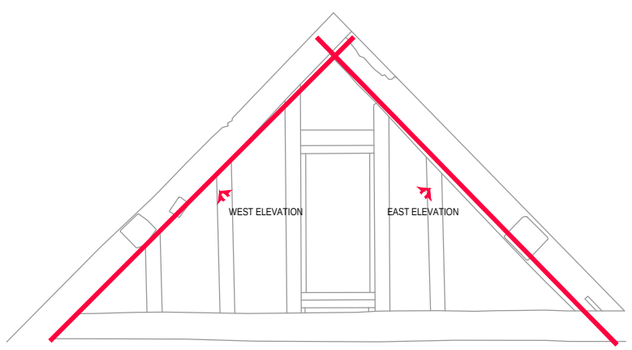
EAST ELEVATION Scale 1:20 @ A1

0 cm 2.5m 5m

PLAN LOCATION

ELEVATION LOCATION





TYPICAL TRUSS SHOWING IN_PLANE ELEVATION (VIEWED LOOKING NORTH)

Figure 31: Elevation of rafters and Truss 4 of Roof 2

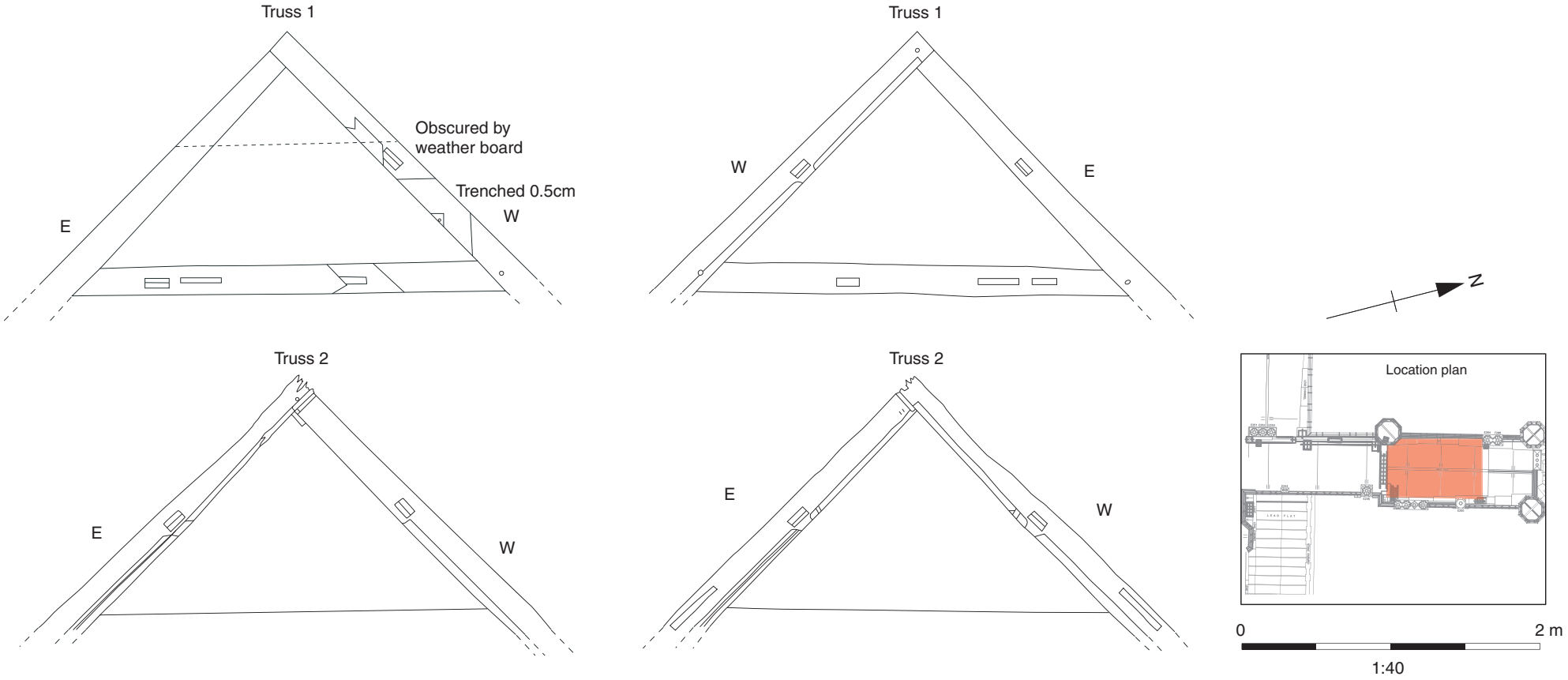
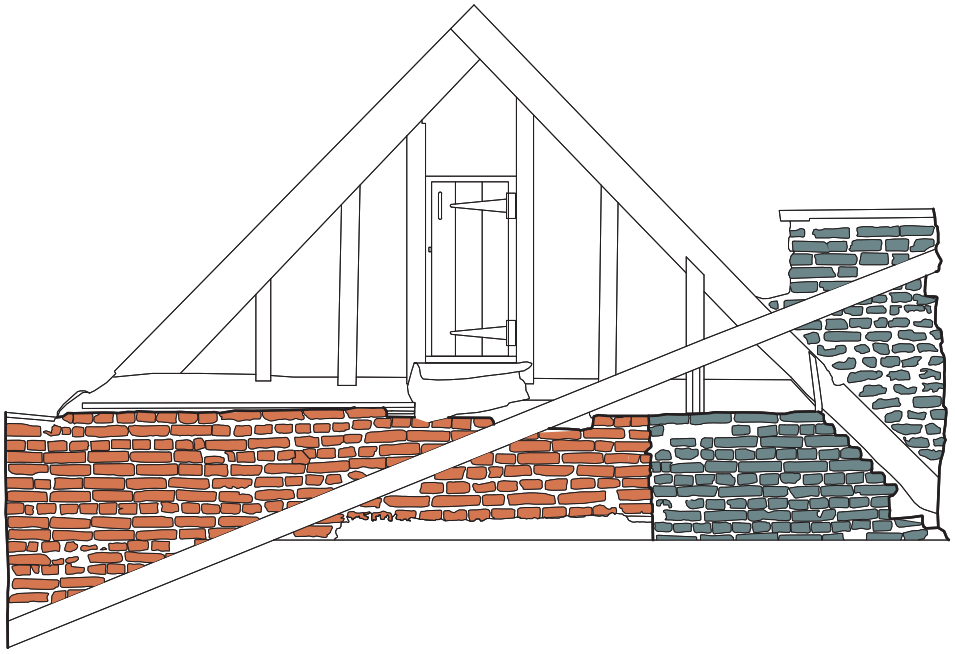
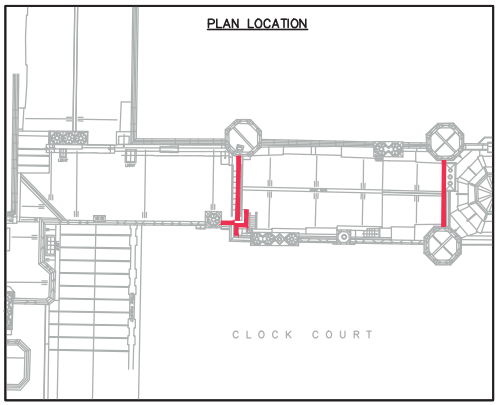


Figure 32: North and South elevations of Trusses 1 and 2, Roof 2



Henrician stock brick (C)
Elizabethen
Modern straw imprint brick 1950's - 1960's repair
Stone work, Iron work and undateable brick



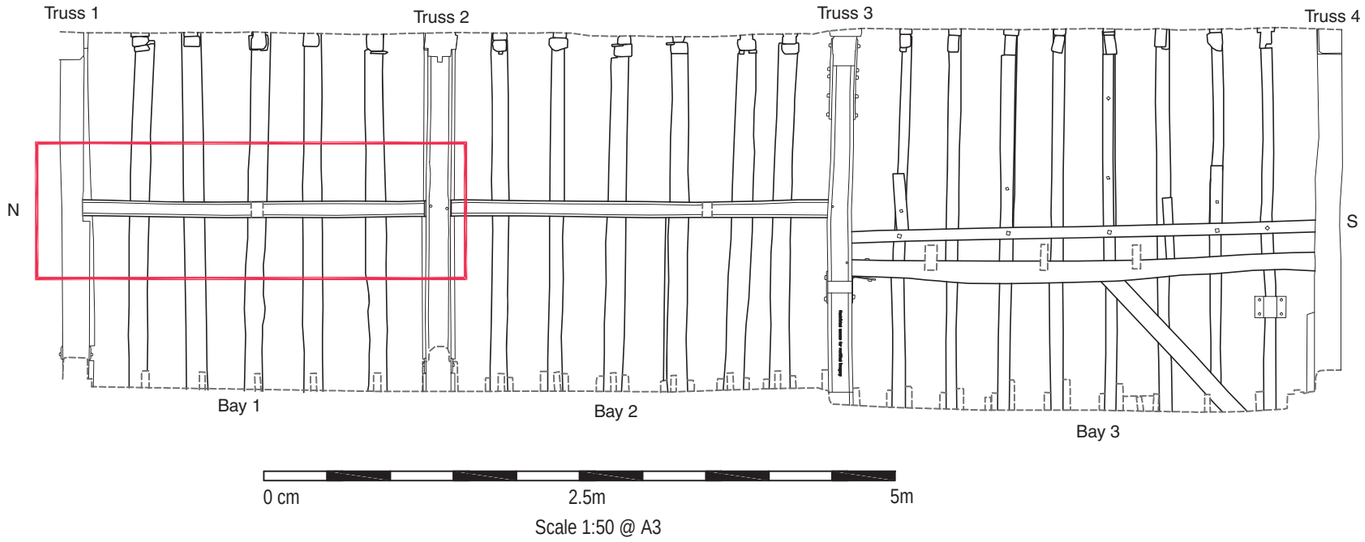
N

0 2 m

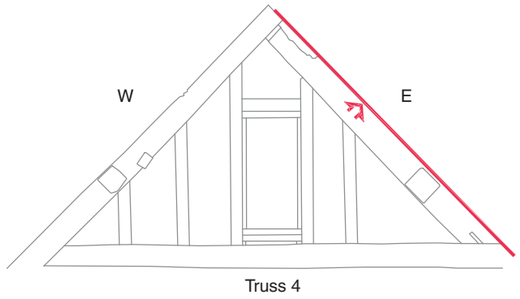
1:40

Figure 33: Elevation of south end of Roof 2 showing section of Roof 3 and return elevations of Clock Court inner parapet

