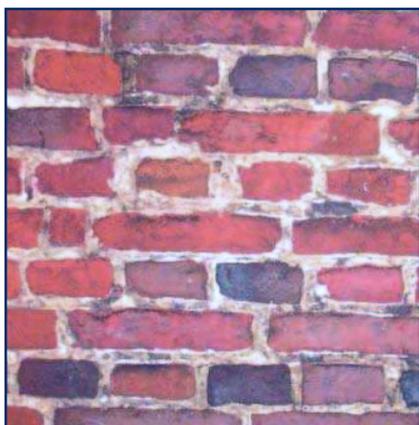


Chapel Court

East Facing Elevation

Hampton Court Palace



**Historic Building Recording
and Investigation**



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Chapel Court East Facing Elevation, Hampton Court Palace

HISTORIC BUILDING RECORDING AND INVESTIGATION

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Chapel Court East Facing Elevation, Hampton Court Palace

HISTORIC BUILDING RECORDING AND INVESTIGATION

SUMMARY

Oxford Archaeology were commissioned by Historic Royal Palaces to record the east facing elevation of Chapel Court at Hampton Court Palace prior to masonry repair and cleaning work. The survey took place during April 2007 and included full recording of the diaperwork decoration, brickwork and mortars. Diaperwork on the adjacent section of the north facing elevation was also recorded. The stonework of the east elevation (faces 1-5), the south facing elevation (face 1) and north facing elevation (face 3) that was to be repaired or replaced was also photographically recorded at this time.

The west range of Chapel Court was partly built by Wolsey around 1515-1528 with the section on the west range housing one of a pair of large spiral staircases that served the adjacent T-shaped chapel. , Decoration was also added to the brickwork consisting of red ruddling, pencilling and painted diaperwork. Henry VIII constructed council chambers beside the staircase in 1529, completing the two storey range. The range was heightened to three storeys sometime between 1710-1775 and 19th century repairs and refenestration completed the appearance of the elevation that we see today.

The survey and recording work done upon the Chapel Court east elevation enabled a close study to be made of brickwork, pointing and the various mortar types connected with the changes to the elevation. The remains of Tudor decoration were found in several places on the Wolsey period part of the elevation where traces of the red wash and outlining of the joint in white plaster can clearly be seen.

Using the Brick Typology Data Sheets and analysis of the different mortar types it can be seen that there are many different phases of work upon the elevation. These include: the primary building phase under Cardinal Wolsey and then the addition of the council chambers by Henry VIII; the 18th century heightening of the range; the 19th century replacement of the plinth to the base of the elevation and the addition of black ash mortar pointing to the brickwork.

1 INTRODUCTION

1.1 Background

1.1.1 Oxford Archaeology were commissioned by Historic Royal Palaces to undertake a programme of historic building investigation and recording on the east facing elevation of Chapel Court at Hampton Court Palace.

1.1.2 Historic Royal Palaces have initiated a programme of restoration and repairs which will remove some of the Victorian black ash pointing and replace damaged bricks and stonework to ensure the future structural stability of the elevation and to prevent further deterioration/loss of important building fabric.

1.1.3 This restoration and repair work is a continuation of completed works upon the north and south elevations and therefore readers should also refer to the recent Oxford Archaeology report 'Chapel Court North Facing Elevation, Hampton Court Palace' (Site code HCP50) which was issued in May 2007.

1.1.4 Alison Kelly carried out the investigations, with the main survey work taking place during April and May 2007. The areas recorded were as per the archaeological brief issued by Historic Royal Palaces Curator Julia Grinham in March 2007.

1.2 Aims and objectives

1.2.1 The purpose of the investigation was to:

- inspect and record in detail the use of vitrified bricks and paintwork within decorative schemes;
- inspect and record in detail all pointing, mortar and bond types in order to produce a phased summary of the works upon the east elevation;
- inspect and record in detail other details such as fixings, putlogs and other features of significance;
- record the brickwork used upon the east elevation and reformat the existing brick typology where necessary;
- add to our knowledge of fabric and phasing of the ranges forming the chapel courtyard;
- create an ordered archive of the work for deposition with Historic Royal Palaces.

1.3 Methodology

1.3.1 The survey comprised three principal elements. The *photographic survey* consisted of general shots and specific details and was undertaken using 35 mm black and white print film and colour slide film. Digital shots were also taken to ensure a full photographic record.

- 1.3.2 The *drawn survey* used photogrammetric drawings of the elevations that had been completed by the Downland Partnership and were provided to OA by HRP. Permatrace was overlain on the drawings (scale 1:40) and the elevation details were recorded on this. Two instances of records were made, the first prior to any intrusive works (raking out and brick/stonework replacement) and the second during and after the intrusive works.
- 1.3.3 The *descriptive survey* complemented the other two surveys and added further analytical and descriptive detail.
- 1.3.4 Weathered and damaged stonework upon the north (face 3), east (faces 1-5) and south (face 1) elevations was recorded and photographed prior to its removal and a list of removed stonework is included within this report as Appendix V.
- 1.3.5 As part of this survey the Victorian painted diaperwork upon the 19th century chimney on the north elevation face 3 was also recorded. Substantial amounts of brickwork upon this elevation were replaced in the 1980s and the elevation had been completely repointed at the time so this aspect of the elevation was not studied in great detail.
- 1.4 **The brick typology**
- 1.4.1 A brick typology for Hampton Court Palace had been 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 sheet AS2/113 and the associated brick data sheets B, C, I and T were used as a base for this report.
- 1.4.2 As part of the archaeological brief, the brick types and associated mortars were carefully recorded and compared to the brick typology elevations and data sheets. Oxford Archaeology brick recording sheets were completed for each different section of brickwork. The brick recording sheets included the recording of brick measurements (in cms), bond, pointing, mortar, brick colour and other features. The arris to arris measurement recorded by Oxford Archaeology is the same as taken by Daphne Ford for her survey. i.e. the height of 4 bricks plus associated mortar.
- 1.4.3 The measurements taken for each brickwork were input into an Excel spreadsheet and from this average measurements were produced (see Appendix II). These were converted into inches and compared with the brick typology data sheets that have been devised by Daphne Ford for English Heritage. The descriptions used upon the brick typology data sheets were also compared to the brickwork upon the elevation and the results are discussed in §1.3.

2 HISTORICAL BACKGROUND

- 2.1.1 Originally owned by the Knights Hospitaller, Lord Daubney purchased the lease for Hampton Court in 1495 and began building works to create a large estate of some importance. Hampton Court is located on the river Thames and its proximity to Richmond ensured its position as a house which was often visited by Henry VII and his wife Elizabeth of York (Thurley 2003, 9).
- 2.1.2 Cardinal Wolsey acquired the lease of Hampton court in 1514 and amongst the earliest works was the construction of Base Court in 1514-1522. The chapel which forms the north elevation of Chapel Court was constructed in the later part of Wolsey's occupation of the palace and it is very likely that when Henry VIII took possession of the palace in 1529 the chapel was only in the final stages of construction (Rawlinson, 2005). The chapel is T-shaped and similar to the chapels seen at some Oxford colleges with twin staircases either side of the antechapel, a design similar to Henry VIII's palace at Eltham which was built in 1519-22 (Thurley 2003, 36).
- 2.1.3 After the possession of the palace came to Henry VIII he embarked upon a building programme that shaped much of the palace we see today. Existing buildings were removed or adapted and decorated for royal use. In Chapel Court a two storey council chamber was added beside the antechapel staircase completing the western range in 1529/30. The period 1530 to 1535 saw the construction of the tennis court at the east end of the courtyard. After refurbishment of the chapel in 1535-6, the Chapel Court was completed with the addition of Prince Edward's lodgings, which form the north range of the courtyard.
- 2.1.4 The tennis court at the east end of the court was converted into the Duke of York's Lodgings in 1669/74 (Ford 1991, AS2/113). The west range (east facing elevation) was originally 2 storeys high until the elevation was heightened between 1710 and 1775. Prince Edwards Lodgings was also heightened sometime between 1710 and 1775. Plate 1 shows a view of the north-eastern corner of chapel court by John Spyers painted in around 1780. It can be seen that the court at this time had a mix of window styles (casements and sashes).
- 2.1.5 Following a fire in Prince Edward's lodgings in 1886, the north range underwent major repairs which included the replacement of 17th and 18th century windows with Tudor style ones. It is likely that some repairs were made to the adjacent west range at this time, but this is uncertain. The porch in the south-eastern corner of the court was added sometime between 1852 and 1912 (Ford 1991, AS2/113).

3 DESCRIPTION

3.1 Introduction

- 3.1.1 The east facing elevation of Chapel Court is predominantly brick-built with stone string coursing, doorway and windows. There is a large bay in the elevation (faces

1a-4) which originally housed one of the Chapel Royal staircases. The top of the elevation consists of brick and stonework crenellations that are set slightly lower than the adjacent north facing elevation.

3.2 **Brickwork description**

3.2.1 The earliest part of this elevation (faces 1 - 4) consist of Wolsey stock brick, dated to between 1522-1528 (plate 2) and defined as Type B by Daphne Ford in the English Heritage brick typology (Ford 1991, AS2/113). This brick type is consistent with the probable date for construction of the Chapel during the final part of Wolsey's occupation of Hampton Court. The Type B bricks are a red/brown/orange in colour with some small to medium sized stone inclusions. The bricks have no frog and the brickwork is laid in English bond. Some bricks have large inclusions, pebbles and pebble fragments, and there are holes where inclusions have fallen out. Bricks may also have fractures caused by weathering and the adhesion of the black ash mortar or have natural fractures formed during the forming and firing process. There are overfired and vitrified bricks present but they do not form part of a diaperwork pattern.

3.2.2 The council chamber built by Henry VIII in 1529 (face 5) was constructed with Type C Henrician stock bricks, dated to between 1529-1566 (plate 6). This brick type is also used on the south and west facing elevations as well. These bricks are brown/orange/rose in colour with occasional stone inclusions. They have no frog and the brickwork is laid in an English bond. There is a small area of diaperwork pattern using vitrified bricks and this is discussed further in §4.1 but otherwise vitrified bricks are used randomly within the elevation.

