

**An Archaeological Watching Brief  
At The Great Hall, Leicester Castle**

**NGR: SK 582 041**

Stephen Baker



**ULAS Report No 2016-120**

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**Stephen Baker**

**For: De Montfort University**

<b>Filename/Version</b>	<b>Amended/Checked by</b>	<b>Date</b>
<b>2016-120</b>	<b>Richard Buckley</b>	<b>17/8/2018</b>
<b>2016-120v2</b>	<b>Richard Buckley</b>	<b>23/8/18</b>

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**ULAS Report Number 2016-120**

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# An Archaeological Watching Brief at The Great Hall, Leicester Castle

**Stephen Baker**

## Summary

*University of Leicester Archaeological Services (ULAS) carried out an Archaeological Watching Brief at the Great Hall of Leicester Castle and within Castle Yard, Leicester, during development work associated with the conversion of the building by De Montfort University into a Business and Law Centre.*

*The Great Hall is a Grade 1 Listed Building and Leicester Castle is designated as a Scheduled Monument.*

*The works, undertaken intermittently from 28th June 2016 to 28th June 2017, included the excavation of an external service trench across Castle Yard and the removal of court furniture, lowering of floor levels and other alterations within the Great Hall.*

*The exterior ground works revealed the articulated remains of three human burials, interred near the Church of Mary de Castro. Two of these were exhumed and the third preserved in situ, along with some disarticulated human remains. A possible oven, yard surfaces, floor layers, pits, foundations and masonry structures were identified and recorded during the excavation of the service trench.*

*The internal work revealed evidence for floor deposits and layers, possible post holes associated with the construction or maintenance of the Great Hall, and stone arches of infilled doorways in the northern gable wall.*

*The site archive and finds will be held by Leicester City Museums Service, under accession number A10.2016.*

## 1. Introduction

An archaeological watching brief was carried out by University of Leicester Archaeological Services (ULAS) at the Great Hall of Leicester Castle and within Castle Yard, in the Castle Conservation Area, Leicester, Leicestershire (SK 582 041). The Great Hall is a Grade 1 Listed Building and Leicester Castle, with the Magazine Gateway, is a Scheduled Monument (SM ref: 1012147). The watching brief was undertaken in order to monitor exterior groundworks in Castle Yard associated with the excavation of a service trench, the removal of a redundant gas main and the construction of a wheelchair access ramp, along with interior alterations including the removal of court furniture, removal of the public gallery and the lowering of other floor levels.

An intermittent and ongoing archaeological watching brief during the development work was requested by the Leicester City Archaeologist (as archaeological advisors to the local planning authority and Historic England). The work was required to assess the nature, extent, date and

significance of any archaeological deposits which might be present, in order to determine the potential impact of the development proposals on them. Subsequent mitigation measures involved the investigation and recording of some archaeological remains and preservation *in situ* of others, depending on their significance and the development impact, in consultation with the developers, the local planning authority and their heritage advisors.

In accordance with the *National Planning Policy Framework* (NPPF) Section 12: Conserving and Enhancing the Historic Environment, this document reports on the archaeological watching brief, presenting the record of external buried archaeological remains encountered from groundworks and internal alterations to the Great Hall associated with the development.

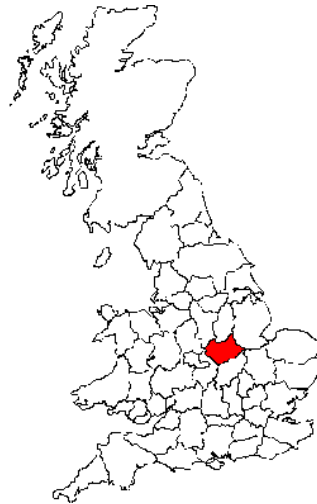


Figure 1: General location plan within the UK and county of Leicestershire

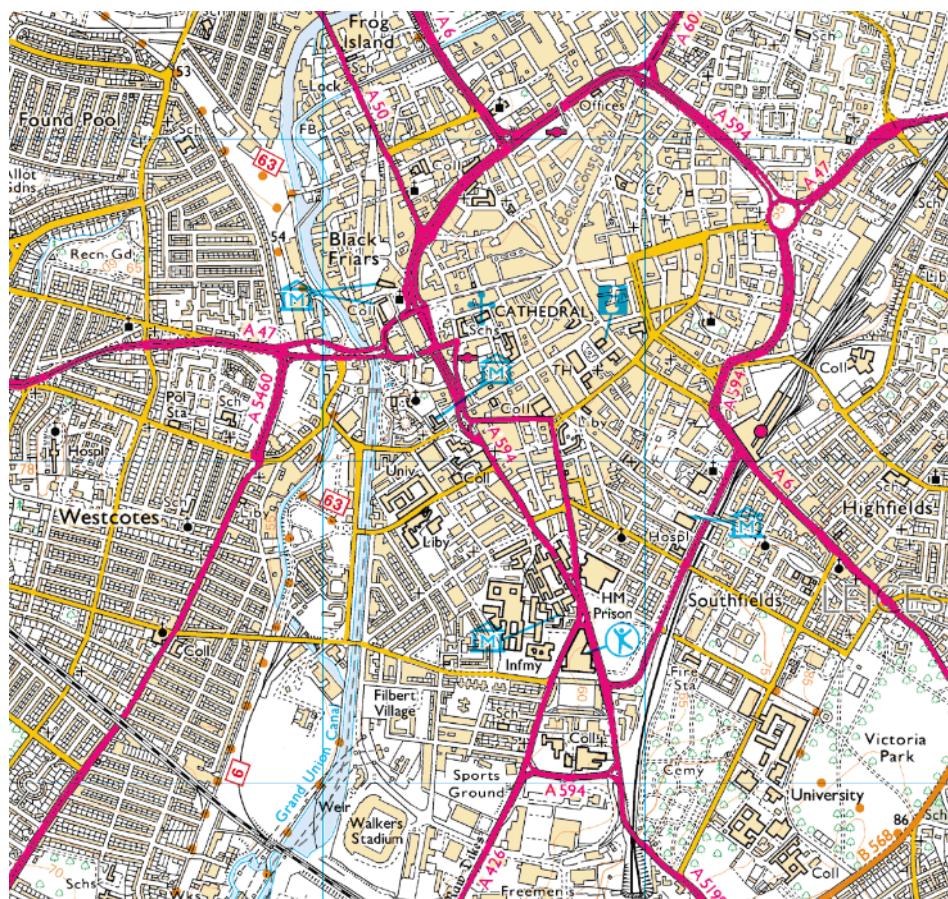


Figure 2: Site location - Leicester

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## 2. Site Location, Topography and Geology

The site lies close to Leicester City Centre, on the east bank of the River Soar and close to the inner ring road and St Nicholas Circle, which connects the ring road to the western approach roads crossing the river at that point. To the east is the central retail area and to the south is the campus of De Montfort University.

The Ordnance Survey Geological Survey of Great Britain indicates that the underlying geology of the site is mudstone of the Branscombe Formation. No superficial deposits are recorded (British Geological Survey, 2013).

## 3. Historical and Archaeological Background

The building is located within the Castle Conservation Area, one of the first conservation areas designated in Leicester, in 1969. Virtually all the buildings in the area are on the statutory list of buildings of special architectural or historic interest and a large part of the Conservation Area falls within the boundaries of a Scheduled Monument (Leicester Castle and the Magazine Gateway). Although effectively separated from the city centre by the construction of the inner ring road in the 1960s, the area retains considerable historical and archaeological integrity.

The Great Hall of Leicester Castle is one of the oldest buildings in Leicester, dating from the mid-12th century. Recent tree-ring dating has established a felling date range of 1137-62 for its timber arcade posts. The Great Hall is reputed to be one of the oldest surviving aisled and bay-divided timber halls in the UK and Europe. It was in continuous use for over 800 years as a seat of local authority and justice and housed the civil and crown courts until the 1990s when these were relocated. Since then the building has stood empty and unused except for occasional public events and historical tours.

The Great Hall was built by Robert de Beaumont (also known as Robert le Bossu), who was the second earl of Leicester from 1118 to 1168. It may have replaced a timber precursor built at the start of the 12th century.

The building has been altered and adapted over the centuries and in 1821 the Great Hall was subdivided to create separate Assize and Magistrates Courts. As part of the conversion into a Business and Law Centre for De Montfort University, the early 19th-century fittings were removed from the former Magistrates Court at the north end of the Great Hall.

As indicated in the Heritage Statement and the Design and Access Statement, the approved development plans were sympathetic to the conservation needs of the building, involving only minor external work and internal work affecting only 19th century and later fabric.

The following summary account of the history of Leicester Castle is abstracted from various sources, including Thompson (1859), Fox (1942), Alcock and Buckley (1986) and Buckley (1994).

The castle at Leicester was established in *c.* 1068, soon after the Norman Conquest. It was situated at the south-west corner of the town, in the angle of the earlier Roman defences, on the east bank of the River Soar, controlling the town and river crossing. The castle was of a motte and bailey design, with a timber tower surmounting the motte and a bailey to the north of this, containing timber buildings within a defensive ditch and palisade. The motte, reduced in height in the late 18th or early 19th century, survives as an earth mound in the present Castle Park. There is now no visible trace of the bailey ditch, but its likely extent has been determined by archaeological excavation.

The first Norman lord to control Leicester Castle was Hugh de Grentmaisnil, who was given extensive estates in Leicestershire, Warwickshire and other midland counties by William the Conqueror. Hugh was succeeded by his son Ivo de Grentmaisnil in 1093, who joined a rebellion against Henry I in 1101. Ivo attempted to regain royal favour by going on crusade to the holy land, but was killed abroad; his lands were subsequently granted to Robert de Beaumont, count of Meulan.

Robert de Beaumont was made first earl of Leicester and it is generally accepted that he instigated a major building campaign at the castle, which involved the replacement of timber buildings with stone and included construction of the Church of St. Mary de Castro begun in about 1107. The work was continued by his son Robert le Bossu, second earl of Leicester, who was responsible for construction of the Great Hall, situated within the western side of the original bailey, north of the castle motte. Robert le Bossu also founded Leicester Abbey.

Robert Blanchmains, son of Robert le Bossu, became the third earl of Leicester in 1168 on the death of his father. He joined the rebellion of Henry, the King's son, in 1173, as a result of which his English estates were confiscated. Leicester was taken by force and the town was burnt; the castle held out but was surrendered to the crown in 1174. Henry II order that the castle be demolished and the Pipe Rolls record sums expended on demolition of the castle and town wall. The Great Hall and St Mary de Castro appear to have been spared and it is possible that the destruction was limited to the castle's defences. Robert was subsequently pardoned

and most of his estates were restored. Following the death of the fourth earl, another Robert, in 1204, the Beaumont line of earls came to an end. The earldom passed by marriage to the de Montfort family and Simon de Montfort (the elder) became the fifth earl, though Leicester Castle and its lands were in the hands of royal administrators at various times until 1231 when his son Simon de Montfort, sixth earl of Leicester, took possession. It seems likely that the sixth earl enlarged and improved the residential buildings and he is said to have entertained King Henry III and his son, Prince Edward, at Leicester Castle in 1264. Within a year however Simon de Montfort had assumed the leadership of the baronial cause and was at war with his sovereign. The sixth earl was killed at the battle Evesham in 1265 and the honor, earldom and castle of Leicester were granted to Edmund Crouchback, the king's son, in that year.

Edmund and his successors were earls of Lancaster and Derby as well as of Leicester and owned extensive estates, which later became known as the duchy of Lancaster. It was under earl Edmund that the hall of Leicester Castle first came to be used by the king's justices as a court of assize, documented in the Borough Records in 1273. The Great Hall was used for this purpose for the next 700 years, until the courts of assize were abolished under the Courts Act of 1971 and replaced by a permanent Crown Court, which was also held there until the 1990s.

Following Edmund's death in 1296, his son Thomas, second earl of Lancaster, succeeded to his lands and titles. Thomas was executed for treason in 1322 and his estates were confiscated by the Crown. For two years the honor and castle of Leicester remained in the hands of the king, but in 1324 were restored to Thomas's younger brother Henry, who founded a hospital for the poor there in 1331, dedicated the Annunciation of the Virgin Mary and referred to as the 'New Work', later corrupted to The Newarke. Henry died at Leicester castle in 1345 and was succeeded by his son Henry of Grosmont, who became duke of Lancaster in 1351. Duke Henry significantly enlarged his father's foundation, attaching to it a collegiate church and enclosing the site within a substantial precinct wall adjoining the south side of the castle complex. It is likely that improvements were also made to the castle buildings by Duke Henry, who died at Leicester Castle in 1361 and was buried in the collegiate church.

Henry died without a male heir and his lands were divided between his two daughters Maud and Blanche, but were reunited in the following year on the death of Maud. Blanche's husband, John of Gaunt, fourth son of King Edward III, became Duke of Lancaster and took possession of all of Henry's estates. Leicester is said to have been one of his favourite residences and at various times Edward I, Edward II, Queen Isabella and Edward III were entertained there.

Surviving accounts provide some details of the arrangement and appearance of the various buildings associated with the castle at its height in the 14th century, including the Great Hall.

John of Gaunt's son and heir, Henry of Bolingbroke was crowned King Henry IV of England in 1399 and the Lancastrian possessions, including the honor and castle of Leicester, became an appendage to the Crown. This is seen as an important turning point in the castle's history, marking the start of a gradual decline in its importance. Whilst the castle still played host to occasional royal visitors, its role as administrative centre gradually overtook that of prestigious residence.

Building accounts demonstrate regular expenditure on maintenance of the castle in the first half of the 15th century, including construction of the surviving stone walls between the castle and Newarke precinct and erection of the Turret Gateway in 1422-3. The main entrance to the Newarke precinct, now known as the Magazine Gateway, was completed in about 1410. The main castle gateway was repaired in 1444-5 after a fire and in the following year it was enlarged; these references probably relate to the construction of the timber-framed part of the



present Castle House. Further expenditure on the castle gates and the house attached thereto is recorded in 1458-9.

Expenditure on maintenance declined in the second half of the 15th century and the castle buildings gradually fell into disrepair, though were still sufficient to accommodate King Richard III in August 1483.

A survey of the fabric in 1523 records the castle in decay with a memorandum stating that a hundred oak trees should be taken from Enderby wood for its repair. This accords well with dendrochronological evidence for the roof of the Great Hall having been replaced in the early 16th century. Tree-ring dating has determined that the present roof timbers were felled sometime in the period 1502-1531, although the original 12th century arcade posts were retained. Continued use of the Great Hall for the assize and castle courts presumably ensured its survival.

Another survey of about 1539 again records the castle in decay, except for the estate offices of the duchy of Lancaster, which were maintained in good order, reflecting the importance of the castle's administrative role.

A survey of 1578 ordered by Queen Elizabeth once more depicts a general scene of decay and dilapidation, recommending the need for substantial repairs to various buildings. In 1663 Charles II authorized William Heyrick Esq. to arrange for the survey and sale of certain parts of the castle buildings which had become so 'utterly ruinous, useless and irreparable' and were fit only to be taken down. At the same time he was to establish the costs for repairing Castle House.

In 1608 various repairs to the Great Hall were recommended, including re-slating of the roof, alterations to windows and re-paving of the floor 'in freestone or brick'. Of particular note is the provision of a new upper room for the Grand Jurymen.

After the Civil War in the mid-17<sup>th</sup> century, Parliament ordered the confiscation and compulsory sale of the estates of the church, the Crown and its supporters, which included the honor and castle of Leicester. The castle was surveyed for this purpose in 1650, before being sold to John Saunderson Esq., of Hedleyhope, County Durham. It is notable that the Great Hall was excluded from the sale, presumably because of its continuing role as a courthouse. The confiscated properties were reinstated following the restoration of the monarchy in 1660.

The east aisle of the Great Hall was rebuilt in *c.* 1695 when the present brick façade was constructed. Few changes appear to have been made to the building in the 18th century, based on the evidence of engravings published towards the end of that century.

Various alterations were made in 1821, when the interior of the Great Hall was subdivided to create separate Assize and Magistrates Courts (previously separated only by a curtain), either side of a central entrance hall with stairs rising to the Grand Jury Room above. The latter was an enlarged version of the jury room first noted in 1608, lit by a large Venetian window inserted into the brickwork of the *c.* 1695 façade. The west aisle was also closed off to create judges rooms and a cellar below was constructed to accommodate cells and a boiler room.

In 1858 further alterations were made to the Great Hall, including the addition of a brick-built upper storey to the west aisle, served by a new staircase, and construction of a new range in brick against the south end of the hall, with cells beneath that were reached by a tunnel from the dock within the southern courtroom.

Leicestershire County Council acquired the Great Hall from the Duchy of Lancaster in 1888. A new heating system was installed in *c.* 1889. Only minor repairs and alterations were made in the 20th century and little work has been done to the building since the courts were relocated



to new purpose-built courthouses elsewhere in the city in the 1990s. Castle House continues to serve as judges lodgings.

#### **4. Aims and Objectives**

The principal aim of the project was to ensure that any historic fabric or archaeological deposits revealed during the course of the approved development works were, depending on their significance, either preserved *in situ* or adequately recorded prior to removal.

The specific objectives of the archaeological observation, attendance and investigation (as appropriate), as set out in the approved WSI, were:

- To identify the presence/absence of any archaeological deposits/historic fabric;
- To establish the character, extent and date range for any archaeological deposits/historic fabric to be affected by the proposed works;
- To record any archaeological deposits/historic fabric to be affected by the ground works;
- To establish the relationship of any remains found to the surrounding contemporary landscape;
- To recover artefacts and ecofacts to compare with other assemblages and results;
- To produce an archive and report of any results.