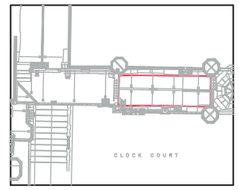
Figure 34: Plan of Roof 4



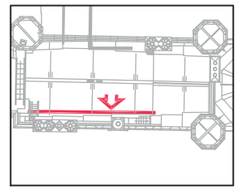
Scale 1:50 @ A3

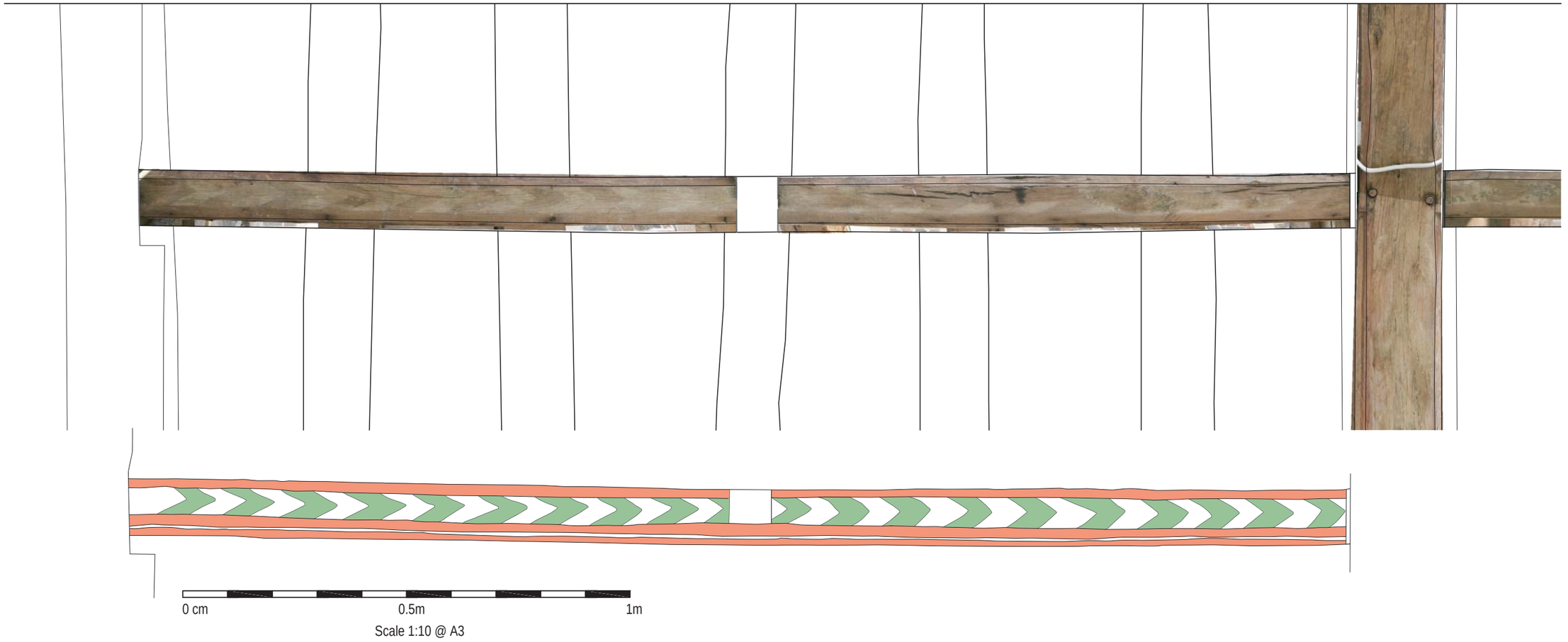


PLAN LOCATION



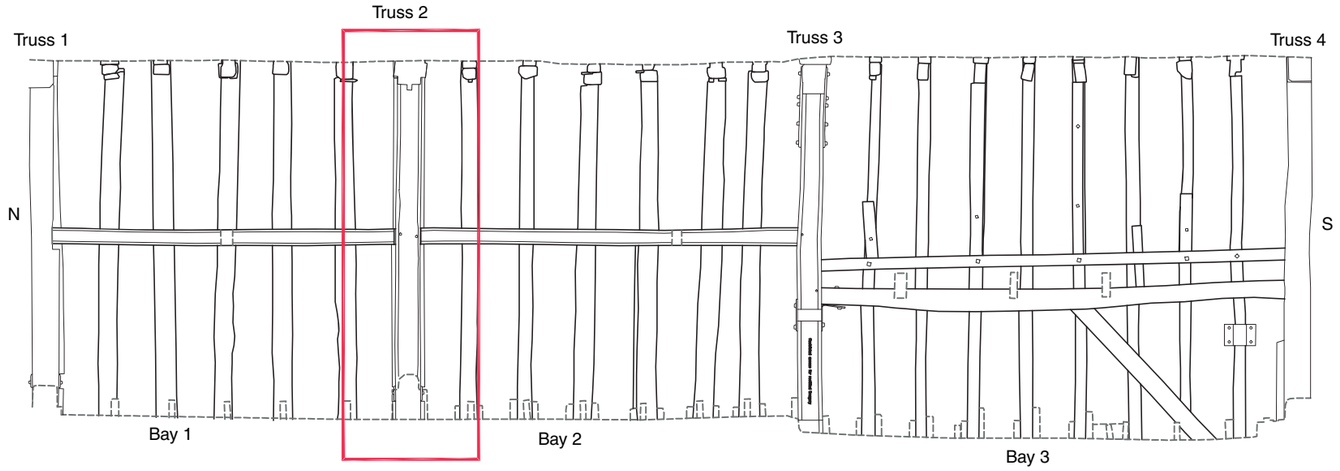
ELEVATION LOCATION

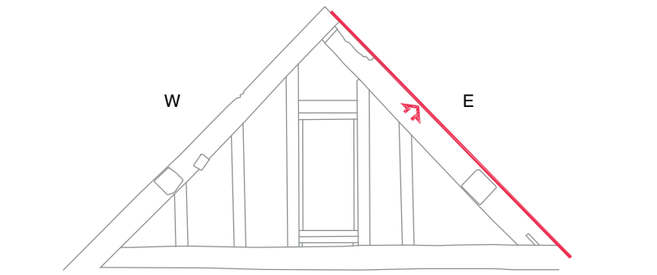




Scale 1:10 @ A3

Figure 35: Painted east purlin of Bay 1, Roof 2

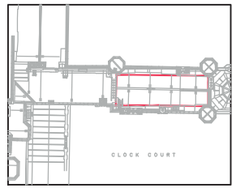




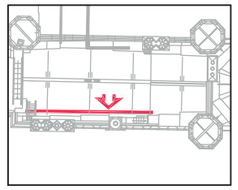
0 cm 2.5m 5m

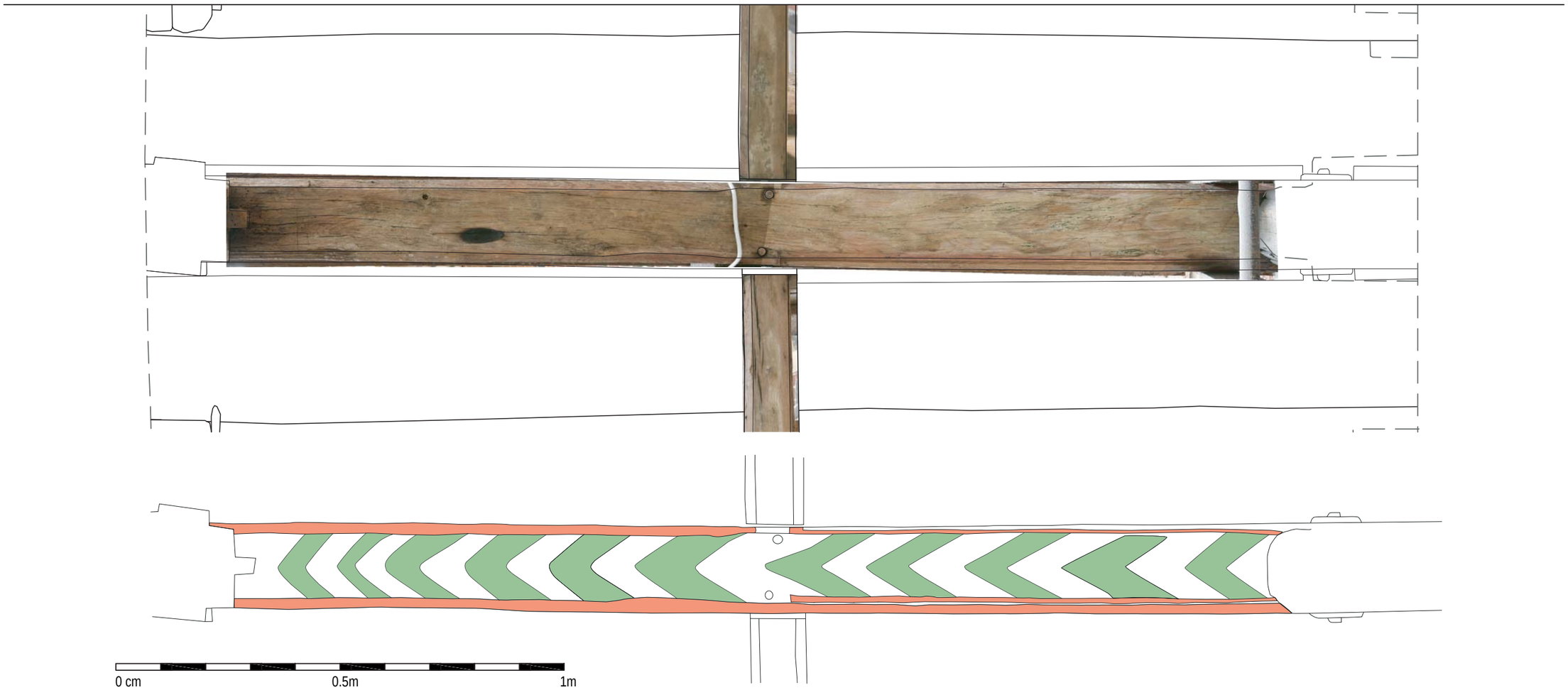
Scale 1:50 @ A3

PLAN LOCATION



ELEVATION LOCATION

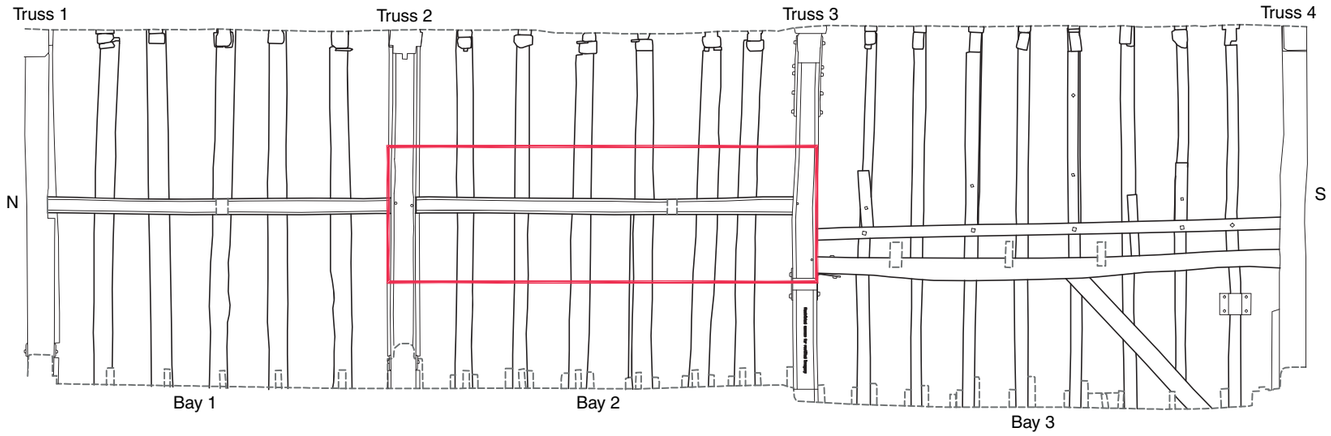


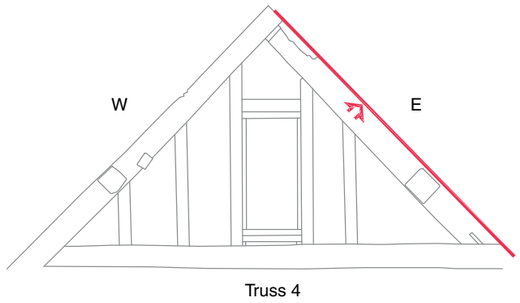


0 cm 0.5m 1m

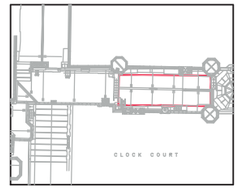
Scale 1:10 @ A3

Figure 36: Painted east principal rafter of Truss 2, Roof 2

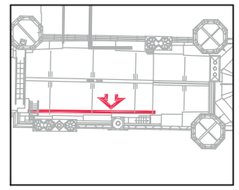


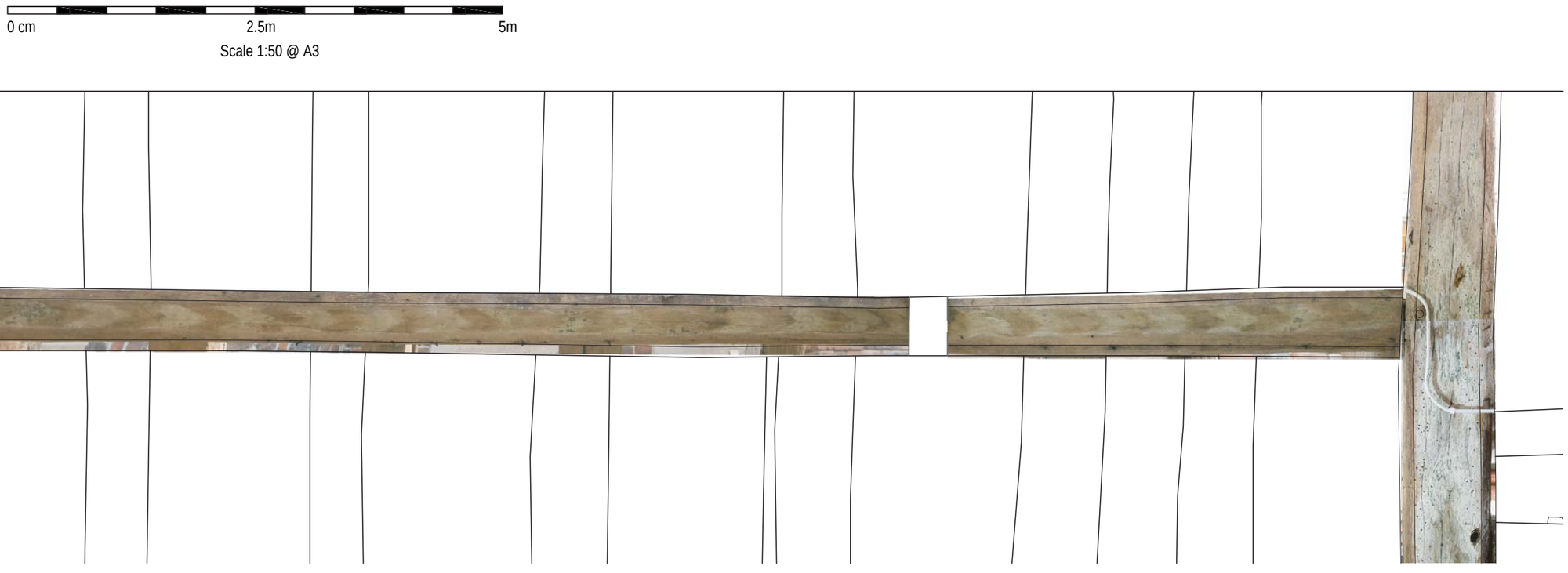


PLAN LOCATION



ELEVATION LOCATION





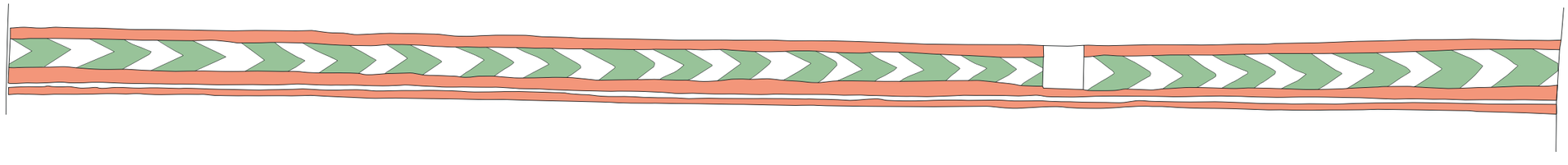
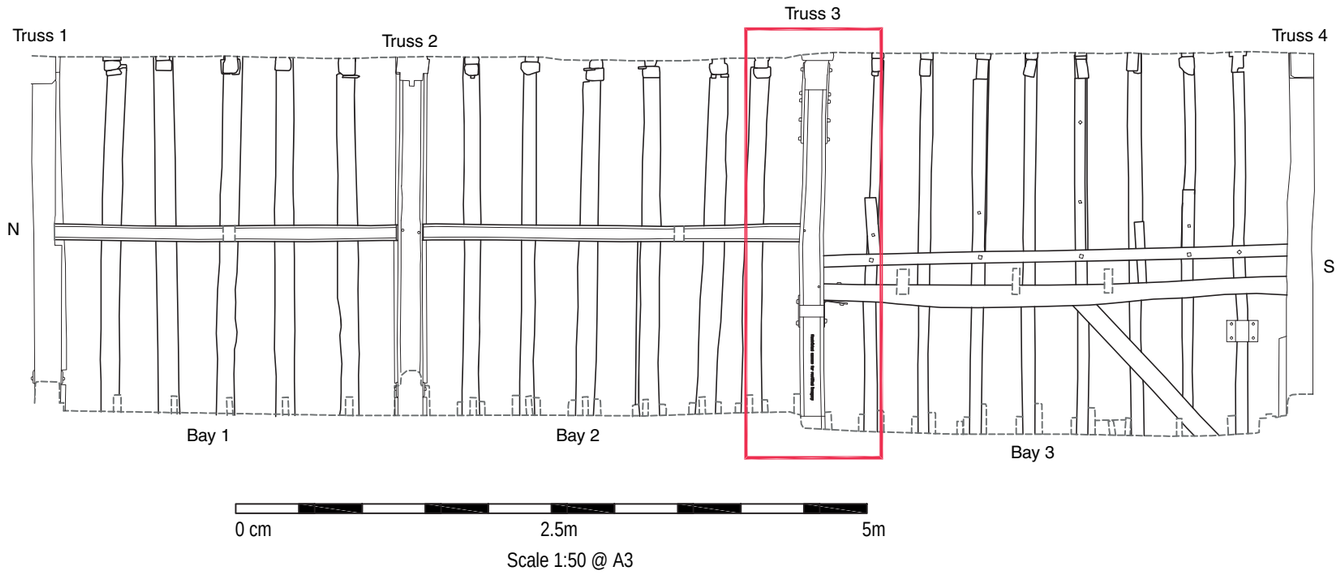
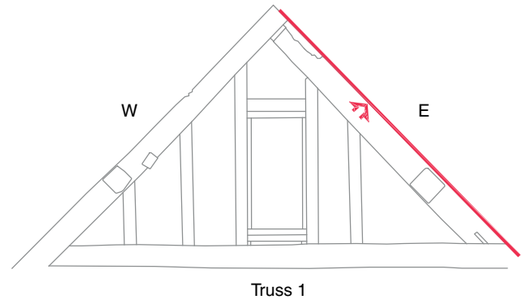


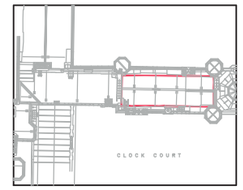
Figure 37: Painted east purlin of Bay 2, Roof 2