3.2.3 On east face 1 there is a section of bricks identified as Type I Wren stock bricks (dated late 17th/early 18th century) by Daphne Ford (plate 3). These Type I bricks have a dark plum/brown colour and are laid in a Flemish bond which contrasts to the English bond on the Wolsey brickwork below. It is likely that this brickwork section forms part of the 18th century heightening of the range. Pictorial evidence suggests this to have occurred post 1710, and pre 1775 (Ford 1991, AS2/113). The use of Wren Type I bricks for this work would suggest an early 18th century date.

3.2.4 There is also a patch of Type I bricks above the ground floor window of face 1 and there are straight joints suggesting it is infilling a removed fixture or feature (plate 4). Type I bricks have also been used on face 3 of the north facing elevation where refenestration of an antechapel ground floor window replaced a Tudor twelve-light window with an eight-light window, with Type I bricks used in the blocking of the void (plate 5). This is likely to have been during the 1710/1711 works to the chapel where the Tudor windows were replaced with casements (Rawlinson, 2005).

3.2.5 The upper storey of the west range consists of 19th century stock bricks (Type T) laid in an English bond (plate 7). The crenellations above are also 19th century stock bricks (Type T) but these are laid out in a Flemish bond which is the usual brick bond for this date. It is possible that the 18th century brickwork beneath the

crenellations was refaced with Type T stock bricks during repair works after the fire on the north range in 1886. Type T stock bricks are also used extensively for repairwork to this elevation, particularly around the windows, which had been replaced in the 19th century. There is a small glazed brick above the plinth on face 1, which also dates to the 19th century works (fig 4).

3.2.6 There is a brickwork plinth at the base of the elevation that is topped by a stone weathering course (plate 8). There is calcification upon the brickwork and a large quantity of organic growth, mostly a mossy substance. The bricks are 19th century Type T stock bricks in various shades of orangey-red; the mortar is flat and a light grey in colour. There are large areas of friable soft bricks, probably due to weathering.

3.2.7 The two lower windows on face 1 are surrounded by brickwork that has been classed as 'modern' on the brick typology. The bricks are not the 1950/60s straw impression stock often seen in these types of works but appear much older and could potentially be a mixture of reused 18/19th century bricks.

3.3 **Brickwork sizes and comparison to brick typology**

3.3.1 The average Type B brick size recorded during the works is 9 x 4½ x 2⅞ inches, which is consistent with the Hampton Court Palace brick typology data sheets developed by Daphne Ford. However the average arris to arris measurement recorded during the works, 9¾ inches, is slightly smaller than the Hampton Court Palace brick typology data sheets where the average is 10 - 10½ inches. The average Type C brick size recorded is 8¾ x 4¼ x 2 inches which is consistent with the Hampton Court palace brick typology data, however as with the Type B bricks the arris to arris measurement, 9¾, is smaller than the Hampton Court Palace brick typology data.

3.3.2 With the Type C bricks, the difference is probably due to the fact that all measurements were taken after the raking out of pointing. It is probable that during the initial 1990s survey of brickwork all measurements were taken without pointing removal and this would account for the small difference in measurements. Type B bricks were not completely raked back, however, suggesting the arris to arris measurement in the Hampton Court Palace brick typology may need to be expanded.

3.3.3 Both the Type I Wren stock bricks (late 17th to early 18th century) and the Type T stock bricks (19th century) were consistent with the Hampton Court Palace brick typology size and description. It may however be noted that the Type T stock bricks contain a large amount of small pebble inclusions, which are not mentioned in the brick description on the Hampton Court data sheets. The inclusions can be clearly seen where the bricks have been cut for an angled corner and on the rubbed brick replacements on the north elevation chimney stack.

3.4 Pointing and mortar description

- 3.4.1 Where seen, the bedding mortar found in connection with the extant Type B Wolsey stock bricks (faces 1-4) is a pale cream colour with small to medium regular lime inclusions and occasional clay inclusions. There are large areas of a double struck smooth dark beige coloured pointing which has traces of red wash and plaster pencilling. This is thought to be part of the Tudor painted decoration and is discussed further in §4.2.
- 3.4.2 The Type I Wren brickwork has a dark beige mortar, rough textured with inclusions and has penny roll pointing. There are some areas of black ash mortar particularly around the downpipe indicating late 19th century pointing repairs. The bedding mortar for this phase of brickwork was unseen as this area was not raked back.
- 3.4.3 The Type C brickwork and the Type T brickwork on the upper storey of the elevation did not have black ash mortar pointing but instead had a dark cream coloured mortar which appeared to have been painted black. The black has mostly worn off leaving a washed out look to the mortar and there did not appear to be any scoring or penny rolling to the pointing.
- 3.4.4 The Type T brickwork on the plinth had a grey mortar with mixed/black inclusions. This was hard and gritty to touch and in most areas had calcified. The crenellation brickwork had two types of mortar: the lower level had a friable greyish beige mortar (1.5cm thick) with small inclusions, while the brickwork above had a slightly different mix of mortar. This mortar was sandier coloured with larger inclusions and at approximately 2.2cms had been laid thicker than the mortar below. This would appear to indicate two stages of construction, the upper area possibly connected with the replacement of crenellation stonework.

3.5 Stonework description

- 3.5.1 The masonry was surveyed and stone sources identified by Robin Sanderson and a copy of his report appears here as Appendix III.
- 3.5.2 The majority of stonework on the east elevation is of Bath stone and three variants have been identified suggesting three stages of repair and replacement. This stonework is all likely to date to the 19th century; this is due to the general absence of Bath stone in the London area prior to this date.
- 3.5.3 The crenellation stonework was found to be Clipsham type Lincolnshire Limestone. The ground and first floor windows of east elevation face 1 and one ground floor window of east face 5 are also Clipsham Limestone. Since the majority of the elevation stonework is of Bath stone it is proposed that the Clipsham limestone represents a different phase of restoration, probably during to the 20th century.
- 3.5.4 The doorway on the Wolsey period section of the east elevation (face 1) is mostly of Caen limestone and is potentially part of the Tudor construction phase of this range (Sanderson 2007, 2). Records indicate that Wolsey used Caen, amongst other

stones, for the early building phases of the palace. Its preservation can be attributed to the sheltering of this face from the elements, which has also retained the Tudor painted decoration as discussed in §4.2.

- 3.5.5 In most areas removal of the stonework revealed the brickwork behind and some loose fill, however, the north elevation stone coursing above the ground floor window was seen to have a section of timber, probably used as a lacing piece. This potentially dates to the 18th/early 19th centuries as concrete lacing pieces were used as part of the 1893/4 window replacement on the north elevation face 1.

4 OTHER DETAILS

4.1 Vitrified diaperwork

- 4.1.1 Small patches of vitrified diaperwork can be seen on east elevation face 5 as part of the Henrician build. The diaperwork is completely formed using vitrified headers, with variations in the English brick bond to accommodate this. This section is the only occurrence of vitrified diaperwork within this courtyard.

- 4.1.2 The presence of fragmentary diaperwork is itself not unusual, however the reason for its occurrence is not fully understood. Suggestions include the lack of availability of vitrified bricks (Brunskill & Clifton-Taylor 1978, 16), ‘ingenious but bored’ workmen (Goodall 2004, 254) or the possibility that these small sections are templates for the painted decoration (White 2004, 61).

4.2 The painted decorative schemes

- 4.2.1 The majority of face 3 of the north elevation had been extensively repaired and remortared in the 1980s, however the elevation still showed the remains of Victorian painted diaperwork decoration on the 19th century Type T stock red bricks (plate 19). Similar painted diaperwork was also noted on Wolsey Type B stock bricks and Henrician Type C bricks. The design and condition of the paintwork was the same as had been seen on face 1 of the north elevation during the survey of 2006 (see OA report, Chapel Court North Facing Elevation. (May 2007) for further details) and are assumed to be part of a 19th century decorative scheme.

- 4.2.2 The Type B Wolsey stock bricks upon the east facing elevation show trace remnants of an early decorative scheme. In areas where the elevation has been protected from the elements, traces of red ruddling, double struck pointing and the outlining of the mortar joint in a fine white plaster can be seen (plates 10, 11 and fig 4).

- 4.2.3 This surviving material can be compared with the paintwork scheme that was found after the uncovering of the Chapel east wall in 1981 (fig 5). This wall was originally an external wall but it had been covered during Wren’s works to the Palace in the 18th century, thus protecting the earlier decoration. The uncovered wall has a red wash applied with a black regular diamond grid pattern painted over both bricks and mortar to ensure the fictitious diaperwork pattern is uniform. The

mortar is double struck with the joints picked out using a fine white lime plaster. It is suggested that the decoration of the chapel east wall was done c.1525 (White 2004, 91) and the chapel court east facing elevation decoration is therefore likely to date to that period with the projecting bay forming one of the twin stairs servicing the chapel.

4.2.4 No clear traces of pencilling could be seen on the chapel court east facing elevation Henrician Type C brickwork forming the council chambers constructed in 1529 (face 5), suggesting that this brickwork was unpainted at time of construction. It is, however, possible that this section of the elevation also decorated but the decoration has not survived.

4.3 **Downpipes and other fixings**

4.3.1 On the north-western side of the second floor of face 5 there is a metal plate (22cms x 13.5cms) fixed to the wall with an unusual cut hole in the middle (plate 17 and fig 4). This plate is highly eroded in parts and held in place by four metal nails. Behind the cut appears to be a circular pipe hole. The surrounding brickwork is type T 19th century red bricks. This is probably a plate over the outlet to a bell pull mechanism as often seen elsewhere in the Palace. A smaller, more recent example can also be seen above a ground floor window on this elevation.

4.3.2 Above the ground floor window of east face 3 are several wooden dowels fixed into the mortar and east face 4 has nail holes and cut marks in the brickwork. Both of these relate to unknown fixtures, since removed.

4.3.3 The east elevation has three lead downpipes (one of unknown date, one George IV and one Victorian) that collect rainwater from the roof behind the parapet crenellations. These have some repairs and replacements to sections of the piping and fixings.

