



ST PAUL'S CATHEDRAL SOUTH CHURCHYARD  
London  
EC4

City of London

An archaeological watching brief report

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## Summary (non-technical)

*This report presents the results of archaeological monitoring by the Museum of London Archaeology Service on the site of St Paul's Cathedral south churchyard, London, EC4. The report was commissioned from MoLAS by the Cathedral Archaeologist Dr John Schofield on behalf of the client, the Dean and Chapter of St Paul's Cathedral. The watching brief followed an earlier evaluation of the site by MoLAS (2005), comprising of targeted trench excavations, which had exposed areas of the cloister and chapter house of the medieval cathedral.*

*Landscaping in the south churchyard was monitored between 26th July and 29th September 2006. Parts of the medieval cloister were exposed and protected within the landscaping (which includes a partial representation of the cloister and chapter house). Areas surviving to a higher level than had previously been exposed were protected within the foundation of new walls representing the cloister. All remains were surveyed onto the Ordnance Survey National Grid Projection via a direct link traverse to OS control stations and levels recorded to OS datum, the records of which should assist their future preservation.*

*Significant new details were added to historic observations and the remains exposed in evaluation trenches. These included the external threshold and the western range which had 3 long panels of diagonally laid Purbeck slabs, 2 slabs wide towards the outside, 1.5 in the centre and 1 slab wide to the inside. This contrasts with panels of equal thickness on the eastern range (1.5 slabs wide). This is the first time this detail has been recorded. Detailed drawings were made of architectural mouldings which may be compared with historic records. A previously unknown area of good preservation lay in a constructed void below steps to the previous southern garden gate. Comparison of stone from the cloister wall with the Museum of London's historic building materials specialist comparative collection indicated that the yellow limestone of which they were made came from Taynton (from near Burford, Oxfordshire) rather than Caen, as indicated by a geologist during the field evaluation. However, detailed examination of the fabric of the masonry indicated reused material in the walls so their immediate source was probably buildings which stood nearby, or on the spot, before the cloister was built. It is entirely possible that the stone came from more than one source.*

*Also exposed was a large stone and red brick curved foundation, possibly temporary work for Inigo Jones or Wren St Paul's construction, measuring 1.8m by 9m+. This has never before been recorded and its precise function is unknown but had it been a permanent structure in this location it is thought there would have been a record of it. Below it was a large red-brick culvert built by Wren. It is moot whether the foundation was built over the culvert (and was therefore later) or the culvert was tunnelled beneath the foundation.*

*The "Gas Chamber" a subterranean concrete room associated with the provision of town gas to the cathedral was uncovered and recorded, as was an old ragstone foundation at its base.*

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# 1 Introduction

## 1.1 Site background

The watching brief took place in the south churchyard (technically south-west) of St Paul's Cathedral, hereafter called 'the site' (see Fig 1). It is a roughly triangular plot of land bounded by the western part of the nave to the north, the south transept to the east and the boundary wall running along St Paul's Churchyard to the south-west. During the first part of the evaluation the western side was bordered by temporary hoarding for works associated with the south-west tower. The OS National Grid Reference for centre of site is 532020 181110. Prior to commencement, modern ground level varied across the site from approximately 15.75m OD towards the south-west to 16.35m OD in the north. The site code is SCP04.

A desk-top *Outline Archaeological Assessment* was previously prepared, which covers the whole area of the site (Schofield, 2002). This assessment document should be referred to for information on the natural geology, archaeological and historical background of the site, and the initial interpretation of its archaeological potential. It contains numerous illustrations, including historical representations of the cathedral and the results of the surveys in 1879, which will not be reproduced again here.

An archaeological *field evaluation* was subsequently carried out on a total of six trenches (trenches 1 to 6) within the churchyard, as detailed in the *Method Statement* (MoLAS Bateman 2004), between 8/9/04 and 1/10/04. Trenches 7 and 8 were excavated by contractors between 31/8/05 and 5/9/05, monitored by John Schofield. They were recorded by MoLAS from 6/9/05 to 8/9/05 (MoLAS Wroe-Brown 2005). They have informed the design of the works monitored and reported here.

## 1.2 The planning and legislative framework

The legislative and planning framework for archaeological recording was summarised in the *Outline archaeological assessment* (see Section 3 in Schofield 2002). The footings of the destroyed cloister and chapter house are listed Grade II\*. Separate features such as brick tombs are of importance and probably have listed status as being in the curtilage of the cathedral itself.

Archaeological monitoring of groundworks complies with the condition of approval made by the Cathedrals Fabric Commission for England (CFCE) and to discharge a condition of the planning permission for the landscaping of the site given by the Corporation of London, condition 4 of Registered Plan 05/00476/FULL.

The approaches, documentation and standards followed during the watching brief are those of the Institute of Field Archaeologists, the Association of Diocesan and Cathedral Archaeologists, and the practices recommended in the Archaeology Guidance note of the Department of Planning and Transport of the Corporation of London (2004).

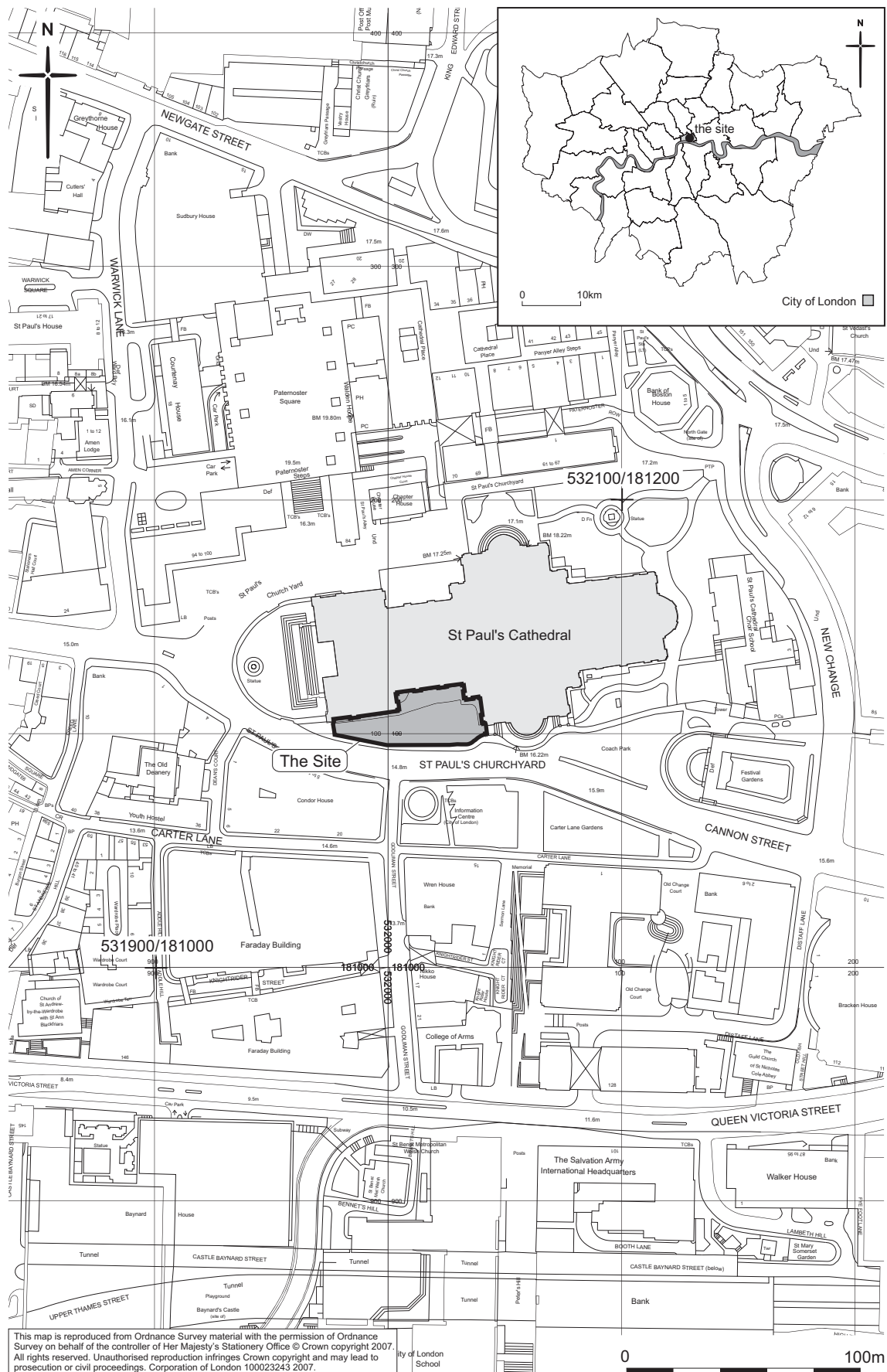


Fig 1 Site location



### 1.3 Origin and scope of the report

The Dean and Chapter of St Paul's Cathedral commissioned the report and the Museum of London Archaeology Service (MoLAS) produced it. The report has been prepared within the terms of the relevant Standard specified by the Institute of Field Archaeologists (IFA, 2001).

The purpose of the watching brief was to determine whether archaeological remains or features were present on the site and, if so, to record the nature and extent of such remains. A number of more site-specific research aims and objectives were established in the preceding *Method Statement*, and are outlined in the following section.

The purpose of the present report is to analyse the results of the excavation against the original research aims, and to suggest what further work, including analysis or publication (if any), should now take place.

### 1.4 Aims and objectives

The following research aims and objectives were established in the *Method Statement* for the watching brief (Section 2.2):

The objectives of the watching brief are to:

- help specify when excavation of the various areas of garden soil to be removed should stop, hopefully when a layer is reached hard enough to be used as a base for the future layer of hardcore which will support the final slabs of the design;
- record the strata exposed, including any archaeological strata exposed in the sides of the excavation areas;
- record and then supervise the conservation of any upstanding pieces of historic masonry encountered, including those which have to be surrounded in the future work by the new hardcore.
- record any strata or features exposed during the digging of two new tree pits for planters on the south border of the site.
- monitor the lift works as and when required by the Cathedral Archaeologist, and undertake any necessary recording, and the digging or amending of two new drain manholes and a drain receptor

The limited nature of the proposed works and the watching brief upon them makes it unreasonable to establish many specific archaeological research objectives. The archaeological brief is essentially limited to establishing where, if at all, archaeological deposits may survive (presence/absence), recording where necessary, and to ensuring that the proposed groundworks do not involve the destruction of any archaeological deposits of national significance.

All research is undertaken within the priorities established in the Museum of London's *A research framework for London Archaeology* 2002.



## 2 Topographical and historical background

The topographical and historical background to the site was described in detail in the *Outline archaeological assessment* (Schofield, 2002, Sections 2 and 4). Since the evaluation was not designed to remove archaeological deposits, merely to record the medieval survival, the most relevant parts of the text are those relating to the medieval cathedral and subsequent activity. A very brief summary of the salient information was included in the *Method Statement* and is adapted here.

The chapter house and surrounding cloister were built between 1332–49, and evidence points towards a date of circa 1335. The cathedral was irreparably damaged in the Great Fire, but the south part of the chapter house and the cloister was repaired by Wren to form his site office, in use until about 1710 when the walls were removed down to ground level. The area then became a churchyard immediately south of the nave, and may have been used for burial, including in brick burial vaults.

In 1879 the surveyor Francis Penrose located two of the southern buttresses and fragments of both south-west and south-east corners of the cloister walk, the latter with a short length of Purbeck flooring in situ. He conserved the remains, but his methodology is not known in detail. The two southern buttress fragments as left by Penrose could be seen above ground as late as 1980, but are now obscured by bushes. The south-east corner of the cloister may also have been exposed in the past, but has been obscured. The south-west corner of the cloister was not exposed in the 19th century and may never have been conserved.

In about 1998 English Heritage carried out a survey which linked the below-ground fragments at the east end of the cathedral and the (then visible) fragments in the south churchyard, but it was not tied in to the Ordnance Survey National Grid and there are no Ordnance Datum levels.

The remains of the Chapter House and Cloister were exposed and recorded during the evaluation of the site. They were surveyed on the OS grid projection (with the correct scale factor applied) and levels measured from OS datum calculated from a temporary bench mark at 15.79m OD established on the site by the MoLAS Geomatics Section.

A statue of St Thomas Becket was erected over the remains of the south-east buttress in 1973 and the south-west buttress was only partially exposed above ground. Photographs from the 1960s and 70s show that some of the remains were covered in bitumen as a preservation measure, although it is not known when this occurred.

### 3 Evaluation

The evaluation comprised 8 trial trenches and remains to relatively modern dates were recorded.

<i>Evaluation Trench 1</i>	
Location	Over SW buttress for the chapter house
Dimensions	5.4m N-S by max 3.2m E-W
Modern ground level	16.00m OD (N) to 15.73m OD (S)
Base of modern fill	15.15m OD
Medieval surface level	Approx 15.15m OD

#### *Description*

Only topsoil [2] was removed in this trench, revealing the south-west chapter house buttress [13].

#### THE SOUTH-WEST CHAPTER HOUSE BUTTRESS

The highest part of the buttress was just exposed above modern ground level prior to excavation at 16.00m OD. A stone footing level, which was not observed as it was covered in bitumen extended 0.30-0.50m out from the dressed masonry. Above this were built two courses of dressed and moulded masonry. Over most of the buttress the base dressed course consisted of Kentish Ragstone blocks measuring in elevation 0.25m high by a maximum of 1.20m in length. Caen sandstone was used for the whole top course and for both courses at the decorative north-east end, where the stones were much deeper in elevation at 0.45m. However, the first moulded stone on the bottom course adjacent to the regular Kentish ragstone blocks was also Kentish ragstone, an anomaly seen on both the north-west and south-east sides of the buttress.

A moulded plinth ran along the top course of Caen sandstone blocks on the three less decorative sides of the buttress; this continued along the top of the base course on the north-east end. A complex series of shaft bases were also present on the north-east end. The plinth moulding had decayed away.

The core of the buttress was not observed as the masonry had been covered with bitumen for protection. A lead pipe, designed to drain the top of the bitumen covering had been drilled through the stonework at the south-west end, and the bitumen had been shaped in order to funnel water to the top of the pipe.