##### **4.1. Research Aims**

While the nature, extent and quality of archaeological remains within the areas of investigation for the project remained unknown until archaeological observation work was undertaken, it was possible to determine some initial objectives derived from *East Midlands Heritage: An updated research agenda and strategy for the Historic Environment of the East Midlands* (Knight *et al.* 2012) and *The Archaeology of the East Midlands: An Archaeological Resource Assessment and Research Agenda* (Cooper 2006).

#### **5. Methodology** (Figure 3) (Figure 4)

Prior to any machining of service trenches, general photographs of the site areas were taken. The service trenches were excavated in stages, once the overlying cobblestones were removed, using a mechanical excavator equipped with a 0.50m wide toothless ditching bucket. The topsoil and overlying modern layers were removed under full archaeological supervision until either the top of archaeological deposits or the natural undisturbed substratum was reached. Trenches were examined for archaeological deposits or finds by hand cleaning. The trenches were tied into the Ordnance Survey National Grid and then were backfilled and levelled at the end of the investigation.

The trench (Area 1) was widened at the eastern extent to allow for full exhumation of Skeleton **01**. Skeleton **03** was also lifted, in both instances under licence from the Ministry of Justice and following consultation with Historic England and Leicester City Planning Authority. With regard to appropriate protection a layer of sand was deposited, after basic recording, over a third inhumation exposed during cleaning of Skeleton **01**. Under no immediate threat of disturbance by the program of works, this was left *in situ*.

The main external work involved the machine excavation of a service trench (Area 1) orientated north-south, turning east-west across the existing pathway of the Castle Yard towards the Church of St. Mary de Castro. It was approximately 42m long. Test pit 1 was hand excavated near the south-west of the hall on the terrace and a trial trench, c.5m long, was excavated by mini-digger towards the north of the terrace, both under archaeological supervision. A further test pit (TP2) was hand excavated in Castle Yard during work on existing services. The main internal excavation (Area 2) took place beneath the civil court room in the north of the medieval hall and comprised of a rectangular area of approximately 8.50 x 12m.

The work followed the approved design specification (Buckley/Gonzalez, 2016) and adhered to the Institute for Archaeologists (Cifa) *Code of Conduct* and adhered to their *Standard and Guidance for Archaeological Field Evaluations* (2013).

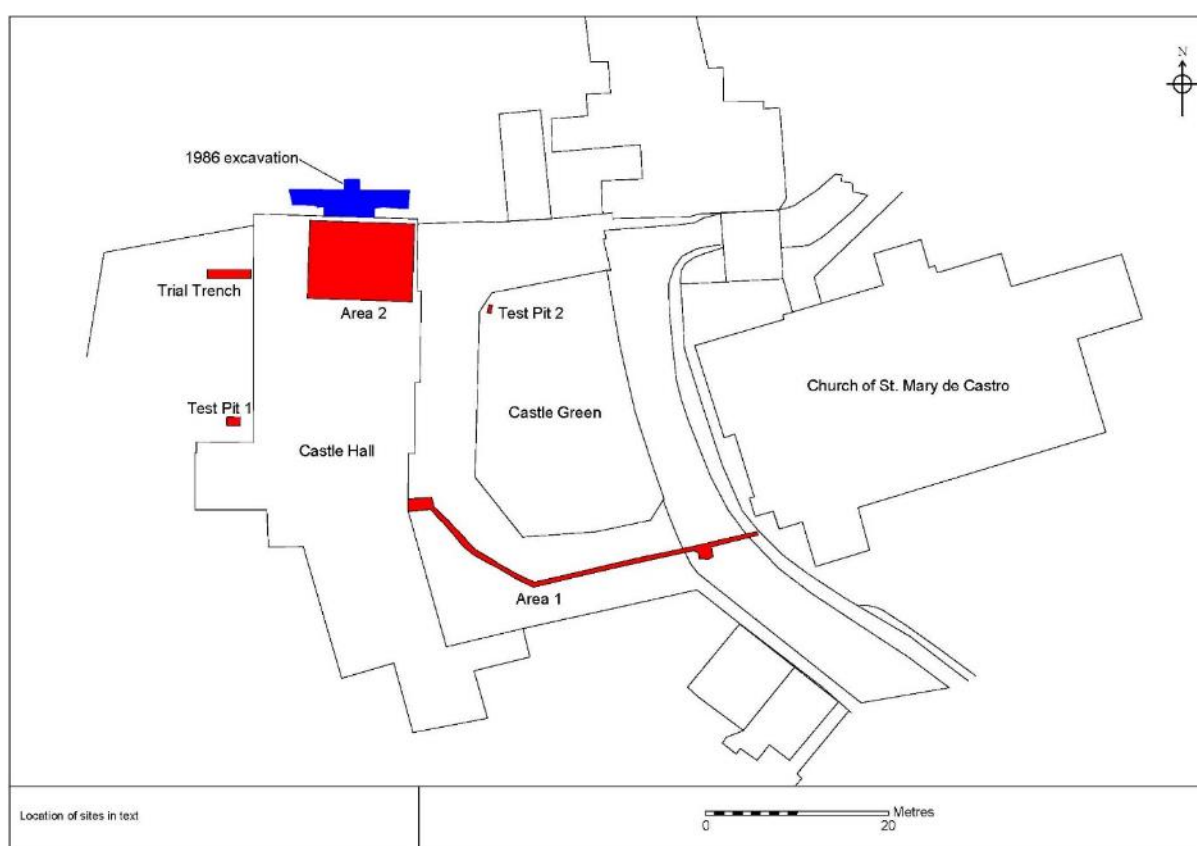


Figure 3: Areas of Investigation



Figure 4: Machining Area 1

## 6. Results - Exterior

The initial *c.*25m stretch of service trench excavated, orientated approximately east-west uncovered two articulated human burials *c.*6.50m from the eastern end, another becoming exposed in the same area during the recording and lifting of them. Made ground was observed and a crude surface with possible masonry structure recorded further west. The service trench dog-legged northwards and ran for *c.*14m north-west/south-east, partially revealing a possible stone and slate built oven feature midway along it, to where it meets a wider and deeper area of excavation associated with the entrance of the services into the Hall building. The section of these deeper ground works reinforced the evidence from previous work (Mackie, 1994) in the Castle Yard and revealed further evidence for the Hall's porch, thought to have been constructed in the mid/late-14th century AD.

### 6.1 Inhumations (Figure 5) (Figure 6)

Three well preserved (albeit truncated) inhumations were identified: two through machining and the third through subsequent hand cleaning of the initial remains. Located *c.*6.50m from the eastern end of the service trench and towards the graveyard of the Church of St Mary de Castro, a quantity of disarticulated human bone was also recovered from a dark brown/grey silty clay burialsoil (01) synonymous with all three burials. This deposit appeared to have been post-dated or overlain by a lighter yellow/brown silt sand (13) with common crushed mortar flecks, possibly a made ground.

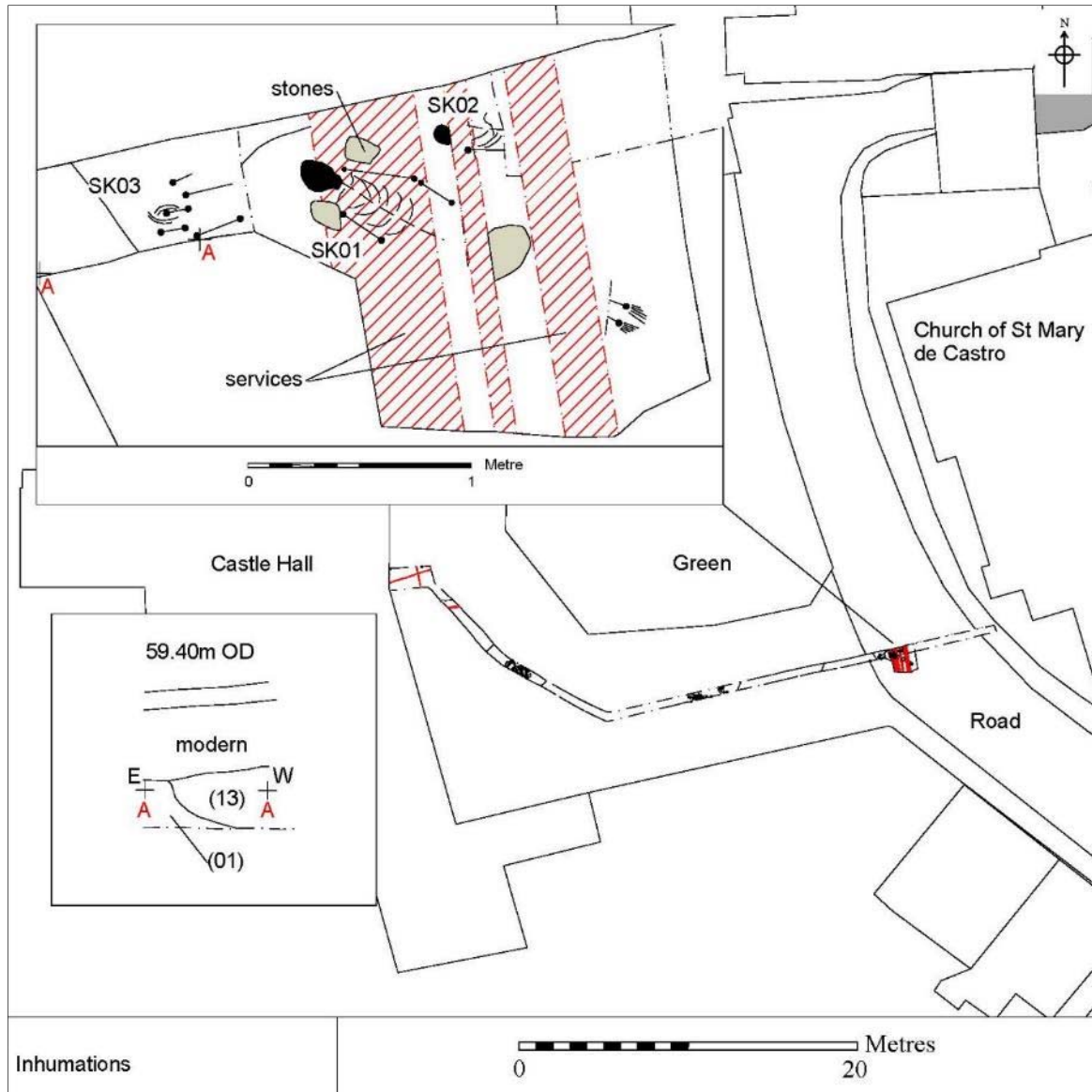


Figure 5: Inhumations - Area 1





Figure 6: Modern services - Area 1

#### 6.1.1. *Skeleton 01* (Figure 7) (Figure 8)

**Skeleton 01** was located *c.*6.60m from the western end of the service trench and was initially identified by the presence of a skull disturbed during machining. Work was stopped and the area immediately around the skull hand-cleaned to determine the articulation of the remains. Once confirmed, an application was made for an exhumation licence and the body was lifted.

The body, an older middle aged male (see below), was supine and aligned WNW/ESE, the head, with displaced jaw, was at the west and facing the front. Two large sandstone blocks lay either side of the skull at a depth of *c.*0.53m OD. Both arms were extended and the ribs collapsed. The pelvis and femur/upper tibia of both lower limbs had disappeared and both hands heavily disturbed, a result of later service and possibly Victorian truncation. The left hand may have rested upon the lower body. The feet were identified undisturbed to the east of another service trench. The well-preserved torso of the body appeared to have been protected beneath modern services running approximately north-south along the road. There was no evidence in the burial soil of any grave cut and no indication for a coffin although reddish/brown mudstone immediately to the north-west of the burial appeared to be natural substratum and possibly evidence for further cut burials at a lower depth.

The grey/brown silty clay possible burial soil (**01**) associated with **Skeleton 01** contained disarticulated human bone matched in post-excavation analysis to **Skeleton 01** and possibly **Skeleton 03**, alongside some fragments of animal bone. Pottery was recovered dating from the 12th – 17th century AD, the later of this possibly residual.



Figure 7: Skeletons (01) and (02), looking west



Figure 8: Skeleton (01), looking west

#### 6.1.2. Skeleton 02 (Figure 7)

On confirming the articulation of Skeleton **01**, the projected area that the inhumation may have occupied was taken down, initially by machine and then by hand to the level of a gas main, to determine the extent of the burial and clean the remains. During this it was observed towards the northern baulk that the gas main had disturbed another burial. The exposed remains were cleaned and recorded but not chased to reveal their full extent, their level of 59.36m OD being below that of the current service trench depth and of existing services. The inhumation was again supine, running beneath the eastern baulk, the gas pipe having truncated the front of the



skull. Only the cervical vertebrae, the clavicle and the upper ribs were exposed and recorded before the remains were covered with sand for protection and left *in situ*.

### 6.1.3. Skeleton 03 (Figure 9)

Following the expansion of the area around Skeleton 01, two long bones were observed protruding out of the section created in the north-west where the line of the service trench resumed. Subsequent investigation and cleaning revealed the heavily disturbed but probably partially articulated remains of another, possibly young individual on an east-west alignment. Considering the small proportion of remains recovered, little osteological information could be obtained. Apparently supine, several of the bones had been displaced – perhaps disturbed and reburied – including both arms. The legs may have been disturbed during initial machining – a quantity of disarticulated bone was recovered from the area, both animal and human, although the latter may have been attributable to another adult individual entirely.



Figure 9: Skeleton (03), looking east

### 6.2. Masonry Structure/cobbled surface (27)/(16) (Figure 10) (Figure 11) (Figure 12)

A concentration of stone, centred c.12m west of the inhumations, was investigated and interpreted as representing a cobbled surface (16), possibly incorporating mortared structural masonry remains (27). There was also a ‘rubble’ deposit (17) contained within a mid/dark grey/brown silty sand with crushed mortar fragments, probably representing a layer of ‘made’ ground (15), above (14). Roman pottery, probably residual, was recovered from the stone surface (16).



Figure 10: Cobbled surface (16), looking southwest - Area 1



Figure 11: Cobbled surface (16), looking south

Structure (27) consisted of possibly reused/worked sandstone blocks bonded with a light yellow/brown mortar, with a total length of c.0.40m. This was different in character to the surface (16) on the western side which was dry bonded within a dark grey/brown silty sand (14), indistinguishable from the deposits interpreted as being made ground. The structure ran beneath the southern baulk of the narrow service trench and its interpretation as structural is no more than conjecture. Surface (16) appears to have been built up to or against this structure and over a dark grey/brown silty sand, also interpreted as representing 'made' ground, possibly lying above the burial soil (01).



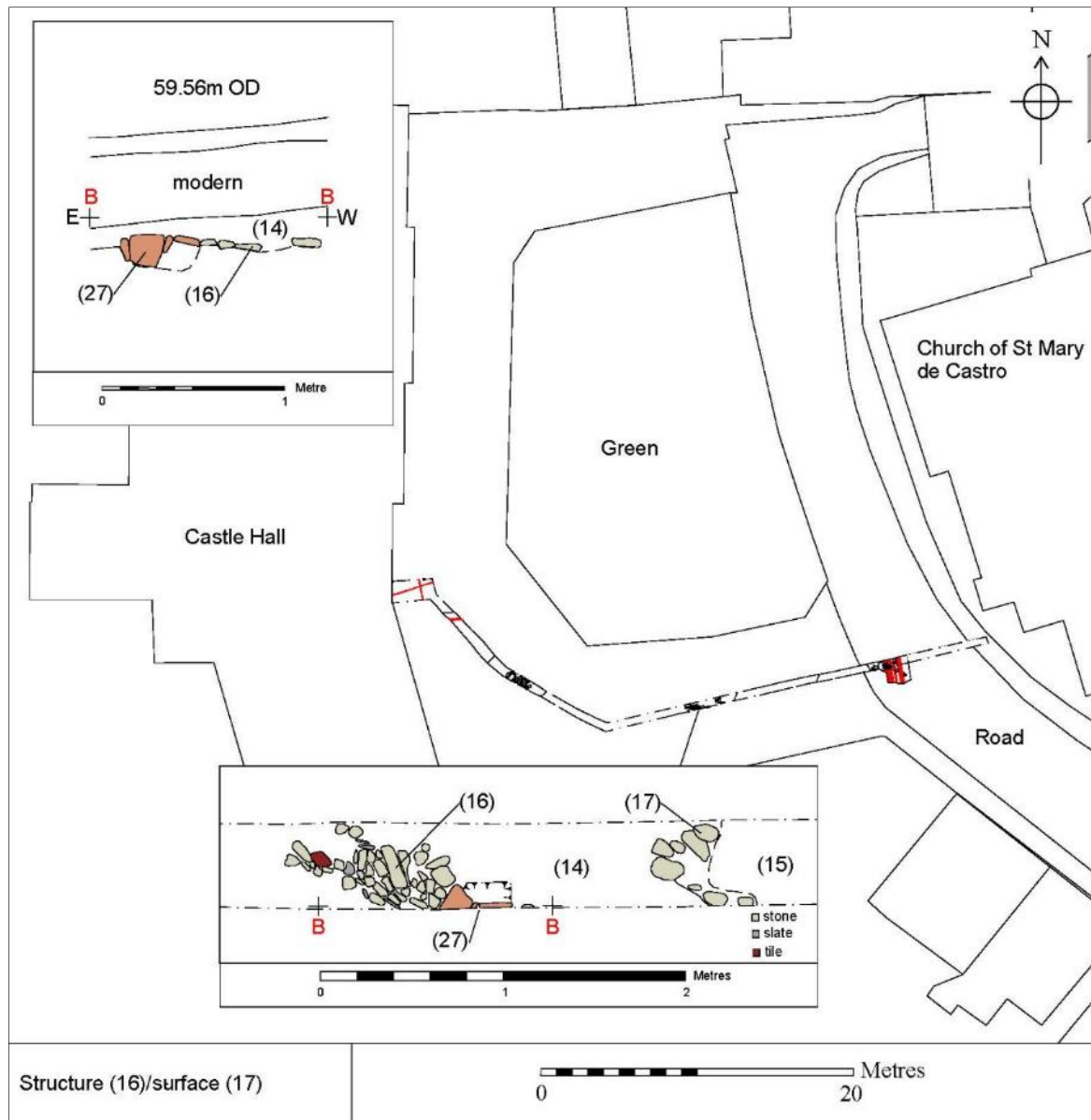


Figure 12: Structural remains - Area 1 - Plan



Figure 13: Possible oven feature (22) – Area 1 - Plan

### 6.3. Oven structure (22) (Figure 13)

Approximately 8.0m from the north-west end of the service trench another concentration of stones was hand cleaned, recorded and interpreted as representing the remains of a possible oven feature, albeit of unclear date. Consisting of a possible masonry structural element (21) and a surface (22), overlying a layer of charcoal. The structural element (21) consisted mainly of sandstone blocks with some granite, typically c.130 x 110mm, to the south-east, possible mortar bonding between, and occasional slate laid upon, some of them. The slate comprising the surface to the north-west was typically c.170 x 120mm. The surviving structure was c.1.20m long, truncated by Pit [20] to the north-west. Containing pottery dated to 1680+AD, the slate surface (22) was seen continuing on the north-west edge of the pit.