4.4 **Graffiti**

4.4.1 Several instances of graffiti were found, particularly on the entrance to the courtyard in the western corner (fig 4). For visitors to the Palace this is an access point to the courtyard from the chapel cloister and therefore a likely target for graffiti.

4.4.2 In addition to graffiti on the doorway stonework, several bricks upon the elevation have incised marks on them and these also most likely to be graffiti.

4.5 **Scaffolding marks**

4.5.1 As with the north facing elevation surveyed in September 2006, there were several scaffolding marks found on the elevation (fig 4). The marks are approximately 50mm in diameter and formed by a hollow scaffolding tube rubbing against the brickwork creating a slightly oval shape (plate 16).

4.5.2 Due to the popularity of metal scaffolding from the 1920s onwards it can be assumed that these marks therefore relate to works from the 20th century, and are most likely from the replacement of the crenellation stonework and two windows on face 1.

5 CONCLUSION - PHASING THE ELEVATION

5.1 Introduction

5.1.1 The survey has identified several main phases of work which are listed below. In some cases exact dates for these phases cannot be determined due to the lack of records.

5.2 The main phases of work

5.2.1 Through observing the changes in mortars, brickwork and findings reported within the Lithological Report by Robin Sanderson, the following phasing for the east facing elevation is suggested:

Phase 1 - Primary build of the chapel and antechapel stairwell under Wolsey- c. 1515-1528. Decoration of external walling with a painted diaperwork scheme and joints picked out with lime plaster.

Phase 2 - Building of the council chamber by Henry VIII - c. 1529

Phase 3 - Heightening of the range - c. 1710-1775 (exact date uncertain)

Phase 4 - Refenestration of elevation and refacing of upper storey - c1853-1912 (probably c. 1886 due to works after major fire in north range). Decoration of brickwork with a painted diaperwork scheme also probably carried out at this time.

Phase 5 - Replacement of the crenellation stonework and the stonework of two windows on face 1 with Clipsham limestone - 20th century

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May 2008

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APPENDIX II BRICK ANALYSIS SPREADSHEET

Hampton Court Palace - Chapel East Elevation

East Face Brick Measurements

Type B - Wolsey Stock Brick c. 1522-1528

Uneven surface, Friable, Occasional pebble inclusions. No Frog. Random vitrified brick. Pointing is double struck.

Type C - Henrician Stock Brick c. 1529-1566

Uneven surface, Friable, Occasional pebble inclusions. No Frog. Random vitrified brick. Pointing is double struck.

Type I - Wren stock brick (selected for dark colour)

Uneven surface, Hard, No significant inclusions. Frog unknown. Penny roll pointing

Type T - Stock Brick c. 19thC

Smooth surface texture with sharp arris. Shallow or no frog. Pointing is flat with scored or penny pointed.

Type B Wolsey Stock Bricks (cms)					
L	W	D	Arris to Arris	Location	
5.3	23	11.4	24.7	East 1-4	
5.3	23.4	11.4	24.4	East 1-4	
5.2	23.4	11.4	24.4	East 1-4	
5.5	22.5	10.9	24.1	East 1-4	
5	22.5	11	25	East 1-4	
5.2	23.5	10.9	24.8	East 1-4	
Average (Inches)					
2.07	9.07	4.4	9.67		
HCP Measurements (Inches)					
2 to 2.25	9 to 9.5	4.25 to 4.5	10 to 10.75		

Type C Henrician Stock Bricks (cms)					
L	W	D	Arris to Arris	Location	
5	23	10.8	25	East 5	
5	22	10.6	22.8	East 5	
5.2	22.2	10.4	24	East 5	
4.7	21.5	10.9	24.4	East 5	
5.2	22	10.8	24.2	East 5	
5.4	22.4	10.8	24	East 5	
Average (Inches)					
2	8.73	4.22	9.48		
HCP Measurements (Inches)					
2 to 2.25	8.25 to 9.25	4 to 4.25	9.5 to 10.25		

Type I Wren Stock Bricks (cms)				
L	W	D	Arris to Arris	Location
6.5	22	10.2	28	East 1
6.5	22.2	10.5	29	East 1
6.5	22	10.7	28.5	East 1
5.9	22.4	10.5	*	East 1
6	22.9	10.4	*	East 1
6.2	23	10.7	*	East 1
Average (Inches)				
2.47	8.83	4.13	11.22	
HCP Measurements (Inches)				
2.25 to 2.5	8.5 to 9	4 to 4.25	11 to 11.5	

Type T 19thC Red Face Bricks (cms)				
L	W	D	Arris to Arris	Location
5.7	22	10.2	26	Plinth
5.6	22.4	10.5	26	Plinth
5.6	22.6	10.5	26	Plinth
5.7	22.5	10.6	26.4	Plinth
5.5	22.2	10.6	26	Plinth
5.6	22.2	11.6	26.4	Plinth
5.8	22.4	10.7	25	Upper
5.8	22.5	10.2	25.4	Upper
5.5	22.3	10.4	25.5	Upper
5.9	22	10.4	25.5	Upper
5.6	22.4	11.6	26	Upper
6.5	22.7	10.4	29	Cren
6.5	22.7	10.4	29	Cren
6.6	22.6	10.4	29	Cren
6.4	22.5	10.4	28.8	Cren
6.5	22.8	10.7	29.5	Cren
6.5	22.6	10.7	30.2	Cren
6.6	22.4	10.8	30.4	Cren
6.8	23	10.5	29.2	Cren
Average (Inches)				
2.38	8.84	4.18	10.76	
HCP Measurements (Inches)				
2.13 to 2.5	8.75 to 9.25	4 to 4.5	10.25 to 11.5	

Alison Kelly
May 2007

HCP54BS Hampton Court Palace - Chapel East Elevation

Measurements taken during survey

Measurements in cms				Type	Location
L	W	D	Arris to Arris		
5.8	22.4	10.7	25	T	East elevation below uppermost string course
5.8	22.5	10.2	25.4	T	East elevation below uppermost string course
5.5	22.3	10.4	25.5	T	East elevation below uppermost string course
5.9	22	10.4	25.5	T	East elevation below uppermost string course
5.6	22.4	11.6	26	T	East elevation below uppermost string course
5.3	23	11.4	24.7	B	East elevation below Wren stock
5.3	23.4	11.4	24.4	B	East elevation below Wren stock
5.2	23.4	11.4	24.4	B	East elevation below Wren stock
5.5	22.5	10.9	24.1	B	East elevation below Wren stock
5	22.5	11	25	B	East elevation below Wren stock
5.2	23.5	10.9	24.8	B	East elevation below Wren stock
6.5	22	10.2	28	I	East elevation
6.5	22.2	10.5	29	I	East elevation
6.5	22	10.7	28.5	I	East elevation
5.9	22.4	10.5	*	I	East elevation
6	22.9	10.4	*	I	East elevation
6.2	23	10.7	*	I	East elevation
5.7	22	10.2	26	T	East Plinth
5.6	22.4	10.5	26	T	East Plinth
5.6	22.6	10.5	26	T	East Plinth
5.7	22.5	10.6	26.4	T	East Plinth
5.5	22.2	10.6	26	T	East Plinth
5.6	22.2	11.6	26.4	T	East Plinth
5	23	10.8	25	C	East elevation face 5
5	22	10.6	22.8	C	East elevation face 5
5.2	22.2	10.4	24	C	East elevation face 5
4.7	21.5	10.9	24.4	C	East elevation face 5
5.2	22	10.8	24.2	C	East elevation face 5
5.4	22.4	10.8	24	C	East elevation face 5
6.5	22.7	10.4	29	T	East Crenellations A
6.5	22.7	10.4	29	T	East Crenellations A
6.6	22.6	10.4	29	T	East Crenellations A
6.4	22.5	10.4	28.8	T	East Crenellations A
6.5	22.8	10.7	29.5	T	East Crenellations B
6.5	22.6	10.7	30.2	T	East Crenellations B
6.6	22.4	10.8	30.4	T	East Crenellations B
6.8	23	10.5	29.2	T	East Crenellations B

APPENDIX III LITHOLOGICAL SURVEY REPORT BY ROBIN SANDERSON

LITHOLOGICAL SURVEY OF THE
CHAPEL COURT WESTERN ELEVATIONS,
HAMPTON COURT PALACE.

R. W. Sanderson, B.Sc., C.Geol., F.G.S.

17th June 2007

**LITHOLOGICAL SURVEY OF THE CHAPEL COURT
WESTERN ELEVATIONS,
HAMPTON COURT PALACE.**

R. W. Sanderson, B.Sc., C.Geol., F.G.S.

17th June 2007

Introduction:

This report was requested by Ms Julia Gingham, who requested the identification of the stone types and their possible sources. It completes the survey described in my Report 0522, which contain discussion of the historical significance of the stones.

The area surveyed is marked with a thick outline in Fig.1., and the details are marked on the photogrammetric plots listed below.

North facing elevation	NF3
South facing elevations	SF1 & 2.
East facing elevations	EF1 & EF2
East facing elevations	EF3, EF4
East facing elevation	EF5

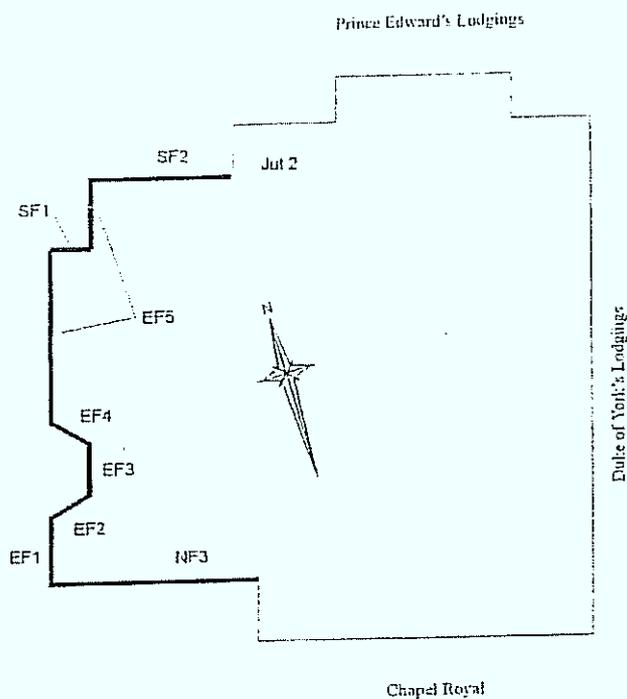


Fig. 1 Sketch Plan of Chapel Court.