#### MODERN FEATURES AND DEPOSITS

To the south of the buttress a small length of dry-stone walling [12] was revealed, placed as part of the 19th- or 20th-century display torevet material to the south. Part of the modern gravel path bedding [9] and the associated concrete vertical edging slabs and base for railings [11] were discovered in the south-east of the trench.

#### *Discussion*

The shaft moulding on the north-east end of the buttress was in relatively fair condition but it is evident that Penrose's recording was undertaken when the stone was in a better-preserved state than at present. It has been established that the central shaft, which Penrose showed as angled to the north and therefore not symmetrical, is indeed as he recorded it.

There has clearly been attempts in the past to preserve the chapter house buttress, including the bitumen on the top and foundation, the addition of patches of mortar/concrete in places on the sides. The Kentish ragstone is relatively unaffected by weathering but the decorative moulding on the softer Caen sandstone has severely eroded. Nevertheless the original effect can still be discerned. It is not clear when the preservation measures were undertaken but it is likely that they are partly the work of Penrose in 1879. They are visible on photographs taken in the 1960s and 70s (e.g. Schofield 2002, fig 10).

The path edging, make-up and railings, which were present in the trench also show on photographs taken by the Corporation of London in the mid 20th century

<i>Evaluation Trench 2</i>	
Location	Over SE buttress for the chapter house
Dimensions	5.00m x 3.40m x 1.10m max depth
Modern ground level	15.75m OD – 16.03m OD
Base of modern fill	14.65m OD (S end)
Medieval surface level	Approx 15.15m OD

#### *Description*

Topsoil [37], a mixed grey/brown and dark organic brown clay/silt was the only deposit removed, revealing a footing and three courses of the south-east chapter house buttress [45]. The north-western end was truncated, however, and very little of the complex shaft moulding seen on the buttress in trench 1 was present here.

#### THE SOUTH-EAST CHAPTER HOUSE BUTTRESS

The roughly-shaped Kentish ragstone footings extended approximately 0.30m outside the line of the north-east and south-west sides, and 0.10m on the south-east side. They had been very roughly dressed, on one side at least, to present a flat surface. Damage and repair work obscured the extent of the footings to the north-west and it is possible that part of the footings were formed into a surface in this area after the 1879 works.

The majority of the base course consisted of Kentish ragstone blocks between 0.50m and 1.60m in length and 0.25m high in elevation. On the south-east side a lead pipe protruded from the centre of this course. The two higher courses were of Caen sandstone of varying size up to 0.58m. The middle of the three courses was moulded into a plinth. In the north-west a fragment of the moulding survived and, as with the trench 1 buttress, the first stone adjacent to the Kentish ragstone dressed blocks was a moulded Kentish ragstone. The remainder of the moulding was in Caen sandstone. Indications were that it would have been very similar to that recorded in trench 1.

The core of this buttress was exposed where it had been truncated at the north-west end. It was composed of rough hewn Kentish ragstone in a hard lime mortar. A

considerable amount of hard grey mortar had been applied to the surface, presumably as part of conservation work.

#### MODERN FEATURES AND DEPOSITS

All other contexts in the trench were 20th century in origin. Three rows of vertically set concrete slabs surrounded the buttress, [39], [40] and [43]. These were used to support the surrounding soil when the masonry was on display and, in the case of [39], they edged the consolidation gravel for a path [38]. To the east of the buttress a length of land drain composed of ceramic pipes [44] took excess water to the south. The modern plinth [47] for the statue of Becket was numbered separately to distinguish it from the earlier masonry.

#### *Discussion*

It is clear that the buttress in this trench would have closely resembled the example in trench 1. The shaft moulding on the north-west face is virtually all missing but an accurate reconstruction can be confidently assumed by using a mirror image of the extant moulding on the trench 1 buttress [13]. This would mean that the angled central moulding would be orientated towards the north.

Photographs taken by the Corporation of London at the time when the statue of Thomas Becket was being installed show that this buttress was also covered in a capping of bitumen. The lead pipe emerging from the stonework on the south-east side was inserted to drain this in an identical way to the trench 1 buttress. The bitumen was removed when the plinth for the statue was constructed.

<i>Evaluation Trench 3</i>	
Location	NE area of the site, adjacent to the paved area S of the cathedral nave
Dimensions	2.70m E-W x 1.30m N-S x max 1.20m deep
Modern ground level	16.26m OD – 16.34m OD
Base of modern fill	Approx 15.70m OD
Medieval surface level	Not seen

Trench 3 was excavated beneath a mature Black Walnut tree and the excavators were advised that roots were to be left undamaged if possible. On the stripping of the topsoil it was found that only a small area on the west side of the trench was accessible enough through the root spread to excavate to the required depth. Thus a sondage measuring 1.1m x 1.1m was dug to 1.20m deep.

### *Description*

At the base of the sondage a thick layer of mortar [34] was removed to 1.20m deep. This was not the lower limit of the layer but further excavation would have required shoring due to safety concerns, an impractical measure in the circumstances. It filled the trench to 15.55m OD and was truncated to the east by cut [33], filled with brickearth and mortar [32], on the east side of the sondage. Whether this was indeed a separate feature or simply a tip line in a single large cut was not apparent from the limited area exposed. No datable artefacts were discovered in these deposits apart from clay tobacco pipe stem fragments indicating a post-medieval origin.

A brick and stone structure [7] was discovered in the extreme western end of the trench. It consisted of at least 6 courses of brick, laid somewhat haphazardly with the base course orientated NE-SW and the higher courses altering alignment gradually so that the top stone course was orientated N-S. The bottom course may not have been found and the base as observed was at 15.05m OD, the limit of excavation. The top of the feature was at 15.71m OD. Because only a small part of the structure was exposed its purpose was unclear. It was apparently cut into the mortar layer [34].

A thin dump, [8] was used to level the area at 15.61m OD before a line of vertically positioned edging slabs [5] was laid against a shallow cut edge [6]. To the north a mortary deposit [4] was laid. It was notable that the top of the edging slabs, at 15.70m OD were nearly level with the top of the stone feature [7], and the two were perhaps in contemporary use (although not by the 1970s, see discussion). A number of 20th-century artefacts were found in all these deposits (from [8] upwards).

The ground was later made up to its present level of 16.26m OD on the west side and 16.34m OD on the east side with dumping [3] and topsoil [1].

### *Discussion*

This trench was in the location of a possible future ramp for wheelchair access from the cathedral disabled access path to a potentially lower area to the west. It is positioned on the alignment of the medieval entrance to the chapter house from the east cloister but no evidence from this date was found. It seems that the thick mortar dump [34] was backfilling a large pit although it was not clear whether this dated to Penrose's work or earlier. The lack of finds other than clay tobacco pipe may suggest an earlier date, perhaps Wren period work, as the 19th-century dumps could be expected to produce a greater number of more varied artefacts.

The brick and stone structure, [7], remains enigmatic as so little was seen but possibilities for its purpose include drainage, a garden feature, a tomb and a statue base.

On examination of a photograph taken by the Corporation of London prior to 1973 in which path and its edges can be seen, context [5] must be on the north side of the path behind the benches. Thus [8] must have been beneath the path and [4] beneath the bank to the north. The stone and brick feature is not apparent and therefore was just beneath the path surface at this date. Whether it was ever in contemporary use with the path is not clear.

<i>Evaluation Trench 4</i>	
Location	W of the disabled access path over the SE corner of the medieval cloister
Dimensions	5.40m E-W x 6.00m N-S (L-shaped in plan) x up to 1.10m deep
Modern ground level/top of slab	16.02m OD – 16.20m OD
Base of modern fill	Circa 15.21m OD
Medieval floor level	Circa 15.21m OD

*Description*

(see figs 16-20)

This trench successfully located the standing remains of the medieval cloister. It consisted of an inner wall arcade [50], the cloister walk floor [51] and the outer wall [52]. A number of modern layers were removed to expose the remains.

## THE INNER CLOISTER WALL [50]

The inner wall ran south from the northern edge of the trench for 4.40m and returned westwards for 1.40m. It was constructed on a chalk and ragstone foundation of which only a small area was exposed where a later drain cut truncated it. The majority of the dressed and moulded masonry was Caen sandstone but the decorative shafts and corner buttress were in Purbeck marble. The stones were close-fitting and, although fine sandy mortar was employed between the stones, very little was observable on the wall faces.

Two piers were recorded, one forming the corner and one 1.40m to the north. They were supported at foundation level on red ceramic tiles, possibly a levelling technique. A maximum of three courses survived on both piers, reaching a height of 15.92m OD. The bottom two courses on the east (cloister walk) side of the northern pier was Purbeck marble and was evidently originally finely moulded but had become severely decayed. The corner pier also possessed Purbeck marble on the bottom two courses which became the ornate corner buttress. Originally the moulding on the facing sides of these elements would have been matching mirror images.

Parts of a total of six Purbeck marble shafts were recorded and these along with the corner buttress were severely decayed and in an extremely delicate condition, to the extent that cleaning them with a soft brush would damage them. They were designed to divide the arches between the piers into three lights but the space between the two observed piers was shorter than the next arch to the north, leaving room for two lights only. The shaft closest to the corner on both sides was present but built against the corner pier, with no space for a light.

Only one course high was present on the remaining north-south walls between the piers, to 15.46m OD, and two courses survived on the east-west wall, to 15.67m OD. The Purbeck marble shafts were built into these on the cloister walk side. The second course was moulded into an angled plinth on both sides, and was thus narrower at the top. The plinth was evident around the piers and the corner buttress at the same height.



All horizontal surfaces had been covered in bitumen for protection, with a system of lead pipes designed to drain rainwater into the drainage channel outside the cloister to the west. The lead brackets holding the pipes were stamped with the crest of the Dean and Chapter. A further attempt at preservation was the infilling of small gaps in the stonework with hard coarse mortar (notably different from the fine sandy medieval mortar).

#### THE OUTER CLOISTER WALL [52]

A shorter length of the outer wall was exposed, measuring 2.30m N-S x 0.45m thick (E-W) and 0.68m high. It was built in dressed Caen sandstone of varying sizes with a single Purbeck marble shaft set into it. It was three courses high to the south of the shaft and two larger courses high to the north, reaching the same height.

It was capped with 100mm of stone fragments set in cement with the impressions of tiles in the surface, presumably a 19th- or 20th-century preservation measure. The Purbeck marble shaft consisted of only two courses, with a protruding slate capping above (a 19th-century preservation method) and the stones above were Caen sandstone. This may indicate that at least part of the wall has been rebuilt at some stage as the shaft must originally have continued upwards.

#### THE CLOISTER WALK FLOOR [51]

The floor surface of the cloister walk comprised two sizes of square Purbeck marble slabs. A line of slabs, each measuring 450mm square, was laid parallel to the inner cloister wall 0.8m to the east and following the corner round to the south. The centre of the line was 1.04m from the inner wall edge and 2.08m from the outer cloister wall edge, placing the slab alignment at exactly one third of the width of the cloister walk. The remainder of the slabs were 320mm square and were laid in a diamond pattern, that is with the corners of the slabs on the cardinal points of the compass. The surface was relatively level to the north and against the walls at 15.20 – 15.22m OD, but subsidence had occurred to the south where it had sunk to 15.14m OD.

Not all of the surface was original medieval slabs and a degree of infilling had been undertaken in order to display the floor at some stage. This consisted of either a mosaic effect with small square tiles set into concrete or, in some places, concrete and stones filling the gaps.

The floor was relatively well preserved given the decay of the Purbeck marble shafts on the walls. Many slabs were intact, although a high proportion of the larger slabs were cracked. Square concrete bases were present in a line close to the inner wall, probably supports for a 19th-century railing. These could not be removed without damaging the slabs.

#### THE EASTERN FOUNDATION

To the east of the outer wall [52] a small part of a ragstone and mortar foundation was exposed, butting against the rear of the cloister wall. It measured 1.40m N-S and only 0.20m E-W as seen, but it continued to the east, north and south beyond the edges of



the excavated area. The top was at 15.93m OD. This may have been part of the foundation or core of the medieval cathedral south transept wall.

#### MODERN FEATURES AND DEPOSITS

To the west of the inner cloister wall a northward-leading land drain [21], consisting of loosely placed ceramic pipes, was laid in a cut. The lead pipes from the cloister drainage fed into the cut but not directly into the drain. Above the cloister floor another drain, [35], was also built with ceramic pipes but these were set onto a concrete base and led southwards with several branches feeding into it, finally draining into a vertical pipe set in a brick-lined column which originally led from the surface. The concrete base was laid directly onto the medieval floor but fortunately it was removed with no damage to the slabs.

Both sides of the inner cloister wall were backfilled with loosely-packed chalk rubble [24], presumably laid down in 1937. Since chalk is an alkali it may have been designed to counteract the effects of acid washing through the topsoil. Above this on the east side of the trench two north-south rough dry brick walls [18] and [19] were built,. These were intended to be buried and they probably formed the subsurface support for the edges to the path which ran through this area in the 1960s and 1970s. Outside these walls on both sides was dumped a clean orange sandy gravel [23]. A well-packed stone and brick rubble [22] was deposited inside them to act as path make-up.

Many of the stones from context [22] were worked. Most of these were in Classical style, and appeared to derive from either the Wren cathedral or possibly Inigo Jones' work in the early-mid 17th century . The assemblage includes three stones of medieval date, three of probable medieval date, 31 of post-medieval date, and two of uncertain date. They may have been discarded after bomb damage during the Second World War. The medieval examples were almost certainly from the medieval cathedral.

Topsoil [20] lay over the rubble and gravel covering the entire trench. Finally a series of concrete slabs [10] was laid out on the surface before the 1960s to indicate the location of the inner cloister wall.

#### *Discussion*

The stonework of the cloister was in varying states of preservation. The Caen stone is in relatively good condition, although not as pristine as when Penrose excavated it. The Purbeck marble by contrast is in a highly delicate and rotted state which is probably the reason it was covered over in 1937. Several techniques have been applied to stem the rate of decay, presumably by Penrose and his successors, including the bitumen covering, additional mortar in the stonework, the use of chalk backfilling dumps to counteract their effects of acid and the slate capping on the outer cloister wall shaft.