Figure 14: Possible oven feature (22), looking west

#### 6.4. Pit [20] (Figure 13)

Sub-circular Pit [20], c.1.14m x 0.88m was filled with a mid-dark grey/brown silty sand (19) with crushed mortar and ceramic building material (CBM) fragments and charcoal flecks. It had gradual concave sides merging gently with a central concave base. It contained animal bone but its function was undetermined.

#### 6.5. Mortared floor surfaces (03) (Figure 15) (Figure 16)

An area c.2.50 x c.1.30m was excavated under controlled conditions up against the east wall of the existing hall to enable access for the services to the inside of the building and at deeper levels than the service trench itself. Two existing services – an electricity main and water pipe (Figure 17) – were unexpectedly revealed during this, thus removing the vast majority of any archaeological deposits in plan. The resulting section providing confirmation of results of previous archaeological observations (Mackie, 1994), notably evidence for a floor to a ‘porch’ and for the foundations for the original eastern wall of the hall.

Mortar floor (03) had a depth of c.0.06m and width of c.1.14m ending at a foundation trench to the east and truncated by a modern cut for a north-south water pipe to the west. It was constructed from light yellow/orange/brown mortar, the top being firmly compacted. It does not appear in the opposite north-facing section, the reasons for this unclear, but possibly due to the truncation of the modern east-west electricity main. It may be that the north facing section is without the original width of the porch. Mortar surface (03) was overlain by layer (02), probably made ground, c.0.18m thick, with crushed mortar and building material fragments. It was undated.

Another layer of undated sandy mortar (10) may represent a second floor surface below layer (04). This had a depth of c.0.03m sloping downwards just before it was truncated by the water pipe. The deposit appeared to be firmer and surviving as a more recognisable surface towards

the east where it was truncated by the foundation trench [09]. A purple/grey fragmented clayey layer (05) lay beneath the lower floor, probably made ground consisting of redeposited natural. Below this, at the bottom of the excavation, a very dark grey/brown clay silt mix (06) with occasional building material fragments was difficult to interpret but may represent the fill of a pit.

#### **6.6. Foundations (12) [09]** (Figure 15)

Deposit (12) consisted of mixed granite and crushed sandstone fragments in a yellow/brown sandy matrix in a straight sided cut [09], c.0.45m wide, at least c.0.70m deep and observed at the western limit of the mortar floor layers. It may represent foundation or robber material dating from the demolition of the original east wall of the Hall and subsequent construction of the present brick facade in c.1695, although no finds to support this were retrieved. Notably, this cut was not reflected in the north facing section of the service trench here, tentative supporting evidence for a termination of both the floors and the eastern wall at this location, although the extent of any disturbance from existing services could not be ascertained.

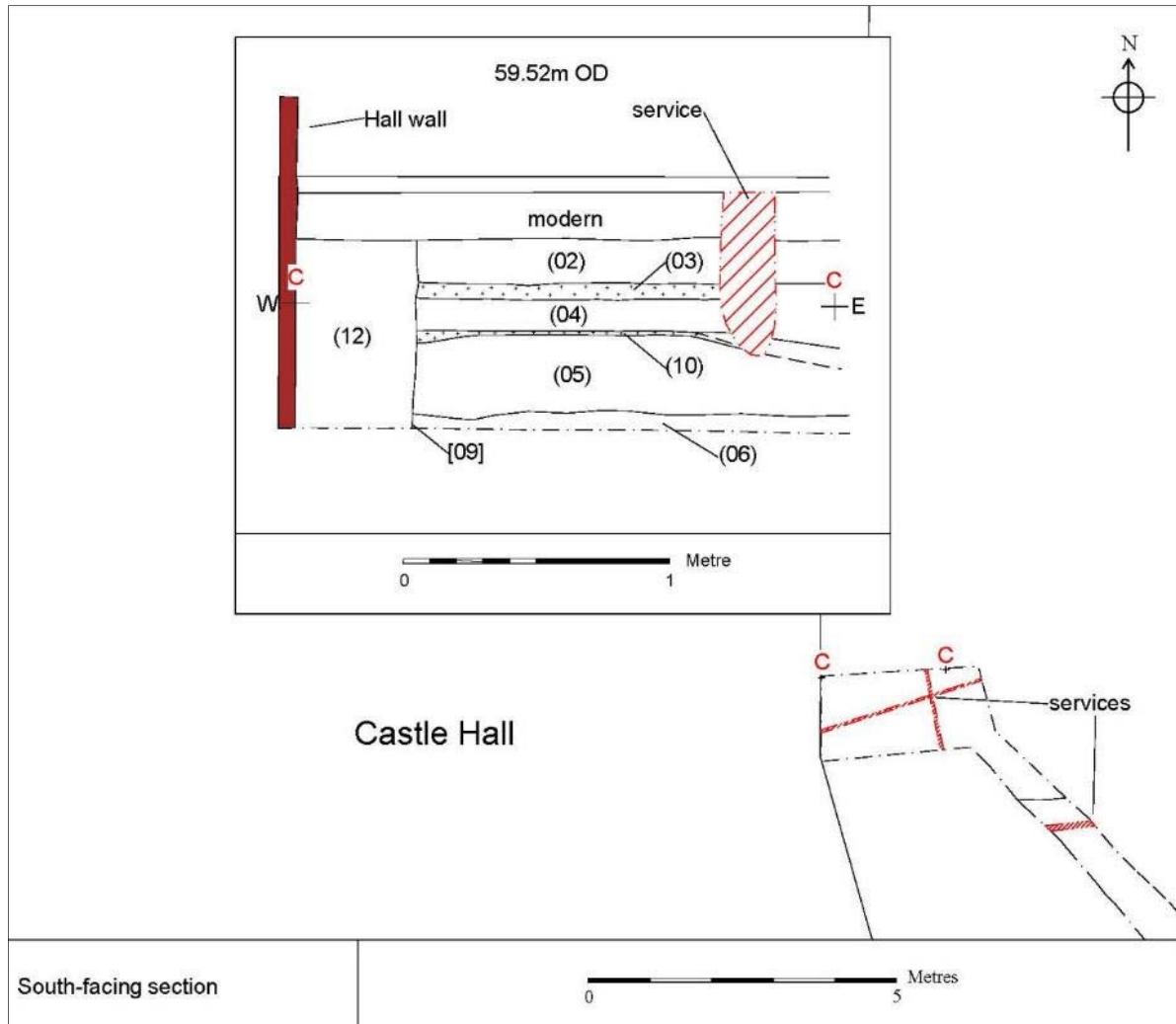


Figure 15: South facing section through mortar floor (03) and east wall robber [09]

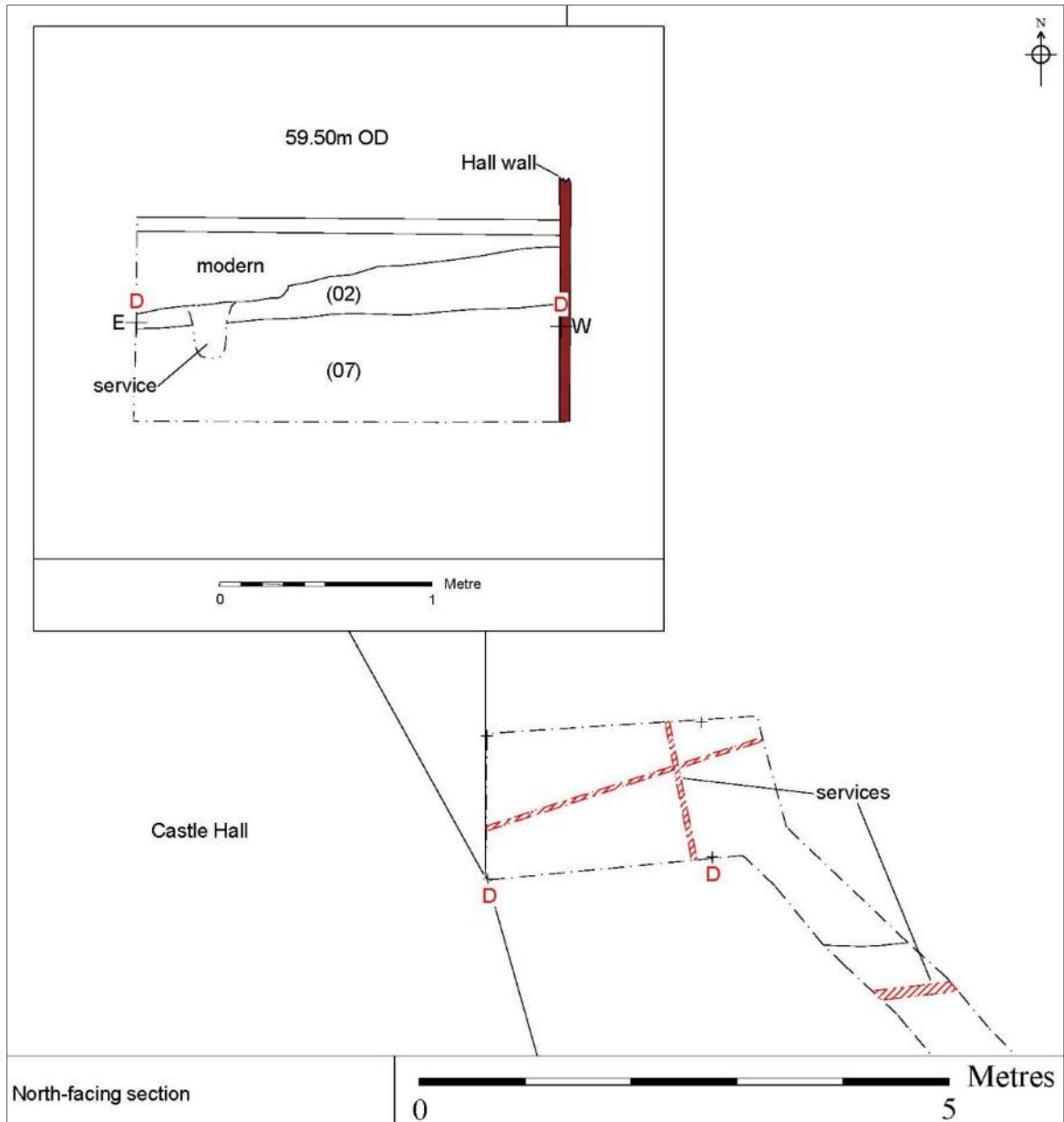


Figure 16: North facing section





Figure 17: South facing section, looking northeast, with electricity service

#### **6.7. Trial Trench – November 2016** (Figure 3) (Figure 18) (Figure 19)

A trial trench 1.0m wide and approximately 5.80m in length was excavated under archaeological supervision through the western terrace of the Castle Hall. Orientated perpendicular with and starting from the western wall, it was positioned to determine the impact of landscaping works, including the construction of a retaining wall and balustrade. It was shortened from the length in the specification after reviewing the initial results.

The trench was stepped and excavated to a maximum depth of 1.80m to the level of natural mudstone substratum which dropped gently away to the west and the direction of the river. The sections described made ground of topsoil (c.0.45m max depth) overlying a rubble/stone/mortar layer (c.0.30m max depth), in turn above a mid-grey/brown loose loamy backfill deposit, containing fragmentary slate, stone and building material. No deposits, layers or structures of archaeological interest were observed during the investigation and, after advice from the City Planning Archaeologist, the trench was recorded, back-filled and levelled.



Figure 18: Trial Trench, looking north-east



Figure 19: Trial Trench, looking north



## 6.8. Test pits

### 6.8.1. Test Pit 1 – November 2016 (Figure 18)

A test pit, approximately 1m x 1m and c.0.40m deep, was hand excavated at the request of the City Planning Archaeologist at the southern end of the terrace to the west of the hall to complement the results from the trial trench described above. Two modern service pipes were observed within a similar mid/dark grey silty sandy made ground deposit but no archaeological remains were encountered. The test pit was backfilled on completion of recording.



Figure 18: Test pit 1, looking south-west

### 6.8.2. Test Pit 2 – June 2017 (Figure 19)

On the 28 June 2017, De Montfort University requested permission to remove a redundant gas main from Castle Hall as part of ongoing alterations and groundworks to the building. National Grid were contracted to perform the work and, in accordance with Scheduled Monument Consent, a watching brief was initiated by ULAS to monitor the work.

The gas pipe was located close to the entrance of Castle Hall and found to project on an east to west orientation towards Castle View. The place chosen to excavate the pipe was in an area of grass in Castle Yard situated between Castle Hall and St. Mary De Castro Church, approximately 30 north of the initial excavations. To keep the disturbance to a minimum a small trench measuring 0.60m long by 0.40m wide was hand-dug in the north-east corner. This revealed an old metal pipe in the north-western corner of the trench that was encasing the modern pipe. To enable the metal pipe to be removed and expose the plastic gas pipe inside, the trench had to be extended a further 0.30m in length. No archaeological features were encountered and the ground appeared to have been previously disturbed when the pipe was

originally instated. The pipe was located at a depth of 0.75m and was surrounded by a loose, friable mid brownish/grey sandy silt, overlain by several layers of modern made ground. The topsoil was found to be 0.20 - 0.30m thick and consisted of a smooth mid brownish/grey silty clay.



Figure 19: Test pit 2, looking north

### ***6.9 Bollard watching brief – April 2018***

An archaeological watching brief was carried out in Castle Yard on 11th April 2018. Work watched the replacement of static bollards with removable ones. Two bollards were removed on the north side of the yard and one to the south. The settings for the new bollards (c.0.2m square and c.0.5m deep) were narrower, stayed within the concrete setting of the original posts and had no impact on any underlying archaeology.

### ***6.10 Previous Results: 1986 Excavations*** (Figure 20)

An external evaluation was undertaken to the immediate north of Castle Hall in 1986 by Leicestershire Archaeological Unit (LAU) as part of a research excavation following some remedial work on the roof timbers. The main objectives were to investigate whether there had been any buildings to the north of the hall. A series of layers, deposits and features dating to the post-medieval period were recorded. The resulting plan did not produce any archaeological evidence for any structures, masonry or otherwise, that may have represented ancillary buildings associated with, or extensions to, the Castle Hall. This may be significant in discussions concerning the interior layout and use of the building. Notably, c.3.4m from the northern gable wall the natural ground was observed falling away steeply, towards the River Soar.

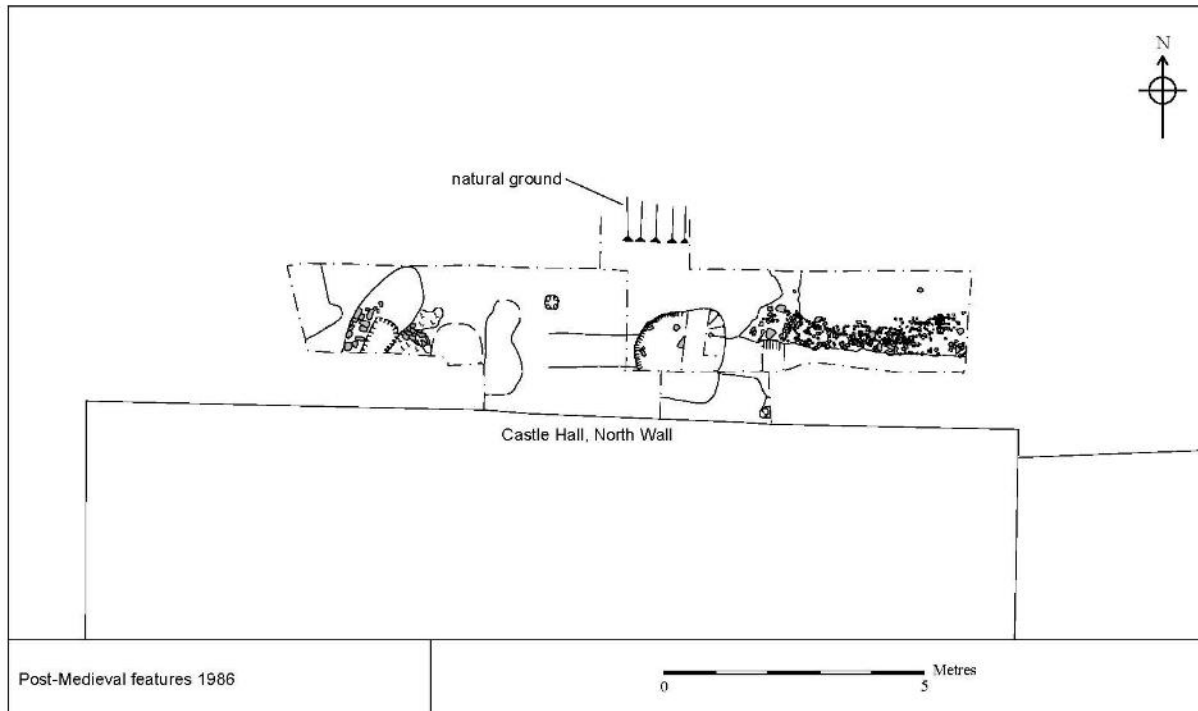


Figure 20: 1986 excavations

## 7. Results: Interior

### 7.1 Introduction (Figure 22)

During August 2017 work began by hand to dismantle and remove the court furniture, wall panelling, floorboards and supports, and to lower the public gallery along the inside of the east wall of the Civil Court at the north end of the Great Hall. A number of features were revealed including two infilled doorways in the northern gable wall, masonry walls that were probably supports associated with the court furniture, and negative features cut into the deposits below the floorboards. Two areas were targeted for investigative excavation after consultation with Historic England and the Leicester City Archaeologist, with the objective of determining the survival of earlier medieval floor surfaces. In another area, a modern intrusion, possibly representing a previous test pit, was removed with the same intention. The arched doorways in the north wall were recorded and hand drawn.