Area surveyed during April-May 2007 shown by thick outline, and elevation identifiers indicated.

Identifications were effected by *in-situ* examination over three days from the 4th – 6th April 2007. Two samples of stone were removed for further analysis. Stone masonry is restricted to the dressings of the parapet coping, buttresses, string courses, windows and door surrounds. Eight lithological types were noted. These are

English stones

Great Oolite Group limestones,

Bath Stones, two types (B)

Bath Stone, Hartham Park. (Bh)

Taynton stone (T)

Inferior Oolite Group, Lincolnshire Limestone,

Clipsham Stone. (Lc)

Reconstituted Stone. (Art)

Imported Foreign stones

Caen Stone. (C)

Savonnières stone. (S)

Identification of the Stones.

Caen Stone.

The surround to the Tudor style door in the S.E. corner, leading into the Chapel cloister, presents the only occurrence of this near white fine grained French limestone in Chapel Court. It is inserted into pre-Henrician brickwork (according to Daphne Ford's typology) and may be accepted as an original Tudor feature. However, the dressings within the cloister are of Reigate Stone. This latter stone is also present as remnants to the ground floor windows of Prince Edward's Lodgings (SF3).

Great Oolite Group limestones.

Bath Stones.

More or less shelly matrix prominent oolitic limestones, sometimes showing fine lamination. These stones form most of the window, string courses and porch dressings around the Court, and are strongly patinated with variable decay. At least three variants may be distinguished, related to different stages of repair. They are unusually pale coloured where not showing patinated surfaces.

Thin section analysis show that

1.the windows are of relatively shell poor oolitic limestone marked by thin calcite veins , and with the ooliths most commonly separated by a crystalline calcite cement. This most probably derives from the Combe Down Oolite of the Great Oolite Group.

2. the upper string course which shows a greater degree of powdery decay, is more shell-rich, with a large proportion of micrite (lime mud) embedding the shell and ooliths. These characters suggest a source in the Bath Oolite of the Great Oolite Group.

This shows that probably two periods of Bath Stone restoration have occurred. Comparable variation was noted in the Chapel façade.

The third type is present as insertions into the outer buttress of elevation NF3, during late 2006, after the previous report was submitted. This is said to be Bath Stone from the Hartham Park quarry.

Taynton Stone. Fig.2.

The first floor three-light right hand window (SF2) differs from all the other windows in the Court in being formed of Great Oolite type, yellow patinated, shelly oolitic limestones showing concentrations of shell debris in wide bands. Although of similar facies to the Bath Stones the pronounced wide shelly bands indicate that this stone is from the Taynton Limestone Formation of the Windrush Valley, Oxfordshire.

This stone is apparently identical with that of the door to the Duke of York's Lodgings (elevation WF2). It is an unusual stone at Hampton Court, which indicates that the insertion of this window and the door are co-eval.

Inferior Oolite Group limestones.

Lincolnshire Limestone. Clipsham Stone.

Coarse grained rough weathering peloidal shelly limestones, identified as Clipsham Stone from the Middle Jurassic Inferior Oolite, Lincolnshire Limestone, near Grantham, Lincolnshire, is found used for all the parapet coping and also the lower windows and part of the door jamb of elevation EF1 and the left hand ground floor window of elevation EF5. It has also been noted as the ground floor two-light window in the north-east corner of the Court.

Reconstituted Stone. Fig.2.

The first floor Taynton Stone window (SF2) is extensively restored with grey medium grained artificial 'sandstone'. These appear to be cast blocks of artificial material, and are in a good state of preservation. It is identical with the restorations of the ground floor windows of Prince Edward's Lodgings.

Savonnières Limestone.

Pale coloured spar prominent oolitic limestone, of French origin, forms most of the upper string course of elevation Jut 1 at the west end of the Chapel Royal, and continues as the basal roll moulding at the string course base of elevation NF3. This stone has an unusual porous tuffaceous structure owing to almost complete loss (from the exposed surface) of the ooliths.

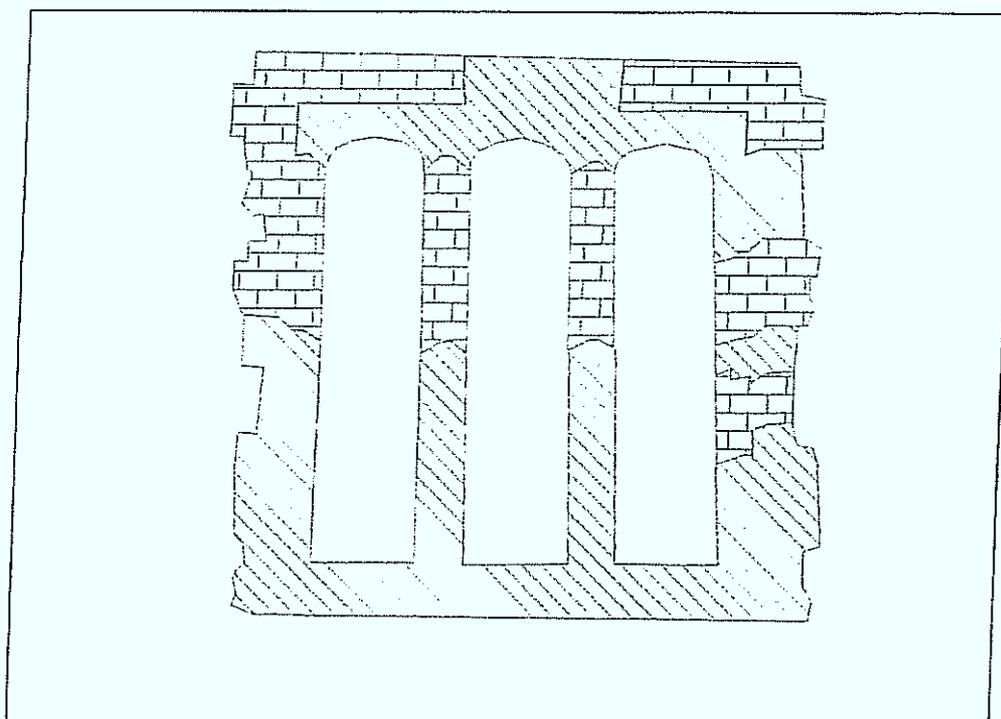


Fig. 1. South Face 2. 1st floor window.

Brick pattern = Taynton Stone.
Diagonal hatching = Artificial cast stone.

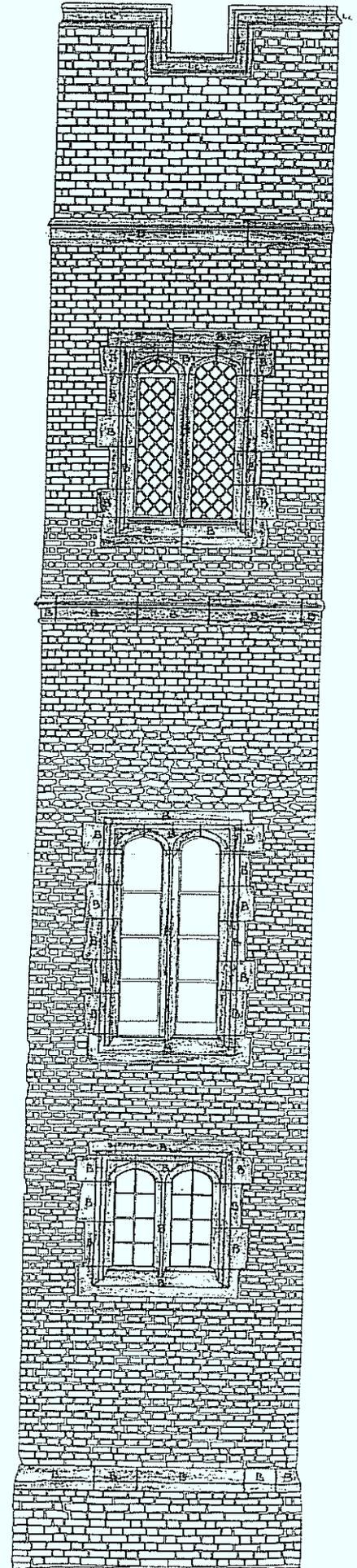
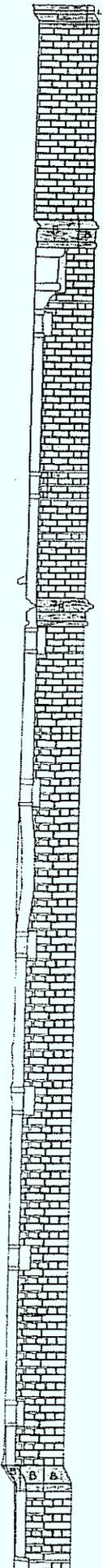
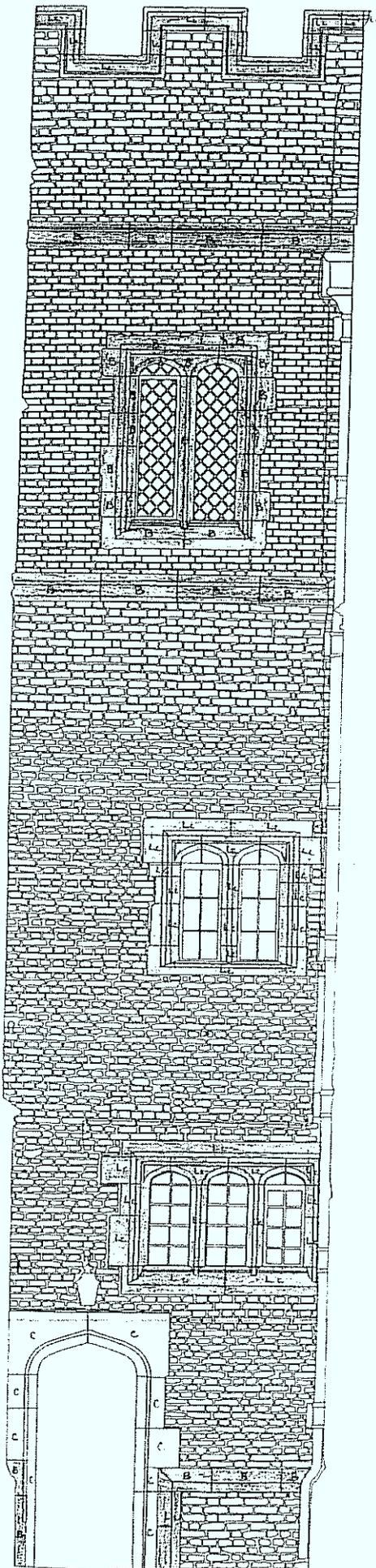
Reference.