<i>Evaluation Trench 5</i>	
Location	SW corner of the site
Dimensions	3.70m N-S x 2.50m E-W x max 1.50m
Modern ground level	16.06m OD
Base of modern fill	15.22m OD
Medieval surface level	Truncated at approx. 15.10m OD

### *Description*

(see figs 21-22)

The earliest material in the trench was a mid grey/brown sandy silt layer [31] found at the base of the trench. This was not excavated and was severely truncated. No finds were discovered in association with it but it was apparently cut by masonry [29] in cut [30] and therefore of medieval date, although this relationship was somewhat tenuous. The masonry [29] consisted of rough-hewn blocks of chalk, Kentish ragstone and occasional greensand set randomly in a hard, pale yellow mortar. No dressed stones were observed. It formed a trench-built foundation and lined up with the inner cloister wall found in trench 4. On the west side of the trench it was less well defined and extended 0.7m further to the north and 0.2m further south than the straighter alignment on the east side of the trench. It survived to 15.17m OD.

Two thin dumps, [17] and [28], covered the foundation and deposit [31]. These both produced 19th-century or later material. They were cut by a large square feature, [27] filled with [26], which occupied most of the northern half of trench 4. It included a narrow extension to the north and south which proved to be a modern pipe trench containing an iron pipe, backfilled with the same material containing 20th-century artefacts. The pipe was laid at 14.68m OD through a deep channel (interpreted as part of cut [27]) cut into foundation [29].

Above foundation [27] a land drain was laid east-west in cut [16], cutting through [17] and [28]. It consisted of short lengths of ceramic pipe laid loosely in a gravel fill [15]. A solid orange compacted gravel path base [14] covered this in the south of the trench. Finally topsoil [25] filled the remainder of the area to a depth of 0.8m in places.

### *Discussion*

Masonry [29] was evidently the foundation of the inner cloister wall but it was not entirely clear why it was thickened to the west when the eastern portion was straight-edged and evenly aligned. Although this was not the south-west corner of the cloister itself, the return must have been nearby to the west and it is possible that the foundation was enhanced for strengthening the corner. No evidence of the above-ground dressed courses was observed but since the level at the top of the foundation, up to 15.17m OD compared with 15.15m OD in trenches 1 and 2, and 15.21m OD in trench 4, the exposed foundation must have been at or very close to the interface, and therefore medieval ground level.

The relationship between the deepest deposit, [31], and masonry [29] was difficult to elucidate as the contact between the two was mostly truncated and [31] was not

excavated. However, assuming [31] is a medieval context and the 14th-century cloister masonry is trench-built, it follows that [31] was deposited prior to the 14th century.

All other layers and features in the trench were probably 1879 or later in origin. The pipe trench [27] was filled with 20th-century material and the two earlier layers, [17] and [28], may date to Penrose's activity. The gravel path make-up was part of the same path observed in several other trenches which is shown on the 1960/70s photographs.

<i>Evaluation Trench 6</i>	
Location	E of the disabled access path adjacent to the present S transept.
Dimensions	2.05m N-S x 2.70m E-W x max 0.9m deep
Modern ground level	16.33m OD – 16.46m OD
Base of modern fill	15.74m OD – 15.94m OD
Medieval surface level	Not seen

#### *Description*

The earliest layer encountered was a hard surface and make-up [49], which was above a sequence of other surfaces and possibly a foundation (although no direct evidence for this was recorded). It consisted of crushed mortar, chalk and other stones which had been compacted down. On the east side a linear cut, [48] filled by [46], was found to truncate this surface. The fill was excavated to 15.56m OD but was not bottomed at this depth. The side of the cut revealed that the sequence of surfaces similar to [49] continued down.

Above this, and covering the whole trench, was a further surface [42] which was composed of mortar and pebbles, with fragments of clay tobacco pipe inclusions and a Delft tile fragment (see below). Topsoil [41] completed the sequence. The latter also filled a depression on the east side which may have been a late cut.

#### *Discussion*

The surfaces in this trench were well above the expected medieval surface level. Since the trench was intended to be located over the medieval cathedral south transept wall the foundation or wall core may have been present beneath the surfaces but was not revealed.

Layer [42] yielded a Delft tile fragment of Dutch origin depicting a bird with a decorative motif in the corner. It is of mid-late 17th-century date, based on thickness and the style of the corner decoration. It would probably have been used around a fireplace. A very similar bird Delft tile was found at 102-105 Newgate Street (site code KEW98) approximately 300m to the north of St Paul's Cathedral.

The date suggests an origin contemporary with Wren and the building of the post-Fire cathedral, which may indicate that the mortar surfaces and the cut were all associated with the reconstruction phase works. Its purpose is by no means established but there are a number of possibilities. For example, a hard surface such as this could have been

created as a supply route for heavy loads into the precinct from the south. Alternatively it could have been the site of a mortar mixing area during the construction of the south transept.

<i>Evaluation Trench 7</i>	
Location	South side of the paving adjacent to the modern cathedral
Dimensions	2.20m N-S x 2.10m E-W x max 1.20m
Modern ground level	16.25m OD
Base of modern fill	16.19m OD
Medieval surface level	14.98m – 15.08m OD

### *Description*

Trench 7 was excavated by contractors to the medieval stone floor beneath the chapter house.

#### THE STONE FLOOR

The floor surface [54] comprised two sizes of square Purbeck marble slabs laid on a hard yellow mortar. The larger slabs, measuring 450mm square, formed an apparent right-angled corner on the east side of the trench. The remainder of the slabs were 320mm square and were laid in a diamond pattern, that is with the corners of the slabs on the cardinal points of the compass. Where they met the larger square slabs they were cut in half to accommodate the change in pattern. The floor sloped from 15.08m OD in the north-east down to 14.98m OD in the south-west, where there had been a degree of subsidence.

To the south a much larger slab was in place, measuring over 880mm E-W (extending beyond the section) by more than 530mm N-S; it was truncated along the southern section by a modern cut. Between this and the regular floor surface, and to the west, a series of random broken slabs had been used to infill.

#### POST-MEDIEVAL MASONRY

The floor was truncated by a masonry structure [55] in the north of the trench. It measured 0.90m n-s x 0.65m e-w and stood to 0.85m above the floor level (the base was not observed). It consisted of a number of blocks of stone laid in rough courses and bonded with a hard chalky mortar. Many of the stones were moulded and dressed, frequently with the ornate moulding facing into the core of the structure, and the stones clearly derived from an earlier building. Little care was taken in its construction with no effort by the builders to achieve straight vertical faces, regular pointing (the mortar was spread over parts of the faces) or level courses.

It was truncated by a modern cut for a brick wall to the west, which had undercut it considerably. It extended beyond the northern limit of excavation but the modern wall also showed indications of truncating the northern part. Thus the only faces remaining intact were those to the south and west. Most of the stonework, particularly the moulded pieces, was Caen sandstone but two bricks were also noted.

This structure dated to the period following the Great Fire. The stonework was undoubtedly reused from the fabric of the medieval St Paul's cathedral with some post-medieval brick employed to fill gaps. It was casually constructed implying either that it was not designed to be seen or that it was not meant to endure. Since the fire-damaged chapter house was partly refurbished and used by Wren as a site office it can be assumed that masonry [55] was designed as part of a support for the north wall, the original north wall being within the footprint of the new cathedral. It would then have been buried beneath the make-up for the new churchyard level.

#### POST-MEDIEVAL DEPOSITS, 17TH AND 18TH CENTURIES

A thick burnt deposit [64] was observed to entirely cover floor [54] for up to 0.3m and appeared to be laid up to masonry [55]. It was fairly fine and high in charcoal content with few inclusions. Samples were taken for further analysis. Over this lay a series of make-up and levelling dumps including rubble-rich deposits [60], [62], [63] and [65], a crushed brick levelling deposit [61] and a less rubbly layer [66] covering the top of the masonry structure [55].

In the western limit of excavation the base of a small brick feature was observed, masonry [67] in cut [68]. Only three bricks were recorded in situ with indications that it went deeper than floor [54] into which it was cut. It was truncated to the north and from above by a large modern cut.

#### 19TH CENTURY MATERIAL

Two features probably of 19th-century date were observed to truncate the post-Fire sequence. Feature [59] was cut through [60] from the top and apparently backfilled with the same material which had been removed.

A deep feature, [57], had been excavated through [59] and the entire post-Fire sequence down to the medieval floor [54] in the north-east corner of the trench. It was backfilled with [56] a mixed amorphous dump.

#### *Discussion*

Context [54] was evidently the floor surface beneath the pre-Fire chapter house which was at first floor level. The space beneath the chapter house was open between the eight piers supporting the building. The floor as found was relatively well preserved but had suffered both wear in use and probably some degradation since burial.

The pattern of the floor, where it remained unaltered was very similar to that recorded for the cloister walk in trench 4. The slabs were the same size and material, and laid in the same way with the larger flags laid orthogonally to the general alignment of the cloister and the smaller ones at 45° around them.

The black layer [64] above the floor may have been a deposit from the Great Fire of 1666, but it must have been dumped here later rather than forming in situ as it post-dated the masonry structure [55]. The remaining layers formed a typical post-Fire sequence (as observed elsewhere in the vicinity) raising the ground surface to above 16.20m OD, consistent with the level of the present cathedral in this locality. No finds were recovered as it was only observed in section.

The function of the brick feature [67] was unclear but it may have related to a burial vault. The purpose of feature [59] was also unclear. Cut [57] could have been one of the trenches excavated by Penrose in the 1870s although there is no known contemporary record of the floor in this position.

<i>Evaluation Trench 8</i>	
Location	S side of the site, centre
Dimensions	2.40m N-S x 1.80m E-W x max 1.20m
Modern ground level	15.90m OD (paving slabs)
Base of modern fill	15.45m OD
Medieval level	Truncated at approx. 15.18m OD

### *Description*

Two thick deposits, [77] and [78], formed the earliest material in the trench. They were only observed in section to a height of 15.15m OD each side of an east-west running foundation. Potentially [77] and [78] were the same layer as their composition was the same but the latter had far fewer inclusions than the former. The chalk and mortar foundation, [74] in cut [75] and the layers through which it was cut were recorded in the deepest part of the trench at 14.65m OD and clearly all three were extending deeper. The foundation measured 0.82m wide and ran the length of the trench east-west.

To the north a thin strip of a further material [76] similar but infused with mortar lay between (and was truncated by) two later brick features.

A deposit of mixed rubble and loose mortar [73] lay over foundation [74] to 15.45m, the top of the pre-modern sequence. In the north-east corner of the trench a red brick and yellow mortar wall [72] was recorded. It was 1.05m x 0.40m in plan, extending beyond the north and west limits of excavation. It was 0.40m deep and the eastern side may have been a face. The southern side appeared to be truncated, however, although it was not clear by what.

An east-west brick drain [71] crossed the centre of the trench, measuring 0.80m wide, 0.3m high (truncated from above) and 2.10m long, extending beyond the east and west limits of excavation. It was constructed with a red brick floor laid directly onto soil, with the flat bricks laid slightly diagonally across the drain. The sides were then built at least 3 courses high on top, forming an interior width of 0.33m. The fill was context [70], a dark grey-black silt with brick fragments and occasional whole bricks in it. It was not evident how the drain was covered.

A thin deposit of sandy silt [69] covered the earlier material over much of the trench.

### *Discussion*

The chalk foundation was very similar to [29] in trench 5, and at 0.82m was of comparable width. The top of the foundation, at 15.20m OD, was the height of the top of the chalk foundation observed in trench 5 and the base of the coursed inner cloister wall recorded in trench 4. It was in the correct location and on the correct alignment to represent the foundation for the medieval inner cloister wall.

The function of brick wall [72] is not apparent. The drain [71] appeared to be slightly later and may be part of the 17th/18th century drainage pattern established by Wren around the cathedral, although it is not shown on the drainage plan. It sloped down from 15.20m OD on its base in the west to 15.16m OD in the east.

Context [73] is very similar to other make-up material from the Wren construction period.



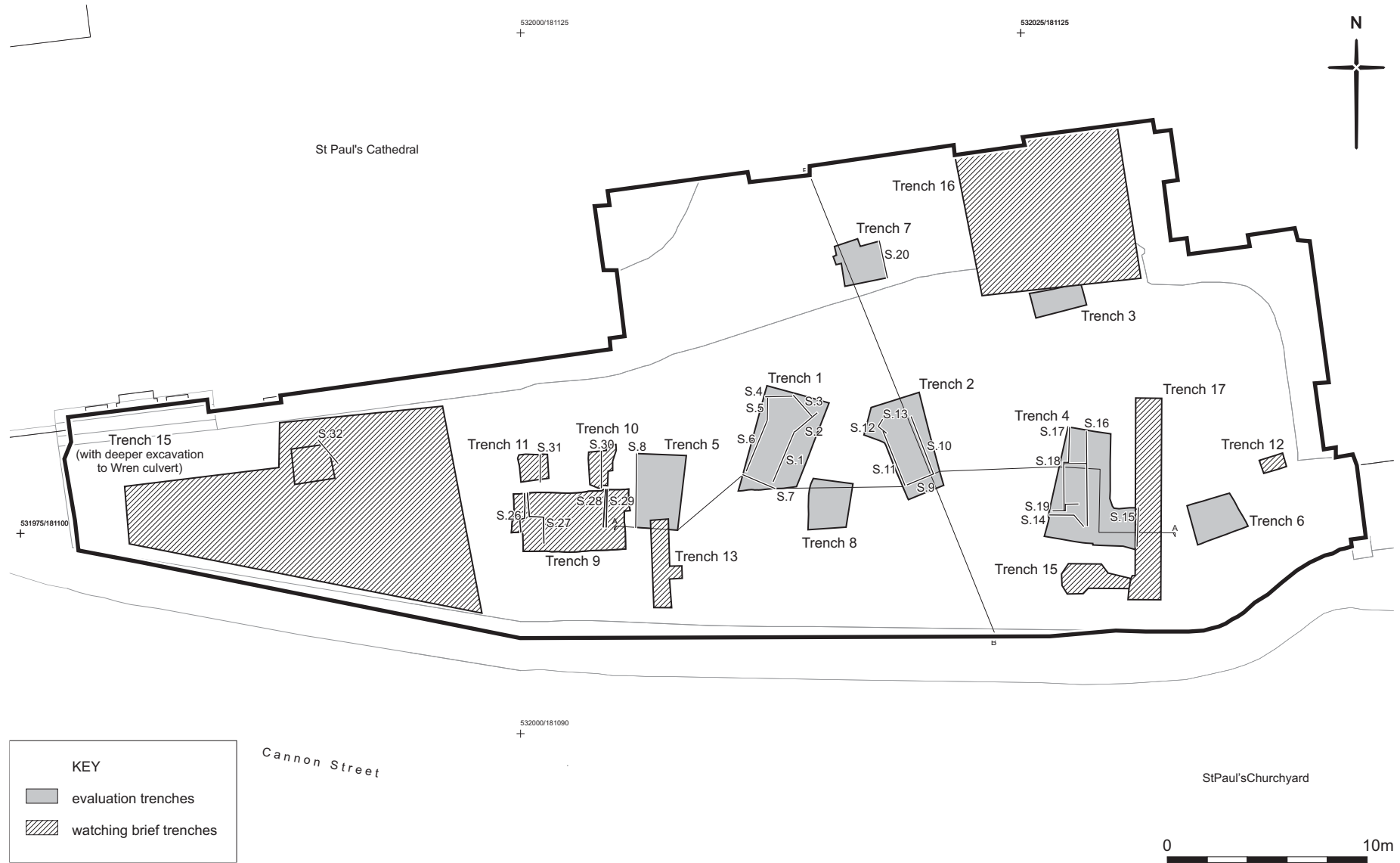


Fig 2 Trench locations

## **4 The watching brief**

### **4.1 Methodology**

All archaeological excavation and recording during the watching brief was done in accordance with the *Method Statement* (MoLAS 2005) and the MoLAS Archaeological Site Manual (MoLAS 1994).