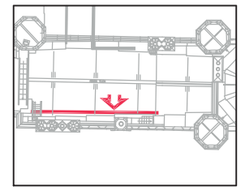
Scale 1:50 @ A3

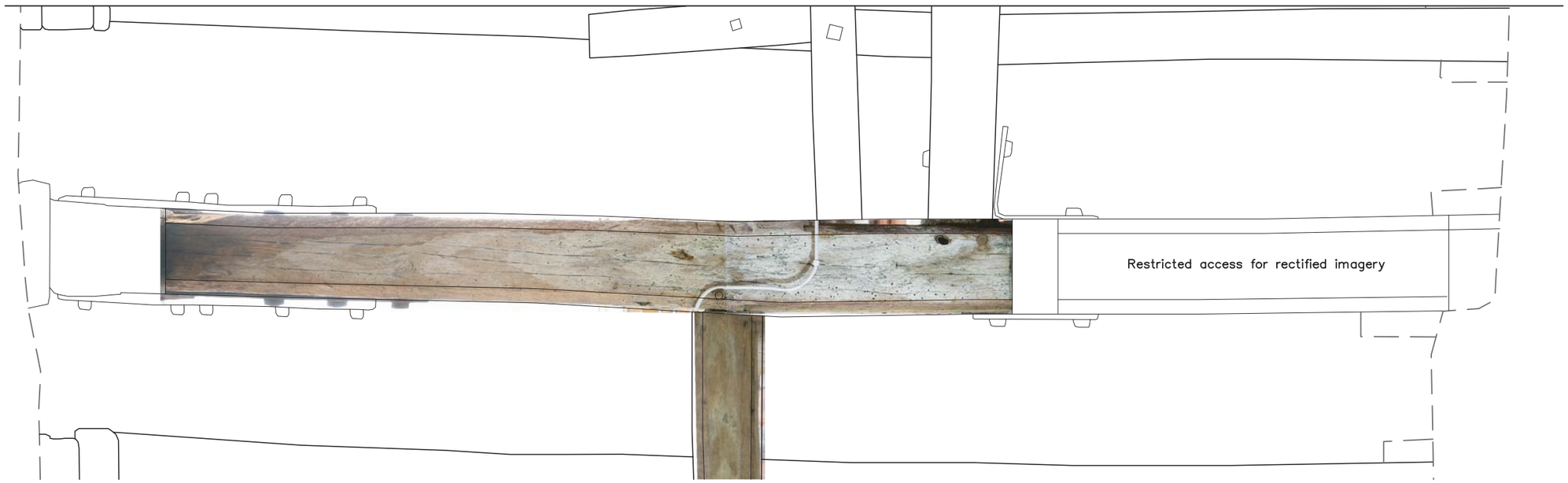


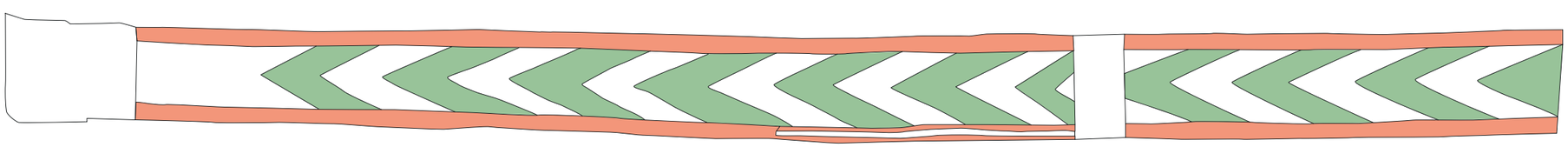
PLAN LOCATION



ELEVATION LOCATION



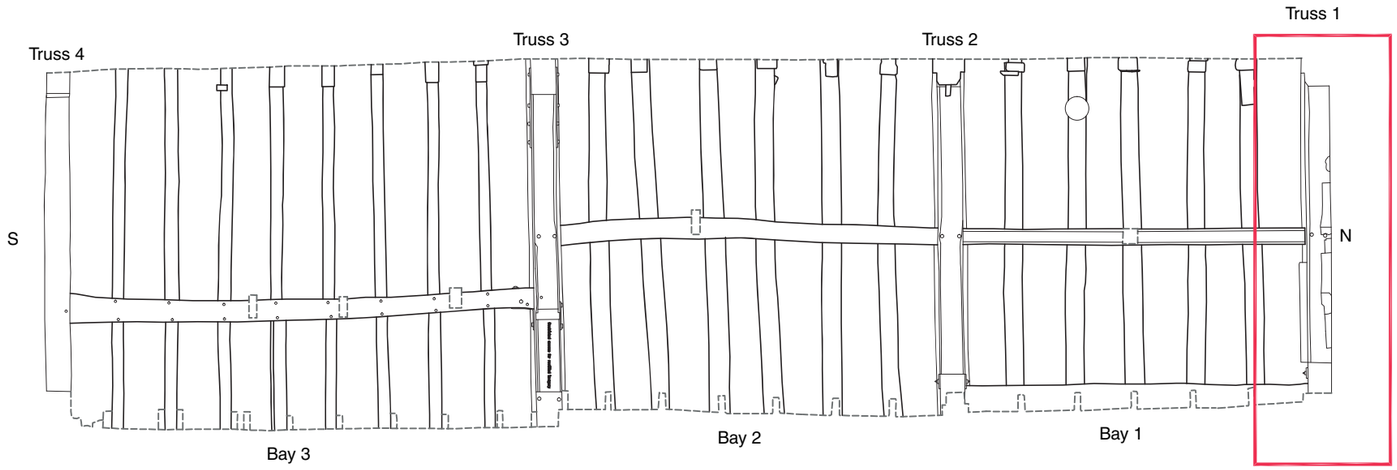




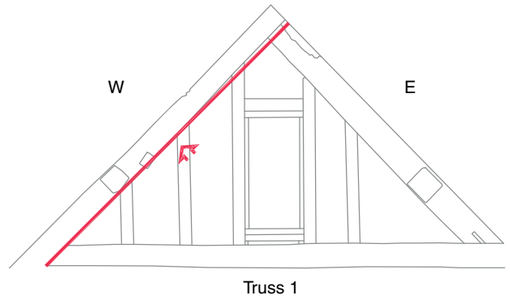
0 cm
0.5m
1m

Scale 1:10 @ A3

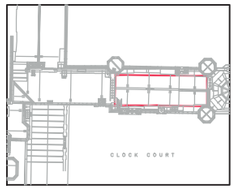
Figure 38: Painted east principal rafter of Truss 3, Roof 2



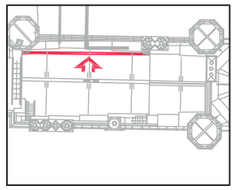
Scale 1:50 @ A3

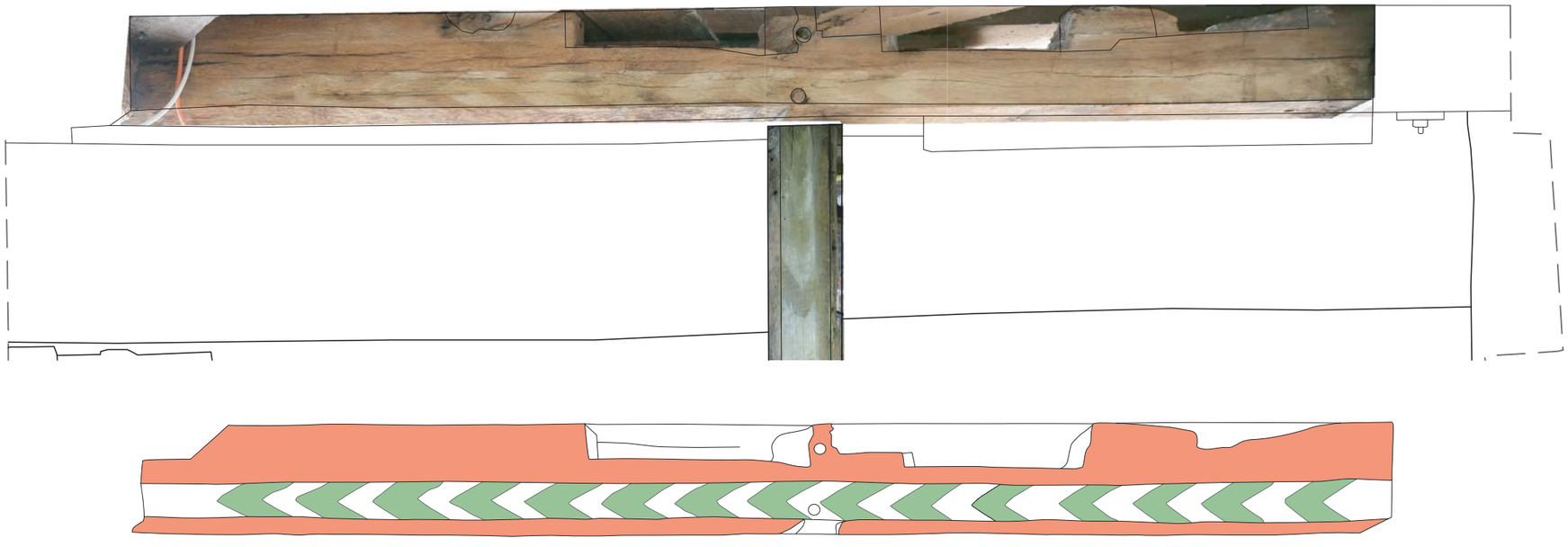


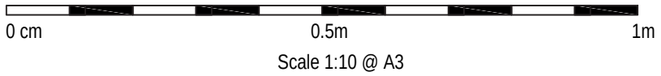
PLAN LOCATION



ELEVATION LOCATION

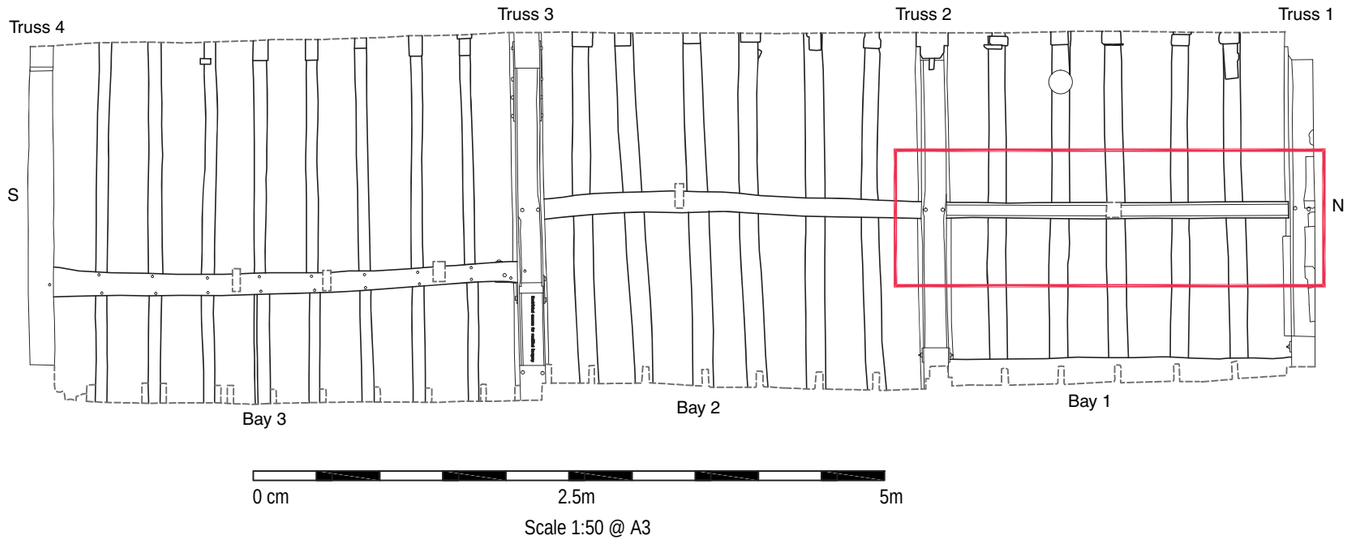




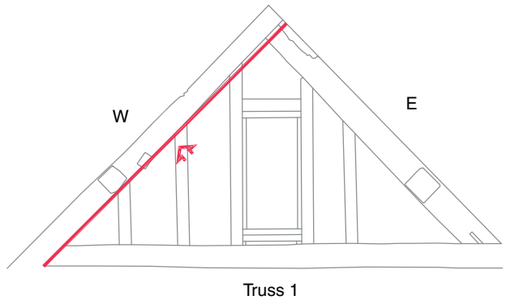


Scale 1:10 @ A3

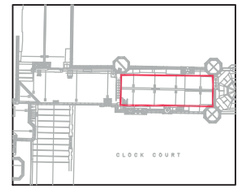
Figure 39: Painted west principal rafter of Truss 1, Roof 2