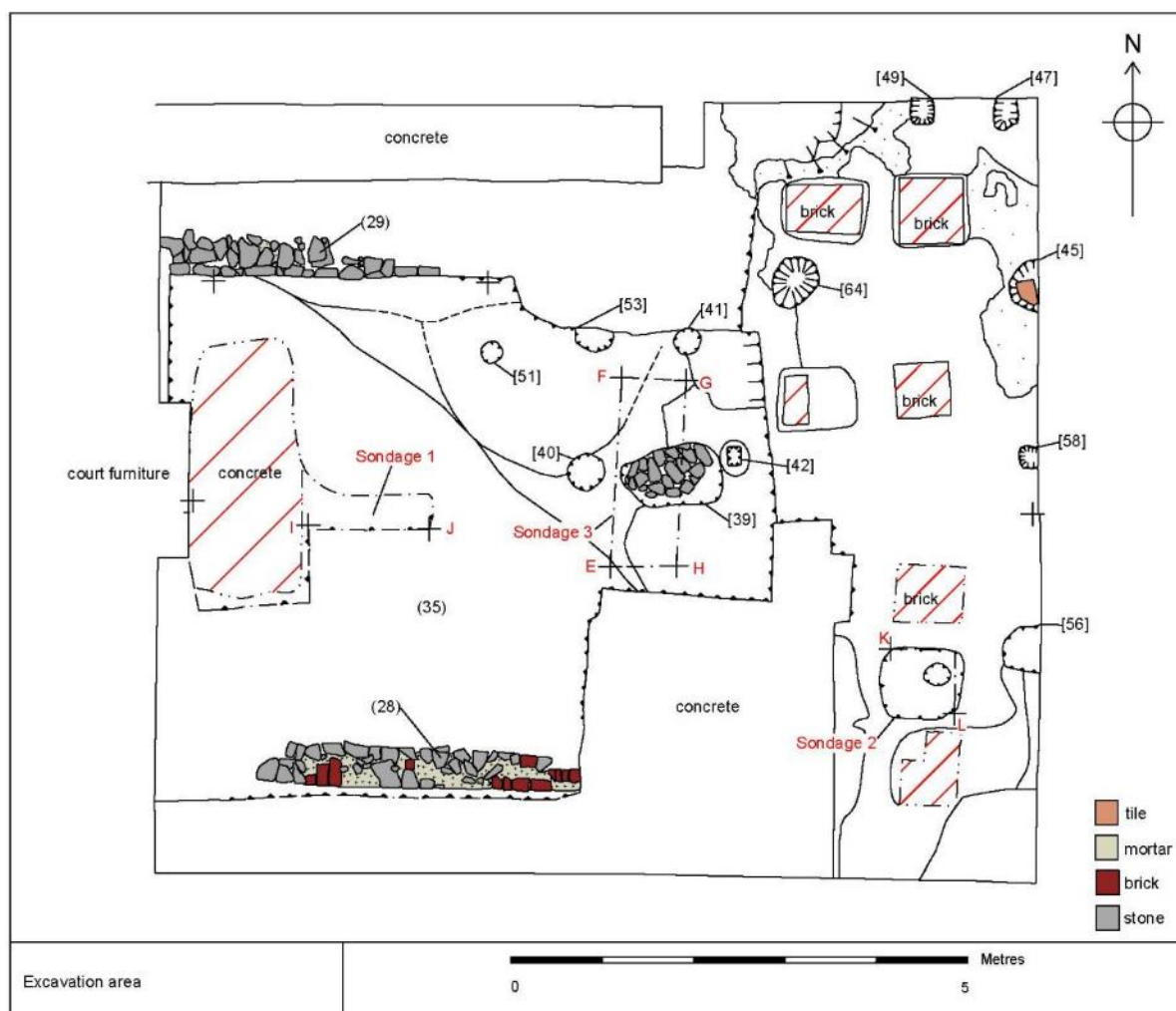


Figure 21: Internal excavations – Area 2

### 7.2 The Court Furniture Removal (Figure 24)

The Civil Court furniture, floorboards and wall panelling was removed under intermittent archaeological monitoring in July and August 2016 (Figure 24). A photographic record was made of the process. The floor structure included a mixture of wooden joists, floorboards, planks and some modern concrete and stone slabs. The work was postponed due to the discovery and subsequent controlled removal of some asbestos. Concrete, with names scratched into it, from the centre of the room dated it to the 1980s (Figure 23). The Judge's bench on the west side of the courtroom was left *in situ*.





Figure 22: Court furniture graffiti



Figure 23: Modern disturbance in hall floor - Area 2



Figure 24: Removing panelling, north wall



Figure 25: Stone supports revealed

### 7.3 Public Galley (Figure 26) (Figure 27)

The reduction by hand of the public galley along the eastern wall was monitored intermittently. It was composed of stone slabs above a make-up of modern brick and concrete rubble, with no indication of earlier floor layers.





Figure 26: Public gallery removal



Figure 27: Public gallery removed

#### ***7.4 Sondages and cut features*** (Figure 21)

Considering the scheduled status of the site, three sondages were targeted in the internal area of the Castle Hall as part of a limited programme of intrusive investigation as agreed upon with Historic England and the Leicester City Planning Department. Utilising, where possible, modern disturbances, Sondage 1 was excavated up against concrete foundations for the court furniture and Sondage 2 involved the re-excavation of a previous archaeological test pit. Sondage 3 was excavated across a disturbed area of the court's interior where a compacted mortar surface had been subject to truncation and some protruding masonry debris had been identified.

### 7.4.1 Sondage 1 (Figure 28) (Figure 29)

Sondage 1 was excavated in the west of the area of investigation, up against a concrete foundation for court furniture. It was approximately 1.3m x 0.40m and rectangular in plan. The north facing section was drawn. A loose mixed grey soil layer (35), containing pottery dating to the 12th – 14th century AD, was c.0.40m deep. This overlay a light yellow crushed mortar layer (37), 0.02m thick, possibly representing the fragmentary remains of a degraded floor at a level of 61.15m aOD. Further grey silty sandy deposits (38) and (43) were observed underlying the mortar floor, the former of these (38) containing roughly made 12th century AD pottery. A compacted brownish/grey clayey silt (62), observed at the base of modern intrusions in the Great Hall, was recorded at the base of this sondage but not excavated.

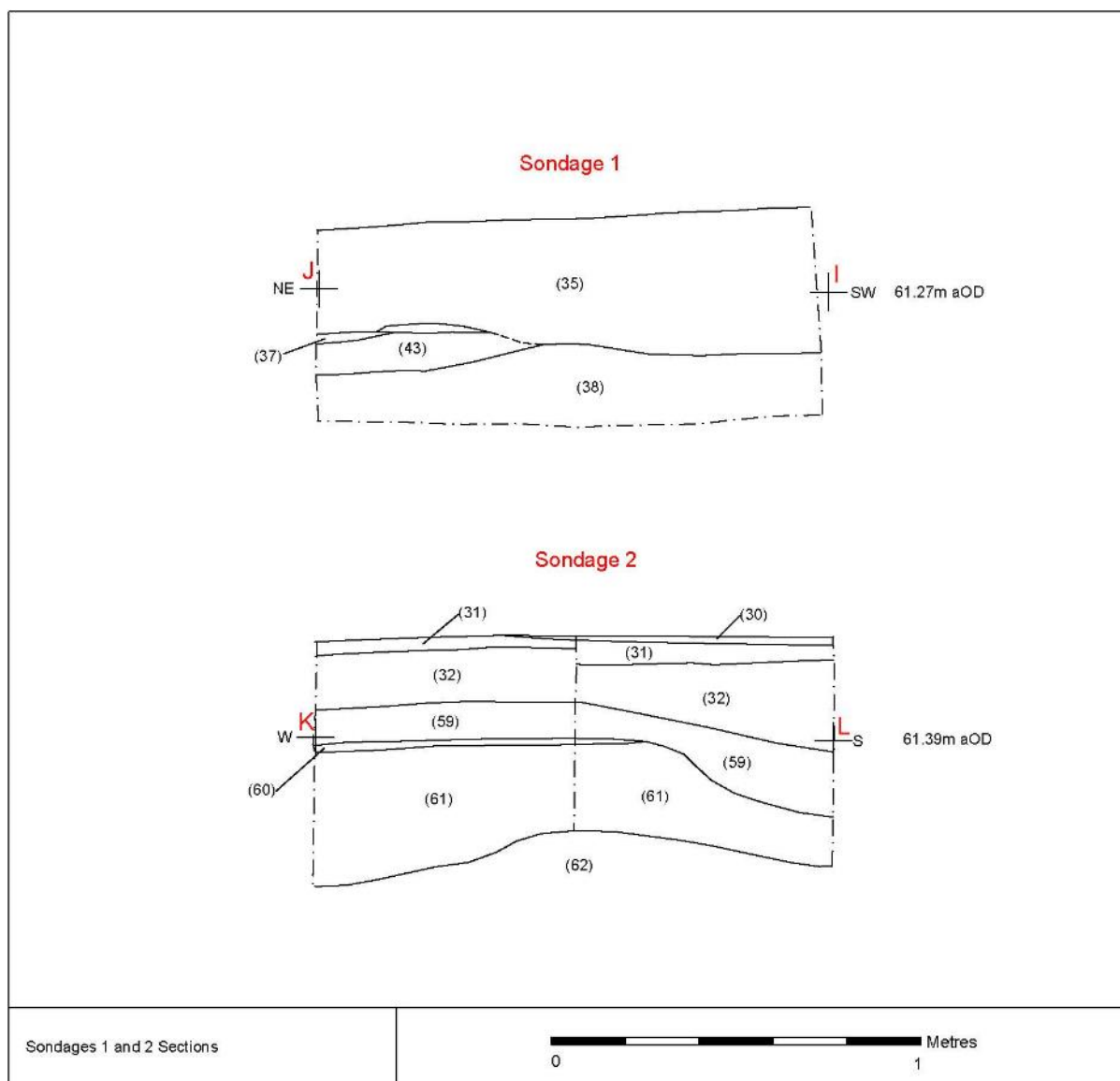


Figure 28: Sondage 1 and 2 - sections





Figure 29: Sondage 1, looking south

#### 7.4.2 Sondage 2 (Figure 28) (Figure 30)

Rectangular Sondage 2 was located in the east aisle of the hall and involved the re-excavation of a previous archaeological test-pit between the southern two of five brick foundations supporting what was the public gallery. It measured *c.*0.90m x *c.*0.77m and was excavated down to the same compacted deposit (**62**) as seen in Sondage 1.

Below another mid/dark grey/brown silty sand deposit (**32**) comparable to (**35**), seen in Sondage 1, and a compacted yellow silty clay layer (**59**), evidence for earlier floor layers were also observed and recorded in the north, west and south sections of the sondage. A yellow/brown lime mortar surface (**60**), 0.02m thick, was recorded at a depth of 61.34m aOD, overlying a mixed soil layer (**61**) also reflecting that seen in Sondage 1.



Figure 30: Sondage 2, looking north

#### 7.4.3 Sondage 3 (Figure 31) (Figure 32) (Figure 33)

The most informative sondage was excavated across the area of the eastern arcade post line where some disturbance in a compacted floor surface (**33**) was observed. The investigative slot was *c.*2.10 x *c.*0.70m, covering an area of *c.*1.5m<sup>2</sup>. Natural red/brown clay substratum was observed at the base of this slot at a depth of 61.38m aOD.

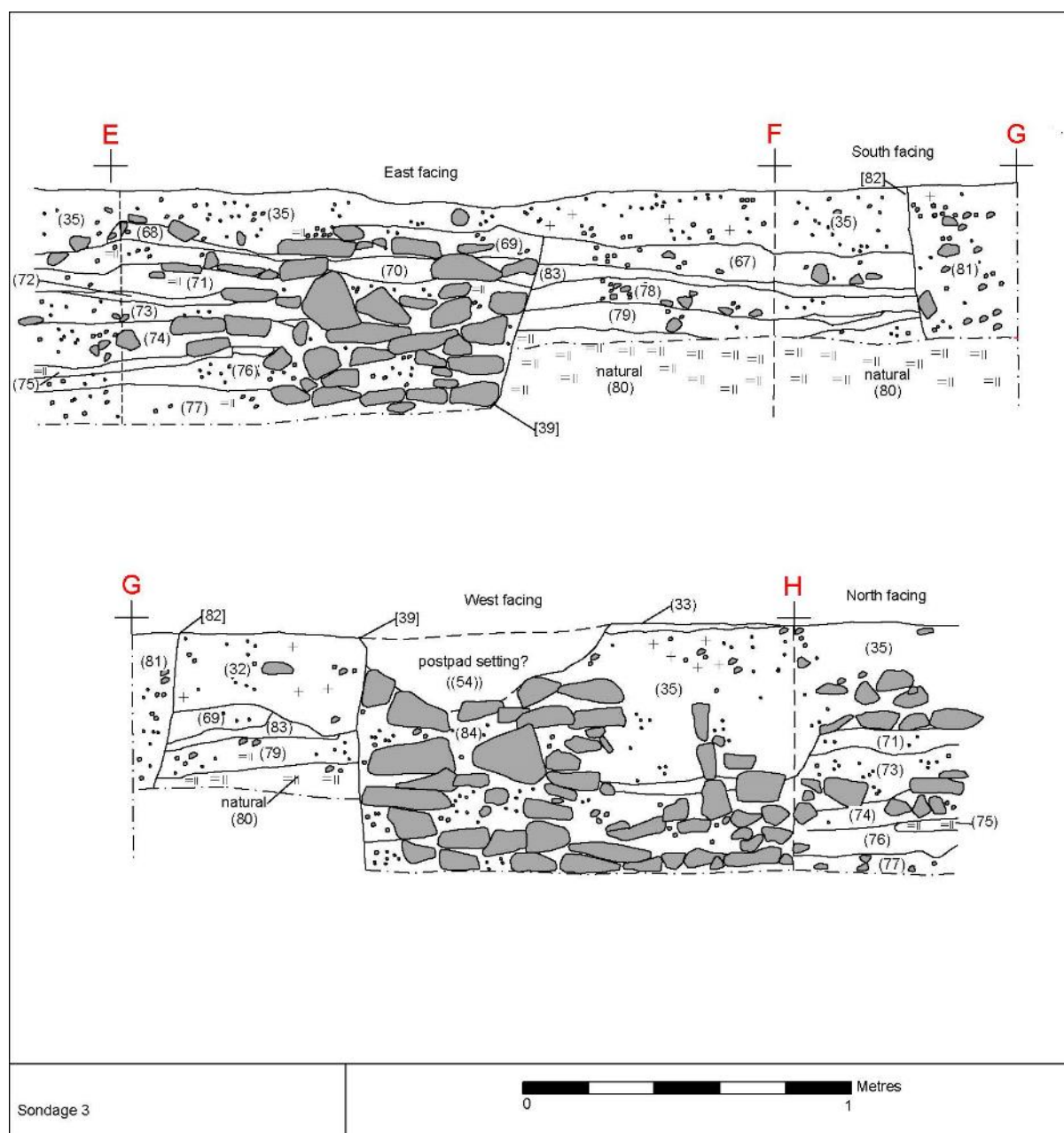


Figure 31: Sondage 3 - sections

*Floor layers* - A mixed loose soil deposit (35) was again observed, albeit thinning to c.0.20m, overlying possible floor deposits in this location (Figure 35). The latter survived as a layer of yellow crushed sandstone and mortar, c.0.10m thick, perhaps representing a demolition event, overlying another mortar floor (78) and possible trample layer (83). Layer (78), at 61.51m aOD and typically c.0.07m thick, consisted of yellow sand with crushed limestone and was distinct from the layer immediately above it (83), a darker grey silt, up to c.0.06m thick, with charcoal. Context (78) contained pottery dating to the 11th – 13th century AD and context (83) pottery dating to 12th – 14th century AD.