Paving was removed by hand. Contractors under MoLAS supervision cleared the ground. Topsoil was removed and areas of soft deposits excavated down to layers of harder material. Where this process revealed ancient remains they were hand cleaned, recorded, surveyed and photographed to the same level as the previous evaluation. Although the entire area of the south gardens was stripped and monitored, particular areas of interest are referred to as trenches and were usually dug to a greater depth. This also enabled records to dovetail the watching brief and evaluation phases into a single system. The modern ground level was constantly changing throughout the watching brief. The level at the time of recording trenches was purely arbitrary and is not reported.

The locations of observations were recorded in relation to the Ordnance Survey National Grid by the MoLAS Geomatics section via a link traverse to the OS control (closed) traverse points in the City of London. A written and drawn record of remains was made in accordance with the principles set out in the MoLAS site recording manual (MoLAS 1994). Modern deposits were not recorded in the manner of the evaluation. The priority of monitoring the works was on recording ancient remains. However, where more recent additions or remodelling of those remains had occurred, this was recorded. Levels were calculated from site datum, 17.605m AD.

Where relevant, elevations were drawn at a scale of 1:10 or 1:20; numbered contexts were allocated where appropriate.

In total, evaluation and watching brief has produced: 1 trench location plan; 16 trench record sheets; 105 context records; 34 elevation and section drawings at 1:20 and 1:10, and 67 photographs

The site finds and records can be found under the site code SCP04 in the MoL archive.

### **4.2 Results of the watching brief**

In total, 8 separate interventions (trenches) were made for the purposes of record., in addition to the general monitoring of ground reduction/preparation throughout the site. These have been numbered consecutively (9–16) and follow, in sequence, evaluation trenches 1 to 8. There follows a brief description of the archaeological deposits as recorded.

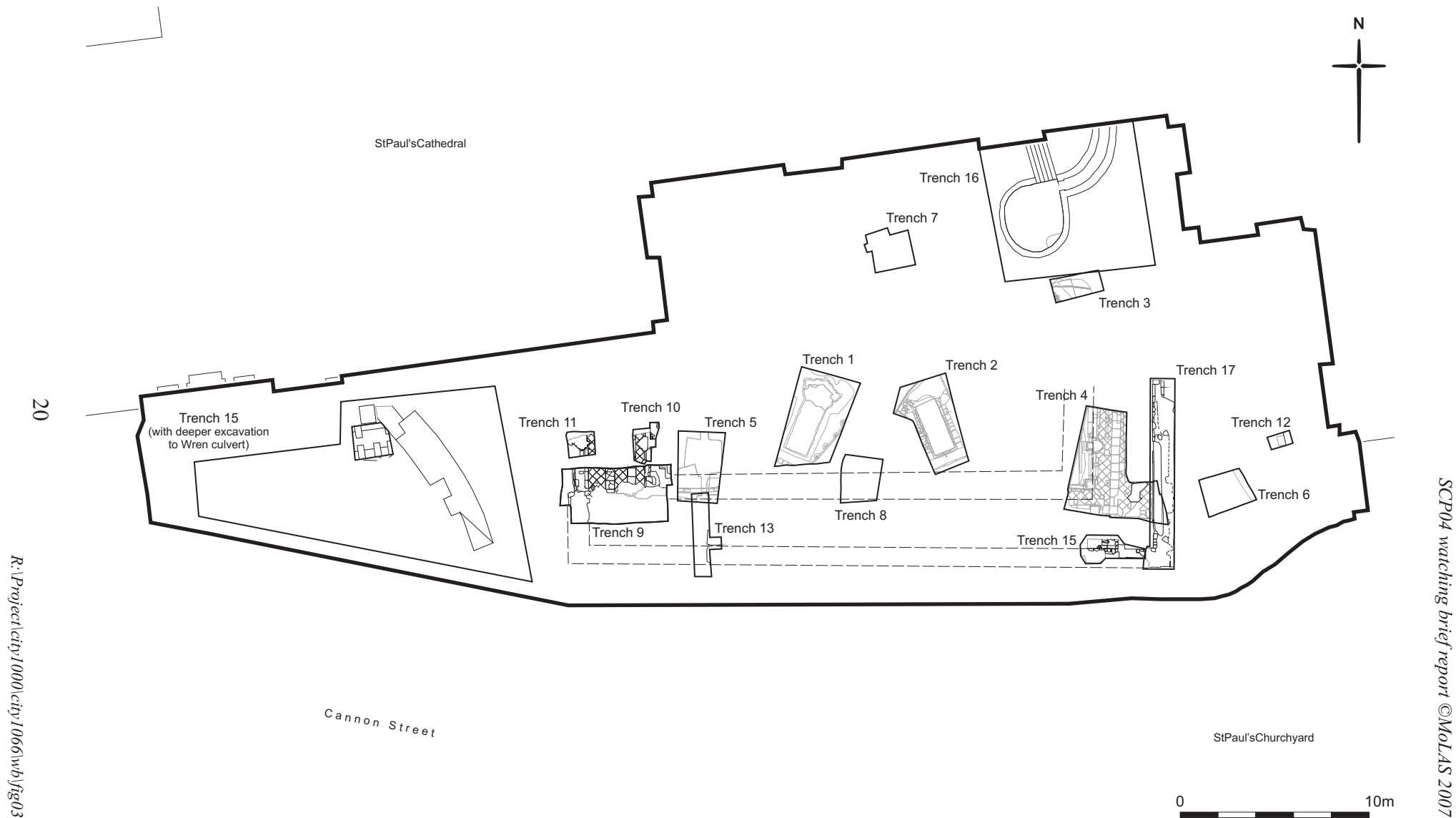


Fig 3 Overview of archaeological remains, evaluation in grey

For all trench locations see Fig 2

<i>Watching Brief Trench 9</i>	
Location	Over SW inner corner of cloister and part of threshold
Dimensions	3.1m N-S by 5.7m E-W
Base of modern fill	15.16m–15.13 OD, approx lower than 14.0m where truncated
Medieval surface level	Approx 15.15m OD

### *Description*

(see figs 4, 5 and 11)

Removing topsoil to test the proposed route of new wall foundations exposed historic masonry. The location was at variance to the projected line of the wall and the topsoil was removed to the floor of the cloister, which it overlay. The southern edge of the remains had been truncated in antiquity and backfilled with chalk rubble, flooded with flowing water. The water was traced to a cracked pipe elsewhere on site after investigative excavations.

The exposed remains were the western external cloister wall [79], a section of the west range cloister walk floor [80], a much damaged portion of the internal western cloister wall [81] and its return to the south range, and a portion of the threshold to the west of the cloister [82].



*Fig 4 Trench 9 looking east*



*Fig 5 Trench 9 looking west*

#### THE WESTERN EXTERNAL CLOISTER WALL [79]

A short length of the outer wall was exposed, measuring 1.7m N-S x 1.1m thick (E-W) and 0.3m high. The core was a poured mass of mostly irregular rough hewn stone; including fragments of re-used yellow limestone (one fragment moulded – see front cover plan) and a large ragstone block 440mm in diameter. A single fragment of pegged rooftile reinforced the impression of reused materials used in the cloister construction. A dressed, squared block of pinkish sandstone 300mm wide, 150mm high and 110mm thick was seen on the outside of the wall. Next to it was a grey limestone moulded door jamb with two projecting ribs. It was 300mm across and lay next to a flat stone of similar limestone. The door jamb had been truncated in the past. Internally, an eroded Purbeck shaft, trefoil in plan, <280mm diameter lay adjacent to the threshold. The inner, facing blocks had been removed in antiquity. The Museum of London historic building material specialist (Terry Smith) inspected the stones in situ and examined samples with the aid of a comparative collection. The yellow limestone was Taynton limestone (from near Burford, Oxfordshire) and the grey non-oolitic limestone, *possibly* from the Hythe Beds in Kent.



### THE WESTERN RANGE CLOISTER WALK FLOOR [80]

The floor surface of the cloister walk comprised two types of Purbeck marble tiles or slabs. Rectangular edging slabs, measuring 180mm x 400mm to the threshold and 80mm x 400mm to the inner wall, edged the main design. Similarly to the other side of the cloister [51], the main design was of two lines of 450mm square tiles laid in line with the cloister separating three panels of 320mm square and were laid in a diagonal pattern – 45 degrees to the line of the cloister. Unlike the floor in that exposure (trench 4) the panels of diagonal slabs on the west side were of different widths. The inner panel, nearest the internal wall, was 1 tile wide (450mm). The central panel was 1.5 slabs wide (680mm). And the western panel, opposite the threshold was two tiles (900mm) wide. The surface was relatively level, subsiding from 15.15m – 15.16m OD at the edges to 15.13m OD in the centre. The Purbeck marble tiles were laid on a bed of lime mortar varying up to 200mm thick.

### THE WESTERN INNER CLOISTER WALL AND RETURN [81]

The inner wall ran south from the northern edge of the trench for 1.0m and returned eastwards for 0.40m. It was very much damaged and took the form of an irregular line of upright stones, the eastern half of paired stones that had once formed the wall. They were of yellow sawn limestone, 200–250mm wide and similar height, 80–100mm thick. The return was formed of a single large block with carved surfaces to allow for a projection into the cloister, bisecting the angle, and wide enough for the full width of the wall (200mm). Below ground, the foundations were of massed chalk rubble, with rough hewn blocks to 200mm diameter, and with some squared limestone blocks and at least one tile which looked the size and shape of a standard Roman wall brick. The foundations were a little over 900mm wide, reflecting the weight of the superstructure they carried. The top of the wall stood to 15.4m OD, the base of the wall was about 15.1m OD and the lowest observations of the foundations was at 14.92m OD.

### THE THRESHOLD [82]

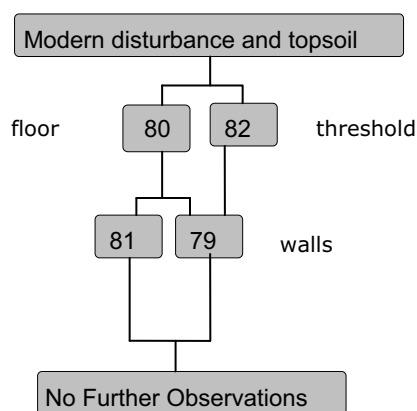
The door jamb, terminal of the external wall [80], had been truncated (see above) and this also had removed steps rising from the cloister floor, up to the outside. However, the rising bedding of the steps was still in place, made from a variety of sources including a standard sawn yellow limestone block (the same as used in the inner wall but less eroded) and a polished limestone block which had the greyish lime mortar negative impression of a moulding. This is thought to have been from the previous use of this stone (which may have been reused more than once. The moulding impression was of a half-round groove and the stone was at least 800mm long with a pronounced chamfer. The threshold built up from a base at 15.16m OD, where the scar of a removed step was visible, to 15.25m OD. The width of the threshold exposed in this trench was 1.0m but the full width was outside of the area examined on this intervention.

### *Discussion*

The variation of widths of the panels of diagonally-set Purbeck stone tiles, compared with the equally-spaced panels of the other side of the cloister, is probably a product of the position near to the threshold and the eye-line of those descending from the outside into the cloister walk. The tiling pattern was deceptively simple but actually sophisticated, the balance achieved by having the diagonal width of diagonally placed

tiles equal to the distance across the orthogonally-set tiles (320mm square tiles are 450mm across the diagonal = 450mm square orthogonally-set tiles). It should not be too surprising to see the spacing of tiles used to manipulate the perception of space in the structure as one moved from level to level. The obvious re-use of materials has important implications on the sourcing of the building material, The origins may have been from elsewhere but the yellow, grey and ragstone limestones – together with ceramic tiles – probably came from London, if not buildings previously on the same spot.

#### *Trench 9 context matrix*





<i>Watching Brief Trench 10</i>	
Location	Over inner cloister wall, north of Tr 9
Dimensions	2.2m N-S by 1.2m E-W
Base of modern fill	15.13 OD
Medieval surface level	15.13m OD

### *Description*

*(see figs 6, 7 and 11)*

Removing topsoil to the north of Trench 9, higher-surviving stonework was exposed, this was cleared top medieval floor levels but the floor itself remained covered in topsoil. Trench 9 was over the inner wall and trench 10 the outer.

The exposed remains were the internal western cloister wall [83], a portion of medieval floor adjacent to the wall [84] and some brickwork built inside the cloister [85].