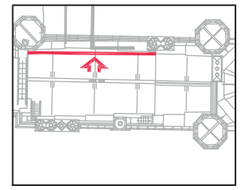
Scale 1:50 @ A3

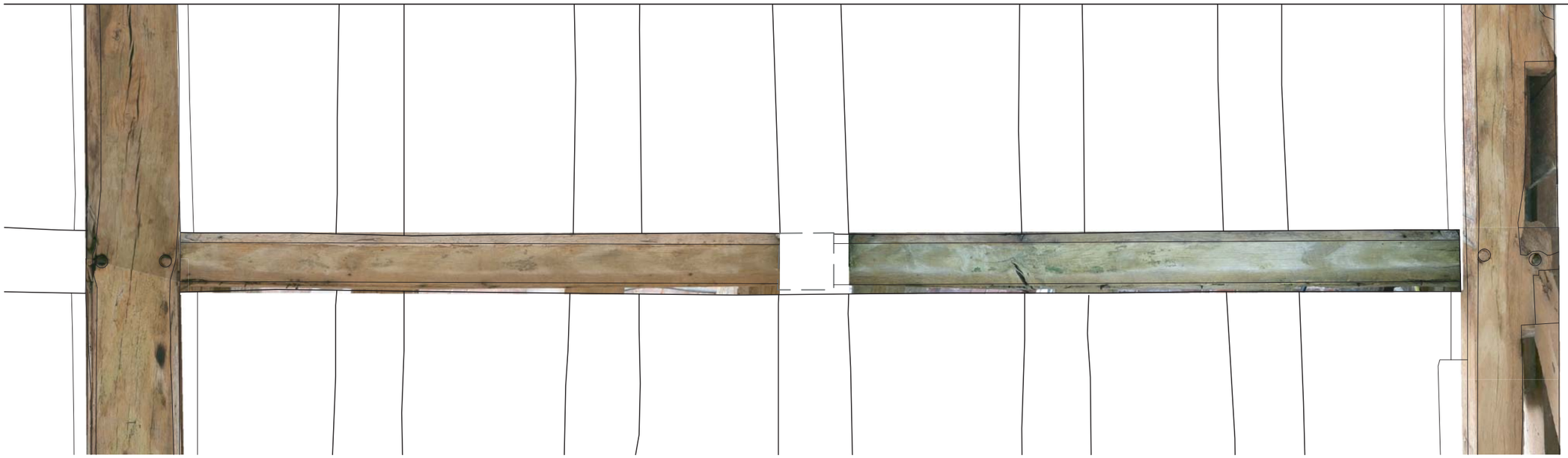


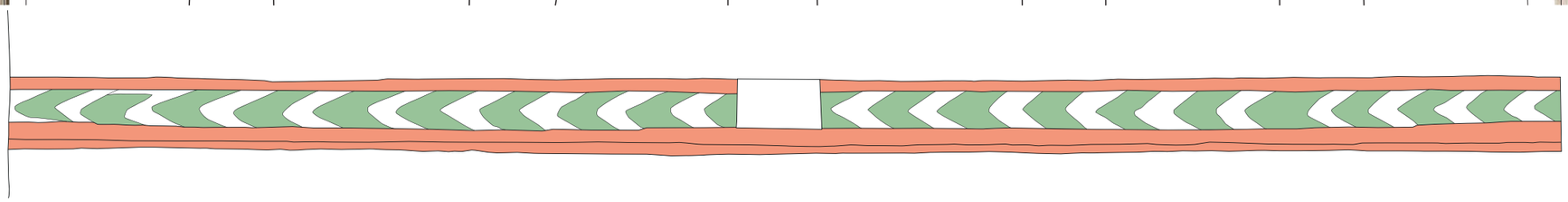
PLAN LOCATION



ELEVATION LOCATION



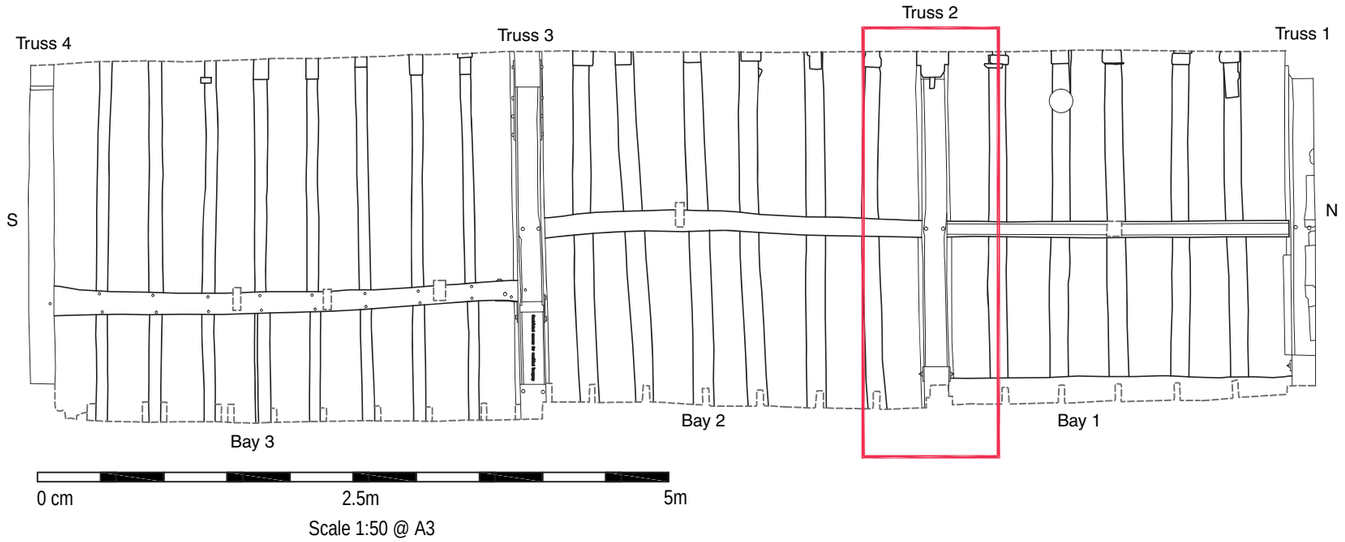


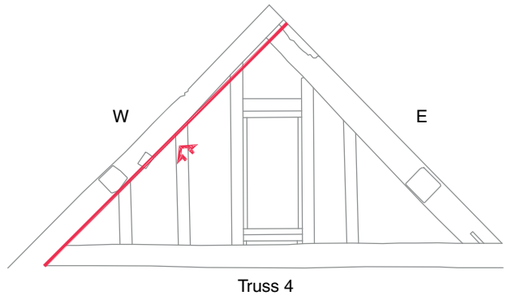


0 cm 0.5m 1m

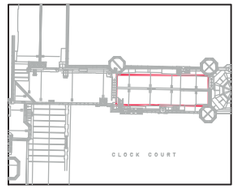
Scale 1:10 @ A3

Figure 40: Painted west purlin of Bay 1, Roof 2

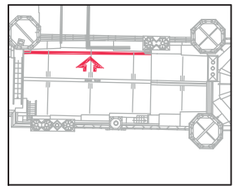




PLAN LOCATION



ELEVATION LOCATION



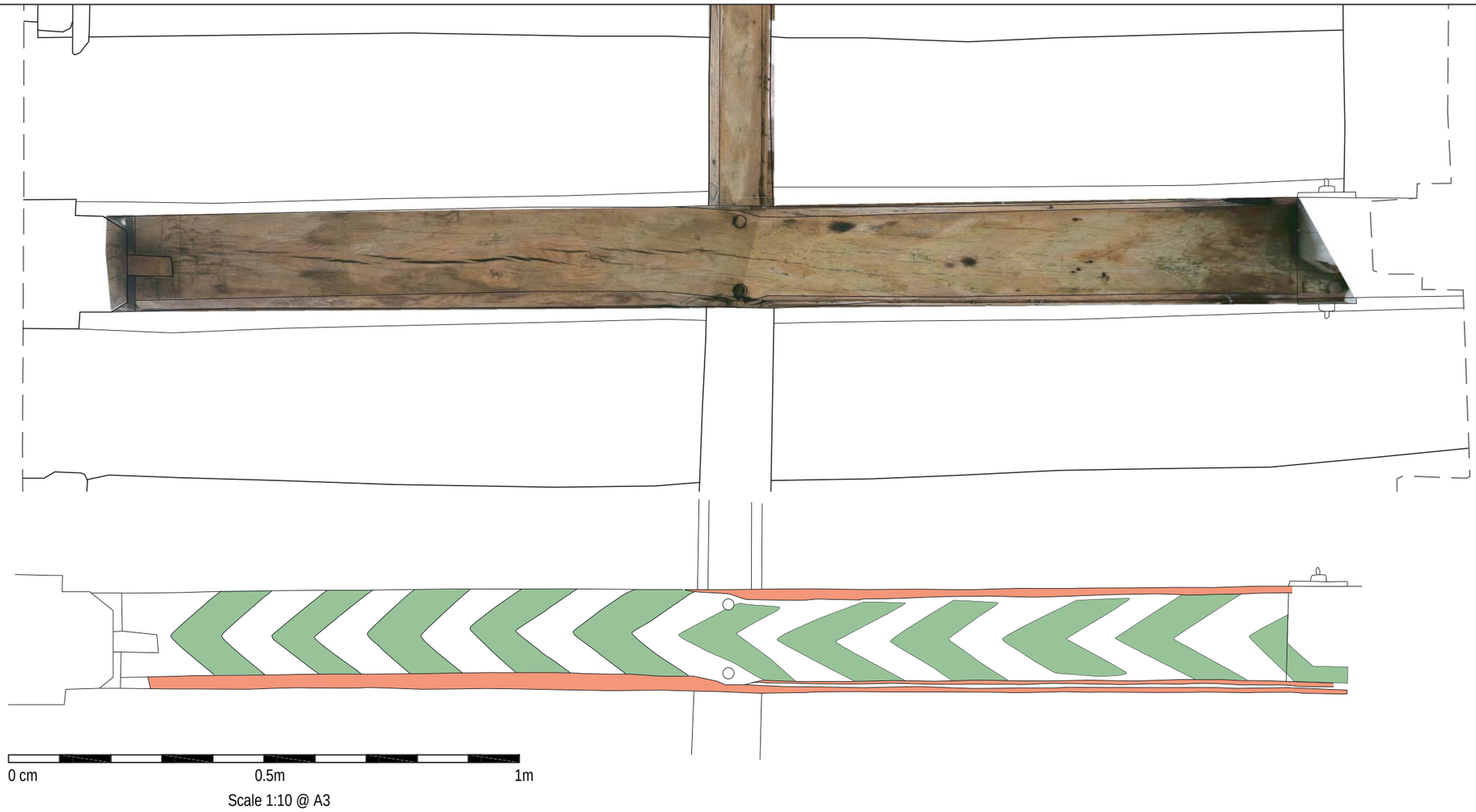
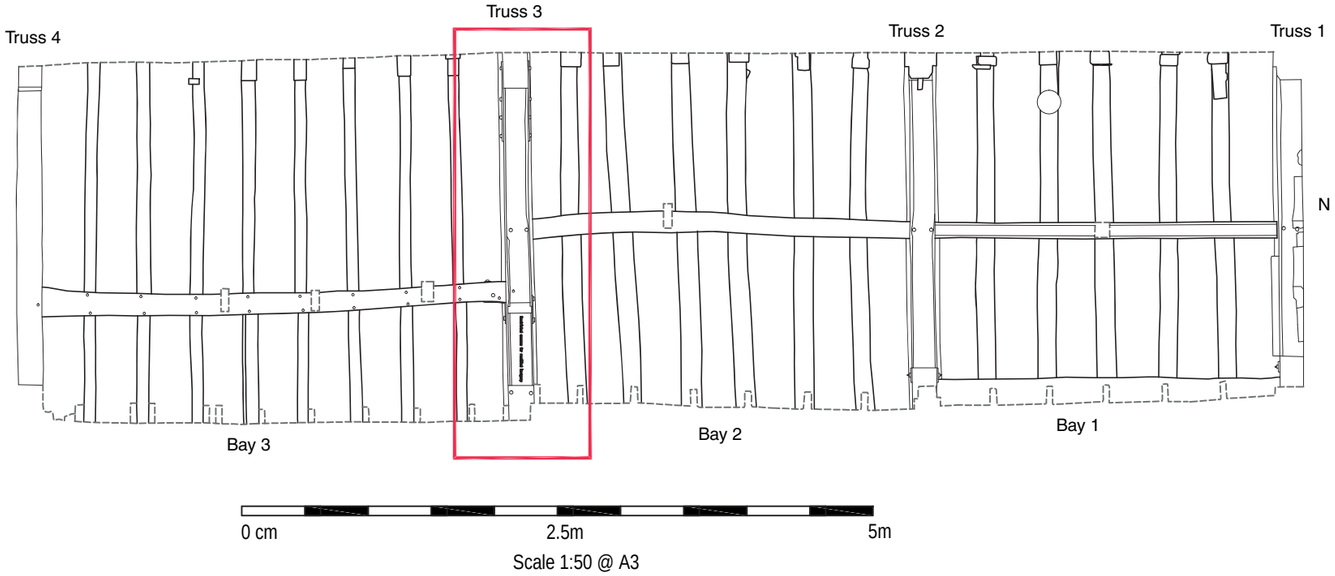
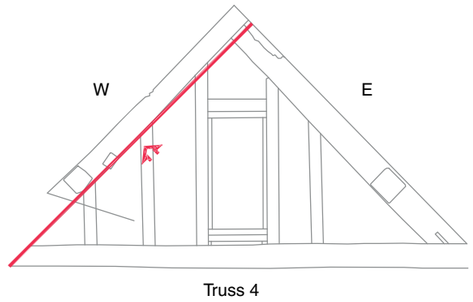
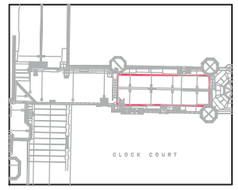


Figure 41: Painted west principal rafter of Truss 2, Roof 2





PLAN LOCATION



ELEVATION LOCATION

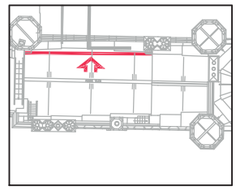
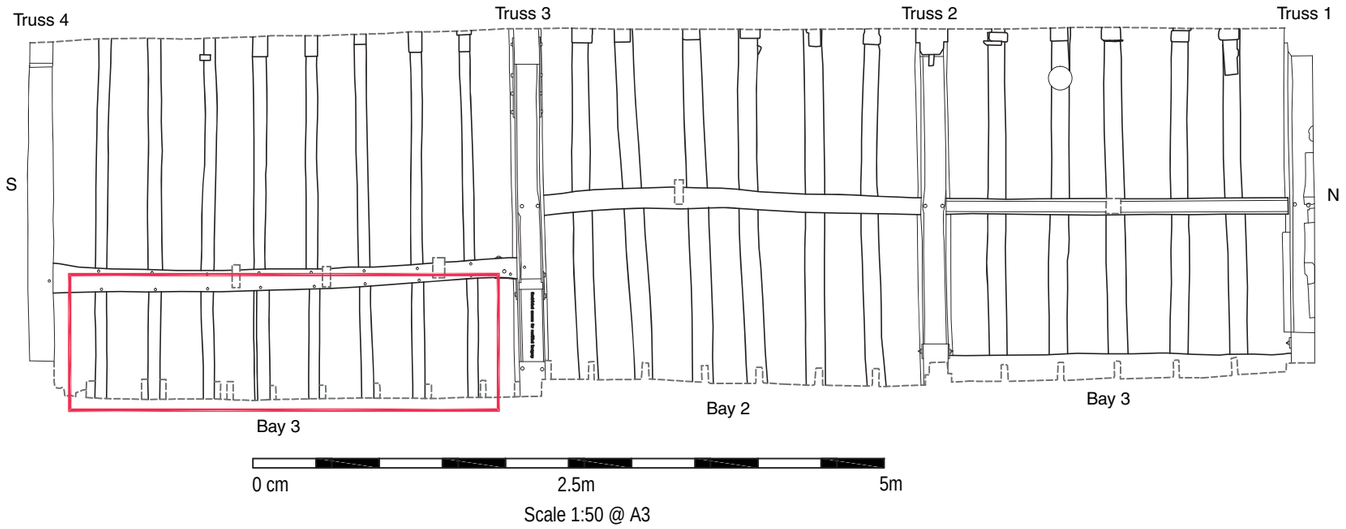
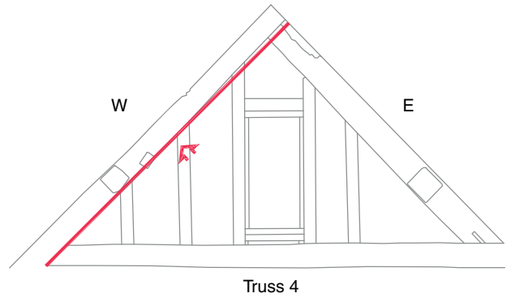


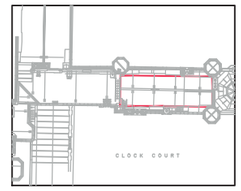
Figure 42: Painted west principal rafter in Truss 3, Roof 2