Sanderson, R.W., 2006. *Lithological survey of the Chapel Court elevations, Hampton court Palace.*
Unpublished Report 0522 for H.R.P. 17th November 2006.



R. W. Sanderson.

17.6.2007

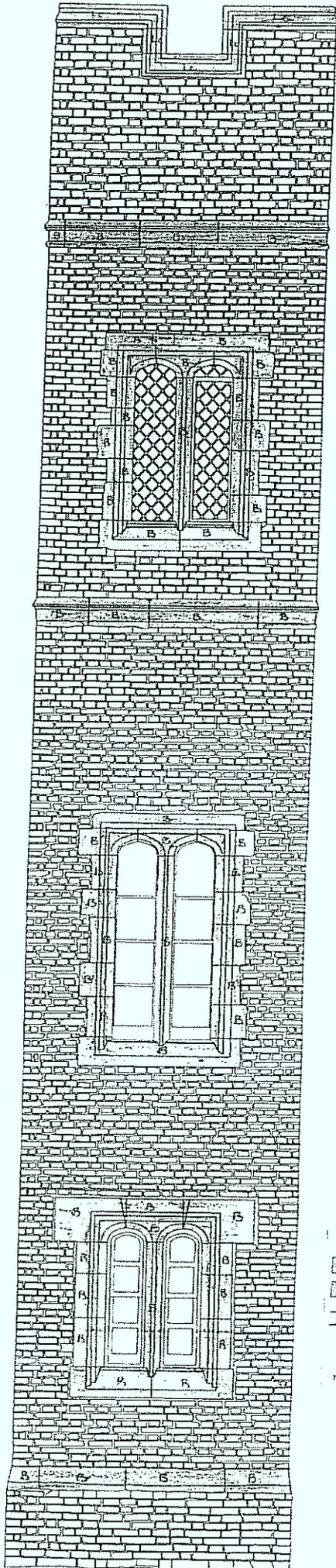


Hampton Court Palace
 Chapel Court Elevations
 E11.2

Legend

- Great Oxen Limestone
S&P Bond (unshaded)
- Green Stone
- Lincolnshire Limestone
Chapman box
- Additional mortar joints
- Joints marked in situ

Photogrammetry by
 Helen Vix Sanderson
 11 Aquila Grove, Trow Moor
 Surrey KT12 8BN
 Report GPC3
 April 2022



EF 3

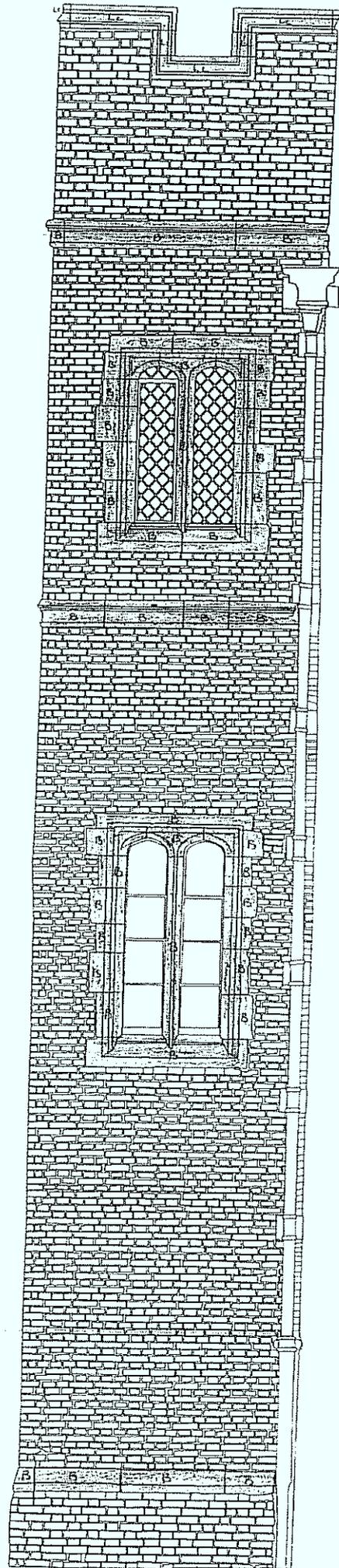
Hampton Court Palace
Chapel Court Elevations
EF 3 - 4
Legend

-  Great Duke Limestone
Bath Stone and/or sand
-  Leicestershire Limestone
Glauconite

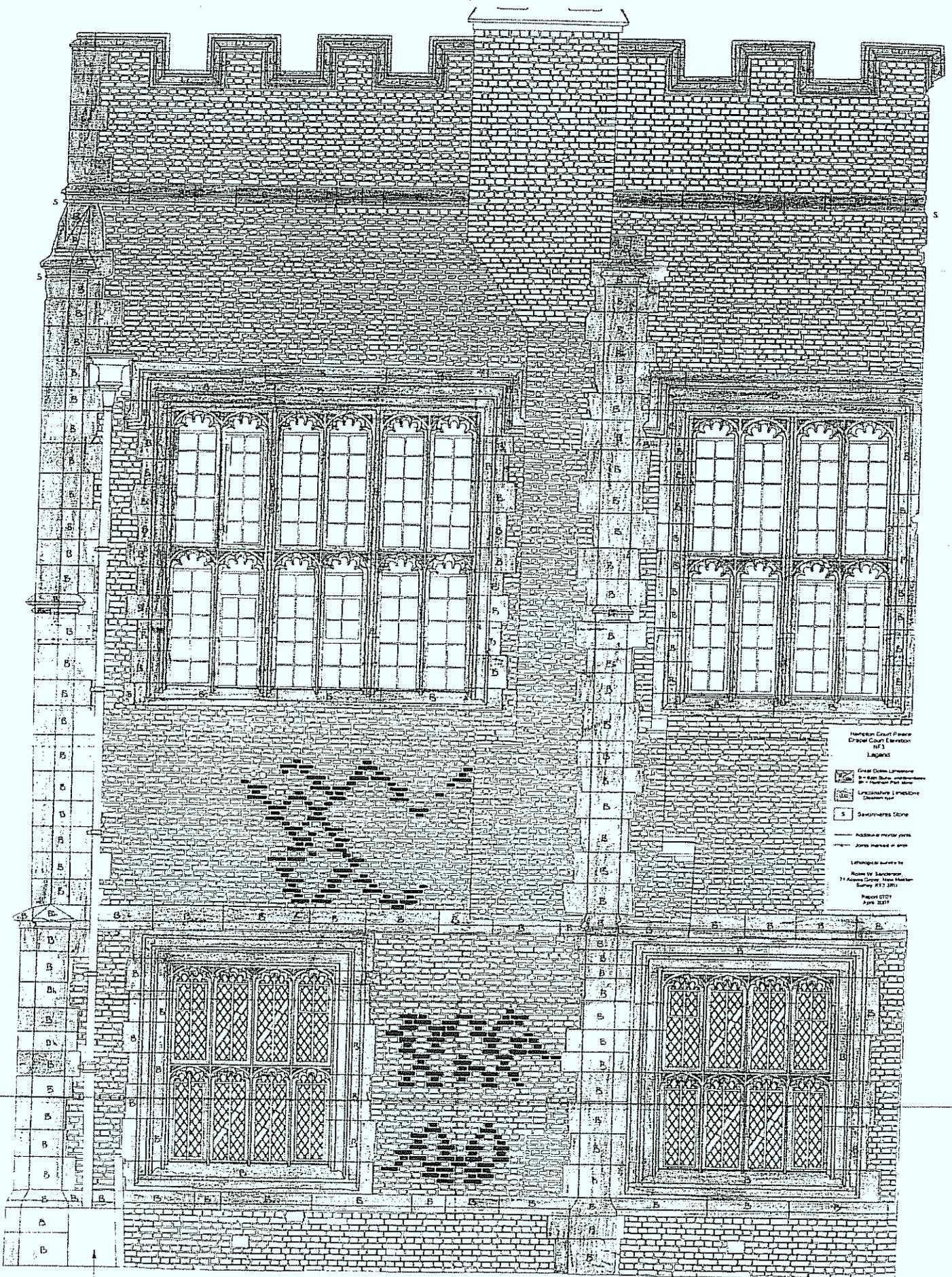
--- Additional mortar joints
--- Joints marked in situ

Lithological Survey by
Hazel W. Sammons
11 Acacia Grove, New Malden
Surrey #13 0DU