*Post hole* - Cut [39], over 0.60m deep, was observed in the east and west facing section of the sondage, possibly representing the original construction posthole for the eastern arcade post. Sealed by layer (35), this contained an abundance of granite packing stones and layered deposits (68) (69) (70) (71) (73) (74) (76) (77). These may represent floor and make-up layers

disturbed during removal of the arcade post or backfilling and consolidation after the same event. Layer (74), a light brown sandy silt, c.0.17m deep, contained an early post - Roman fine Stamford ware (see below) dated c.1050 – 12th century AD. Layer (70) contained several sherds of pottery dating from the 11th – 14th century AD.

*Post pad void* - A shallow ‘scoop’, c.0.76m wide, c.0.20m deep and sub-rectangular in plan, observed in the west facing section of Sondage 3, would be consistent in representing the position of a padstone used to support the arcade post after it was redesigned from an earlier ‘earthfast’ construction. The start of the granite rich deposits immediately below may be part of this consolidation process. A very loose mid grey/brown deposit (54), containing pottery dating to 15th – 16th century AD, was removed from this.



Figure 32: Sondage 3, looking west





Figure 33: Sondage 3, looking east

#### 7.4.5 Postholes [40] [41] [42] [51] [53] (Figure 21)

In proximity to Sondage 3, a number of smaller postholes were excavated and recorded [40] [41] [42] [51] [53]. Postholes [40], [41] and [42] (Figure 34) with diameters from *c.*0.20m – *c.*0.40m and depths of between *c.*0.30m – *c.*0.52m may represent postholes associated with the possible removal process of the eastern aisle post. Postholes [41] and [42] were sub-circular in plan, Posthole [42] sub-rectangular. They were all recorded as containing modern rubble debris fills, not assigned a unique context number. None of them yielded datable material.



Figure 34: Postholes, looking northeast, 0.50m scale

Postholes [51] and [53], also sub-circular, had diameters of *c.*0.20m and *c.*0.36m respectively and were between *c.*0.24m – *c.*0.30m deep. Both contained a loose mid/dark grey/brown silty sand (50) and (52), the former with floor tile from the 14th century AD.

Posthole [64] was located between two modern brick foundations to the northeast of Sondage 3. Sub-oval in plan, with a length of *c.*0.60m, width of *c.*0.44m and depth of *c.*0.19m, it contained a mid/dark grey/brown silty sand, devoid of finds.

Postholes [45], [47] (Figure 35), [49], [56] and [58] (Figure 21) were positioned around the internal perimeter of the hall, along the northern and eastern wall and contained fills (44) (46) (48) (55) (57) with modern inclusions and few datable finds. They were typically sub-circular in plan, ranging from *c.*0.21m – *c.*0.54m wide, but incomplete, extending beneath the line of the wall they were up against. They were between *c.*0.20m and *c.*0.28m deep. Mid brown/grey silty sand fill (44), within Posthole [45] (Figure 36), contained a notably large fragment of tile.



Figure 35: Posthole [47], looking northwest, 0.50m scale



Figure 36: Posthole [45], looking northeast, 0.50m scale

### 7.5 *The Padstone* (Figure 37) (Figure 38)

The padstone beneath one of the western aisle arcade posts located beneath the Judges bench was accessible through a small opening in the wooden panelling from the western edge of the excavation area. This was investigated in order to photograph and, using a 360° Line Laser projecting a known height from the excavation area, establish a level upon it allowing a comparison with the heights of the floor levels identified in each of the sondages and the gable end archways.





Figure 37: Levelling the western aisle padstone





Figure 38: Padstone beneath judge's bench, looking northwest, 0.50m scale

#### 7.6 *The Arched Doorways* (Figure 39) (Figure 42)

The removal of the court furniture and wall panelling in the Civil Courtroom exposed two blocked up masonry archways set into the northern gable end wall beneath the Great Window. The doorways were side by side, approximately 0.34m separating them. The inner doorway proper was c.1.30m wide. The inner edge of the centre point of the arch was c.1.80m below the sill of the Great Window, c.3.0m west of the eastern aisle post and c.1.60m above the level of the existing floor (33). The inner arch appeared to have been constructed of hard sandstone, c.80mm thick, in 6 segments, without a keystone, and the outer one of softer greenish grey Dane Hills sandstone, c.120mm thick. The infill at the head of the door was brickwork in the archway, c.0.64m deep, and sandstone in the doorway proper, c.0.83m thick. The lower part

of the doorway was obscured by the modern brick flue wall of the hall heating system. After discussions with Leicester City Council Planning Officer, the brickwork infill was removed under archaeological observation revealing a compacted mortared coarse stone infill immediately behind it (Figure 40). The date of construction and infilling of these doorways is unclear.



Figure 39: Doorways, partially revealed, looking north, 0.50m scale





Figure 40: Archway 1, 0.50m and 1m scale

#### 7.5.1 Archway – Watching Brief (Figure 41)

A watching brief visit was arranged with the developer to oversee the removal of further stone and brick infill after written agreement for the work with Leicester City Planning Department on 16th February 2017. This work began with the removal of the remaining brickwork and then the first course of lower stonework. It was discovered that this stone work was keyed into the stone backfill behind the bricks and, as such, formed part of the fabric of the Grade 1 listed building. On further advice from the Planning Officer the work was suspended and agreement reached to reinstate the affected area.



Figure 41: Archway 1 - watching brief, 0.30m scale

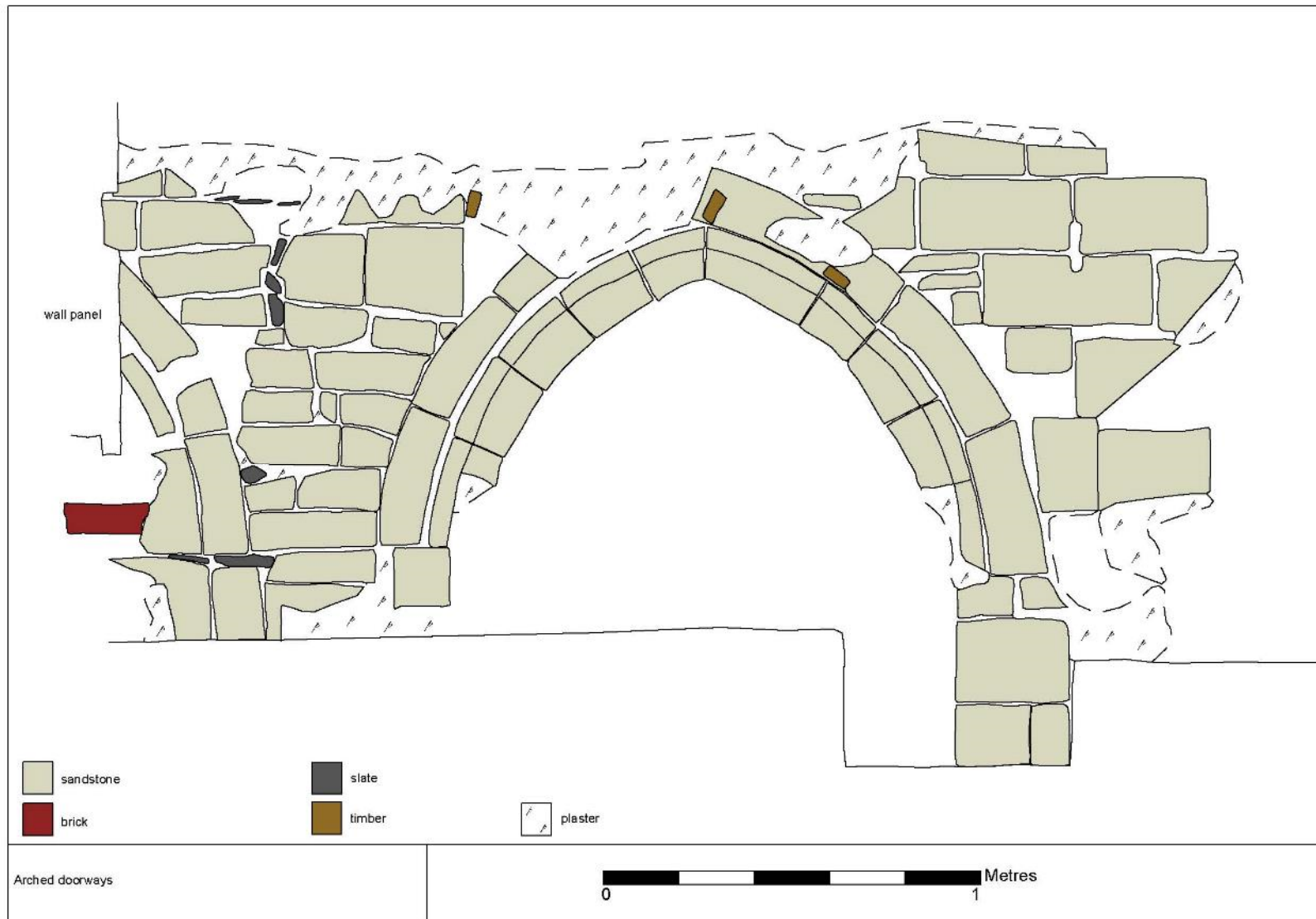


Figure 42: Archway elevation drawing



### 7.6 Court Furniture - Stone Supports (28) (29) (36)

Two stone structures were revealed and recorded in the west of the excavation area and were interpreted as foundations for the 19th century wooden court furniture.

Wall (28) (Figure 44) was located along the south edge of the excavation, extending c.3.50m on an east/west orientation. Constructed from limestone chunks and bricks bonded with mortar, it was between c.0.15m – c.0.26m in height and c.0.38m wide, rising to two rough courses. Parallel Wall (29) (Figure 45), along the northern edge of excavation, was c.3.10m long and between c.0.15m – c.0.52m wide, rising to three courses and of similar random brick, limestone and mortar bonded construction. It was connected to the north/south wall (36) supporting the *in situ* Judge's bench.

The face of Structure (36) (Figure 43), supporting the Judge's bench, was uncovered on the western edge of the excavation area. This consisted of two courses of limestone blocks with slate and brick. The heating system for the Hall ran through and behind this.



Figure 43: Stone support (36), looking southwest, 1m scale



Figure 44: Stone support (28), looking northeast, 1m scale



Figure 45: Stone support (29), looking north, 1m scale

## 8. The Ceramic Finds

### 8.1 The Roman Pottery *Nicholas Cooper*

Table 1: The Roman pottery and ceramic building material by context.

Context	Type	Ware - fabric	No.	Gr	Comments
POTTERY					
1	layer	GW – Grey ware	1	14	
1	layer	CG – Calcite Gritted	1	17	
16	Stone surface	GW – Grey ware	1	6	Mid 2 <sup>nd</sup> C
54	Post hole	BB1 – Black Burnished ware 1	1	18	Mid 2 <sup>nd</sup> C+
CERAMIC BUILDING MATERIAL					
1	SK01	Earthenware	1	6	Tile

### 8.2 The Medieval and Later Pottery and Tile *Deborah Sawday*

#### 8.2.1 *The Ceramic Record*

The assemblage: 38 sherds of medieval pottery, weighing 722 grams; five fragments of medieval ridge tile, weighing 532 grams, and part of a medieval floor tile, weighing 403 grams, was examined under an x20 binocular microscope and catalogued with reference to current guidelines (MPRG 1998, MPRG 2016) and the ULAS fabric series (Davies and Sawday 1999, Sawday 2009). Ten fragments of clay tobacco pipe, including two complete bowls, were also recorded from unstratified contexts.

The fabric codes and sources – where known – are shown in the fabric list (Table 2), and the site totals (Table 3, Table 4). The identifiable pottery vessels present is listed by fabric (Table 4), and the medieval and later pottery, tile and clay tobacco pipe is catalogued by fabric and context (Table 6).

The finds are fragmentary; the 38 sherds of pottery represent a minimum count of 38 vessels, with no conjoining sherds and an EVEs (vessel rim equivalent, where 1.00 equals one vessel of only 0.602. The average weight for the medieval sherds ranged between 16 and 17 grams (Table 3).

#### 8.2.2 *The Stratigraphic Record (Table 1)*

The pottery and tile provide evidence of activity in the vicinity from the Roman period and later. The earliest pottery, dating from the 12th century, if not slightly later, was recovered from the layers, contexts (38) and (74), whilst most of the medieval finds, dating from the 12th to the 13th or 14th centuries, occurred in the layers (34), (35) and (70). The floor, context (78) and the layer of trample above, context (83) also produced pottery with a similar date range to the latter.

Table 2: The medieval and later pottery and tile fabrics

Fabric	Common Name/Kiln & Fabric Equivalent where known	Approx. General Date Range
ST2	Stamford - fine, fabrics G B (Kilmurry 1980)	c.1050-12th C.
SP3	Splashed ware - Leicester (Davies and Sawday 1999)	c.1100-1250
OS	Oxidised Sandy ware -? Local (Davies and Sawday 1999)	c.12th-13th C.
PM	Potters Marston ware - Potters Marston, Leicestershire (Haynes 1952)	c.1100- c.1300/50+
CC1	Chilvers Coton A/Ai Warwick CTS WW01 (Mayes & Scott 1984, Soden and Ratkai 1998)	c.1250-1400

MS	Medieval Sandy ware – misc. coarse soft fired quartz tempered fabrics, including coarse Chilvers Coton fabrics A/Ai, and ? Nottingham, Burley Hill/Allestree, Derbyshire and Staffs (Davies and Sawday 1999, Mayes & Scott 1984, Soden and Ratkai 1998)	Early/mid 13th C.-1400
MS3	Medieval Sandy ware 3 – misc. coarse hared fired quartz tempered fabrics -? Burley Hill/Allestree/Ticknall, Derbyshire or Staffs (Sawday 2009, Soden and Ratkai 1998, Cumberpatch 2004))	Early/mid 13th C.-1450
MP4	Midland Purple ware - ?Ticknall, Derbys (Coppack 1980, Cumberpatch 2004)	c.1375-1550
CW1	Cistercian ware 1 – coarse? Ticknall, Derbyshire (Boyle 2002-3)	c.1450/1475-1550
CW2	Cistercian ware 2 – fine? Chilvers Coton fabric E (Mayes & Scott 1984)	c.1450/1475-1550
EA2	Earthenware 2 – ‘Pancheon ware’, Chilvers Coton/Ticknall, Derbyshire	17th C-18th C. +
EA3	Mottled ware	1680-1780
MA3	Martincamp Stoneware (Hurst 1986, Ickowicz1993)	1500-1650
XY	Continental Import – ?Andenne (Jennings 1981)	?12th – 13th C

A ridge tile fragment dating from the mid-13th century or later was found in the backfill of the pit [26], and part of a 14th century medieval floor tile in the post hole (50). The stone surface, context (16) produced a fragment of ridge tile in the later medieval fabric Medieval Sandy ware 3, and a sherd of later medieval Midland Purple ware pottery was found in the backfill of the post hole [39]. The possible Andenne ware, fabric XY, which is thought to date from the 12th or 13th centuries was recovered from the backfill of the pit [24]. Later medieval Cistercian ware occurred in unstratified contexts, whilst post medieval pottery occurred in the layer (01) and the backfill of the pit [20].

### 8.2.3 Discussion

The medieval and later wares, which date from the mid or later 12th to the 17th or 18th centuries, reflect continuing activity in the vicinity throughout the various phase of occupation and refurbishment associated with the castle. The vessel forms are generally domestic in nature (Table 4), whilst the local wares are typical of the region and more especially of those found in the city and the southern suburbs (Davies and Sawday1999, Sawday 2009).

Table 3: The medieval and later pottery site totals by fabric, sherd number, weight (grams), EVEs, minimum vessel count and average sherd weight (ASW).

Fabric	No.	Gr	EVEs	Min.. Vessel	ASW	% of total by sherd
Earlier Medieval/Medieval						
ST2	4	51	0.075	4		
SP3	1	9		1		
OS	3	13		3		
PM	22	429	0.402	22		
CC1	1	29		1		
XY	1	6	0.125	1		
Sub Total	32	537	0.602	32	16.7	84.2
Later Medieval						
MP4	1	10		1		
CW1/2	2	24		2		
Sub Total	2	34		3	17.0	5.2
Post Medieval						
MA3	1	7		1		
EA2	1	139		1		
EA3	1	5		1		



Sub Total	3	151		3	50.3	7.9
Site Totals	38	722	0.602	38	19.0	97.3

Table 4: The medieval and later pottery: the identifiable vessels by fabric and minimum vessel count.

Fabric	Totals						Totals
	jar	bowl	jug	Jar/ pitcher	cup	flask	
ST2			1	1			2
PM	3	1	1				5
CC1			1				1
XY				1			1
MP4			1				1
CW2					1		1
MA3						1	1
EA3					1		1
Site Totals	3	1	4	2	2	1	13

Table 5: The medieval ridge tile site totals by fabric, fragment number and weight (grams).

Fabric	No.	Gr	Min. tile
Earlier Medieval/Medieval			
SP3	2	179	1
MS3	2	239	1
CC1	1	114	1
Site Totals	5	532	3

#### 8.2.4 Conclusion

The pottery provides a useful addition to the evidence provided by the latest radio-carbon dates for the timbers in the Castle Hall of *c.*1137 – 1150 (R. Buckley, pers. comm.). The glazed and oxidised Stamford wares, the earliest post Roman pottery on the site, includes at least one example of a jug, which first makes its appearance as a vessel type in the mid-12th century at Stamford, which ties in well with the dendrochronological dates at Leicester Castle.