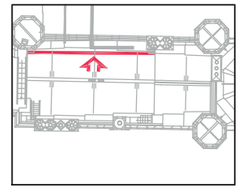
Scale 1:50 @ A3

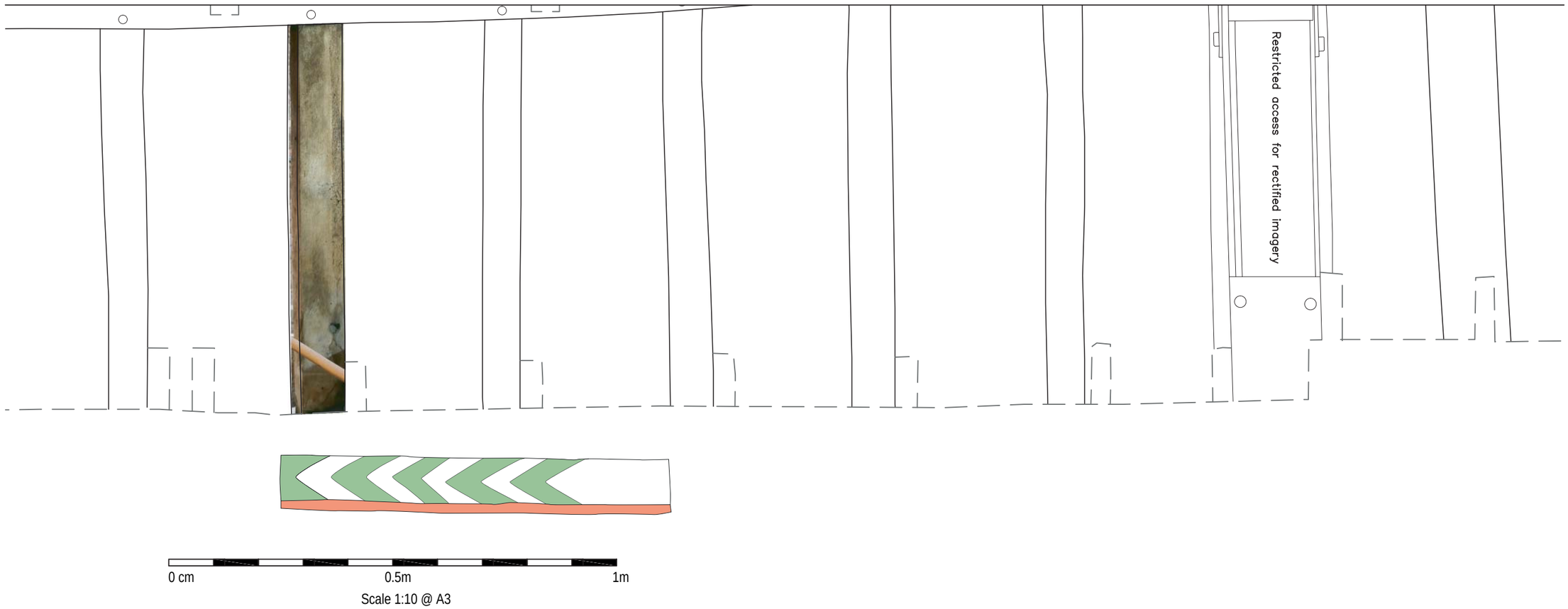


PLAN LOCATION



ELEVATION LOCATION





0 cm
0.5m
1m

Scale 1:10 @ A3

Figure 43: Painted rafter in west side of Bay 3, Roof 2

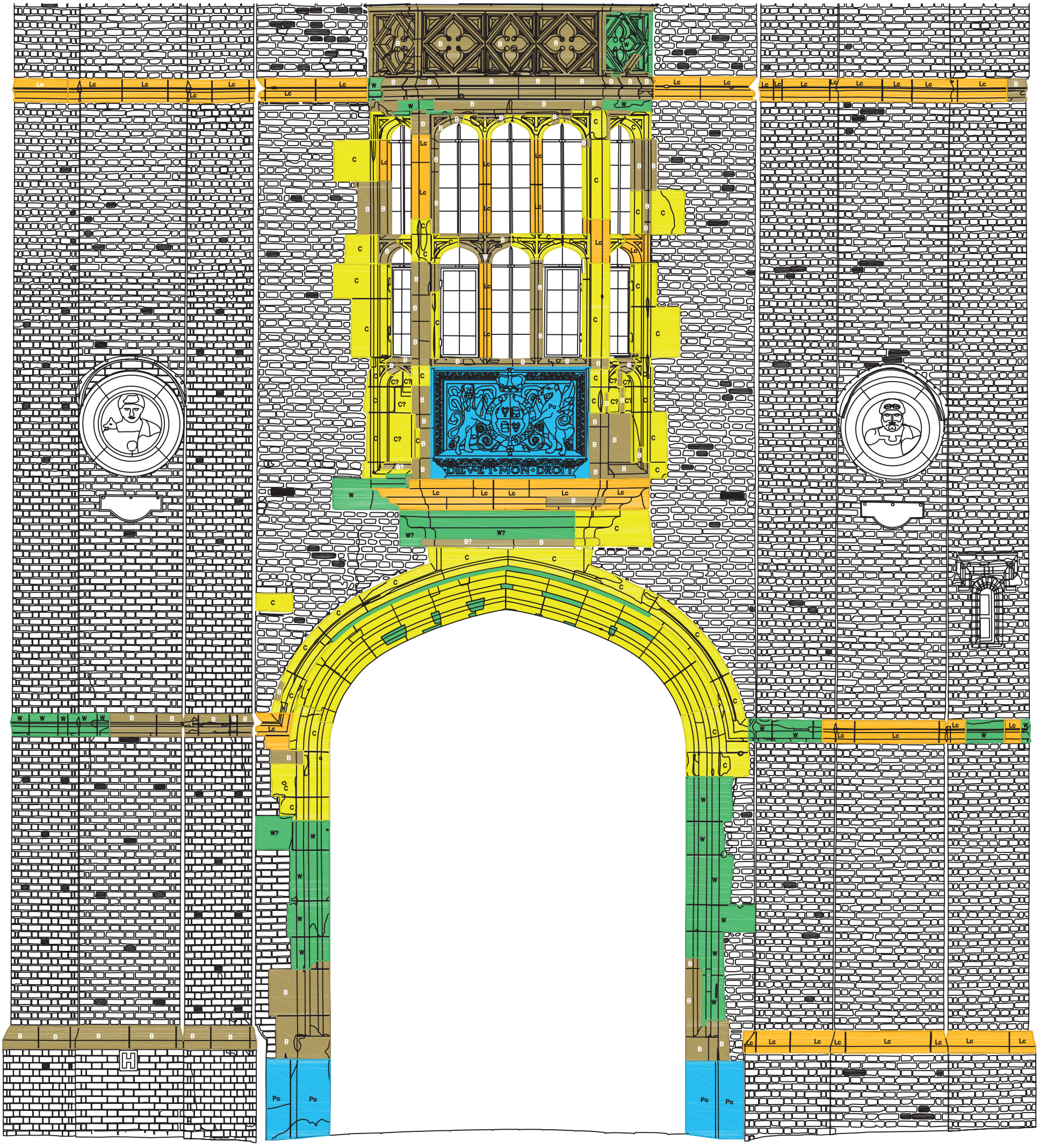
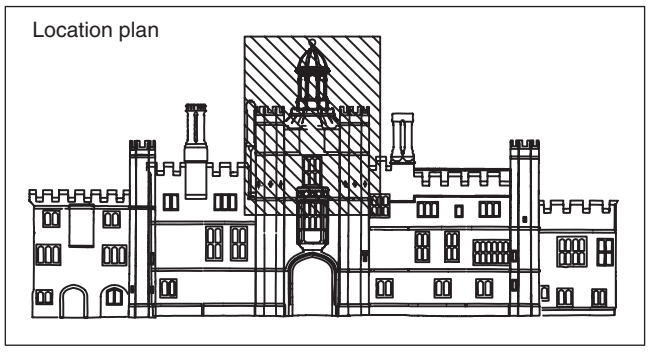


Figure 44: Lithography Survey of Lower west elevation of the Anne Bowleyn Gatehouse

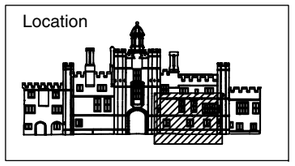


B - Great Oolite Limestone
Lc - Lincolnshire Limestone (Clipsham)
Lw - Lincolnshire Limestone (Wheldon)
Po - Portland Stone
U - Unidentified Stones
W - Wheatly Limestone
C - Caen Stone

0 2 m

1:40

Figure 45: Lithography Survey of Upper west elevation of the Anne Bowleyn Gatehouse

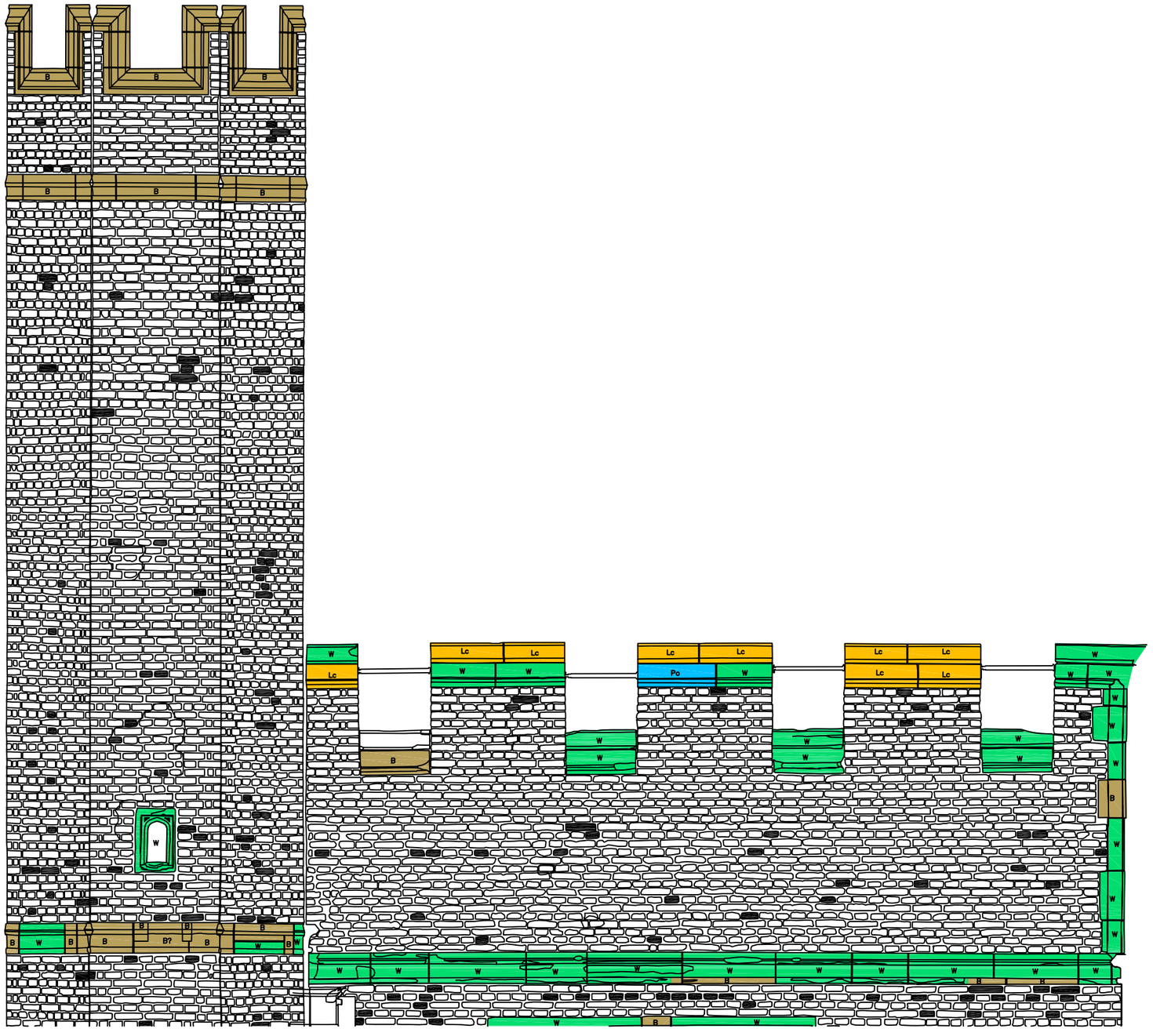


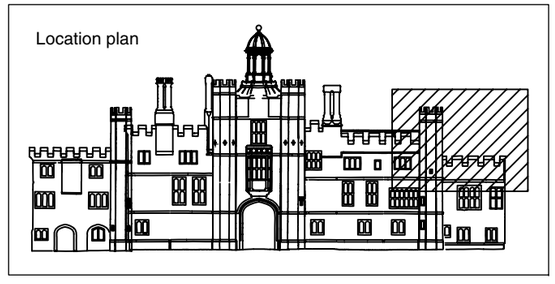
B - Great Oolite Limestone
Lc - Lincolnshire Limestone (Clipsham)
Lw - Lincolnshire Limestone (Wheldon)
Po - Portland Stone
Sl - Welsh Cambrian Slate
R - Reigate Stone
U - Unidentified Stones
W - Wheatly Limestone
C - Caen Stone

0 2 m

1:40

Figure 46: Lithography Survey of Base Court – West Facing Elevation Part 1



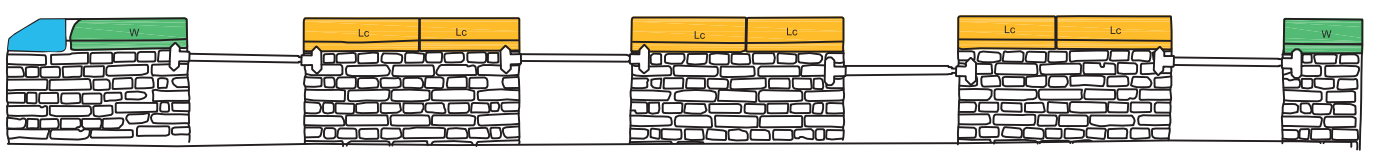


B - Great Oolite Limestone
Lc - Lincolnshire Limestone (Clipsham)
Po - Portland Stone
U - Unidentified Stones
W - Wheatly Limestone

0 2 m

1:40

Figure 47: Lithography Survey of Base Court – West Facing Elevation Part 2



Lc - Lincolnshire Limestone (Clipsham)
Po - Portland Stone
W - Wheatly Limestone

0 2 m

1:40

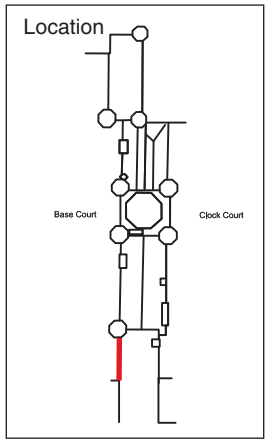
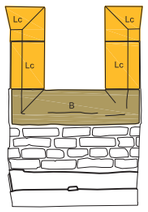
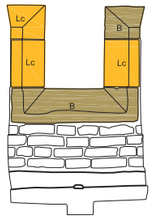


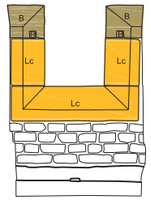
Figure 48: Lithography Survey of, Inner parapet, Base Court – West Facing Elevation Part 2



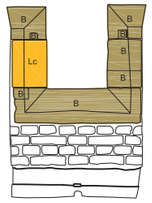
EAST
ELEVATION



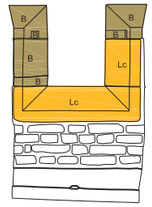
SOUTH EAST
ELEVATION



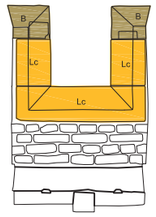
SOUTH
ELEVATION



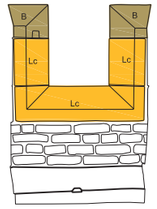
SOUTH WEST
ELEVATION



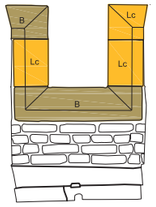
WEST
ELEVATION



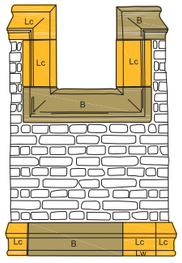
NORTH WEST
ELEVATION



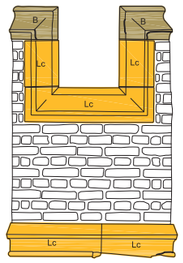
NORTH
ELEVATION



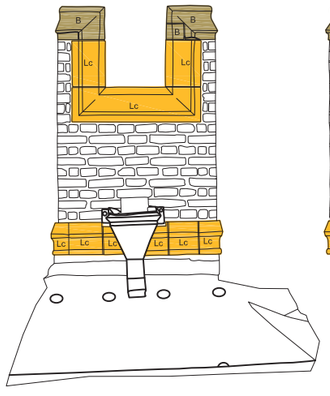
NORTH EAST
ELEVATION



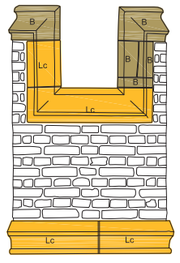
NORTH EAST
ELEVATION



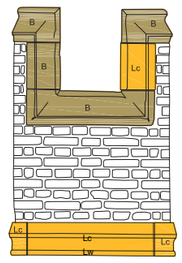
NORTH
ELEVATION



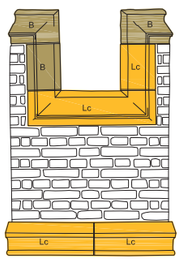
NORTH WEST
ELEVATION



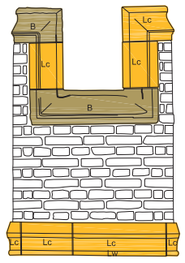
WEST
ELEVATION



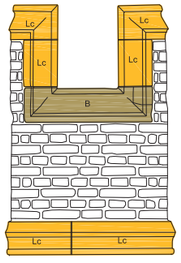
SOUTH WEST
ELEVATION



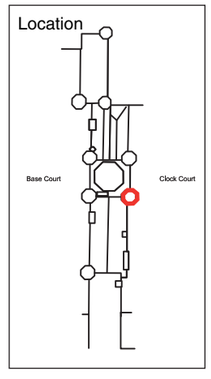
SOUTH
ELEVATION



SOUTH EAST
ELEVATION



EAST
ELEVATION



B - Great Oolite Limestone
Lc - Lincolnshire Limestone (Clipsham)
Lw - Lincolnshire Limestone (Wheldon)