Report 07/01
April 2001

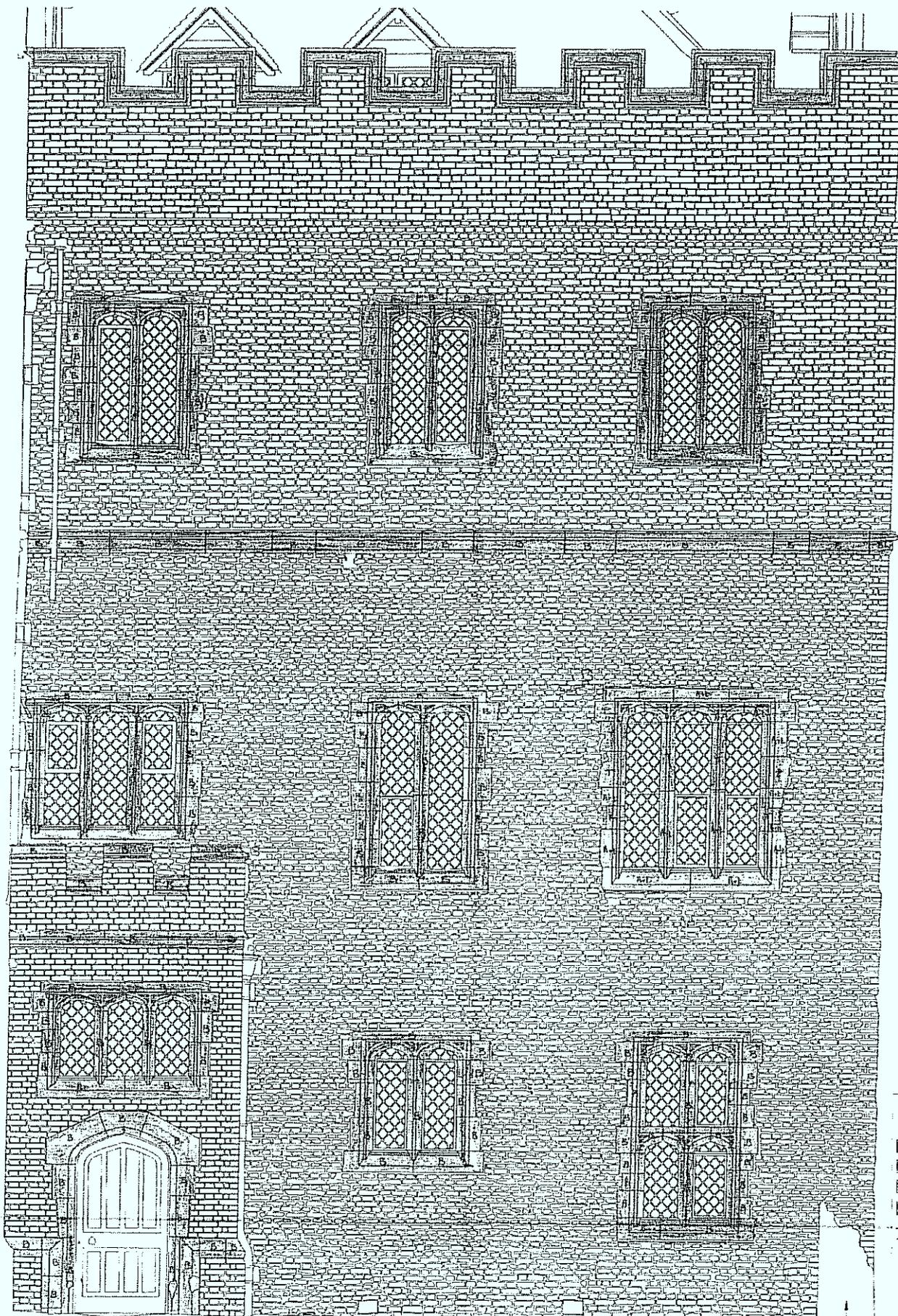


EF 4



Hampton Court Palace
 Chapel Court Elevation
 N 1
 Legend
 [Symbol] Great Dress Limestone
 [Symbol] Limestone / Portland
 [Symbol] S Sawnwood Stone
 [Symbol] Additional mortar joints
 [Symbol] Joints marked in situ
 Lithographic Survey by
 Ross W. Sanderson
 77 Adams Drive, New Market
 Survey #12 2011
 Project 0207
 April 2017

Obscured



Hampton Court Palace
 Chapel Court Elevations
 07/12
 Legend

-  Artificial cast stone
-  Green Gable Longstone East Stone unpolished
-  Limestone Limestone Clarendon
-  Tuff Stone
-  Additional mortar joints
-  Joints marked in situ

Lithographic survey by
 Roger W. Sanderson
 71 Acacia Grove, New Malden
 Surrey, W13 3PL
 Paper 0027
 April 2011

Obscured

South Faces 1 and 2

APPENDIX IV RECORD OF REMOVED STONWORK

Hampton Court Palace, Chapel Court East Facing Elevation
Site Code: HCP54

Stonework removed during works

For locations please refer to site drawings within the archive, which were marked up on site. Black and white and colour (films 1 and 3) and digital images were taken of each stone.

North Elevation (Face 3)

Stone No.	H (cms)	W (cms)	D (cms)	Film No. 1	Note
1	23	7	22	Neg. 4	Window hood mould (section of)
2	23	98	22	Neg. 5	Window hood mould (torus)
3	6	62	10	Neg. 6	Window hood mould (section of)
4	22	161	23	Neg. 7/8	
5	31	75.5	26	Neg. 9	String course
6	13	75	8	Neg. 10	
7	13	42	8	Neg. 11	
8	26	42	17	Neg. 12	Section of hood mould
9	3	489	3.5	Neg. 12/13	Torus
10	19	54.5	-	Neg. 13	Window moulded jamb
11	16	21	15	Neg. 14/15	String course
12	36	76	-	Neg. 16/17	String course and hood mould
13	31	67	-	Neg. 18	String course and hood mould
14	3	192	3	Neg. 19	Tous
15	10	41.5	-	Neg. 20	Hood mould (section)
16	10	46	-	Neg. 21	Hood mould (section)
17	13	37	22	Neg. 22	Corner of jamb/lintel
18	21	17	-	Neg. 22/23	Jamb
19	40	23	-	Neg. 23	Jamb
20	31	39	18	Neg. 24	Pilaster
21	33	38.5	18.5	Neg. 25	Sill
22	26	29	19	Neg. 26	Sill
23	14	32	7	Neg. 27/28	
24	14	38	7	Neg. 28/29	

East Elevation (Faces 1-5)

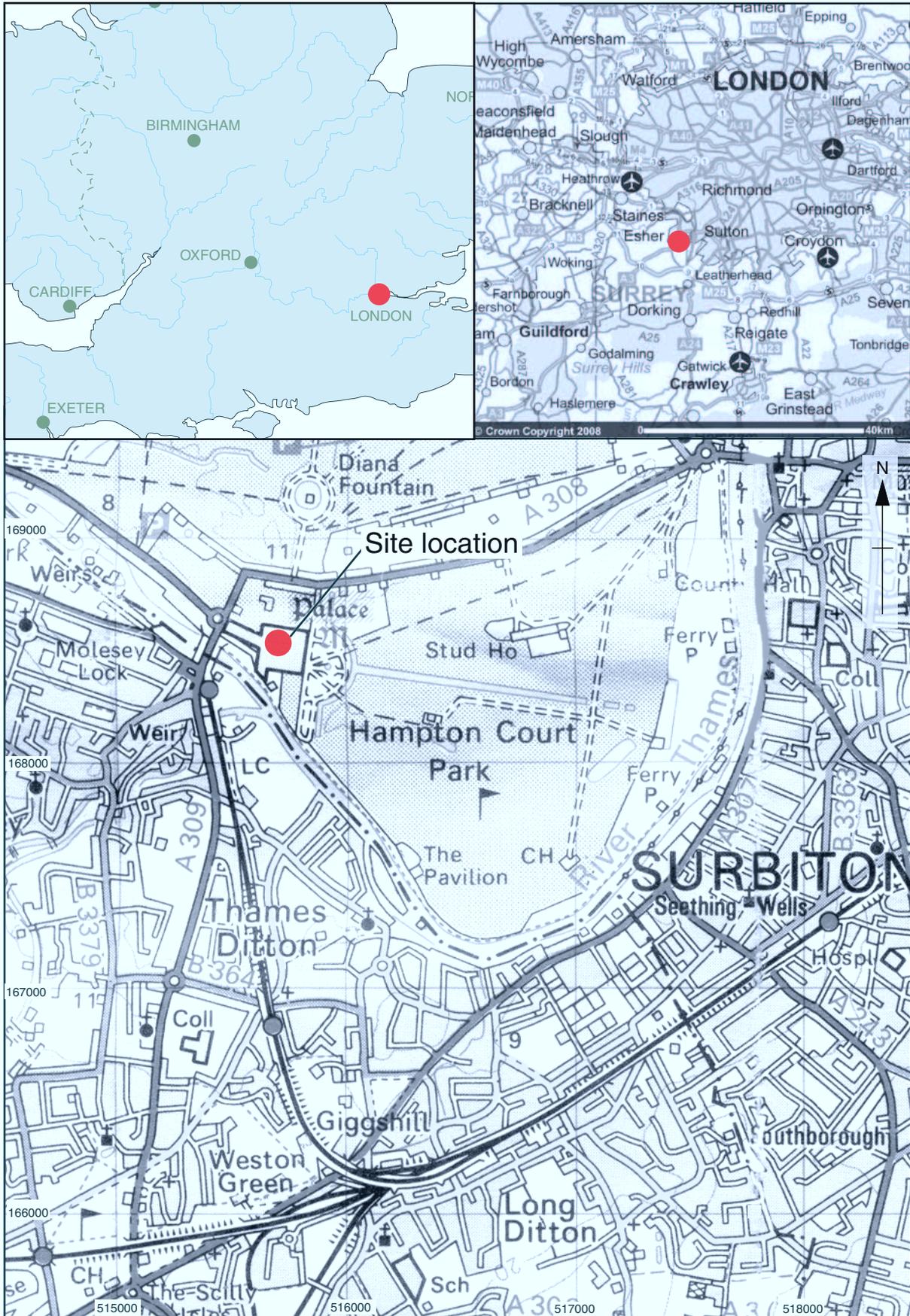
Stone No.	H (cms)	W (cms)	D (cms)	Film No. 3	Note
1	24	-	-	Neg. 14/15/16	Upper string course - various replacements
2	28	61	31	Neg. 17	Sill (section of)
3	13	57	21	Neg. 17/18	Sill (section of)
4	13	57	21	Neg. 18/19	Sill (section of)
5	13	57	21	Neg. 19	Sill (section of)
6	12	54	20	Neg. 20	Sill (section of)
7	12	53	20	Neg. 20/21	Sill (section of)
8	5.5	40	9	Neg. 21	Sill (section of)
9	-	-	-	Neg. 22/23/24/25/26	String course - various replacements
10	14	80	20	Neg. 26	Sill (section of)
11	14	81	20	Neg. 26	Sill (section of)
12	7	77	11	Neg. 27	Sill (section of)
13	14	80	17	Neg. 27	Sill (section of)