The Martincamp flask, which is possibly from a production area centred on Beauvais in northern France, is generally thought to be a common early post medieval import, although it remains a relatively uncommon find in Leicester and the county. In the past many of the find spots have been linked to castles, but this may bias may reflect the nature and selectivity of archaeological excavations (Ickowicz 1993). There is evidence also, that ‘Martincamp type’ flasks were made at Ticknall during the 17th century (McCormick pers. comm., Spavold and Brown 2005, 77).



Figure 46: A jar or pitcher rim in ?Andenne ware

What has been tentatively been identified as part of a jar or pitcher in Andenne ware (Jennings 1981, fig.9.214) (Figure 46), from the Meuse valley is perhaps more indicative of a high status site. This is an unusual find locally; part of a jar in Andenne ware was recorded at the church of St. Peter in Wymondham, Leicestershire (Field 2000, 255), and another body sherd in the same ware was identified by the author at Freeschool Lane (Sawday 2009). However, as was noted at Freeschool Lane (P. Courtney, pers. comm.), it is possible that both the Leicester finds may in fact originate from another source also producing high quality fine wares in northern France, such as Beauvais.

Table 6: The post Roman pottery, tile and clay tobacco pipe by context. (vtu – vessel type unknown, spo – spouted pitcher).

context	fabric	n o.	gr	EVE	vessel	part	Comments
POT							
1 layer	MA3	1	7		flask	body	16 <sup>th</sup> – 17 <sup>th</sup> C.
1	PM	1	11		vtu	body	12-13 <sup>th</sup> C. +
1	OS	1	5		vtu	base	12-13 <sup>th</sup> C.
19[20] pit	EA3	1	5		cup	body	1680+
23[24] pit	XY	1	6	0.125	jar	rim	12 <sup>th</sup> – 13 <sup>th</sup> C.? jar or pitcher rim, pale pinkish fabric, yellowish/orange glaze on interior and exterior. Squared rim, diameter c.90mm
34 layer	PM	1	9		jug	neck	12- 13 <sup>th</sup> C.+
34	CC1	1	29		jug	neck	c.1250+
35 layer	PM	1	17	0.06	jar	rim	Everted, hammer headed, 12 <sup>th</sup> – 14 <sup>th</sup> C., (Davies and Sawday 1999, fig.90.73), diam. 210mm
35	PM	1	8	0.067	bowl	rim	Externally thickened – 12 <sup>th</sup> 14 <sup>th</sup> C. (Sawday

							1989, fig.9.8), diam. C.160mm	
38 layer	PM	1	39	0.10	jar	rim	Hammer headed, rim, shouldered body – roughly made 12 <sup>th</sup> C.? fire pot, internally sooted ( <i>ibid</i> 1999, fig.88.42), diam 150mm,	
54[39] p hole	MP4	1	10		jug	neck	Glazed, 15 <sup>th</sup> - mid 16 <sup>th</sup> C.	
70 layer	OS	1	4		vtu	base	c.1100-1250	
70	PM	3	45		vtu	body	one externally sooted, 12 <sup>th</sup> – 14 <sup>th</sup> C.	
70	PM	1	17		vtu	Base	sooted external, sooting pattern suggests use of trivet, 12 <sup>th</sup> – 14 <sup>th</sup> C.	
74 layer	SP3	1	9		vtu	body	Glazed, probably a jug, c.1100-1250.	
74	ST2	2	24	0.075	Jar/spo	Rim/base	Glazed – 12 <sup>th</sup> C. diam c.140mm, (Kilmurry 1980.fig.51.60) ?jar/spouted pitcher	
74	ST2	1	17		vtu	handle	Glazed strap handle, spouted pitcher or jug, 12 <sup>th</sup> C. (Kilmurry 1980, fig.69.36)	
78 floor	PM	4	47		vtu	Body/base	Sooted externally- 12 <sup>th</sup> -13 <sup>th</sup> C.	
78	OS	1	4		vtu	base	Sooted externally, c.1100-1250.	
83 trampoline	PM	1	71	0.175	jar	rim	upright, hammer headed shouldered jar, sooted, 13 <sup>th</sup> -14 <sup>th</sup> C. diam. 200mm ( <i>ibid</i> 1999, fig.83.7.3)	
83	PM	3	31		vtu	base	Sooted 12 <sup>th</sup> -14 <sup>th</sup> C.	
U/S	PM	5	134		vtu	Body/base	Three sooted, 13 <sup>th</sup> -14 <sup>th</sup> C.	
U/S	ST2	1	10		jug	neck	Fine fabric, thin lead glaze, later 11 <sup>th</sup> – 12 <sup>th</sup> C.	
U/S	CW1	1	17		vtu	Body/handle	Hollow ware, cup/jug, c.1450-1550	
U/S	CW2	1	7		cup	body	Oxidised pale brown glaze, c. 1450+	
U/S	EA2	1	139		vtu	body	Hollow ware, post med	
<b>RIDGE TILE</b>								
16	MS3	2	239		tile	body	Green glazed, join. Evidence of limestone mortar underneath., c.1400-c.1550	

25 [26]	CC1	1	114		tile	body	Hard fired, with spots of over-fired brown glaze, inscribed wavy line decoration., c.1250-1300/50+
70	SP3	2	179		tile	body	Thick walled fragments, (max. c. 26mm) with single thumbing on upper surface, probably associated with crest.
FLOOR TILE							
50	MS	1	403		tile	Body	Abraded , c.116mm x25 mm thick (4 1/2 x1”), 14 <sup>th</sup> C.
CLAY TOBACCO PIPE							
U/S	China clay	2					Complete spurred bowls, later 18 <sup>th</sup> C. (Higgins 1985, fig.3.35)
U/S		1					Bowl as above with broken spur
U/S		7					Stem fragments, one with spur.



## **9. Osteological Analysis** *Sophie Newman and Malin Holst*

### **9.1 Summary**

York Osteoarchaeology Ltd was commissioned by University of Leicester Archaeological Services (ULAS) to carry out the osteological analysis of two skeletons and a small quantity of disarticulated human bone from an ongoing watching brief at Castle Yard, Leicester (NGR: SK 58261 04175).

The excavation across Castle Yard revealed three truncated inhumations near to the St Mary de Castro Church and two of the skeletons were lifted for further analysis. A small quantity of disarticulated human bone was also recovered.

Osteological analysis revealed a minimum number of individuals of six individuals (three adults and three non-adults) recovered from articulated and disarticulated human bone contexts. The two articulated skeletons had good to moderate surface preservation and only slight fragmentation. Unfortunately, completeness was comparatively poor due to truncation from earlier site development.

Skeleton 1 was an older middle adult male, approximately 171.7cm (5'8") in height. He demonstrated a multitude of additional bony nodules in the ankles/feet and in the hands. However, it is unlikely that these had any impact on life. Degenerative joint changes were identified in the sternoclavicular joints, elbows, right knee and spine, likely associated with advancing age. A well-healed rib fracture of an upper left rib and a healed fracture of the right fifth metacarpal (at the base of the little finger) are suggestive of inter-personal violence, but may also be related to accidental injury. Dental enamel defects were indicative of stress experienced during early childhood and poor oral hygiene had led to the formation of dental plaque concretions, periodontal disease and caries.

Due to only a small proportion of the skeleton being recovered for Skeleton 3, little osteological information could be determined. However, it is likely that they were aged between six to eight years old (older juvenile).

These individuals probably date to the medieval period, but AMS dating and further study is recommended to attempt to determine whether these individuals belonged to the burial ground of the St Mary de Castro church, deposition of execution victims, or from earlier site usage.

## 9.2 Introduction

In September 2016, York Osteoarchaeology Ltd was commissioned by University of Leicester Archaeological Services (ULAS) to carry out the osteological analysis of two skeletons and a small quantity of disarticulated human bone. The skeletons were excavated in July 2016 during an ongoing watching brief at Castle Yard, Leicester (NGR: SK 58261 04175), ahead of the conversion of Leicester Castle Hall into a new University Law Centre.

The excavation of an exterior service trench across Castle Yard revealed three truncated inhumations near to the St Mary de Castro Church (Nicholas Cooper *pers comm.* 2016). Two of the skeletons were lifted for further analysis (Table 7), while the third (Skeleton 2) was left in situ. A small quantity of disarticulated human bone was also recovered from the burial soil surrounding the inhumations (context 01) and additional human bone identified during analysis (see Table 2).

Table 7: List of articulated skeletons

Sk No	Burial type	Position	Orientation	Additional finds with Sk	Notes
1	Unknown	Supine, legs missing but likely extended	W-E	Pottery recovered from burial soil; two animal bone fragments found with skeleton; one fragment of human bone found with skeleton	Found beneath services. Pelvis and lower limbs truncated, but feet present
3	Unknown	Supine?	W-E?	Pottery; four animal bone fragments found with skeleton; four human bone fragments found with skeleton	Burial position difficult to discern due to disturbance

Castle Yard encompasses the area of land between the Castle Hall and St Mary de Castro Church. Leicester Castle was built in 1069 and the Castle Hall itself dates from the 12<sup>th</sup> century, when some of the earlier timber buildings were replaced with stone (Nicholas Cooper *pers comm.* 2016). St Mary de Castro Church dates from 1107 and it is possible that these inhumations represent burials within its grounds. As these burials lay beyond the limits of the modern graveyard, it must also be considered that a church existed on this site prior to the establishment of the castle or that this area was used for the burial of execution victims (Richard Buckley, *pers comm.* 2016). Nevertheless, it is likely that these burials date to the medieval period.

Table 8: List of disarticulated contexts containing human bone

Context No.	Location on site	No. fragments	Notes
01	Probable burial soil surrounding Skeleton 1	1	Debris containing human bone, majority disarticulated but several fragments matched to Skeleton 1 and possibly Skeleton 3
With SK1	Found with Skeleton 1	4	Additional human bone found with Skeleton 1 from a foetal/neonatal individual. Two animal bone fragments also recovered
With SK3	Found with Skeleton 3	34	Additional human bone found with Skeleton 3 from at least one adult individual. Four animal bone fragments also recovered

### 9.2.1 Aims and Objectives

The aim of the skeletal analysis was to determine the age, sex and stature of the skeletons, as well as to record and diagnose any skeletal manifestations of disease and trauma.

### 9.2.2 Methodology

The skeletons were analysed in detail, assessing the preservation and completeness, calculating the minimum number of individuals present as well as determining the age, sex and stature of the individuals. All pathological lesions were recorded and described.

## 9.2 Osteological Analysis

Osteological analysis is concerned with the determination of the identity of a skeleton, by estimating its age, sex and stature. Robusticity and non-metric traits can provide further information on the appearance and familial affinities of the individual studied. This information is essential in order to determine the prevalence of disease types and age-related changes. It is crucial for identifying sex dimorphism in occupation, lifestyle and diet, as well as the role of different age groups in society. A summary of the osteological and palaeopathological data for the articulated skeletons is given in Table 9, with a detailed catalogue of skeletons provided in Appendix A.

Table 9: Summary of osteological and palaeopathological results

Sk No	Fragmentation	SP	Completeness (%)	Age	Age Group	Sex	Dental Pathology	Skeletal Pathology
1	Slight	2	60-70	36-45 years	OMA	M	Calculus; caries; DEH; periodontal disease.	Schmorl's nodes; degenerative disc disease and degenerative joint changes in spine; very mild DJC in left sternoclavicular joint, both elbows and right knee; possible <i>calcaneus secundarius</i> of the left calcaneus; <i>os trigonum</i> in both tali; avulsion fractures/ <i>os metastyloideum</i> of the styloid process of both third metacarpals; healed rib fracture; fracture of the right fifth metacarpal head; <i>osteochondritis dissecans</i> on the right glenoid fossa
3	Slight	3	20-30	6-8 years	OJ	-	-	-

**Key:** SP = Surface preservation: grades 0 (excellent), 1 (very good), 2 (good), 3 (moderate), 4 (poor), 5 (very poor), 5+ (extremely poor) after McKinley (2004a); C = Completeness; F = Fragmentation: min (minimal), sli (slight), mod (moderate), sev (severe), ext (extreme)

Non-adult age categories: f (foetus, <38 weeks *in utero*), p (perinate, c. birth), n (neonate, 0-1m), i (infant, 1-12m), j (juvenile, 1-12y), ad (adolescent 13-17y)

Adult age categories: ya (young adult, 18-25y), yma (young middle adult, 26-35y), oma (old middle adult, 36-45y), ma (mature adult, 46+y), a (adult, 18+y)

R - right; L - left; OA = Osteoarthritis; DJC = Degenerative Joint Changes; DEH - dental enamel hypoplasia

### 9.2.1 Preservation

Skeletal preservation depends upon a number of factors, including the age and sex of the individual as well as the size, shape and robusticity of the bone. Burial environment, post-depositional disturbance and treatment following excavation can also have a considerable impact on bone condition (Henderson 1987, Garland and Janaway 1989, Janaway 1996, Spriggs 1989). Preservation of human skeletal remains is assessed subjectively, depending upon the severity of bone surface erosion and post-mortem breaks, but disregarding completeness. Preservation is important, as it can have a large impact on the quantity and quality of information that it is possible to obtain from the skeletal remains.

Surface preservation, concerning the condition of the bone cortex, was assessed using the seven-category grading system defined by McKinley (2004), ranging from 0 (excellent) to 5+ (extremely poor). Excellent preservation implied no bone surface erosion and a clear surface morphology, whereas extremely poor preservation indicated heavy and penetrating erosion of the bone surface resulting in complete loss of surface morphology and modification of the bone profile. Surface preservation could

be variable throughout an individual skeleton, so the condition of the majority of bones in the skeleton was taken as the preservation grade for the whole skeleton. The degree of fragmentation was recorded, using categories ranging from ‘minimal’ (little or no fragmentation of bones) to ‘extreme’ (extensive fragmentation with bones in multiple small fragments). Finally, the completeness of the skeletons was assessed and expressed as a percentage: the higher the percentage, the more complete the skeleton.

Both articulated skeletons had undergone only slight fragmentation and surface preservation ranged from good for Skeleton 1 to moderate for Skeleton 3. There was therefore minimal loss of detail on the bones present for both individuals, which aided osteological analysis.

However, completeness varied between the two individuals. Approximately 60-70% of skeletal elements had been recovered for Skeleton 1, but due to truncation of the lower body (potentially due to disruption from later development at the site for the installation of services) the pelvis and legs were missing. However, the feet were well preserved despite truncation and the bones of the arms, torso and cranium were generally well represented. In contrast, only 20-30% of skeletal elements were recovered for Skeleton 3. Those present included a small skull fragment, bones of the arms, ribs, a small number of vertebrae, the pelvis and the femora. This burial had also potentially previously been disturbed when services were installed across Castle Yard, leading to displacement of skeletal elements.

### 9.2.2 Minimum Number of Individuals

A count of the ‘minimum number of individuals’ (MNI) recovered from a cemetery is carried out as standard procedure in osteological reports on inhumations in order to establish how many individuals are represented by the articulated and disarticulated human bones (without taking the archaeologically defined graves into account). The MNI is calculated by counting all long bone ends, as well as other larger skeletal elements recovered. The largest number of these is then taken as the MNI. The MNI is likely to be lower than the actual number of skeletons, which would have been interred on the site, but represents the minimum number of individuals, which can be scientifically proven to be present.

Three adult right distal humeri were present within the articulated and disarticulated sample. Two non-adult proximal femora were also present, which were likely to have come from juvenile individuals (1-12 years of age). In addition, one unfused right neural arch (vertebra fragment) from a foetal/neonatal individual was also identified upon analysis of Skeleton 1. The overall MNI for Castle Yard was therefore six individuals, being representative of three adults, two juveniles and one foetus/neonate.

### 9.2.3 Assessment of Age

Age was determined using standard ageing techniques, as specified in Scheuer and Black (2000a; 2000b) and Cox (2000). For non-adults age was estimated using the stage of dental development (Moorrees *et al.* 1963a; 1963b), dental eruption (Ubelaker 1989), measurements of long bones and other appropriate elements and the development and fusion of bones (Scheuer and Black 2000b). In adults, age was estimated from stages of bone development and degeneration in the pelvis (Brooks and Suchey 1990, Lovejoy *et al.* 1985) and ribs (modified version of methods developed by İşcan *et al.* 1984; 1985 and İşcan and Loth 1986 provided in Ubelaker 1989), supplemented through examination of patterns of dental wear (Brothwell 1981).

The individuals were divided into a number of age categories. Non-adults were subdivided into ‘foetuses’ (f: where the age estimate clearly fell below 38-40 *weeks in utero*), ‘perinates’ (p: where the age estimates converged around birth), ‘neonates’ (n: where the age estimate suggested 0-1 month), ‘infant’ (i; 1-12 months), juvenile (j; 1-12 years) and adolescent (ad; 13-17 years). Adults were divided into ‘young adult’ (ya; 18-25 years), young middle adult (yma; 26-35 years), old middle adult (oma; 36-



45 years) and mature adult (46+ years). A category of ‘adult’ (a) was used to designate those individuals whose age could not be determined beyond the fact that they were eighteen or older.

For each skeleton as many criteria as possible (preservation and completeness allowing) were used to estimate age. However, it is important to note that several studies (for example Molleson and Cox 1993, Molleson 1995, Miles *et al.* 2008) have highlighted the difficulty of accurately determining the age-at-death of adults from their skeletal remains, with age-at-death frequently being underestimated for older individuals. The categories defined here should be taken as a general guide to the relative physiological age of the adult, rather than being an accurate portrayal of the real chronological age.

Unfortunately due to truncation, the pelvis of Skeleton 1 was not present for analysis, but an age estimation of 36-45 years (older middle adult) could be made based on degeneration of the sternal rib ends and dental wear.