*Fig 6 Trench 10, north is to left, trench 9 backfill (pea shingle) to right*

### INTERNAL CLOISTER WALL [83] WESTERN RANGE

The exposed section of wall was 1.2m long, 240mm thick and 350mm high (shin height). It was formed of pairs of sawn yellow limestone blocks 250mm high x <250mm wide and approximately 100mm thick, topped with a greyer limestone lintel. The lintel profile was flat and 160mm wide on the top with curved edges to vertical sides that, on the inside (west) widened by a 45-degree slope and on the outside had a decorative mitre to the full wall width (a simpler profile than on the east side). The south end of the exposure terminated in the base of a Purbeck marble trefoil-shaped

shaft and the wall and a large composite attached pier and opposed buttress dominated the wall, reflecting the height of the cloister and need for structural solidity. The buttress was built of a square purbeck block 400mm wide, and the internal pier of two decorated and polished purbeck stones <850mm wide and 600mm E–W, projecting 500mm into the cloister walk. Although vaguely triangular the face of the pier was divided in a series of decorative, polished, surfaces, the apex of the triangle and the two ends cut to reflect the trefoil decoration elsewhere, divided by two concave surfaces cut at different depths to the stone. The two stones tapered significantly, forming a spread foundation. The upper stone was 100mm smaller than the base. The lower stone was 250mm thick and the upper 200mm.

#### THE WESTERN RANGE CLOISTER WALK FLOOR [84]

The cloister floor repeated the pattern in trench 9 [80], with narrow strips of marble on edging the floor and diagonal stone tiles set in a panel one Purbeck tile wide. The projecting rib base (above) almost crossed the full width of this panel and the shaft and pier were divided by a single diagonal tile, emphasising the care taken in the repetition of standard measurements through different elements of the design. Enough of The orthogonal stone tiles on the west of the panel were exposed to indicate that several were missing and both floor [84 and wall [83] were truncated by a substantial feature to the north (possibly the Wren culvert, below).

#### BRICK WALL [85]

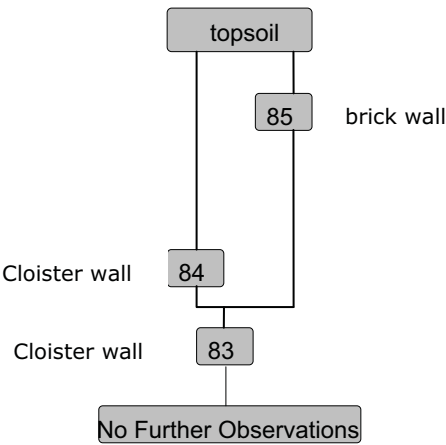
Overlying the filled cut feature and within the cloister wall was a brick foundation 850mm x 450mm, approximately 200mm deep. The bricks were standard sized (ca 60mm x 100mm x 210mm) and purpley red with visible coal-dust added. It was set with a hard cream-coloured lime mortar.

#### *Discussion*

The details of the vaulting-rib base agree closely with historic representations of other rib bases; however they were outline plans and failed to record the detail of the separate – but allied – construction of the buttress. The inner wall [83], at 350mm high, is considerably shorter than the equivalent wall on the east side [50]. The eastern wall is at least 450mm high and may have been higher (the top was obscured by bitumen). The same mouldings appear at about the same level on both walls. The difference in heights of the internal walls appears to be part of the original design and not a product of later alterations. It may relate to the differences in the layout of tiles.

The dating and function of the brick wall [85] is problematic. Firstly, there are no known Wren-period bricks around St Paul's that incorporate added coal dust. Coal dust chokes most fires or furnaces but will combust within the clay when the bricks are fired. This reduces the cost of firing bricks considerably and leads to a harder brick than clay-alone bricks fired in a similar way. Typically, it is an 18th or 19th-century technique (*ie.* it was common practice when brickmaking and building was becoming more industrialised). However, the earliest known historical references to the practice date to the period of post-Great Fire reconstruction (Terence Smith pers. comm.). It is therefore possible that the wall is part of the Wren temporary works but it may well be from later period when the cloister was exposed.

Trench 10 Context Matrix



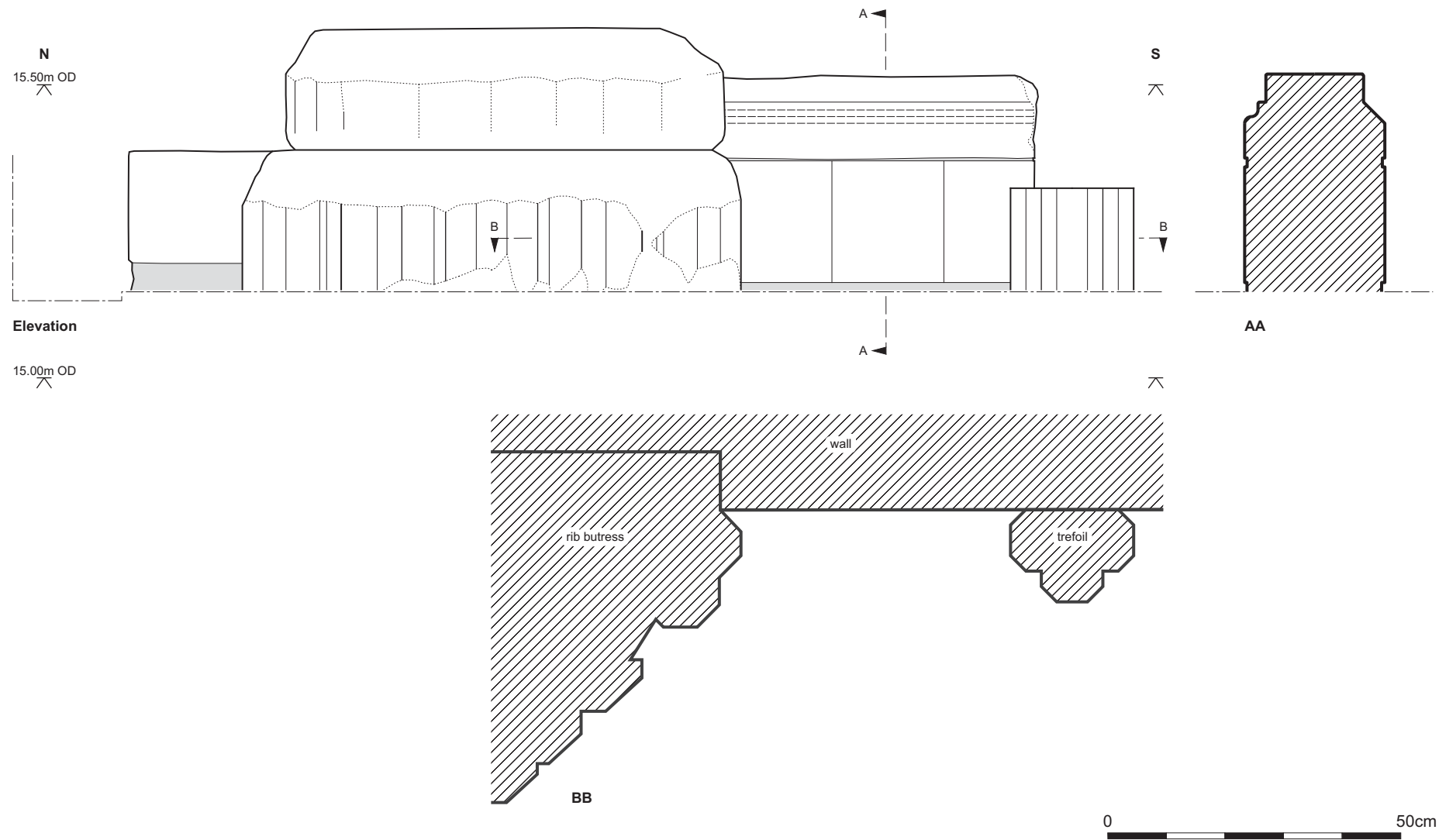


Fig 7 Elevation of and section through cloister wall [83], with details of trefoil-shaped shaft and composite attached pier base

<i>Watching Brief Trench 11</i>	
Location	Over outer cloister wall and threshold , north of Tr 9
Dimensions	1.5m N-S by 1.5m E-W
Base of modern fill	15.13 OD
Medieval surface level	15.13m OD

*Description**(see figs 8, 9 and 11)*

Removing topsoil to the north of Trench 9, higher-surviving stonework was exposed first in trench 11, this was cleared to medieval floor levels but the floor itself remained covered in topsoil. Trench 11 was over the outer wall and trench 10 the inner.

The exposed remains were the external western cloister wall [86], a portion of medieval floor adjacent to the wall [87] and the north side of the threshold [88].



*Fig 8 Trench 11 looking north*

**EXTERNAL CLOISTER WALL [86] WESTERN RANGE**

The exposed section of wall was only 1.2m E-W and 800mm N-S. On the top of it was an attempted repair thought to date from the late 19th century. It took the form of heavily damaged wall construction blocks (sawn yellow limestone mortar) attached to the top of the remains by an iron tubular dowel in the pier base and Portland cement-based mortar. The over-all form was that of a projecting pier and door jamb



around the terminal of the cloister wall. A single facing block of sawn yellow limestone remained north of the pier. Again the pier base was an attached composite pier but perhaps as small as 300mm N-S x 250mm E-W (some of it was obscured by the later repair).



*Fig 9 Trench 11 looking west*

The form was little more than that of the trefoil-shaped shaft discussed above. However, it was more pointed and it should be compared with the carved limestone blocks adjacent to it. They formed the door jamb, comprised of several grey, non-oolitic, limestone encasing the terminal of the wall. The pier holding the vaulting would have merged with the decorated door jamb in a single ribbed effect. The limestone blocks took the form of a ribbed extension to the pier base, followed by a shallow triangular ribbed door jamb for the narrowest part of the threshold – of three ribs similar to but shallower than the trefoil-shaped shaft. This was followed to the west by two sawn square blocks set at an angle to the threshold, to form a widening opening. Outside of them was a damaged block with two projecting ribs, which may have had a 3rd, subsequently truncated. The core of the wall was poured yellow sandy lime mortar and rough-hewn ragstone blocks (in the main) <400mm diameter. As with trench 10, it had been truncated to the north.

#### THE WESTERN RANGE CLOISTER WALK FLOOR [87]

A narrow portion of the adjacent floor was cleared [87], and conformed to the pattern and materials of the larger exposures [80] and [84]. The pier projected over less than one half-tile here, as opposed to the full tile (diagonal) width of the opposing pier [83] (trench 10). A broader edge tile, 170mm wide, led to the threshold.

### THE THRESHOLD [88]

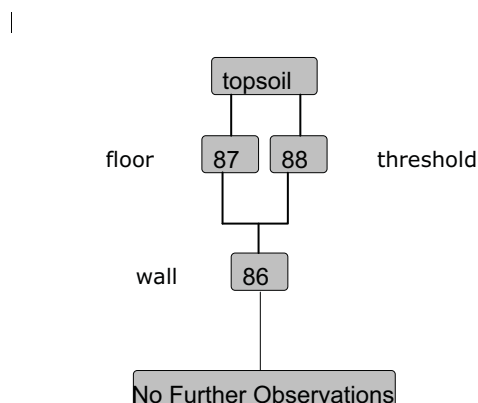
The exposed area of threshold in trench 11 was only 250mm N–S and 300mm E–W and made of a slightly raised substructure of mortar and stone chippings.

#### *Discussion*

This is the first detailed record of the mouldings around the doorway of the cloister and may allow future researchers to reconstruct the scheme of the original. It also allowed the full width of the doorway to be calculated. Taking account of the truncation of the south side and using the adjacent floor edge to estimate the position of the south side of the doorway, the full width will be 1.82m, 2 yards or 6 feet. The height of the door would have reflected this width – if it was in proportion.

The projecting shaft on the outer wall [89] was small when compared to the matched the pier on the inner wall [82] (trench 10) and this confirms 19th-century observations of the cloister.

#### *Trench 11 Context Matrix*



<i>Watching Brief Trench 12</i>	
Location	East of cloister, adjacent to St Paul's transept
Dimensions	0.7m N–S by 1.2m E–W
Base of modern fill	Not excavated below modern fill
Medieval surface level	–

#### *Description*

(see figs 11 and 3)

Site investigations for drainage revealed a red-brick built drain [90] and part of a large mass foundation [89].

### MASS FOUNDATION [89]

This was a small exposure of a very large, mass foundation. It was formed of stone rubble, including <500mm diameter rough hewn ragstone blocks, set in grey lime mortar. A further observation was made of the foundation, in a concrete observation



pit nearby. On this occasion Confined space regulations prevented a closer inspection and the only observations were the snatched photograph.

#### DRAIN [90]

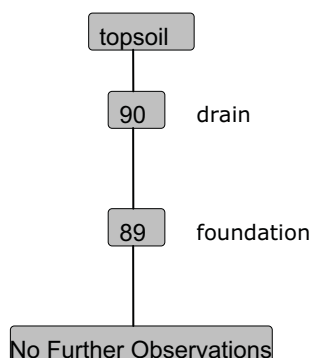
A small exposure – 500mm wide – was made onto the top of a drain made of radially set red brick headers, cemented with a very hard creamy-grey lime mortar. Headers approximated 60mm x 100mm.

#### Discussion

These observations were made when an exposed portion of the cloister was being surveyed and photographed, and are consequently brief. Nonetheless, it was thought useful to compare these observations with others of the wren cathedral, and earlier. Brick drain [90] may well drain into the large culvert built by Wren to drain the site, even though the culvert is made of stretchers and this of headers.

The primary objective of the record was to locate the foundations so that comparison could be made with other observations and plans. Serendipitously, their brief exposure coincided with the surveying of nearby cloister masonry and so an accurate location was obtained – surveyed directly on the OS map projection. The foundation was not quite aligned with the super-structure of the Wren cathedral and its western edge lay 2.4m west of the transept. This may reflect large spread foundations to support the cathedral on the side naturally sloping down towards the Thames. Or, it may be that these are remnants of the foundations of earlier cathedrals (Inigo Jones extension for instance) and were reused in-situ by Christopher Wren.

#### Trench 12 Context Matrix



<i>Watching Brief Trench 13</i>	
Location	Across the south range of the cloister and to the south edge of the garden
Dimensions	4.39m N–S by 0.9m E–W, with an extension 0.6m square to the east.
Base of modern fill	Not excavated below modern fill in the main trench
Medieval surface level	Not observed

#### Description

(see figs 10 and 11)

Repair of a water pipe exposed the south edge of the southern range inner cloister wall foundation [29] (evaluation – trench 5). Medieval floor levels had been removed but the original pipe trench had also cut through the outer wall foundation [91] and inside it was a red-brick built foundation [92]. Whereas the drain trench had cut through remains, which were mainly observed in section, a small 0.6m square area of topsoil was removed from the junction of foundations [91] and [92] to observe them in plan.