Hampton Court Palace, Chapel Court East Facing Elevation
Site Code: HCP54

Stonework removed during works (continued)

South Elevation (Face 1)

Stone No.	H (cms)	W (cms)	D (cms)	Film No. 3	Note
1	13	23	13	Neg. 28	Sill (section of)
2	28	70	22	Neg. 28	Sill (all)
3	28	29	22	Neg. 28	Sill and jamb
4	26	18	23	Neg. 29	Sill and jamb section
5	26	77	23	Neg. 29	Sill
6	26	48	23	Neg. 29	Sill and jamb section
7	26	51	24	Neg. 30	Sill and jamb
8	26	95	24	Neg. 30	Sill and jamb
9	-	-	-	Neg. 31/32	String course - various replacements
10	23.5	61	26	Neg. 33	Porch crenelation coping stone
11	23.5	41	26	Neg. 33	Porch crenelation coping stone
12	23.5	55	26	Neg. 33	Porch crenelation coping stone



Scale 1:25,000

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Figure 1: Hampton Court Palace, Chapel Court, East Facing Elevation

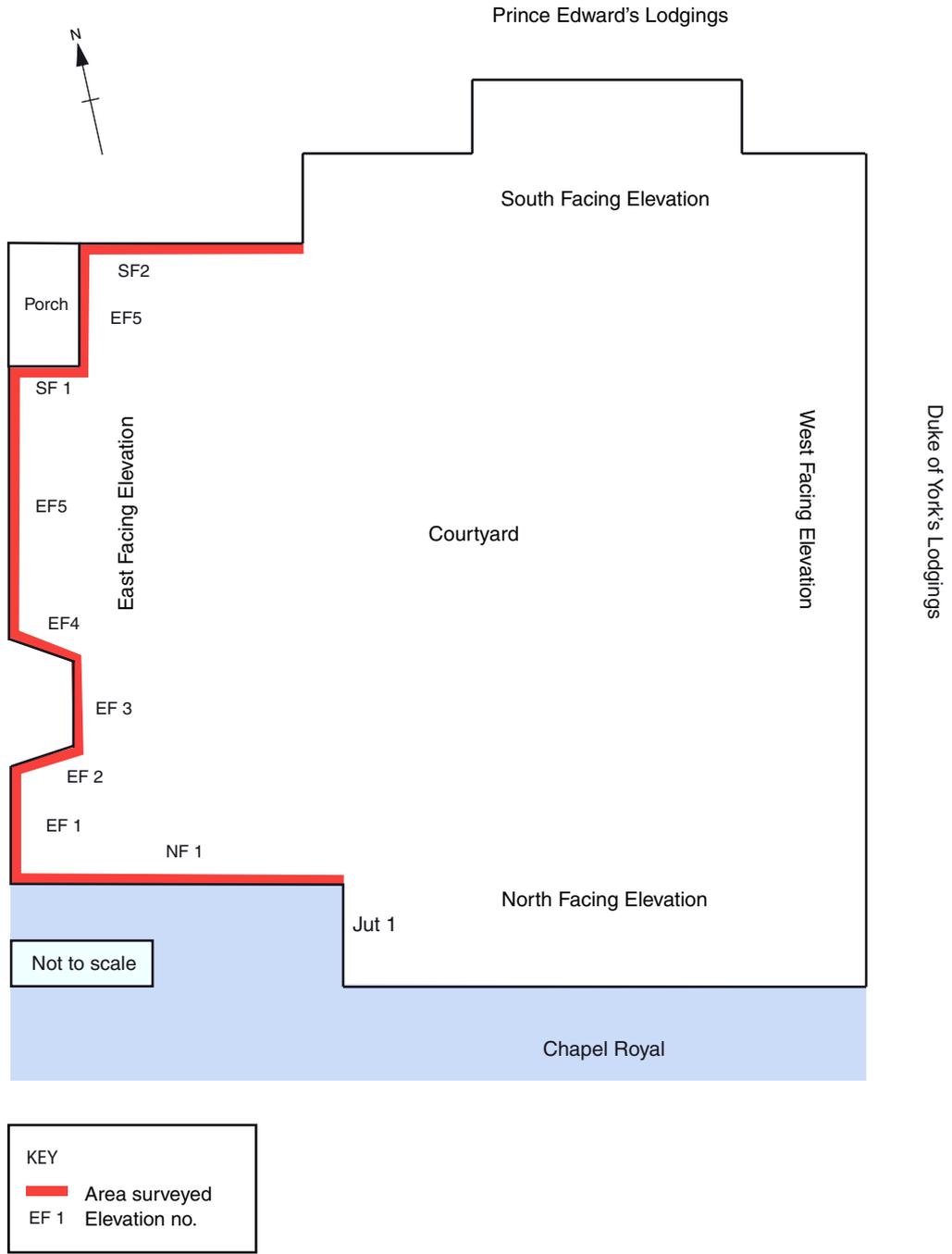
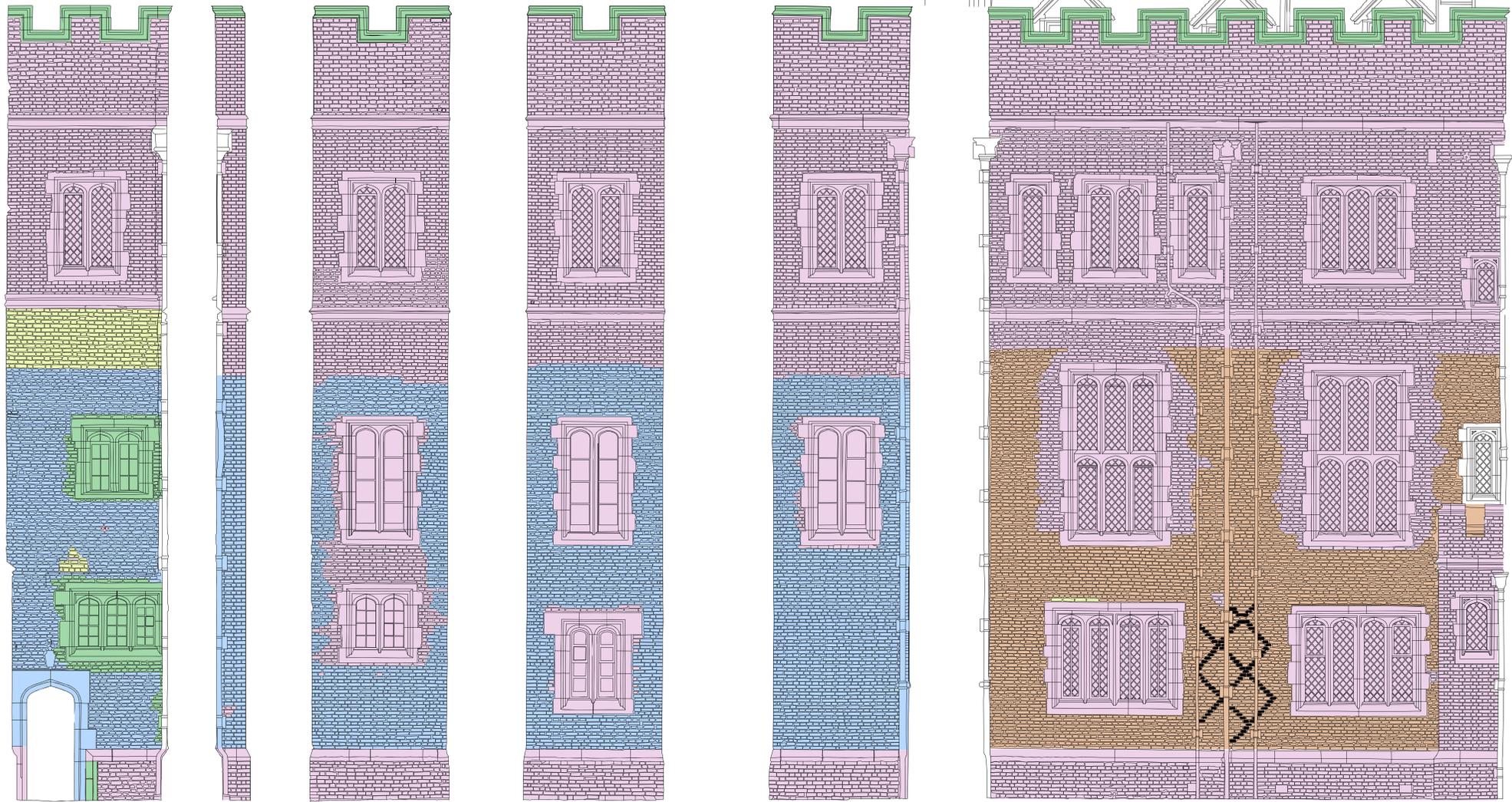


Figure 2: Hampton Court Palace, Chapel Court, East Facing Elevation - Plan showing location of works



East face 1

East face 1A

East face 2

East face 3

East face 4

East face 5

Key	
■	Wolsey (c1515 - 1528)
■	Henry VIII (1529)
■	Wren (late 17th/ Early 18th c)
■	19th century
■	20th century



Figure 3: Hampton Court Palace, Chapel Court, East facing elevation (face nos 1-5) - Phasing of stonework and brickwork