Skeleton 3 was identified as a non-adult, as fusion of the ends of the long bones had not yet occurred. Due to the absence of the dentition for this individual, age estimation was reliant on the pattern of fusion of the skeletal elements present, alongside measurement of the length of the long bones. Based on these criteria, Skeleton 3 was likely aged between six to eight years of age (older juvenile).

#### 9.2.4 Sex Determination

Sex determination was carried out using standard osteological techniques, such as those described by Mays and Cox (2000). Assessment of sex involves examination of the shape of the skull and the pelvis and can only be carried out once sexual characteristics have developed, during late puberty and early adulthood. Evidence from the pelvis was favoured as its shape is directly linked to biological sex (the requirements of childbirth in females) whereas the shape of the skull can be influenced by factors such as age (Walker 1995). Measurements of certain bones were used to supplement the morphological assessment.

Sex determination of Skeleton 1 (older middle adult) was slightly problematic as the pelvis was missing as a result of truncation. However, cranial characteristics were unanimously male in appearance and measurements that could be taken were generally more robust. Therefore it is likely that Skeleton 1 was a male individual.

No attempt was made to assess the sex of Skeleton 3 (older juvenile), as they were non-adult.

#### 9.2.5 Metric Analysis

Stature depends on two main factors, heredity and environment; it can also fluctuate between chronological periods. Stature can only be established in skeletons if at least one complete and fully fused long bone is present, but preferably using the combined femur and tibia. The bone is measured on an osteometric board and stature is then calculated using a regression formula developed upon individuals of known stature (Trotter 1970). Where possible, bones from the legs were used in preference to those of the upper limb as these carry the lowest error margin (*ibid*).

While the more reliable bones for estimation of stature were missing (the femur and tibia) for Skeleton 1, estimation could be made based on the length of the humerus (upper arm). Skeleton 1 (older middle adult male) was 171.7cm in height (5’8”) based on measurements taken from the left humerus. This corresponds with the male average mean of 171cm calculated for the medieval period by Roberts and Cox (2003, 248).

### 9.2.6 Non – Metric Analysis

Non-metric traits are additional sutures, facets, bony processes, canals and foramina, which occur in a minority of skeletons and are believed to suggest hereditary affiliation between skeletons (Saunders 1989). The origins of non-metric traits have been extensively discussed in the osteological literature and it is now thought that while most non-metric traits have genetic origins, some can be produced by factors such as mechanical stress (Kennedy 1989) or environment (Trinkhaus 1978).

A total of thirty cranial (skull) and thirty post-cranial (bones of the body and limbs) non-metric traits were selected from the osteological literature (Buikstra and Ubelaker 1994, Finnegan 1978, Berry and Berry 1967) and recorded. These were anomalies that would not have affected the individual. Only the results for the adult skeletons are presented here.

As stated previously, Skeleton 1 (older middle adult male) and particularly Skeleton 3 (older juvenile) had skeletal elements missing; therefore, many traits were not observable in each skeleton. However, a small number of cranial and post-cranial traits were identified in Skeleton 1. Cranial traits seen in Skeleton 1 included a *precondylar tubercle* (a small bony nodule on the base of the skull) and an *accessory lesser palatine foramen* on the left side of the palate (an additional small hole for the passage of nerves and small blood vessels). Only one post-cranial trait was identified, *os trigonum* on both tali (additional small bones present at the back of the ankle) and this will be discussed further in Section 3.1.2.

### 9.3 Conclusion

The human remains from Castle Yard, Leicester were generally well-preserved, with good to moderate surface preservation providing a minimal loss of detail and only slight fragmentation of the bones present. However, completeness of the two individuals differed, with 60-70% of skeletal elements present for Skeleton 1 (due to truncation of the lower half of the body) and 20-30% of bones recovered for Skeleton 3 (due to possible disturbance of the burial from later development at the site).

Osteological analysis revealed that Skeleton 1 was an older middle adult male, approximately 171.7cm (5'8") in height. His height matched the average stature for males during the medieval period. Skeleton 3 was likely an older juvenile (approximately six to eight years of age).

A total of 39 disarticulated human bone fragments were recovered. Together with the articulated remains, these represented three adults, two juveniles and one foetus or neonate.

## 10. Pathological Analysis

Pathological conditions (disease) can manifest themselves on the skeleton, especially when these are chronic conditions or the result of trauma to the bone. The bone elements to which muscles attach can also provide information on muscle trauma and excessive use of muscles. All bones were examined macroscopically for evidence of pathological changes. More detailed descriptions of the pathological lesions observed can be found in Appendix A.

### 10.1 Congenital Conditions

Heredity and environment can influence the embryological development of an individual, leading to the formation of a congenital defect or anomaly (Barnes 1994). The most severe defects are often lethal and if the baby is not miscarried or stillborn, it will usually die shortly after birth. Such severe defects are rarely seen in archaeological populations, but the less severe expressions often are and in many of these cases the individual affected will have been unaware of their condition. Moreover, the frequency with which these minor anomalies occur may provide information on the occurrence of the severe expressions of these defects in the population involved (*ibid*) and may provide information on maternal health (Sture 2001).

### 10.2 *Calcaneus Secundarius*

The calcaneus (heel bone) can have a small ossicle of bone, known as the *calcaneus secundarius*, located in a crescent-shaped notch in the anterior calcaneal facet (Hodge 1999). In most individuals these ossicles do not cause any symptoms, but they can occasionally cause pain or a restriction in movement at the joint between the talus and calcaneus (Ceroni et al. 2006, Krapf et al. 2015). Mann and Hunt (2005, 207) have suggested that between 1.4% and 6.0% of most populations probably have *calcaneus secundarius*. In archaeological remains the actual ossicle is usually not recovered, but a small crescent with a rough porous surface will be missing from the anterior surface of the anterior facet (Mann and Hunt 2005, 206-207). *Calcaneus secundarius* can be difficult to differentiate from avulsion fractures to the anterior calcaneus (Hodge 1999).

Skeleton 1 (older middle adult male) had possible *calcaneus secundarius* in his left calcaneus. A faint crescent-shaped indentation was observed running horizontally across the superior apex of the articulation between the calcaneus and the cuboid (Figure 47). The surface appeared irregular and there were some small osteophytic nodules along the superior border. It is possible that the *calcaneus secundarius* ossicle had fused to the calcaneus. However, it must also be considered that this was a well-healed fracture of the superior process of the calcaneus. These fractures are commonly result from the rolling of the foot inwards while the foot is in plantar-flexion (stretched out as if on tip-toes) (Hodge 1999, Mellado et al. 2003). Therefore they are frequently associated in modern day clinical literature with the wearing of high heeled-shoes (Hodge 1999).



Figure 47: Possible *calcaneus secundarius* of the left calcaneus in Skeleton 1

### 10.3 *Os Trigonum*

Similarly the talus (ankle bone that sits above the heel bone) can also have a small accessory ossicle that sits in a crescent-shaped notch on the posterior process of the inferior talar facet (at the back of the heel) (Mellado et al. 2003). It is a variation in skeletal development, often recorded as a non-metric trait (see above) and is one of the most commonly occurring accessory ossicles in the ankle and foot (Mellado et al. 2003). Like that seen with *calcaneus secundarius* its presence rarely leads to any pain or discomfort (Mellado et al. 2003).

Skeleton 1 (older middle adult male) had *os trigonum* accessory ossicles on both tali. On the right side the ossicle had remained loose from the talus, leaving a porous crescent-shaped indent in the facet

(Figure 48). The loose ossicle had not been recovered during excavation. On the left side the ossicle had fused to the facet of the talus, evident as a projection of the joint surface posteriorly, a subtle indentation on the inferior surface and a smooth callus-like bump on its superior surface (Figure 48).



Figure 48: *Os trigonum* in both tali of Skeleton 1 (inferior view)



### 10.4 *Os Metastyloideum*

Accessory ossicles, such as those described above, often occur when separate ossification centres fail to unite with the associated growing skeletal element during development. The third metacarpal (located in the centre of the palm) is characterised by its styloid process (a projection of bone towards the wrist), but sometimes this process develops separately from the remainder of the metacarpal and does not unite (Barnes 2012, 150). Instead it may join one of the adjacent carpal (wrist) bones, or remain as a separate entity within the wrist (Barnes 2012, 150).

The right and left third metacarpals of Skeleton 1 (older middle adult male) had flattened, porous, areas of bone on the proximal joint surface of the bone where the styloid processes would usually be located (Figure 49). The bilateral nature of this absence (alongside the clear tendency of this individual towards the development of accessory ossicles) is more suggestive of it being the developmental variant *os metastyloideum* than a fracture.



Figure 49: Possible *os metastyloideum* of both third metacarpals in Skeleton 1 (view of proximal ends)

### 10.5 Trauma

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The evidence for trauma in archaeological populations is restricted to that visible in the skeletal remains, unless soft tissue is preserved (Roberts and Manchester 2005, 85-86). Therefore, most of the soft-tissue injuries sustained by archaeological populations will be invisible, although occasionally soft tissue injuries can be inferred through ossification of the tissues at the site of damage, known as *myositis ossificans* (*ibid*). Much of the evidence for trauma in archaeological populations focuses on fractures to the bones (*ibid*, 84-85), although long standing well-healed fractures may be hard to detect (Jurmain 1999, 186).

#### 10.5.1 Fractures

Skeleton 1 (older middle adult male) had a single rib fracture of an upper (likely third or fourth) left rib. The fracture was well-healed, being only evident as a subtle indentation on the outer surface and small spicules of bone on the superior and inferior borders of the inner surface. The fracture was located approximately just after the curve of the rib shaft, towards the sternal end. The outer surface also had a region of pale, porous, well-remodelled lamellar bone over the location of the fracture. Ribs often fracture as a result of falls or blows to the torso and fractured ribs are common in archaeological populations (Roberts and Manchester 2005). Coughing can also cause rib fractures, particularly in elderly individuals (Roberts and Manchester 2005, 105; Dandy and Edwards 2003, 161). Isolated rib fractures usually heal well without active treatment, but multiple rib fractures occurring simultaneously can be more difficult to treat (*ibid*). Tomczak and Buikstra (1999, 255) found that an impact from behind tends to fracture ribs near the spine and force to the side of the chest fractures the ribs either near the spine, or at the front of the chest, near the sternum. Compression injuries to the chest, on the other hand cause rib fractures at the curved parts of the ribs, at the side of the body (*ibid*). Rib fractures were also one of the most frequently occurring ante-mortem fractures seen at the medieval site of St Morrell's Chapel, Hallaton (Holst and Keefe 2016, 23) and one of the most common fractures in the late-medieval period in general, affecting 3.57% of individuals (Roberts and Cox 2003, 239).

He also demonstrated a significant fracture of the right fifth metacarpal. The joint surface of the head (articulating with the third finger) of the fifth metacarpal had been completely destroyed so that the usual convex shape was more cup-like in appearance with a prominent projection of bone on the dorsal surface (back of the hand) (Figure 50). The joint surface was irregular and cysts had formed at the centre. There was no sign of any new bone formation, suggesting it was healed and the shaft of the fifth metacarpal had not been affected. Fractures of the metacarpal heads can either be vertical, horizontal, or oblique (Galloway 1999, 153). Based on the prominent dorsal projection seen in the metacarpal of Skeleton 1, this may have formed in response to a transverse or crush fracture to the metacarpal head, pushing the head backwards. Unfortunately, the associated proximal phalanx was not present and the left fifth metacarpal was also missing.



Figure 50: Fracture of the head of the right fifth metacarpal of Skeleton 1 (left – lateral view, right – distal view of head)

Metacarpal fractures are very common, particularly the first (thumb) and fifth (little finger), as hands are exposed to a multitude of risk factors during manipulation of objects and when protecting ourselves against falls or impacts (Galloway 1999, 152). They are most common in young adult men (Galloway 1999, 152). Fractures located at the head of the metacarpals usually occur in response to direct impacts or crushing injuries and are common in the fifth metacarpal (Dandy and Edwards 1998, 224; Galloway 1999, 154). Sometimes referred to as a “Boxer’s fracture”, transverse fractures of the neck of the fifth metacarpal can result from punching an object (or person) with a clenched fist (Dandy and Edwards 1998, 224; Galloway 1999, 155). However, it has been noted that car accidents, high impact sports and any general direct trauma to this area of the hand during day-to-day activity can also lead to such a fracture (Galloway 1999, 156). A healed oblique spiral fracture of the left fifth metacarpal of an older middle adult male was also seen in the medieval site of St Morrell’s Chapel, Hallaton (REF, 22). This injury was interpreted to be a potential indicator of inter-personal violence (Holst and Keefe 2016, 22).

#### 10.5.2 *Osteochondritis Dissecans*

Trauma can damage the blood supply to part of a joint surface leading to localised death of the tissue and this small piece can then become detached from the rest of the joint surface (Roberts and Manchester 2005). In skeletal remains the lesion manifests as a roughly circular, porous hollow in the joint surface.

Skeleton 1 (older middle adult male) had a circular, porous, lesion indicative of this condition on the right glenoid fossa (shoulder joint) of the scapula.

## 11. Joint Disease

The term joint disease encompasses a large number of conditions with different causes, which all affect the articular joints of the skeleton. Factors influencing joint disease include physical activity, occupation, workload and advancing age, which manifest as degenerative joint changes and osteoarthritis. Alternatively, joint changes may have inflammatory causes in the *spondyloarthropathies*, such as septic or rheumatoid arthritis. Different joint diseases affect the articular joints in a different way and it is the type of lesion, together with the distribution of skeletal manifestations, which determines the diagnosis (Rogers 2000; Roberts and Manchester 2005).

### 11.1 Degenerative Joint Changes

The most common type of joint disease observed tends to be degenerative joint changes (DJC). Degenerative joint changes are characterised by both bone formation (osteophytes) and bone resorption (porosity) at and around the articular surfaces of the joints, which can cause great discomfort and disability (Rogers 2001).

Mild degenerative joint changes were seen in the sternoclavicular joints (between the collar bones and sternum) of Skeleton 1 (older-middle adult male) with the medial end of the left and right clavicles demonstrating porosity and slight marginal osteophytes on the left side. The sternoclavicular joints and acromioclavicular joints (between the collar bones and scapulae) are commonly affected by joint disease in the elderly today (Roberts and Manchester 2005, 138). The left and right proximal ulnae (elbow joints) and right distal femur (knee joint) demonstrated very mild joint changes in the form of slight porosity and marginal osteophytes, suggesting that these conditions would have progressed if the individual had lived longer. However, more advanced joint changes were seen in the vertebral column of Skeleton 1 (older middle adult male), affecting the vertebral bodies and the vertebral apophyseal facets.

The intervertebral discs are the ‘shock absorbers’ of the spine, but these can degenerate as a result of gradual desiccation (age-related drying), which then causes transmission of the stress from the vertebral discs to the articular facets and ligaments (Hirsh 1983, 123). Spinal osteophytes form to compensate for the constant stress that is placed on the spine as a result of human posture (Roberts and Manchester 2005, 106). Increasing stress or activity can therefore lead to increased size and prevalence of osteophytes (*ibid*).



Figure 51: Degenerative disc disease seen on the seventh cervical vertebra of Skeleton 1 (superior

view). Degenerative disc disease was identified in the cervical and thoracic regions of the vertebral column, primarily affecting the lower cervical (fifth to seventh) and majority of the thoracic (fourth to twelfth) regions. These changes were most severe in the cervical region, leading to a significant degeneration of the vertebral body surfaces (Figure 51). The thoracic region of the spine was the most frequently affected area in St Morrell’s Chapel, followed by the lumbar region, then the cervical region (Holst and Keefe 2016, 18). However, at the medieval site of St John’s Almshouses, Lichfield, the

cervical region was the most frequently affected by degenerative disc disease (Loeffelmann and Holst 2016, 35).

In addition, degenerative joint changes of the apophyseal facets had occurred in the mid-thoracic region (affecting the fourth to seventh thoracic vertebrae). Approximately 21% of individuals suffered from spinal joint disease in the late medieval period according to Roberts and Cox (2003, 281), therefore it was relatively common.

### *11.2 Schmorl's Nodes*

Schmorl's nodes are another condition that can affect the spine. They manifest as indentations in the upper and lower surfaces of the vertebral bodies caused by the pressure of herniated vertebral discs (Aufderheide and Rodríguez-Martín 1998). Discs may rupture due to trauma, but vertebrae weakened by infection, osteoporosis or neoplastic disease may be more vulnerable (Roberts and Manchester 2005). Schmorl's nodes are often associated with degenerative changes to the vertebral bodies (Aufderheide and Rodríguez-Martín 1998, Hilton *et al.* 1976) and are most commonly seen in the lower thoracic vertebrae (Hilton *et al.* 1976).

Overall, Schmorl's nodes were identified in the lower thoracic region (sixth to tenth thoracic vertebrae) and on the third lumbar vertebra of Skeleton 1 (older middle adult male). Holst and Keefe (2016, 19) also found that the most frequently affected region was the thoracic spine at St Morrell's Chapel, Hallaton, as did Loeffelmann and Holst (2016, 37) at St John's, Lichfield. Unfortunately, Roberts and Cox (2003) did not record the prevalence of Schmorl's nodes for the medieval period.

## **12. Infectious Disease**

Infectious disease can involve the skeleton, but since bone cannot respond quickly only evidence for chronic, longstanding infections can be observed in archaeological skeletal remains (Roberts and Manchester 2005, 167). Acute conditions, where the patient either recovers or dies within a short space of time will not be seen. Initial bone formation in response to infection is disorganised (woven bone), but with time, as healing takes place, woven bone is remodelled and transformed into lamellar bone. Consequently, woven bone presence indicates an infection that was active at the time the person died, whilst lamellar bone indicates an infection that had healed; a combination of both suggests a recurring or longstanding infection (*ibid*). Although specific diseases may cause new bone to be deposited on the skeleton, it is almost always impossible to diagnose these from the bones alone. Hence, evidence for infection is discussed as 'non-specific' infection.