*Fig 10 Chalk foundation [91] and brick foundation [92], looking northeast*

#### OUTER CLOISTER WALL FOUNDATION [91], SOUTHERN RANGE

The exposed section of foundation was only 760mm E–W and 1.1mm N–S. The top of the exposure was at 14.9m OD, at which level the remains had been truncated in the past. They were 440mm deep to the base of the trench but are presumed to be founded deeper than this level (14.46m OD). There was a layer of roughly squared chalk blocks <150mm square at the base of the exposure, above which there were randomly placed, badly sorted rough hewn blocks <320mm diameter, set in a yellowy sandy lime mortar.

#### RED-BRICK FOUNDATION [92]

The exposed section of brick foundation was only 760mm E–W and 800mm N–S. The highest surviving level was 15.03m OD, adjacent to foundation [91], from where it descended in steps to 14.93m OD and 14.8m OD. The base of the foundation lay below the lowest level of the drain trench. The lowest observed levels of foundation [92] were formed of 3 courses of soft, brightly coloured, soft red bricks, laid as stretchers (headers exposed) in a hard cream-coloured lime mortar. The bricks approximated to 60mm thick and 100mm wide. Above 14.75m OD, the foundation was made largely of reused tiles.

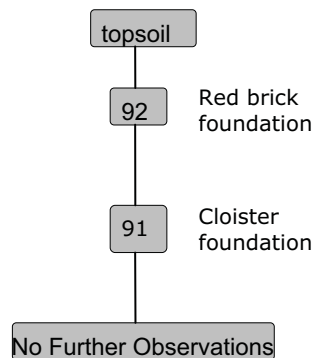
#### *Discussion*

Chalk foundation [91] is in the location predicted for the southern outer cloister wall from other observations. The section through it showed that levelling courses of stone

were used to distribute the load evenly across the foundation, followed by poured areas of rough hewn rubble, more quickly built. The mortar used was a noticeable different mix to superstructure elements, with less lime and more sand.

Exposing the foundations in plan indicated that the brick foundations had been built alongside and over the top of the cloister foundations; following their alignment. The bright red, almost scarlet, colour – and the softness – is typical of bricks made of the local brickearth in the 17th century (c.f. brick wall [85] for atypical hard purply red bricks with coal dust additives).

#### *Trench 13 context matrix*



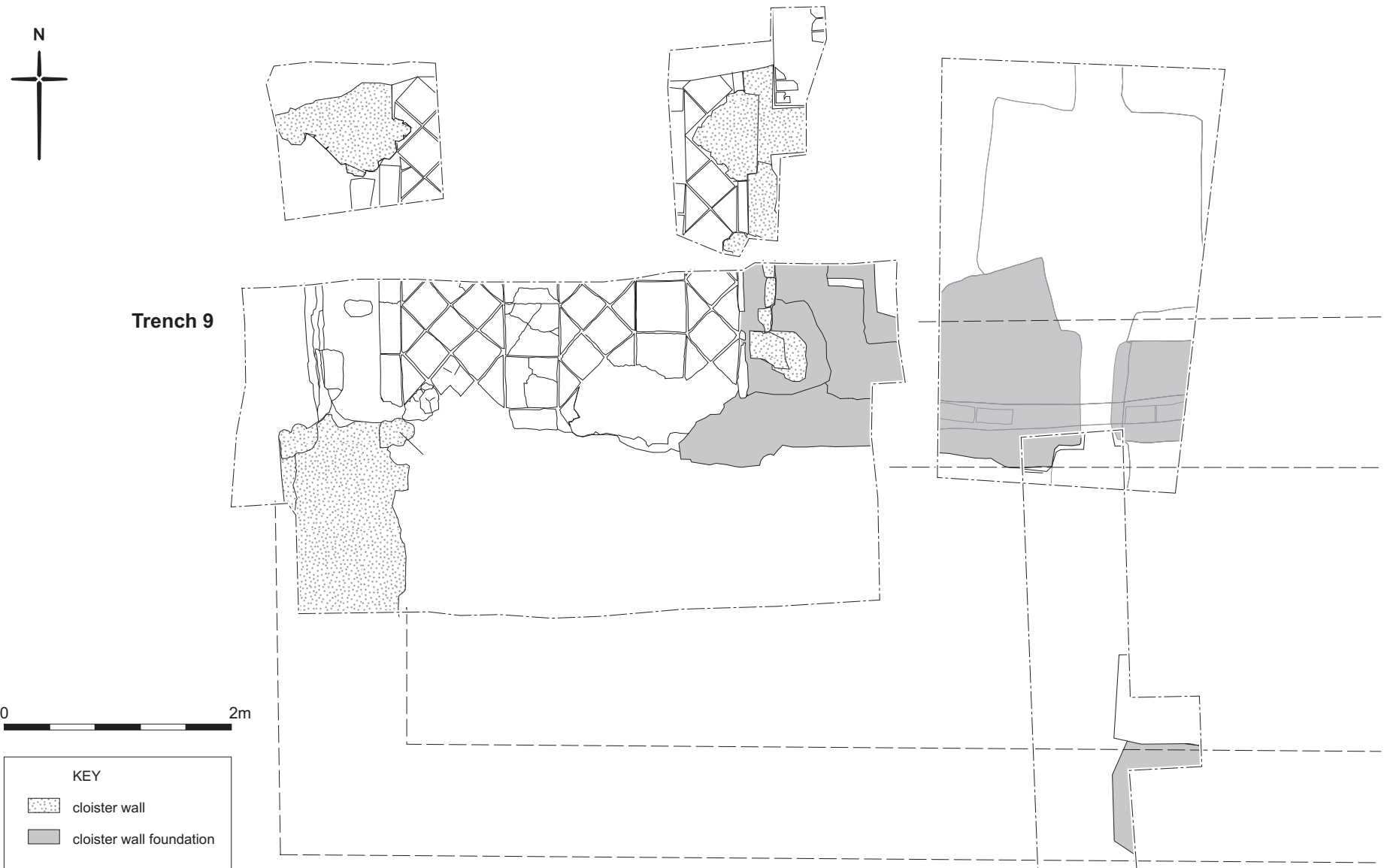


Fig 11 West Cloister plan

<i>Watching Brief Trench 14</i>	
Location	East of the cloister, including a deeper trench to form a new inspection chamber onto the Wren culvert
Dimensions	10.5m N–S by 17.9m E–W, with a deeper area 1.8m square to form the new chamber
Base of modern fill	Not excavated below modern fill
Medieval surface level	Not observed

### *Description*

*(see figs 12 and 13)*

General ground reduction east of the cloister exposed a large, curving, bright red brick foundation cutting across the site [93]. Below it, exposed at the northern end where it was cut through by an existing inspection chamber, was a substantial stone foundation [94]. This was also exposed in the side of the new inspection chamber, 1.57m deep, underneath which the Wren culvert was exposed [95]. The culvert was broken into to form the new inspection chamber.



*Fig 12 Wren culvert [95] with foundation [94] above, looking northeast*

### **CURVED BRICK FOUNDATION [93]**

The exposed section of brick foundation was only 1.8m E–W and 8.2m N–S. It was originally longer but had been truncated at either end. It was made of bright red – almost scarlet – bricks tending to 210mm x 100mm x 60mm in size, laid as header to the edge and stretchers in the body of the foundation. They were set in a very hard cream-coloured lime mortar. The surviving thickness was as low as a single brick where it was exposed in section over stone foundation [94]. Elsewhere the foundation was only exposed on plan and its thickness or depth is unknown. Its form was a distinct curve from approximating the perpendicular to the cathedral at the southern end to a more westerly direction at the north. The width varied (1.1–1.8m) with the difference always being accounted for by steps on the inside of the curve.

### STONE FOUNDATION [94]

Exposed at the truncated north end of the brick foundation [93] was a substantial stone foundation [94]. In plan only a length of 1.98m was exposed – where it was 1.57m wide. Exposed in the side of the new inspection chamber pit, it was 1.57m deep. It was formed of roughly squared blocks of limestone  $\leq 400\text{mm}$  wide, set with grey lime mortar, extruding from the face.

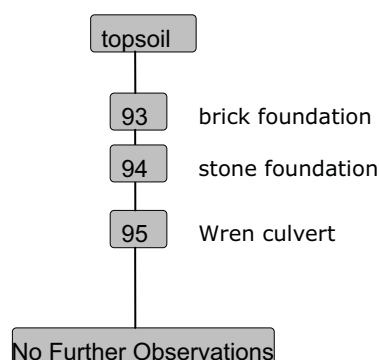
### WREN CULVERT [95]

The culvert was exposed in a 1.86m square shaft to allow construction of an inspection chamber. When the top of the culvert was reached, excavation ceased and the top of the culvert was broken into. The culvert was straight-sided with a round-arch vaulted roof 2 bricks thick. It was 1.02m wide; the top was at 13.98m OD and the internal surface of the base – 12.45m OD. Bricks were hard bright red and measured 230mm x 110mm x 63mm and were set in hard creamy lime mortar. The height therefore was estimated to be 1.85m (assuming the base was also two bricks thick and allowing for render). The sides of the culvert were buttressed to its enclosing trench edges with brick projections 340mm thick and spaced at intervals of roughly half a metre. The base was chamfered internally and bricks lain in the direction of the culvert.

### Discussion

The construction cut for the culvert was wider than the exposure and it must have cut a wide trench around the cathedral. However, it is difficult to determine whether the stone foundation [94] was built after the culvert constructed – as represented in the context matrix below – or whether the culvert was tunnelled beneath it. Both stone and brick foundations are substantial features and if long-lasting structures above ground level would have been remarked upon in official documents. The fact that they are generally unremarked upon (John Schofield and Robin Wroe-Brown pers. comm.) tends to suggest that they were temporary enabling measures for Wren's – or Inigo Jones' – construction.

### Trench 14 context matrix



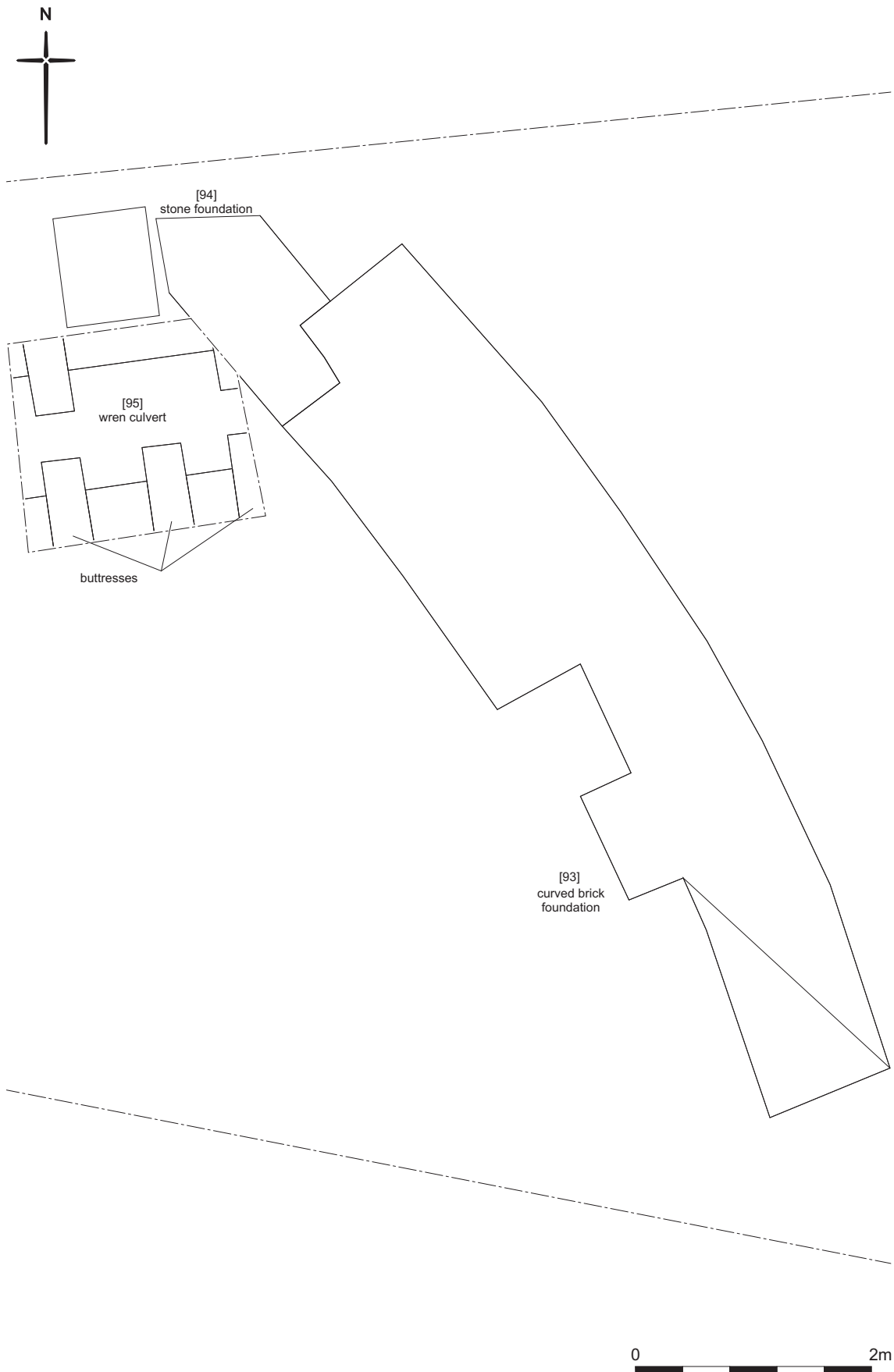


Fig 13 Trench 14 plan



<i>Watching Brief Trench 15</i>	
Location	South cloister external wall beneath steps to south gate
Dimensions	1.6m N-S by 2.4m E-W, with extensions 400mm wide, 800mm and 1.6m long to the east.
Base of modern fill	15.15m OD
Medieval surface level	15.15m OD

*Description**(see figs 14, 15 and 18)*

When the steps to the south gate were removed a void was exposed beneath them, constructed as a vault to preserve the medieval cloister. The south – external – wall [95] formed the south wall of the vault and the much damaged floor [97] its base. The south wall was repaired [98] to support the steps and a wall around the other three sides [99] with the steps forming the roof.