0 2 m

1:40

Figure 49: Lithography Survey of Base Court Turret Parapet

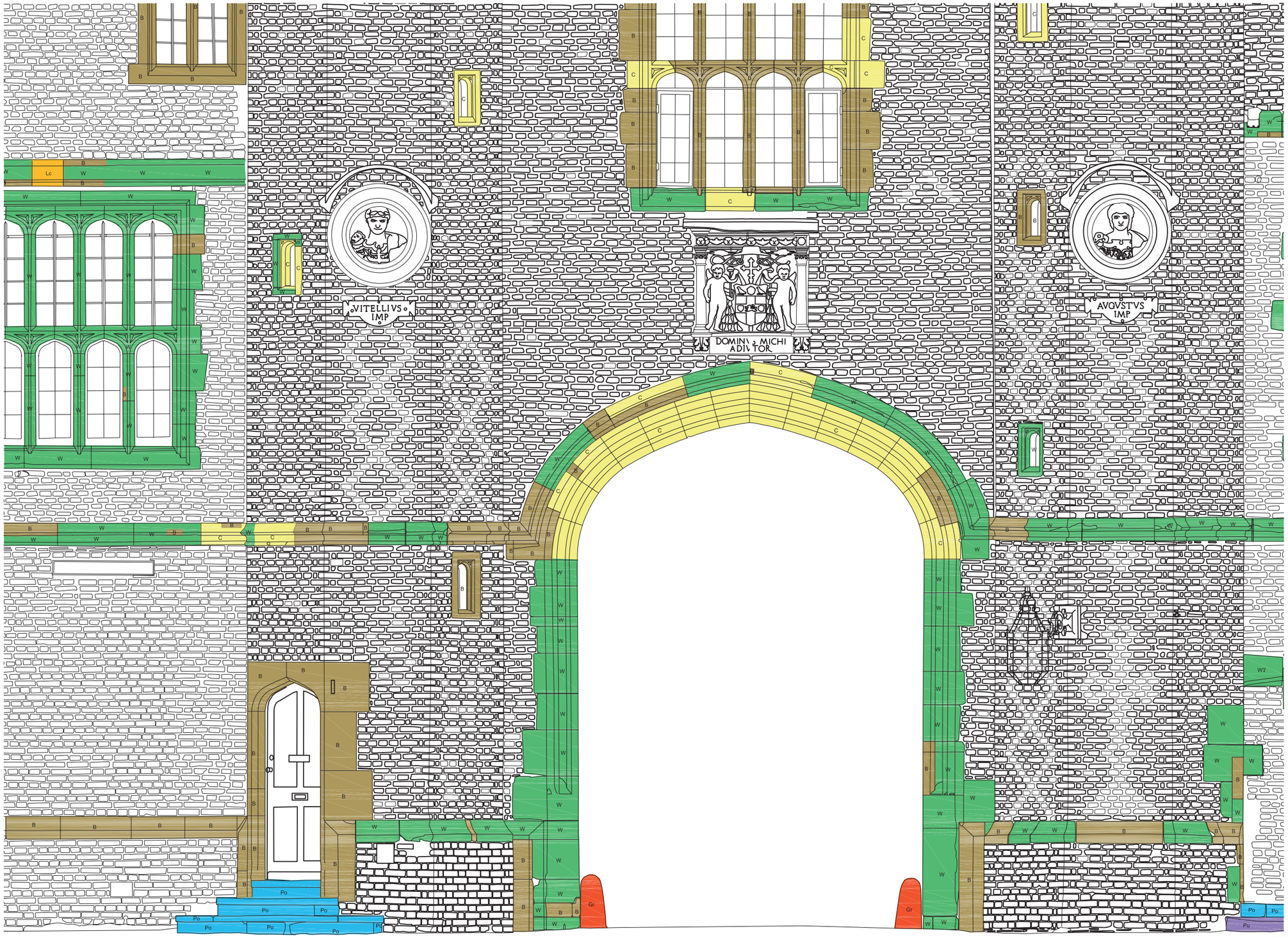


Figure 50: Lithography Survey of Lower east elevation of the Anne Bowleyn Gatehouse

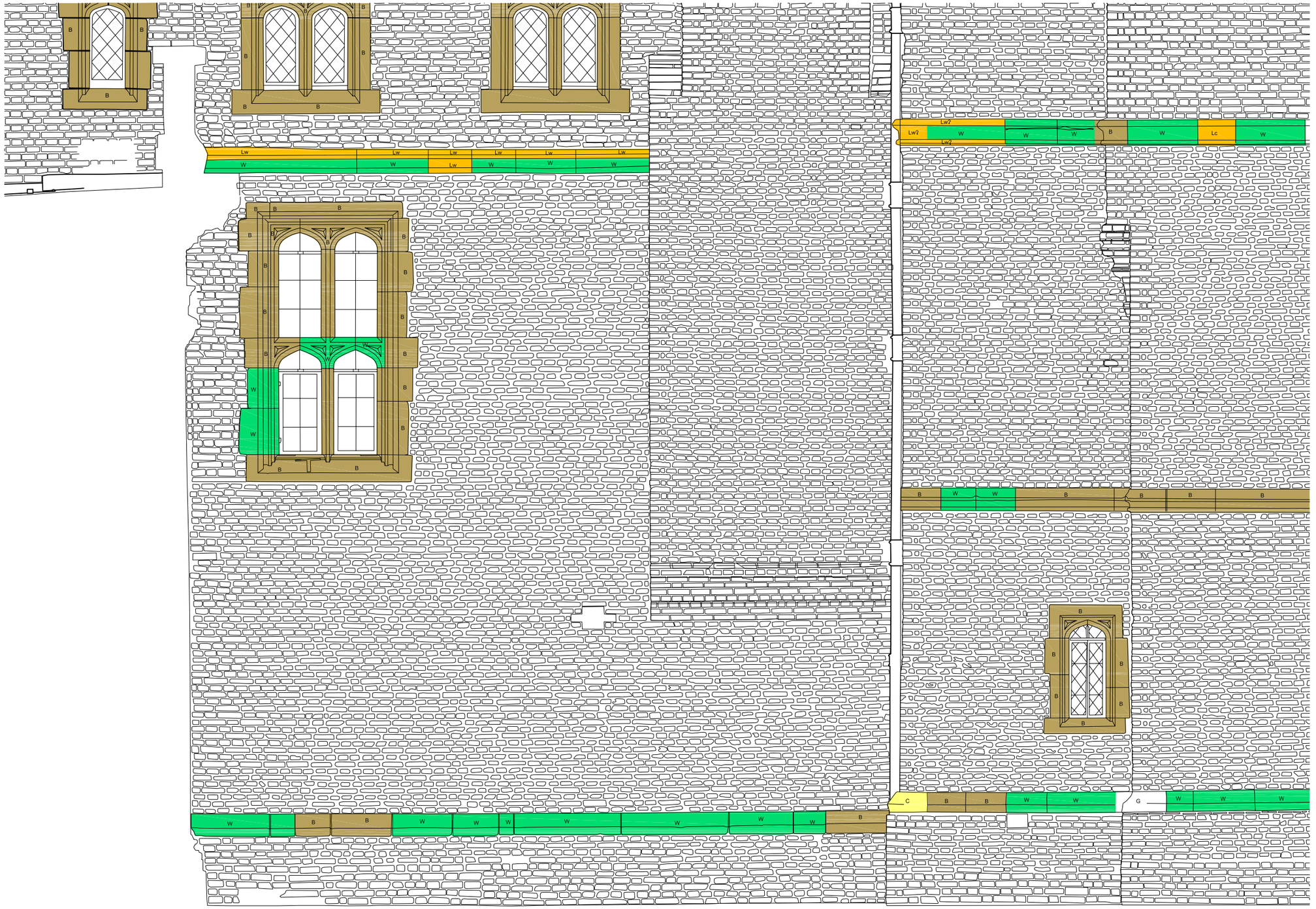


Figure 51: Lithography Survey of Lower Clock Court – East facing Elevation Part 1

Figure 52: Lithography Survey of Upper Clock Court – East facing Elevation Part 1

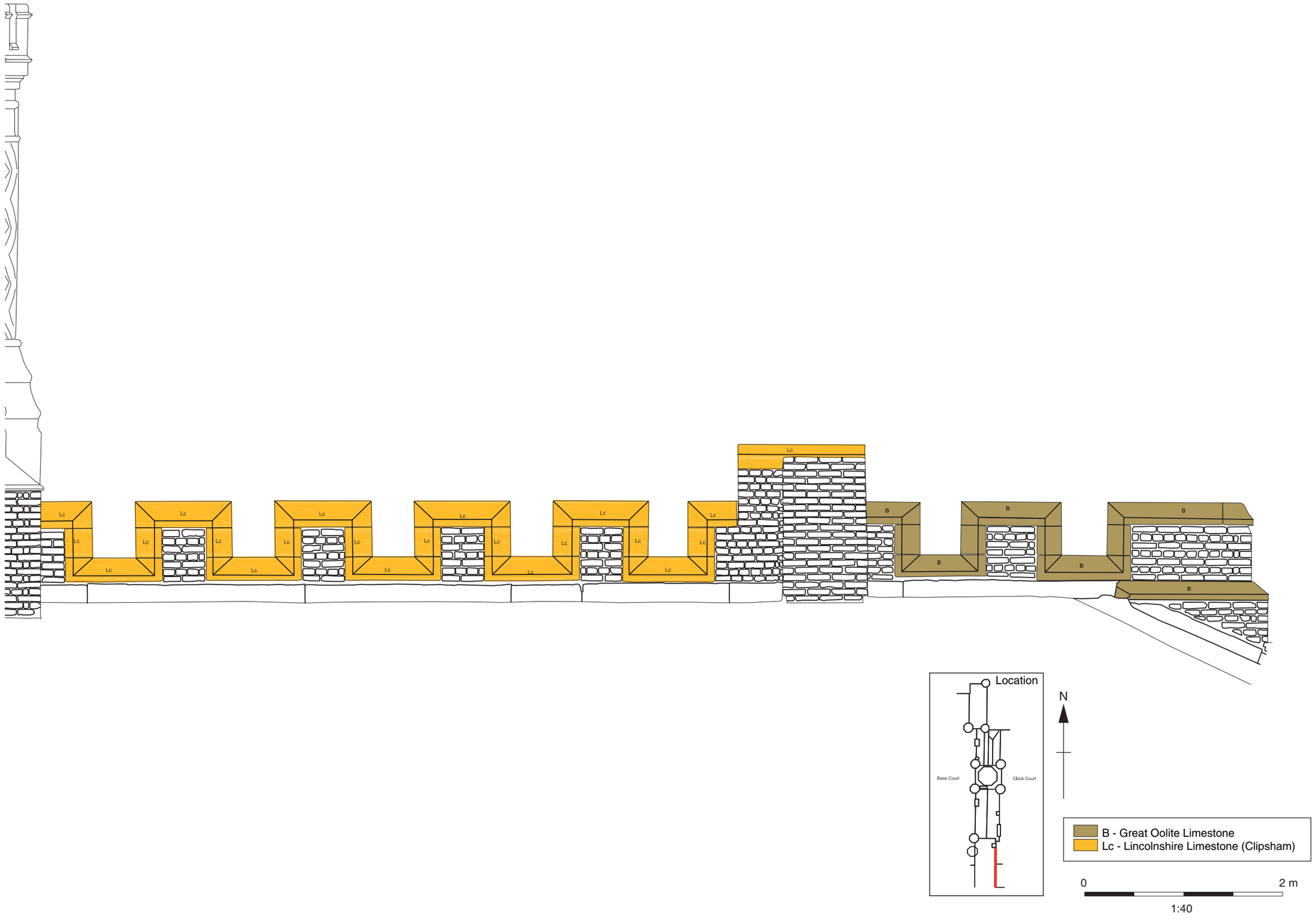
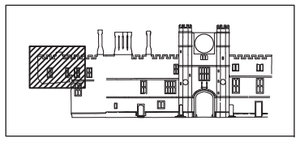


Figure 53: Lithography Survey of Inner parapet, Clock Court – East Facing Elevation Part 1

Figure 54: Lithography Survey of Lower Clock Court – East facing Elevation Part 2



B - Great Oolite Limestone
Lc - Lincolnshire Limestone (Clipsham)
Lw - Lincolnshire Limestone (Wheldon)
U - Unidentified Stones
W - Wheatly Limestone

0 2 m

1:40

Figure 55: Lithography Survey of Upper Clock Court – East facing Elevation Part 2

Plate 1: General view of west facing elevations of Base Court, looking north east

Plate 2: Base Court - West facing Elevation Part 1

Plate 3: Base Court - West facing Elevation Part 1, detail of primary brickwork (A)

Plate 4: Base Court - West facing Elevation Part 1, upper parapet, looking north east

Plate 5: Base Court - West facing Elevation Part 1, upper parapet, looking north east

Plate 6: Base Court - West facing Elevation Part 1, Second floor hood mould, looking east

Plate 7: Base Court - West facing Elevation Part 1, Second floor hood mould, looking east

Plate 8: Base Court – West Facing Elevation Part 2

Plate 9: Mixture of Brick Type B and Brick Type V on Base Court parapet

Plate 10: Chimney breast that supports chimneys E251, E252 and E253, looking west

Plate 11: Upper section of Base Court Turret, looking north west

Plate 12: Detail of south west face of Base Court Turret

Plate 13: General view of east facing elevations of Clock Court, looking west

Plate 14: Clock Court – East Facing Elevation Part 1

Plate 15: Exposed Daubeney turret in the ground floor of Clock Court East Facing Elevation – Part 1