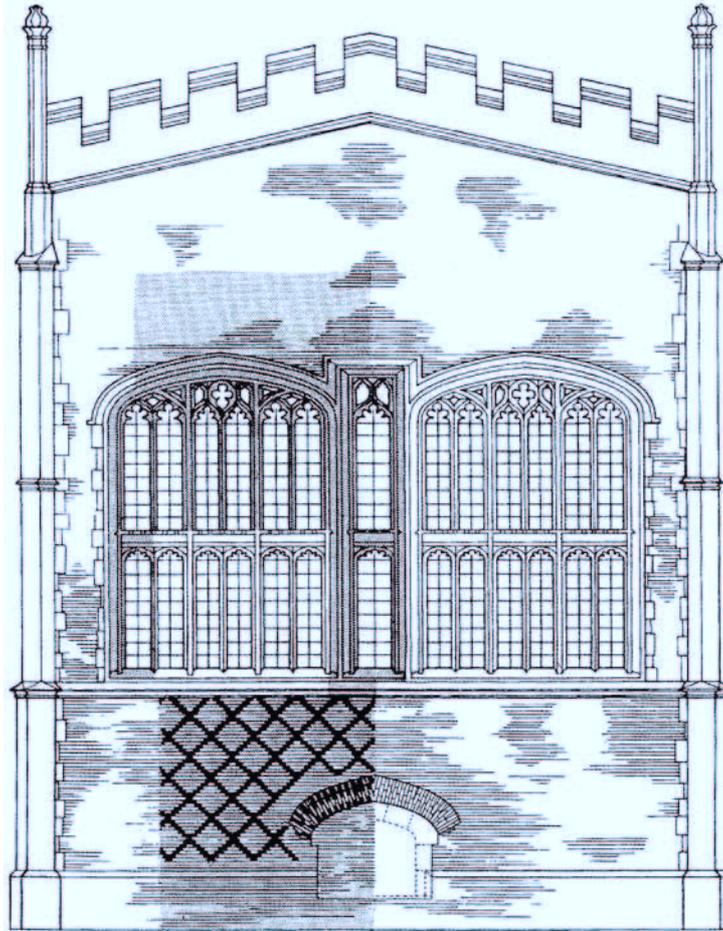


Figure 5: Hampton Court Palace, Chapel Court, East Facing Elevation - The probable Tudor diaperwork design as seen beside the Chapel east wall window (drawing: Daphne Ford)



Plate 1: The east elevation of Chapel Court by John Spyers c. 1780

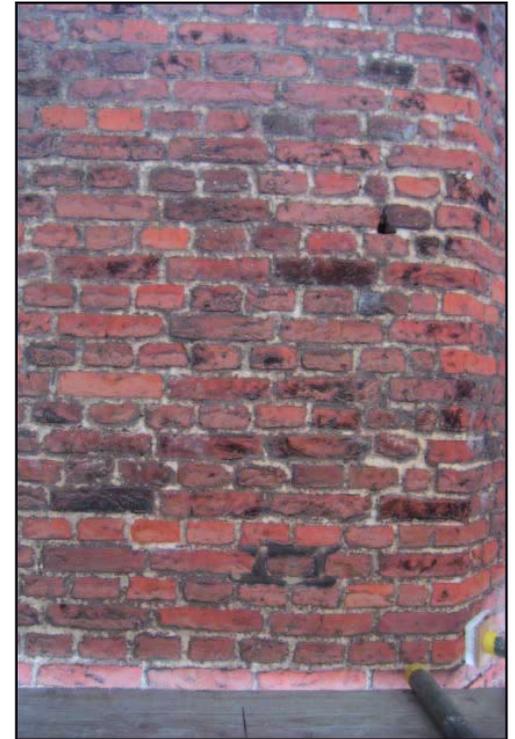


Plate 2: Type B brickwork on face 4



Plate 3: Type I Wren brickwork on face 1

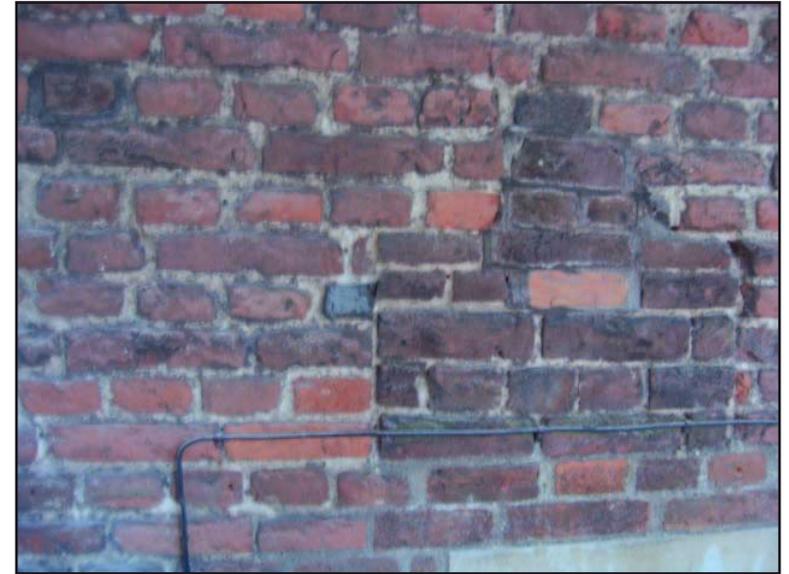


Plate 4: Type I Wren bricks used on infill patch face 1



Plate 5: Type I Wren bricks beside north facing elevation ground floor window



Plate 6: Type C brickwork on face 5



Plate 7: Type T brickwork on face 5



Plate 8: Type T brickwork on plinth



Plate 9: Henrician vitrified diaperwork

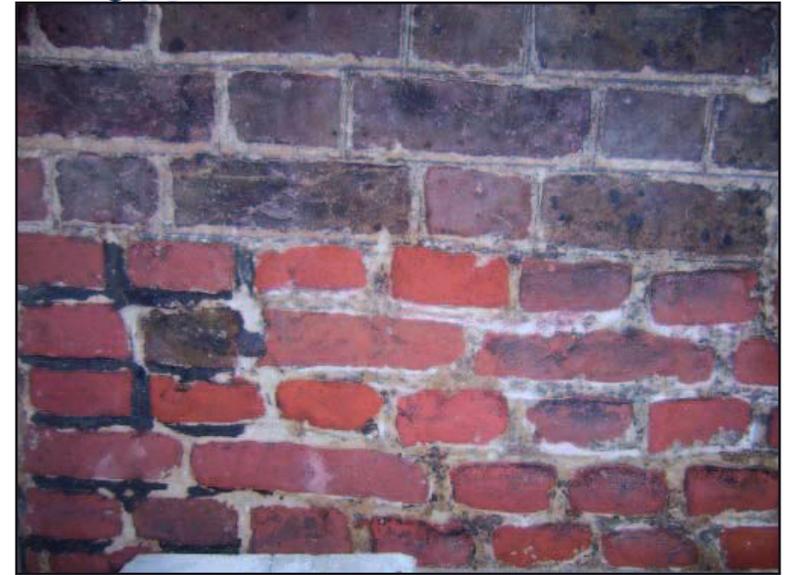


Plate 10: Tudor painted decoration remnants on face 1



Plate 11: Detail of Tudor painted decoration face 1



Plate 12: Red wash on bedding mortar, face 5



Plate 13: Painted diaperwork of unknown date on face 5

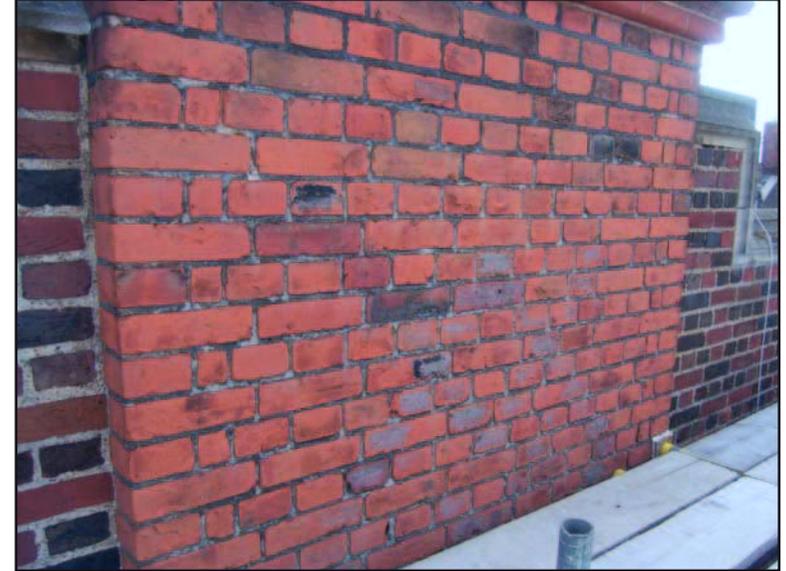


Plate 14: Victorian diaperwork on north elevation chimney type T bricks



Plate 15: Pattern cut on window stonework



Plate 16: 20th century scaffolding mark



Plate 17: Bell pull fixing on face 5



Plate 18: George IV lead hodder and 19th century brickwork



Plate 19: NW corner of chapel court following completion of works

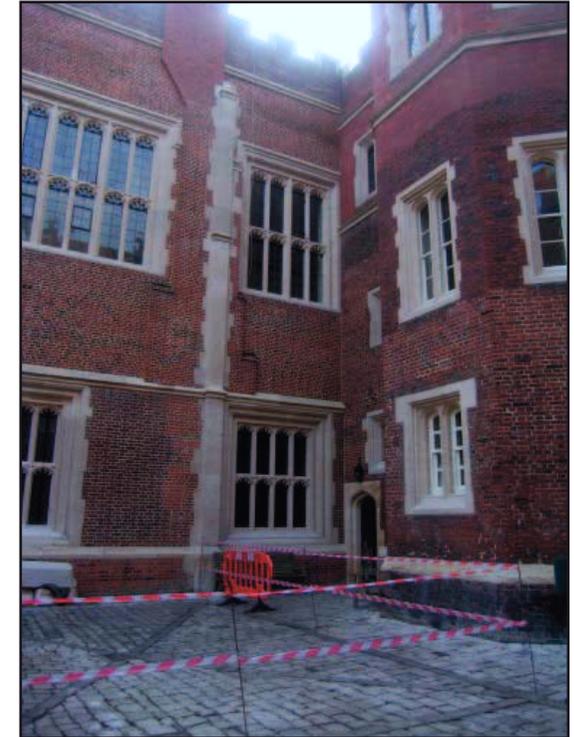


Plate 20: SW corner of chapel court following completion of works



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