*Fig 14 Trench 15 looking south (half-metre scale)*

**EXTERNAL WALL [96], SOUTHERN RANGE**

The southern was exposed in 1.65m in elevation. It was 800mm wide at 15.74m OD, at which level the southern face had been truncated. The body of the wall was made of rough hewn yellow limestone blocks set in lime mortar. The northern face was made of squared sawn yellow limestone blocks the external face of which was 150mm high and of various lengths including one over 450mm. The rear of the stones was left rough hewn. The projecting shaft was three stones high – above which it was not originally part of the general wall construction. Tied into the wall fabric it was made of polished Purbeck trefoils (in plan) tapering with height. The bottom two were 240mm in diameter whilst the third was 200mm wide. The top trefoil was marked with a dowelled centre and radiating grouting grooves – indicating how the missing stone above it had been fixed with the visible joint minimised.

**REPAIRED FLOOR [97] SOUTHERN RANGE**

The floor was of Purbeck marble tiles with rectangular slabs as wide as the shaft lining the wall, at 15.15m OD. North of the edge the floor had a sparse covering of tiles, in no particular order. They were laid on yellow-grey sandy lime mortar and brick piers supporting the steps laid on the same surface.

### TRUNCATION OF EXTERNAL WALL [98]

The cloister wall had been truncated to the lowest course east of the trefoil. This truncation was cut vertically through face blocks.

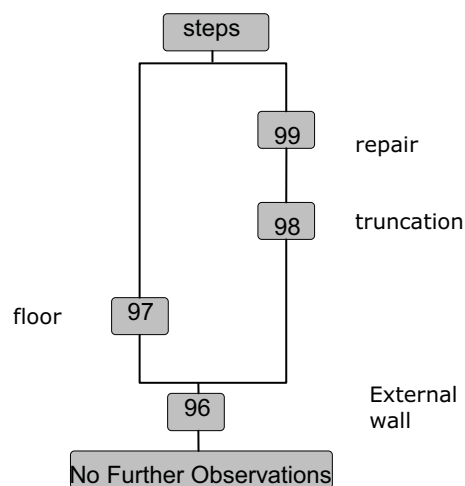
### REPAIR TO EXTERNAL WALL [99]

A section of wall east of the shaft had been rebuilt from 15.31m OD. The new build was traced in plan over 2m (700mm within the steps–vault) and was 300mm wide. It was formed of Purbeck marble square blocks, two courses 150–180mm high divided by one of less than 100mm. The face of the Purbeck marble was cut square but not polished. They were set in lime mortar. A 350mm wide and 330mm deep section of the repair was chiselled out by the author, to allow the passage of new drainage.

### Discussion

This was a previously unknown section of wall and is amongst the best surviving. The detail of the trefoil-shaped shaft indicates that above 15.6m OD the shaft stood proud of the wall and may well have reflected the tracery of the open arcade on the opposite wall. The truncation is thought to have occurred shortly before the creation of the steps, and the wall repair specifically for the purposed of making a chamber below the steps.

### Context Matrix



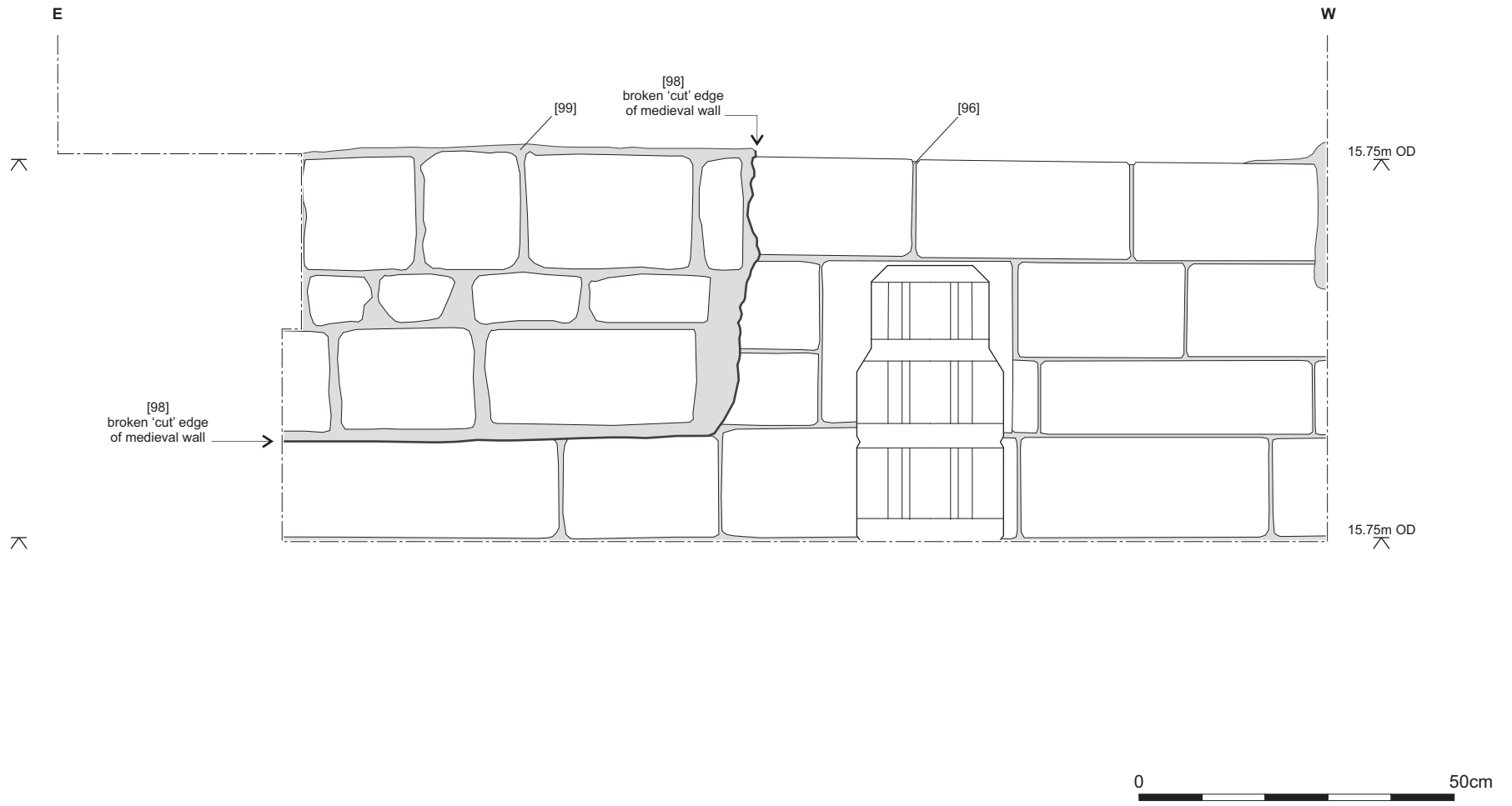


Fig 15 Trench 15 elevation

<i>Watching Brief Trench 16</i>	
Location	Gas Chamber
Dimensions	7.7m N–S by 8.1m E–W
Base of modern fill	13.124m OD
Medieval surface level	–

*Description**(see fig 16)*

A concrete oval chamber (the “Gas Chamber”) had been set into the ground [101]. With it were associated vents [102] that connected with risers within the present cathedral. Protruding through the base of the Gas Chamber was a fragment of an older foundation [100].

**MASONRY FOUNDATION [100]**

A fragment of foundation was exposed, protruding through the base of the gas chamber. The exposure measured 500mm N–S x 500mm E–W and the form of it continued beneath a concrete screed, so total dimensions of 1.0m x 700mm. There was no indication of an external edge and there was discernable direction to the stones within the foundation; so the direction of the true direction of the foundation is unknown. It was made of assorted  $\leq 200$ mm diameter, rough hewn and partially squared ragstone blocks, set in a hard yellow sandy lime mortar. The masonry was 340mm high (13.124m – 13.464m OD).

**GAS CHAMBER [101]**

The gas chamber was an irregular oval chamber with 200mm thick walls and internally was 3.14m E–W and 3.56m N–S. Extending from the north, heading east was a 1.4m-wide concrete stair, which curved through 45 degrees to enter the Cathedral at a right angle. The base of the chamber was at 13.124m OD and it was truncated at 16.164m OD.

**CONCRETE VENTS [102]**

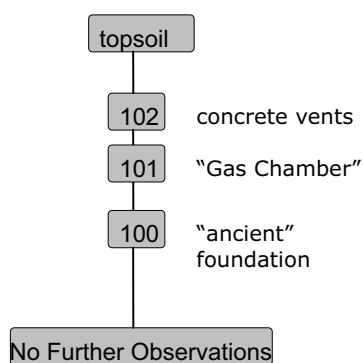
Between the Gas Chamber and risers within the cathedral wall ran concrete vents [102]. They were 1.1m wide x 2.27m long and formed of two flat-bottomed grooves 220mm diameter and 170mm deep (16.21m – 16.38m OD). They had been covered by paving stones – requiring periodic insertion of bricks within the vents.

*Discussion*

The Gas Chamber and masonry foundation occur on historic drawings (Emma Hardisty pers. comm.). The foundation is copied from the Chapman and Small drawing of the 1879 excavations (where it is the west of two fragments of masonry). The depiction of the masonry in the Gas Chamber drawing is not of the smaller fragment exposed within it, but of the larger exposure during the excavations. There is little to date the foundation [100]. It is without tell-tale ceramics or stones from short-lived sources of stone. However, it does not appear to relate to the later medieval remains that have been exposed. It may relate to an earlier medieval cathedral or even Roman remains.

The Gas Chamber is a title that is derived from old documents. It may be that the Gas Chamber was merely to house a large meter. Town gas is a by-product of coking coal. The off gases liberated in the high-temperature carbonization (coking) of coal in coke ovens were collected, scrubbed and contained methane and hydrogen – used as fuel. Any references to coke, coking, or oven in this locality would be particularly interesting as they would imply the production of their own gas by the Cathedral.

*Trench 16 context matrix*



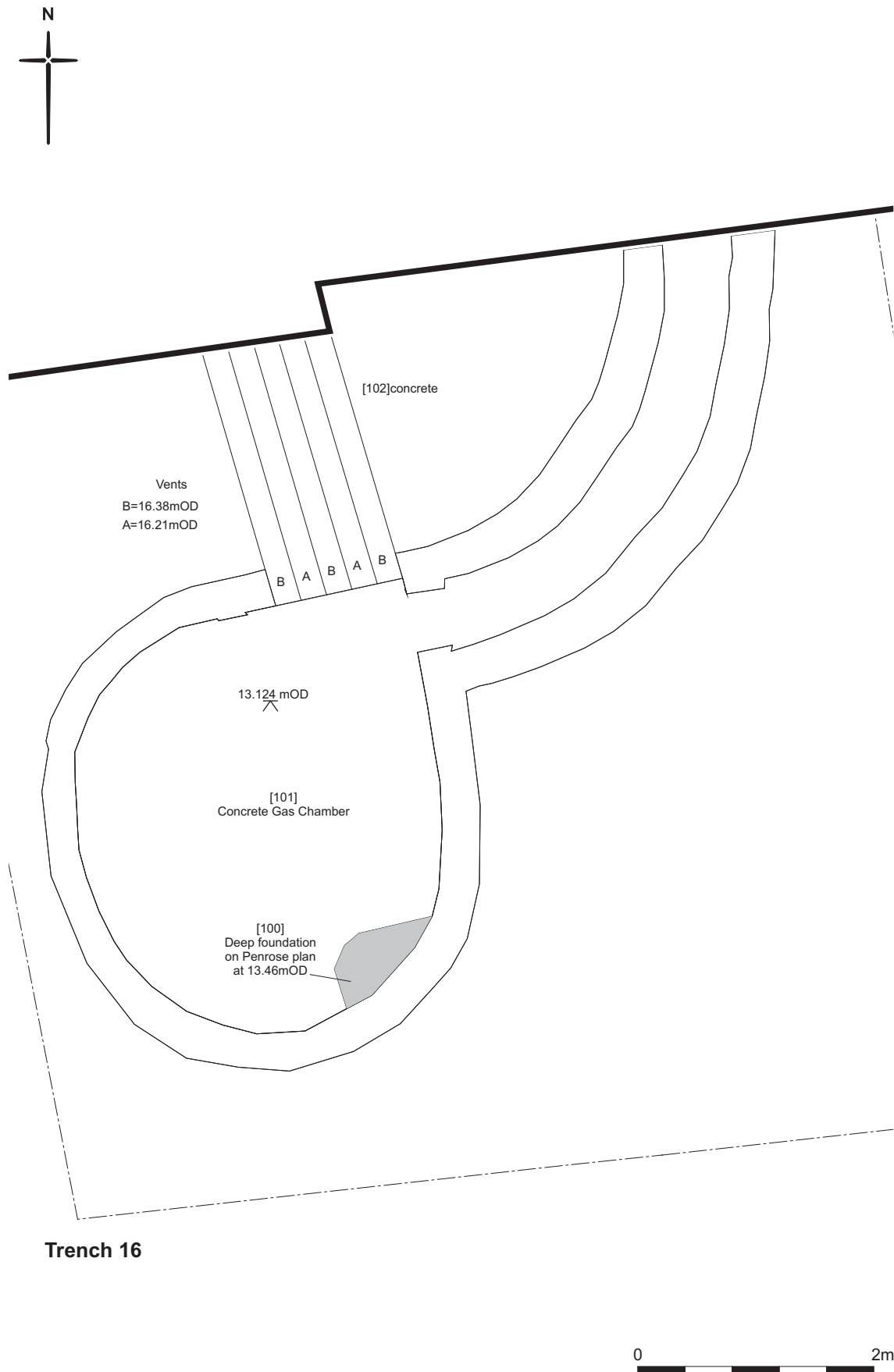


Fig 16 Gas Chamber and masonry foundation



<i>Watching Brief Trench 17</i>	
Location	East outer cloister wall
Dimensions	9.9m N-S by 1.3m E-W
Base of modern fill	15.5m – 15.92m OD
Medieval surface level	–

*Description**(see figs 17 and 18)*

The eastern outer cloister wall [105] survived to a higher level than cloister walls elsewhere. The top of the wall was exposed but without clearance of material down to the medieval floor levels. Two sections of a protective masonry layer were exposed along the inner edge of the wall [103] and [104].