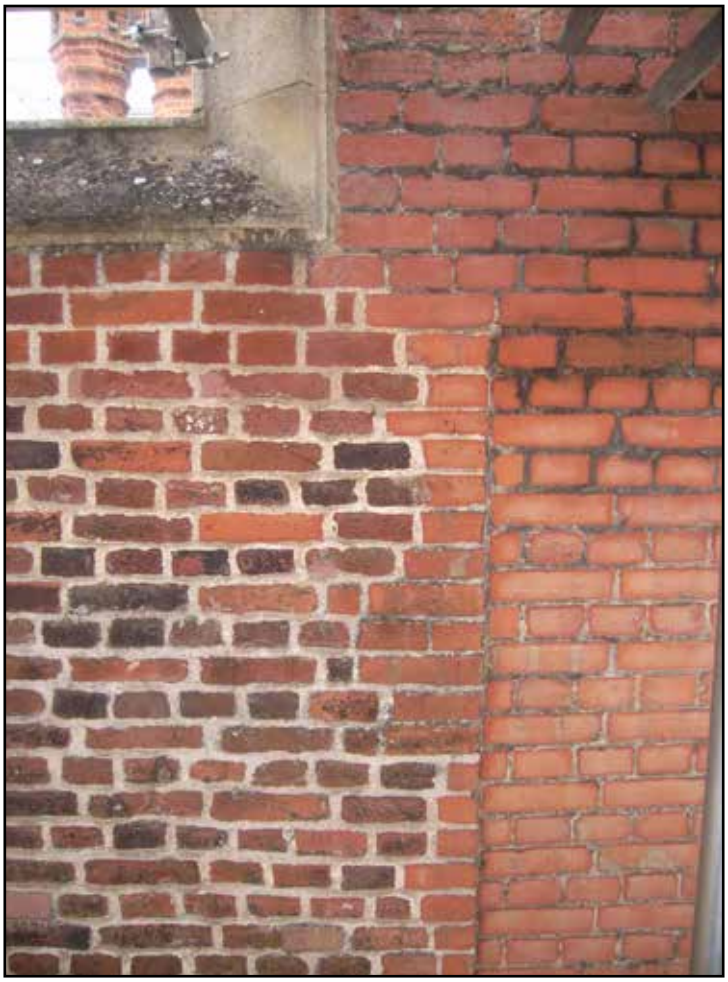


Plate 16: Detail of the parapet of Clock Court - East Facing Elevation Part 1, where Brick Type C and Brick Type T meet

Plate 17: General view of Clock Court - East Facing Elevation Part 1, inner parapet

Plate 18: Clock Court – East Facing Elevation Part 2

Plate 19: Interior of the small vault exposed under Clock Court – East Facing Elevation Part 2, looking north west

Plate 20: Opening into vault in relation to exposed Daubeney turret in the ground floor of Clock Court East Facing Elevation – Parts 1 and 2, looking west

Plate 21: Wolsey Diaper work in Clock Court – East Facing Elevation Part 2

Plate 22: Evidence of crenellations in the Upper East Facing Elevation Part 2, Clock Court

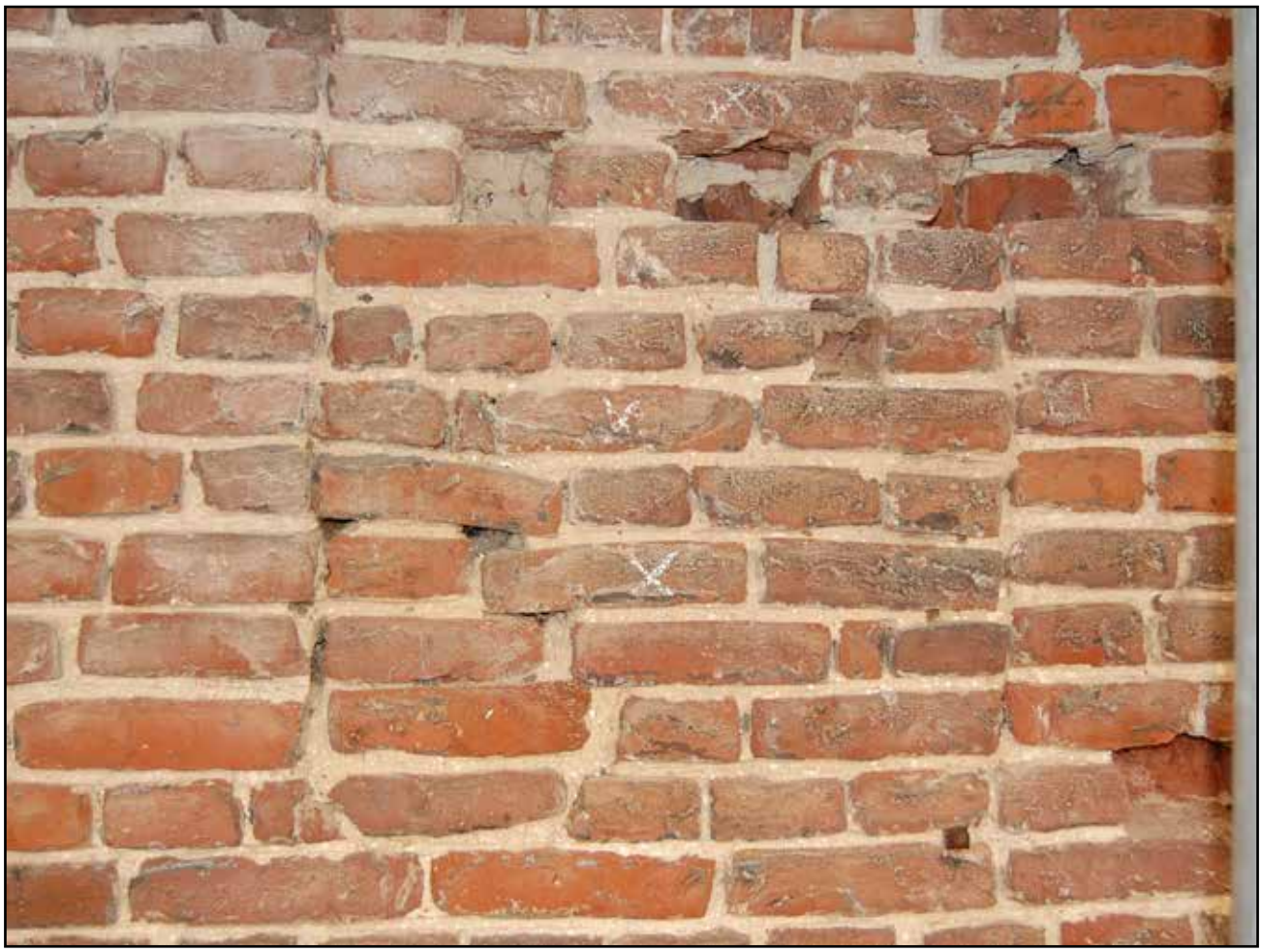


Plate 23: Evidence of crenellations in the Upper East Facing Elevation Part 2, Clock Court

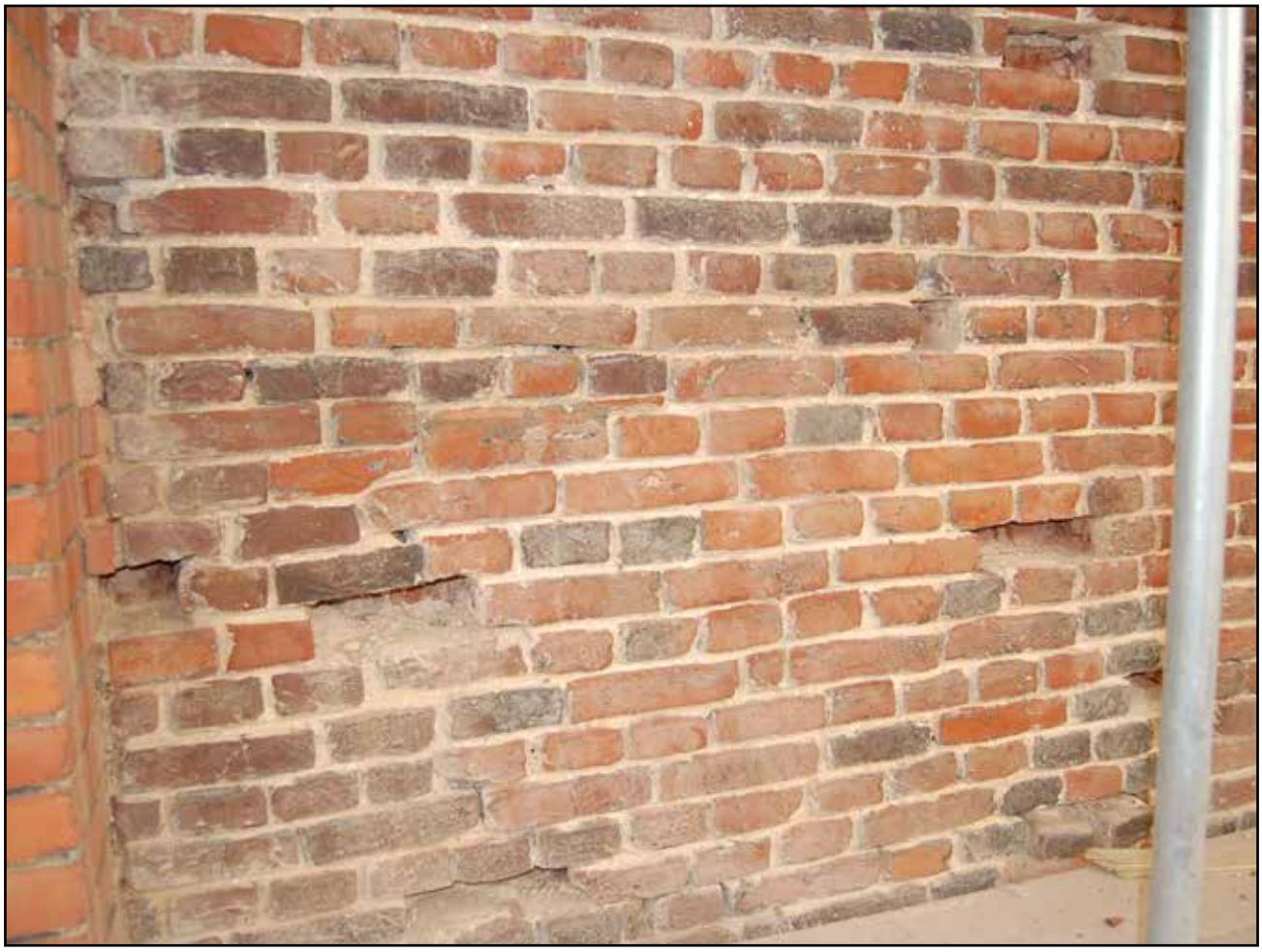


Plate 24: Subtle changes in brickwork in the Upper East Facing Elevation Part 2, Clock Court

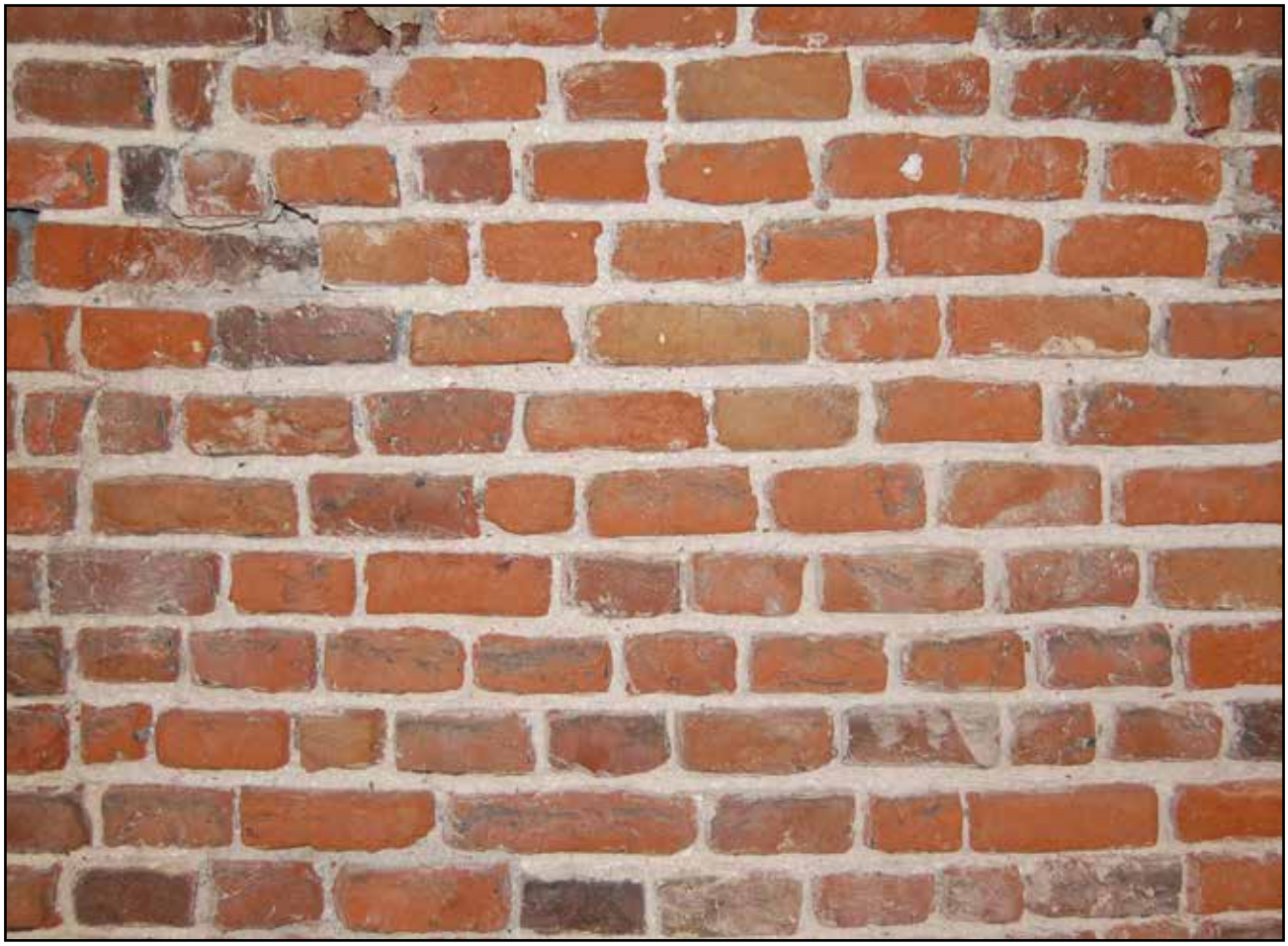


Plate 25: Details in brickwork of possible location of Roundel, East Facing Elevation Part 2, Clock Court

Plate 26: Inner parapet, East Facing Elevation Part 2, Clock Court, looking east

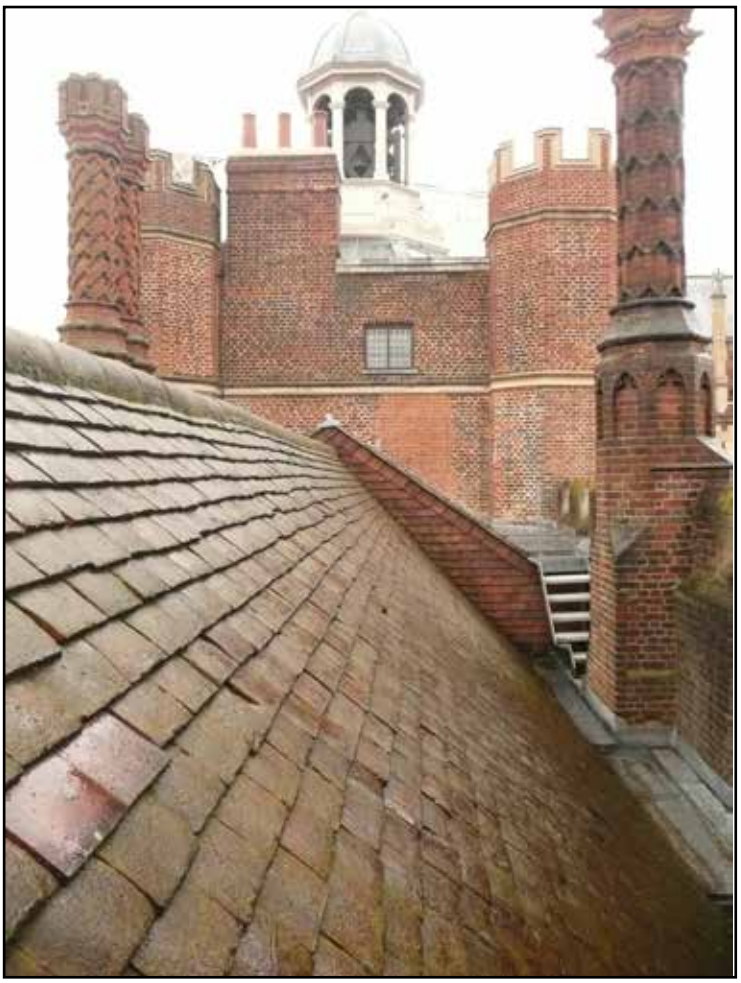


Plate 27: General view of the south face of the Anne Boleyn Gatehouse, looking north