*Fig 17 Eastern outer cloister wall form the south (left, note the large corner blocks) and the highest surviving cloister remains (right)*

**OUTER CLOISTER WALL [105], EASTERN RANGE**

The exposed section of wall was only 200mm high, 1.3m E-W and 9.9m N-S [105]. There was a return to the south range outer wall which was 1m thick, truncated and filled by [98] to the west. This was the highest surviving part of the cloister, with an area up to 15.92m OD (3.5m south of the north edge of the exposure). The inner face blocks north of this point were as wide as 900mm in one instance, but their full depth was not observed, being truncated horizontally and the full depth of the wall remaining unexposed. The outer face was not observed, except (possibly) for a small section 900mm long at the north of the exposure, where the wall was 600mm thick. The core of the wall was mostly comprised of small limestone and ragstone chippings to 100mm diameter. However, two large ragstone blocks, to 300mm diameter, formed the highest pinnacle of survival. Two large squared blocks of squared grey non-oolitic limestone formed the external southeast corner. They larger than stones found elsewhere in the cloister by a margin and measured 400mm and 500mm across. The top was at 15.66m OD.

**MODERN PROTECTION [103] AND [104]**

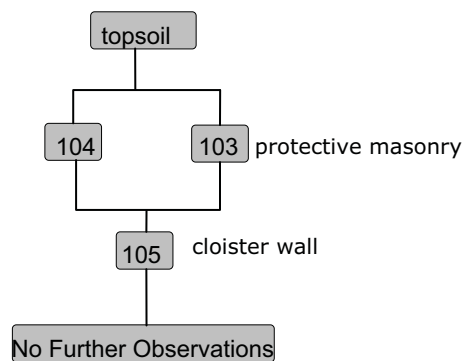
Along the inner edge of the cloister wall [105], below the large ragstone blocks which survived the highest, was a layer of roughly squared limestone blocks topped with a

layer of red tiles [103]. It was 4.9m long and 400–500mm wide (two tile lengths). The limestone blocks were 150mm x 200mm long and the north end of the protection was made of a stack of tiles, at least three deep. The mortar was a very hard dark grey lime mortar, with sizable lime fragments within. It was matched at the north end with large limestone blocks, up to 500mm diameter, roughly squared and fixed with the same mortar [104]; they were set on an angle over the truncated edge of the cloister wall [105].

### *Discussion*

The outer cloister wall [105] survived to such a level that it protrudes up into the new-built wall (landscaped to represent the cloister). This required a redesign of the wall foundations. Part of this wall was recorded during the evaluation [52] (trench 4). Unlike that record of the overlying protective formation [103] is considered to be cemented with a lime mortar, though of a particularly hard nature – it being somewhat of a modern myth that lime mortars are perforce soft, rather they cure slowly. The identification as a lime mortar was due to the presence of white lumps within it. However, experiments were underway in the late 19th-century of composite mortars using both lime and Portland cement, particularly as this hardens more quickly. Earlier alternatives for a quicksetting mortar were adding calcinic clay (to yield carbon dioxide to the lime). Either clay or Portland cement may have darkened the matrix to grey. The angle of protective masonry [104] indicated it consolidated an end of cloister wall [105] that had been cut through and was consequently more at risk of having stones broken away. The most likely time that this work occurred was shortly after the 1870s exposure of the cloister.

### *Trench 17 context matrix*



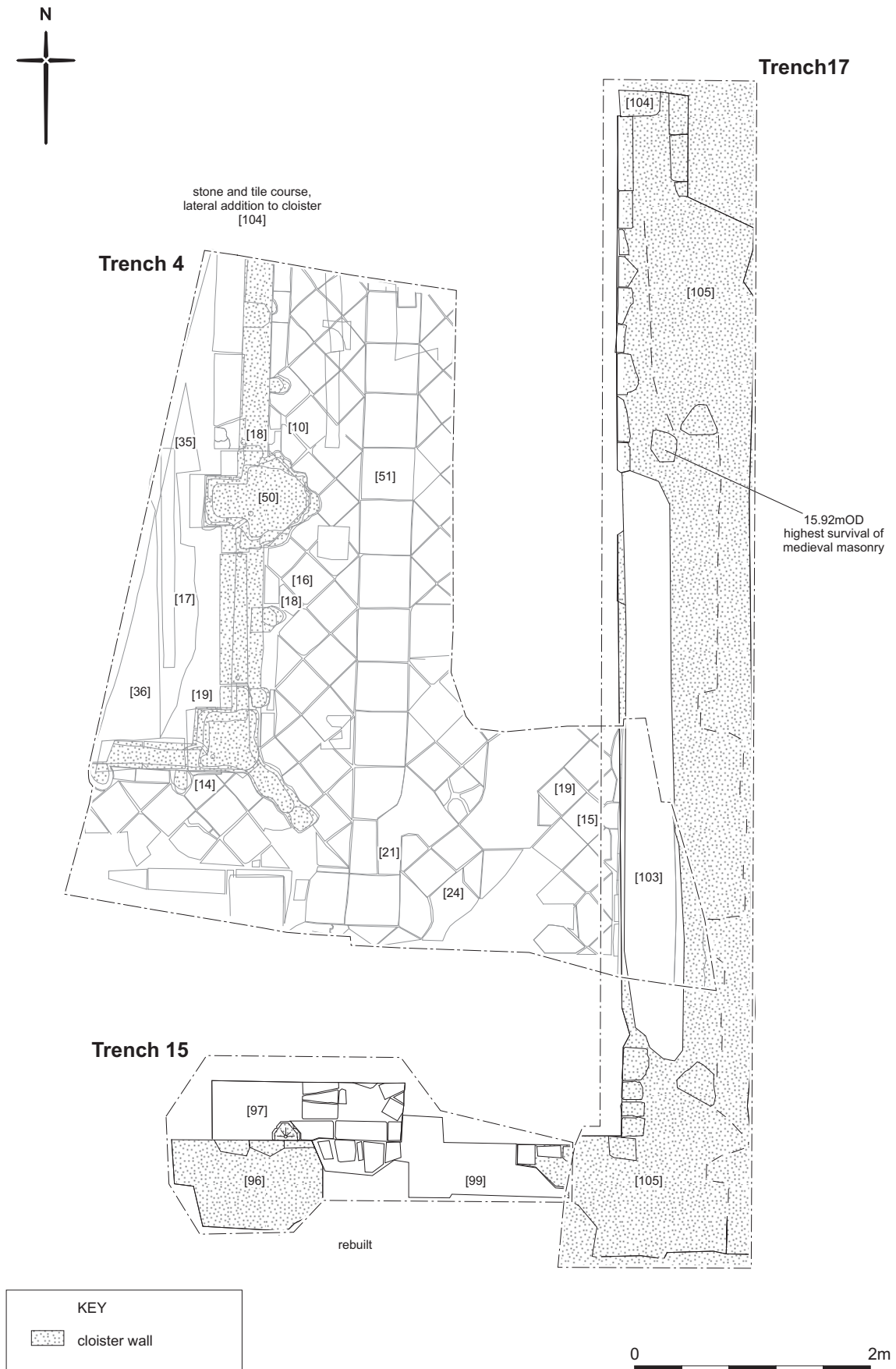


Fig 18 East Cloister plan

## 5 Potential of archaeology

### 5.1 Original objectives

The objectives of the watching brief were to:

- *help specify when excavation of the various areas of garden soil to be removed should stop, hopefully when a layer is reached hard enough to be used as a base for the future layer of hardcore which will support the final slabs of the design;*  
achieved
- *record the strata exposed, including any archaeological strata exposed in the sides of the excavation areas;*  
achieved
- *record and then supervise the conservation of any upstanding pieces of historic masonry encountered, including those which have to be surrounded in the future work by the new hardcore.*  
achieved – particularly note the upstanding areas of cloister wall [105] that have been incorporated into the new wall
- *record any strata or features exposed during the digging of two new tree pits for planters on the south border of the site.*  
no archaeological remains exposed in this area
- *monitor the lift works as and when required by the Cathedral Archaeologist, and undertake any necessary recording, and the digging or amending of two new drain manholes and a drain receptor*  
achieved – “Wren” culvert exposed

*The limited nature of the proposed works and the watching brief upon them made it unreasonable to establish many specific archaeological research objectives. The archaeological brief was essentially limited to establishing where, if at all, archaeological deposits may survive (presence/absence), recording where necessary, and to ensuring that the proposed groundworks do not involve the destruction of any archaeological deposits of national significance.*

achieved

### 5.2 New objectives

Sufficient quantity of remains have been exposed, and enough new details of construction (such as the difference in floor pattern between east and west sides) that a small article alerting scholars to the new information should be prepared for the London Archaeologist. There is a discrepancy between a visual inspection by a geologist of the limestone blocks used to face the walls, which found them to be Caen stone (Worssam 2005, 70–71), and an examination of a flake of yellow limestone with

a comparative collection held by Museum of London Building Materials Specialist (Terence Smith pers. comm.). He was of the opinion that the flake was Taynton limestone (from near Burford, Oxfordshire). The limestone may be inspected by a geologist to confirm the analysis. However, two caveats should be considered beforehand:

- 1) both Taynton and Caen are of similar Jurassic beds
- 2) the cloister includes reused building materials (Roman brick in wall [81], medieval roof tile [79], grey limestone, [82] and yellow limestone face blocks within the core of the wall [79])

Consequently the origin of the cloister stone may be from a number of locations, the source of it is likely to have been buildings that stood nearby, or on the site previously to the cloister. There seems little merit in determining the ultimate origin of the stone under such circumstances.

### **5.3 Significance of the data**

Whilst the archaeological remains are of national importance (Wroe-Brown 2005, 60), the new information provided by this work is mainly important for the detail it can provide to a more general synthesis of St Paul's before the fire. This is an area of study of interest to a number of scholars and they should be alerted to the archive and salient points of interest.

## 6 Publication and archiving

Information on the results of the excavation will be made publicly available by means of a database in digital form, to permit inclusion of the site data in any future academic researches into the development of London.

The site archive containing original records and finds will be stored in accordance with the terms of the *Method Statement* (MoLAS Bateman 2004) with the Museum of London and made available to scholars of the old cathedral.

In view of the limited potential of the material (Sections 5) a short article on the results of the watching brief should appear in the *London Archaeologist*. The article should be prepared within 12 months of the end of the site.



## 7 Acknowledgements

MoLAS and the author would like to thank the Dean and Chapter of St Paul's Cathedral for funding the work; Dr John Schofield, the Cathedral Archaeologist, Martin Stancliffe and Chris Cotton of Martin Stancliffe Architects and Irfan Iqbal of Wates for facilitating and advising on the evaluation.

The author would also like to thank the following for advice, assistance, information and interest: Martin Fletcher, Clerk of Works, and the St Paul's works dept.; Kathryn Stubbs of the Corporation of London Department of Planning and Transportation; Robin Wroe-Brown (Museum of London) and John Schofield, Ian Tolliday and staff of Stonewest Ltd, Emma Hardisty of Purcell Miller Tritton LLP, Surveyors Office St Paul's (who provided scaled copies of historic plans) and Cara Veredegaal (Purcell Miller Tritton LLP, York), who liaised over design issues.

Museum of London field staff Aleksandra Cetera and Simon Gannon excavated, cleaned and recorded remains, Eamonn Baldwin and Mark Burch surveyed the remains and Maggie Cox photographed them. Terence Smith inspected the remains examined stone against the Museum of London's Specialist comparative collection. All staff were prompt in responding to requests for assistance, for which the author is particularly grateful. Nick Bateman Project Managed the archaeological recording

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## 9 NMR OASIS archaeological report form

OASIS ID: molas1-22808

### Project details

Project name	St Paul's Cathedral South Churchyard, London EC4
Short description of the project	Watching brief on the landscaping of the south garden exposed several areas of the medieval cloister - including the external threshold. The western range had 3 long panels of diagonally laid Purbeck slabs, 2 slabs wide towards the outside, 1.5 in the centre and 1 slab wide to the inside. This contrasts with panels of equal thickness on the eastern range (1.5 slabs wide). This is the first time this detail has been recorded. Also exposed was a large stone and red brick curved foundation, possibly temporary work for Inigo Jones or Wren St Paul's construction.
Project dates	Start: 26-07-2006 End: 29-09-2006
Previous/future work	Yes / Not known
Any associated project reference codes	SCP04 - Sitecode
Type of project	Recording project
Site status	Listed Building
Current Land use	Other 4 - Churchyard
Monument type	CHAPTER HOUSE Medieval
Monument type	CLOISTER Medieval
Monument type	FOUNDATION Post Medieval
Monument type	GAS GENERATOR HOUSE Post Medieval
Significant Finds	MOULDING Medieval
Investigation type	'Watching Brief'
Prompt	Faculty jurisdiction

### Project location

Country	England
Site location	GREATER LONDON CITY OF LONDON CITY OF LONDON St Paul's Cathedral South Churchyard London EC4
Postcode	EC4
Study area	1125.00 Square metres
Site coordinates	TQ 3202 8111 51.5129722353 -0.09724114043030 51 30 46 N 000 05 50 W Point

### Project creators

Name of Organisation	MoLAS
Project brief originator	Cathedral Archaeologist

Project design originator	MoLAS
Project director/manager	Nick Bateman
Project supervisor	David Sankey
Type of sponsor/funding body	Landowner
Name of sponsor/funding body	Dean and Chapter

**Project archives**

Physical Archive recipient	St Paul's Cathedral
Physical Contents	'Worked stone/lithics'
Digital Archive recipient	LAARC
Digital Media available	'Database','Images raster / digital photography','Images vector','Survey','Text'
Paper Archive recipient	LAARC
Paper Media available	'Context sheet','Correspondence','Drawing','Manuscript','Notebook - Excavation',' Research',' General Notes','Photograph','Plan','Report','Unpublished Text'

**Project bibliography 1**

Publication type	Grey literature (unpublished document/manuscript)
Title	St Paul's Cathedral South Churchyard, London EC4: an archaeological watching brief
Author(s)/Editor(s)	Sankey, D.
Date	2007
Issuer or publisher	Museum of London
Place of issue or publication	London
Description	A4 report
Entered by	David Sankey (DSankey@museumoflondon.org.uk)
Entered on	18 January 2007