Plate 28: Mantegna Lift, looking north west

Plate 29: Detail of Mantegna Lift

Plate 30: Chimney E243, Looking north west

Plate 31: Chimney E243, Looking west

Plate 32: Chimney E243, Interior during deconstruction

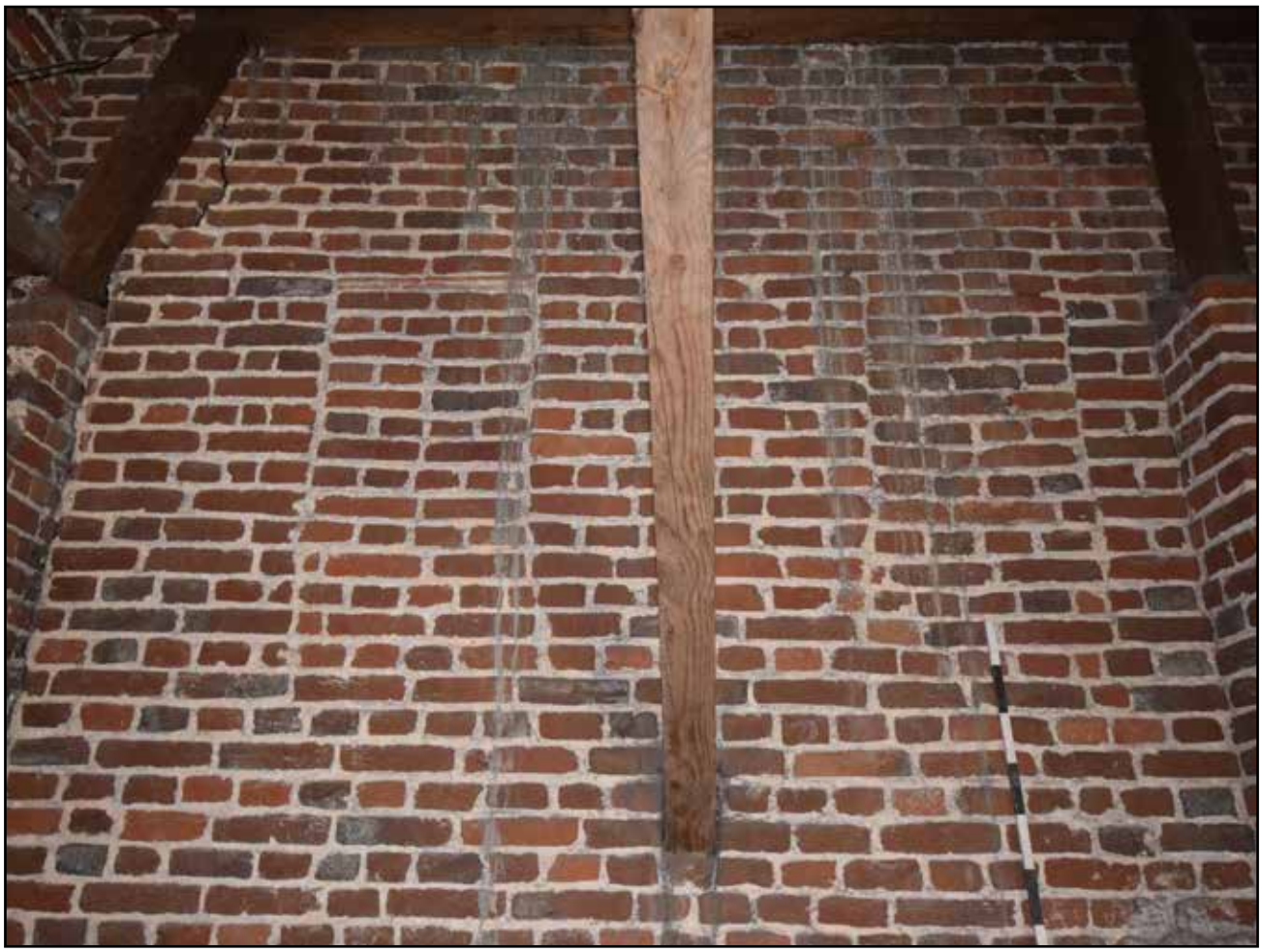


Plate 33: Roof 4 north elevation, west space, looking north

Plate 34: Roof 4 north west elevation, east space, looking north west

Plate 35: Roof 4 north elevation, east space, looking north

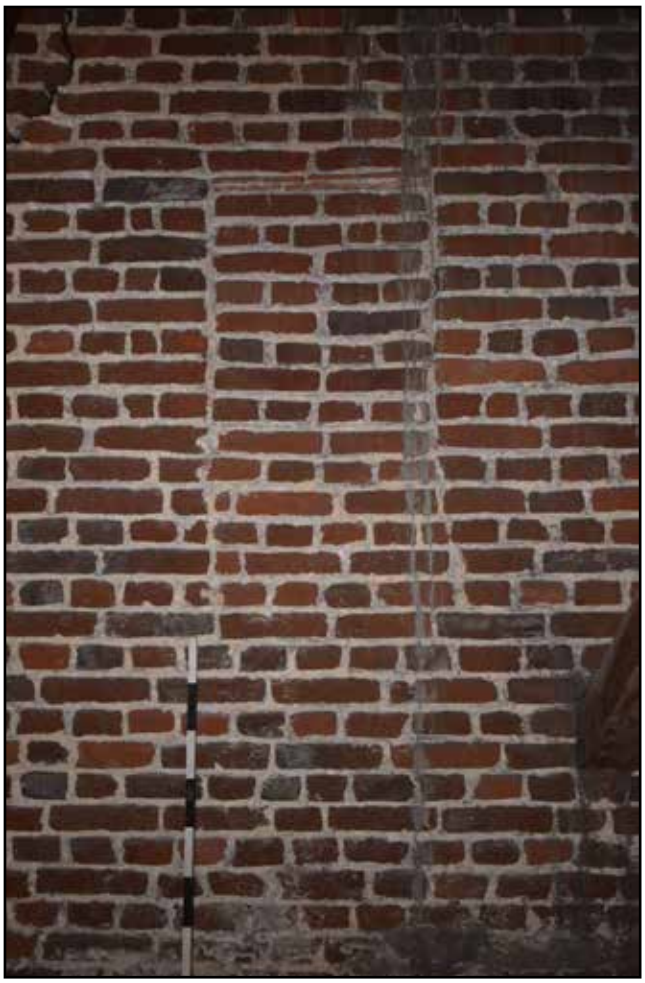


Plate 36: Detail of Roof 4 north elevation, west space, looking north

Plate 37: Roof 4 east elevation, east space, looking east

Plate 38: Exterior parapet level of Roof 4 east elevation, east space, looking east

Plate 39: Roof 4 west elevation, west space, looking west

Plate 40: Roof 4 south elevation, west space, looking south

Plate 41: oof 4 detail of vault like structure, south east corner of west space

Plate 42: Roof 4, Chimney E242, looking south

Plate 43: Roof 4 north elevation, west space, looking north

Plate 44: Roof 1 from above

Plate 45: Details of Trusses 1 and 2, Roof 1, looking south west

Plate 46: Details of Trusses 1 and 2, Roof 1, looking south west

Plate 47: Earlier structure under west side of Roof 1, looking north

Plate 48: Earlier structure under east side of Roof 1, looking north

Plate 49: Notches for rafter feet in earlier wall plate under Roof 1

Plate 50: Roof 2, looking north east

Plate 51: Roof 2, looking north

Plate 52: Wall plate of south end of Roof 2, looking north

Plate 53: Purlin and west principal rafter of Truss 1, Roof 2, looking north west

Plate 54: Painted principal rafter, Roof 2, looking east

Plate 55: Painted purlin, Roof 2, looking south east

Plate 56: Detail of west principal rafter in Truss 1, Roof 2, looking south west

Plate 57: Detail of tie beam in Truss 1, Roof 2, looking north east

Plate 58: Trenches for wind braces in the east purlin of Bay 1, looking west

Plate 59 : West common rafters of Bay 3, Roof 2, looking north east

Plate 60: Detail of common rafter in Bay 3, Roof 2, looking north

Plate 61: Detail of common rafter in Bay 3, Roof 2, looking north

Plate 62: Detail of common rafter in Bay 3, Roof 2, looking north

Plate 63: Detail of common rafter in Bay 3, Roof 2, looking north west

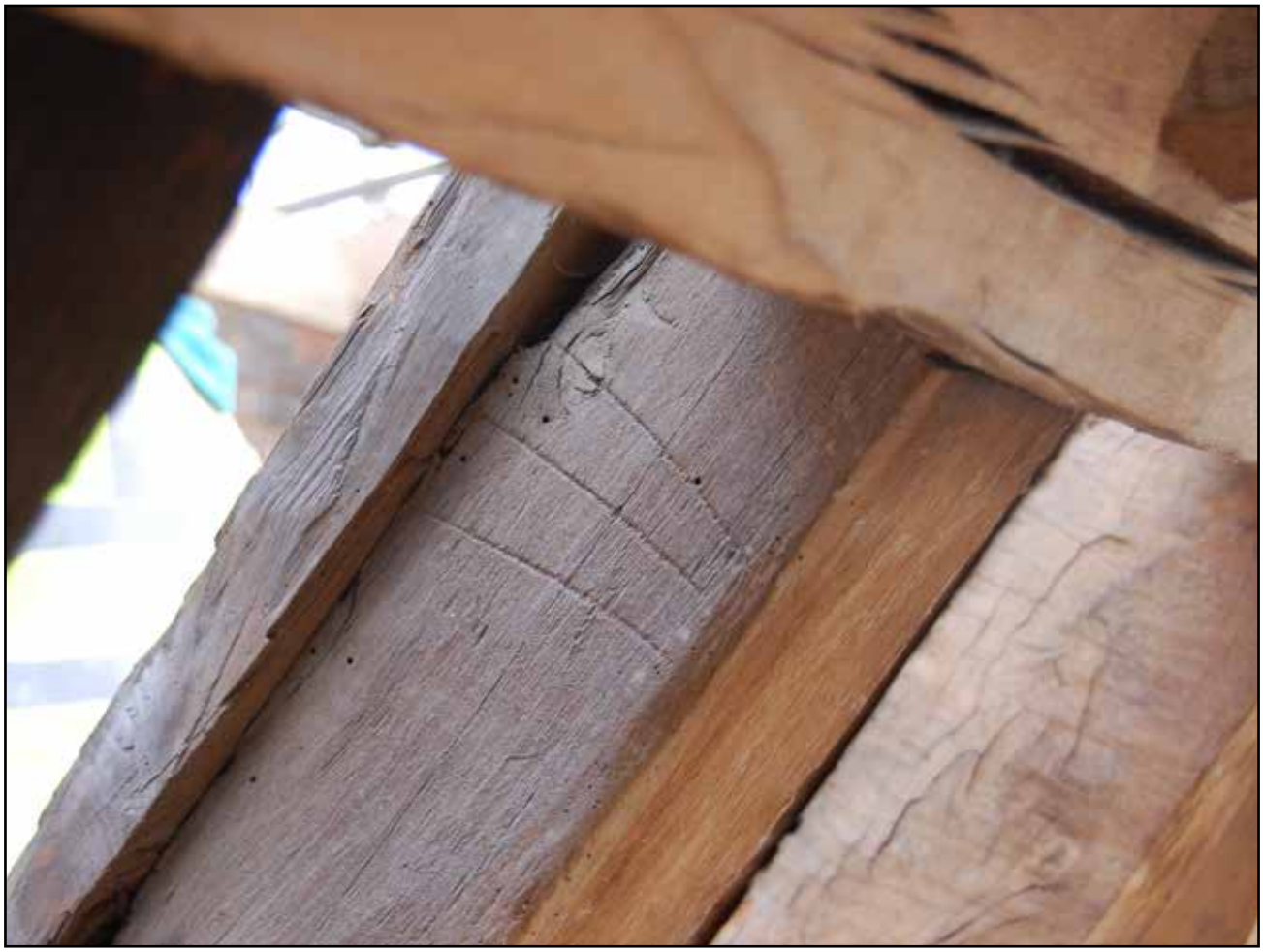


Plate 64: Detail of common rafter in Bay 2, Roof 2, looking south east

Plate 65: Detail of carpenter's marks in sout face of common rafters, Bay 2, Roof 2

Plate 66: Detail of carpenter's marks in south face of common rafters, Bay 2, Roof 2

Plate 67: Detail of carpenter's marks on the west principal rafter and purlin of Truss 1, Roof 2

Plate 68: Detail of carpenter's marks on the east principal rafter and purlin of Truss 2, Roof 2

Plate 69: Detail of carpenter's marks on the east principal rafter of Truss 3, Roof 2

Plate 70: Baltic mark on north face of intermediary collar in Bay 1, Roof 2

Plate 71: 20th century modification to Truss 3, Roof 2, looking north

Plate 72: General view of Roof 3, looking south east

Plate 73 : Lean-to roof structure of Roof 4, looking south west

Plate 74: Baltic mark on lower rafter,Lean-to roof structure of Roof 4, looking south

Plate 75 : Lower roof structure in west space, Roof 4, looking east

Plate 76: Dove tail joint in north west corner of lower roof structure, west space, Roof 4

Plate 77: General view of east space, Roof 4, showing lower roof structure, looking north east

Plate 78: Second Floor room showing dividing wall under Truss 3 of Roof 1 and Truss 1 of Roof 2, looking north

Plate 79: Second Floor room under Roof 2 showing exposed principal rafter feet, looking east

Plate 80: Second Floor room under Roof 2 showing 20th century support under Truss 3, looking south

Plate 81: North east corner of the 'Archaeology Room' on the First Floor, looking east

Plate 82: Exposed lintel under brick hood mould in Second Floor of Base Court – West Facing Elevation, Part 1

Plate 83: Exposed brickwork behind lintel under brick hood mould in Second Floor of Base Court – West Facing Elevation, Part 1

Plate 84: Tin coffee pot 'Time Capsule' found in the parapet of Clock Court – East Facing vation, Part 1

Plate 85: Newspaper and nails found inside tin coffee pot ‘Time Capsule’ from the parapet of Clock Court – East Facing Elevation, Part 1

Plate 86: Bone ring found inside tin coffee pot ‘Time Capsule’ from the parapet of Clock Court – East Facing Elevation, Part 1

Head Office/Registered Office/ OA South

Janus House
Osney Mead
Oxford OX2 0ES

t: +44 (0) 1865 263 800
f: +44 (0) 1865 793 496
e: info@oxfordarchaeology.com
w: http://oxfordarchaeology.com

OA North

Mill 3
Moor Lane
Lancaster LA1 1QD

t: +44 (0) 1524 541 000
f: +44 (0) 1524 848 606
e: oanorth@oxfordarchaeology.com
w: http://oxfordarchaeology.com

OA East

15 Trafalgar Way
Bar Hill
Cambridgeshire
CB23 8SQ

t: +44 (0) 1223 850500
e: oaeast@oxfordarchaeology.com
w: http://oxfordarchaeology.com