### *12.1 Periosteal Reactions*

New bone deposits on the surfaces of the bones can indicate inflammation of a sheath of tissue (the periosteum), which surrounds all bones (Ortner 2003, 206-207). Inflammation may be due to infection, but low-grade trauma and chronic ulceration can also lead to new bone formation (Roberts and Manchester 2005; Ortner 2003, 206-207). Periosteal reactions are commonly observed in archaeological populations, particularly on the tibiae and their prevalence has been used as a general measure of stress in past populations (Ortner 2003, 209). Woven bone deposits are indicative of inflammation that was active at the time of death, while lamellar bone indicates that the inflammation was healing.

No evidence of periosteal reaction was identified in Skeleton 1 (older middle adult male) or Skeleton 3 (older juvenile). However, two fragments of disarticulated bone from Context **01** had distinctive lamellar bone striations, suggestive of an inflammation that was receding at the time of death. The affected bones were the mid-shaft of an adult left femur and the medial surface of a tibial shaft from a possible adolescent/adult.



Roberts and Cox (2003, 235) observed that 14.1% of individuals were affected by periosteal reactions in the late medieval period and inflammation of the lower legs is a particularly common finding in archaeological populations (Roberts and Manchester 2005).

## **12.2. Conclusion**

Developmental anomalies were noted in Skeleton 1 (older middle adult male) in the form of accessory ossicles that commonly form in the feet and ankles. However, it is also possible that the possible example of *calcaneus secundarius* was instead a small compression fracture. Non-union of the styloid processes of the third metacarpals (central bone in the palm) was also seen in this individual. Such conditions were unlikely to have had any impact on health and well-being.

Skeleton 1 (older middle adult male) also had a well-healed rib fracture and a fractured right fifth metacarpal (at the base of the little finger). While the latter is often associated with the act of punching with a clenched fist, it may also have occurred as a result of any direct trauma to the side of the hand.

Joint disease was seen in the spine of Skeleton 1 (older middle adult male) in the form of degenerative joint changes and Schmorl's nodes (lesions resulting from axial stress). The sternoclavicular joints (collar bones), elbows and right knee were also very mildly affected by degenerative disease. However, none of these joint changes had progressed to osteoarthritis.

Due to the poor completeness of Skeleton 3 osteological analysis revealed no evidence of pathology and it is possible that due to the young age of this individual they died before any pathological condition could manifest on the skeleton.

## **13. Dental Health**

Analysis of the teeth from archaeological populations provides vital clues about health, diet and oral hygiene, as well as information about environmental and congenital conditions (Roberts and Manchester 2005).

Skeleton 1 had twenty tooth positions and seventeen teeth preserved for analysis. All teeth were still situated within the left maxilla and whole mandible. One tooth had been lost post-mortem from the left maxilla. A normal adult dentition will contain 32 tooth positions and 32 teeth, so the number of teeth preserved was just over half of that expected for this individual. Therefore, dental health for this individual could be assessed in relatively great detail.

However, the dentition, maxillae and mandible of Skeleton 3 (older juvenile) was missing, therefore dental health could not be assessed for this individual.

### **13.1 Calculus**

If plaque is not removed from the teeth effectively (or on a regular basis) then it can mineralise and form concretions of calculus on the tooth crowns or roots (if these are exposed), along the line of the gums (Hillson 1996, 255-257). Mineralisation of plaque can also be common when the diet is high in protein (Roberts and Manchester 2005, 71). Calculus is commonly observed in archaeological populations of

all periods, although poor preservation or damage caused during cleaning can result in the loss of these deposits from the teeth (*ibid*, 64).

Slight calculus deposits were observed on three teeth from Skeleton 1 (older middle adult male), providing an overall prevalence of 17.6% for this individual. Calculus affected 59.2% of individuals and 54.0% of teeth in late medieval Britain (Roberts and Cox 2003, 262), 81.4% of teeth were affected in St Morrell's Chapel, Hallaton (Holst and Keefe 2016, 30) and 36.34% of teeth at St John's, Lichfield (Loeffelmann and Holst 2016, 43). Therefore, the calculus prevalence seen in Skeleton 1 is comparatively low. However, there are issues regarding the comparison of a prevalence rate of one individual to that of an averages based on larger populations and some calculus deposits may have been lost through post-mortem damage.

### 13.2 Periodontal Disease

Calculus deposits in-between and around the necks of the teeth can aggravate the gums leading to inflammation of the soft tissues (gingivitis). In turn, gingivitis can progress to involve the bone itself, leading to resorption of the bone supporting the tooth and the loss of the periodontal ligament that helps to anchor the tooth into the socket (Roberts and Manchester 2005, 73). It can be difficult to differentiate between periodontal disease and continuous eruption (whereby the teeth maintain occlusion despite heavy wear) in skeletal material, since both result in exposure of the tooth roots (*ibid*, 74).

Periodontal disease was present on the mandible and left maxilla of Skeleton 1, but could not be observed on the right side. Periodontal disease prevalence for the late medieval period was 37.53% (Roberts and Cox 2003, 261), therefore was not uncommon during this time.

### 13.3 Dental Caries

Dental caries (tooth decay) forms when bacteria in the plaque metabolise sugars in the diet and produce acid, which then causes the loss of minerals from the teeth and eventually leads to the formation of a cavity (Zero 1999). Simple sugars can be found naturally in fruits, vegetables, dried fruits and honey, as well as processed, refined sugar; since the latter three contain the most sucrose they are most cariogenic. Complex sugars are usually less cariogenic and are found in carbohydrates, such as cereals. However, processing carbohydrates, including grinding grains into fine powders or cooking them, will usually increase their cariogenicity (Moynihan 2003).

A large carious lesion had led to significant destruction of the left upper first molar, so that only the lingual root remained. The left upper second molar was missing post-mortem, but there was also only one socket (also lingual) remaining for this tooth, so it is likely that it had also been affected by caries.

The prevalence of dental caries in late medieval Britain was 5.6% (teeth affected) and the condition affected 52.6% of individuals (Roberts and Cox 2003, 259).

### 13.4 Dental Enamel Hypoplasia

Dental enamel hypoplasia (DEH) is the presence of lines, grooves or pits on the surface of the tooth crown and occurs as a result of defective formation of tooth enamel during growth (Hillson 1996). Essentially, they represent a period when the crown formation is halted and they are caused by periods of severe stress, such as episodes of malnutrition or disease, during the first seven years of childhood. Involvement of the deciduous (milk) teeth can indicate pre-natal stress (Lewis 2007). Trauma can also

cause DEH formation, usually in single teeth, therefore only individuals with three or more teeth with DEH defects were included in the analysis below.

Eight teeth (47.1% of 17) had hypoplastic defects associated with stress during childhood. All of these teeth were located in the anterior mandible (incisors, canines and first premolars) and were affected by linear defects. The crowns of the incisors, canines and premolars form continuously between the ages of roughly six months to six years of age, suggesting that hypoplastic defects in these teeth are indicative of stress in early childhood.

Just under a third (29.5%) of the adult teeth had been affected by DEH at St Morrell's Chapel, Hallaton (Holst and Keefe 2016, 32) and 35.4% of individuals had evidence of enamel hypoplasia in the late medieval period in general (Roberts and Cox 2003, 264).

### *13.6 Dental Anomalies*

Teeth can be absent from the erupted dentition due to a genuine failure of the tooth to develop (congenital absence), or because the tooth develops but fails to erupt (impaction). Full impaction means the tooth remains completely within the jaw, but teeth that erupt at an angle can be considered partially impacted. In well preserved archaeological skeletal remains it is usually impossible to tell without a radiograph whether a tooth has not erupted because it is impacted or because it is congenitally absent. Occasionally, it is possible to observe that a tooth is impacted if post-mortem damage exposes the impacted tooth. Since systematic radiographs were not taken of the jaws from Hazel Grove, teeth that were absent from the erupted dentition were recorded as 'not present/ unerupted' unless there was definite evidence for impaction.

Two teeth within the mandible of Skeleton 1 were not present/unerupted. Both of these teeth were the left and right third molars. This is consistent with these teeth being the most likely to be impacted or congenitally absent, with the lower third molars tending to be more prone to impaction than the upper teeth (Hillson 1996, 113-114). The left upper third molar appears to have erupted without issue.

### *13.7 Conclusions*

There was evidence for poor dental health in Skeleton 1 that may be related to insufficient oral hygiene practices. Slight dental plaque concretions were seen on a small number of teeth, along with at least one large cavity. Moderate periodontal disease was also identified, along with evidence for early childhood stress in the form of dental enamel defects.

## *14. Funerary Archaeology*

Due to previous disturbance of the burials (likely at the time is installation of the overlying services), interpretation of the funerary archaeology of the two inhumations is slightly problematic. However, Skeleton 1 (older middle adult male) was interred in a west to east orientation and in a supine and likely extended position. Skeleton 2 (left *in situ*) also appears to have been in a west to east orientation and buried supine. There was more disturbance of the burial of Skeleton 3 (older juvenile), leading to displacement of many of the bones, but the orientation was also likely west to east.

Extended, supine burial in a west-east orientation was the predominant burial position and orientation in the early and late medieval period across much of Britain and has become associated with a 'normal' Christian burial (Daniell and Thompson 1999, 67-68, 85; Daniell 1997, 148-149).

It is currently uncertain whether these burials are associated with the adjacent St Mary de Castro Church, or whether they relate to an earlier Saxon church said to have pre-existed on the site (Hoskins and McKinley 1954, 45-46). St Mary de Castro Church was founded in 1107 as the chapel of Leicester Castle (Butt 2016). An additional factor to consider is that during refurbishment of one of the buildings surrounding Castle Yard (Castle House, Judge's Lodgings) in 1750, evidence of human burials led to speculation that either the area used to be part of the burial ground of St Mary de Castro, or may have been the location of execution burials (Butt 2016). While the burial position and orientation seen in the inhumations at Castle Yard follows the conventional pattern for the period, only further excavation at the site would potentially reveal whether this cluster of burials is part of a wider cemetery site connected with the St Mary de Castro Church.

### ***15. Discussion and Summary – Osteological Analysis***

Osteological analysis revealed a minimum number of individuals of six individuals (three adults and three non-adults) recovered from articulated and disarticulated human bone contexts from an ongoing watching brief at Castle Yard, Leicester. Two articulated skeletons had been lifted during excavation and one (Skeleton 2) left in situ.

The two articulated skeletons were well preserved, having good to moderate surface preservation and only slight fragmentation. Unfortunately, due to previous truncation/disturbance of the burials during earlier site development, completeness was comparatively poor. The lower half of the body of Skeleton 1 was missing due to truncation (but the feet were preserved) and Skeleton 3 had less than half of its skeletal elements present for analysis. Nevertheless, osteological analysis still yielded useful information regarding the two individuals.

Skeleton 1 was an older middle adult male, approximately 171.7cm (5'8") in height, the average male stature for the period. He had a multitude of developmental anomalies related to the formation of extra bony nodules in the ankles/feet and in the hands. However, it is unlikely that these had any impact on his life. Very mild degenerative joint changes seen in the sternoclavicular joints (joints between the collar and breast bones), elbows and right knee are related to advancing age and more progressed joint disease was seen in the vertebral bodies and apophyseal facets of the cervical (neck region) and thoracic (torso region) spine. He had a well-healed rib fracture of an upper left rib and a healed fracture of the head of the right fifth metacarpal (at the base of the little finger), which may be related to inter-personal violence. However, accidental injury cannot be ruled out.

Indicators of poor oral hygiene were present on his dentition, in the form of dental plaque concretions, at least one cavity and moderate periodontal disease. Dental enamel defects seen on a multitude of teeth was suggestive of this individual having suffered some form of stress (whether dietary or through illness) during early childhood.

Less information could be gleaned from Skeleton 3, due to a large number of missing skeletal elements, including a lack of dentition. Based on lengths of the long bones present and stages of fusion attained, it is likely that this individual was between six to eight years of age (older juvenile). However, without dentition to support this estimate, a wider age margin must also be considered. No evidence of pathology was discerned on the bones present, suggesting that they may have suffered from an acute affliction that



led to a quick death. However, due to the large number of skeletal elements missing, this should be approached with caution.

Evidence for inflammatory lesions was seen amongst the disarticulated human bone from Castle Yard. Two lower limb bones showed signs of healing periosteal reaction and inflammation of the lower legs is common amongst archaeological populations.

Uncertainty regarding the association of the burials still exists. These individuals may belong to the cemetery population of the adjoining church of St Mary de Castro, or may relate to earlier usage of the site. Alternatively, they may be execution victims from Leicester Castle. Further study is required to determine their origin and AMS dating of the human remains may help rule out, or confirm, any association with an alleged Saxon church at Castle Yard.

## APPENDIX A: OSTEOLOGICAL AND PALAEOPATHOLOGICAL CATALOGUE

<b>Skeleton Number</b>	<b>1</b>
Preservation	2 (good)
Fragmentation	Slight
Completeness	60-70% Cranium, mandible; thyroid cartilage; sternum; clavicles; scapulae; 4 cervical vertebrae, 11 thoracic vertebrae, 3 lumbar vertebrae; 12 left ribs, 12 right ribs; humerii; right radius; ulnae; right hand (1 carpal, 5 metacarpals, 1 proximal phalanx, 1 intermediate phalanx); left hand (1 metacarpal); right femur; left tibia; fibulae; right foot (5 tarsals, 5 metatarsals; 1 proximal phalanx); left foot (4 tarsals, 4 metatarsals; 2 proximal phalanges); unisided foot (1 distal phalanx).
Age	36-45 years (OMA)
Sex	Male
Stature	171.66cm $\pm$ 4.05 (5'8") (L. Humerus)
Non-Metric Traits	<i>Precondylar tubercle</i> , <i>accessory lesser palatine foramen</i> (left), <i>os trigonum</i> (bilateral).
Pathology	Degenerative disc disease (C5-6, T3-10, L1). Spinal degenerative joint changes (T4-7). Schmorl's nodes (T6-10, L3). Very mild degenerative joint changes on the left medial clavicle, proximal ulnae and right distal femur. Possible <i>os calcaneus secundarius</i> – well healed crack running horizontally across the superior apex of the articulation with the cuboid on the left calcaneus. The surface appeared irregular, with small nodular osteophytes on the superior border. No other joint changes identified and not present on the right side. <i>Os trigonum</i> – on the right talus there was a semi-circular indent on the posterior border of the inferior facet. The surface of the indent is roughened and porotic. No loose bone fragment was identified. On the left talus the additional bone fragment had fused onto the posterior surface of the inferior facet, visible as a small linear indentation running straight across the apex on the inferior surface. The superior surface of the fused fragment was rounded, with a callous-like appearance. The bone was very smooth and remodelled. Avulsion fractures/ <i>os metastyloideum</i> of the styloid processes of the left and right third metacarpals, leaving areas of porotic bone where the processes would have been. Well-healed rib fracture of an upper (likely third or fourth) left rib, towards the sternal end. A slight indentation on the outer surface was evident, which was also covered in porotic well-remodelled bone. The visceral surface had no bone formation, with the exception of small bone spurs on the superior and inferior borders of the rib at the site of the fracture. A fracture of the distal end of the right fifth metacarpal had occurred at the head, leading to complete destruction of the joint surface morphology. Instead of the usual convex surface, the head of the fifth metacarpal was more cup shaped, with a large projection of bone on the dorsal surface. The joint surface was irregular, with moderately sized cysts at

	<p>the centre of the lateral half. There was no sign of any active new bone formation. The corresponding proximal phalanx was not present and the left fifth metacarpal was also missing. The shaft of the fifth metacarpal was not affected, with the fracture being localised to the head.</p> <p>Both clavicles had deep, porotic rhomboid fossae and the muscle attachments in general were very rugged.</p> <p><i>Osteochondritis dissecans</i> – small ovoid lesion (3.6mm x 4.4mm) on the centre of the right glenoid fossa.</p> <p>Xiphoid process expanded in size transversely towards the inferior end, before bifurcating and ending in two small rounded projections.</p>
Dental Health	<p>20 tooth positions, 17 teeth present, 1 tooth lost PM, 2 teeth unerupted/not present. 3 teeth with calculus, 8 teeth with DEH, 1 tooth with caries.</p> <p>Medium periodontal disease.</p> <p>Only one root socket remaining (lingual) for the left upper second molar, so may also have been affected by caries.</p>

	Right Dentition								Left Dentition							
Present	-	-	-	-	-	-	-	-	-	-	-	-	P	R	PM	P
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	La	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	6	8+	-	2
Maxilla	<b>8</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
Mandible	<b>8</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
Present	NP/ U	P	P	P	P	P	P	P	P	P	P	P	P	P	P	NP/U
Calculus	-	-	-	-	-	-	-	-	Sm	-	-	-	-	Sb	Sb	-
DEH	-	-	-	-	L	L	L	L	L	L	L	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	6	7	6	5	5	5	5	5	5	4	5	6	7	6	-

<b>Skeleton Number</b>	<b>3</b>															
Preservation	3 (moderate)															
Fragmentation	Slight															
Completeness	20-30% Fragmentary cranium; minimum 2 thoracic vertebrae, minimum 2 lumbar vertebrae; minimum 1 sacral vertebra; left humerus; left radius; ulnae; right hand (1 metacarpal); left hand (1 metacarpal); unsided hand (2 proximal phalanges); pelvis (left and right ischia, left ilium and pubis); femora.															
Age	6-8 years (older juvenile)															
Sex	-															
Stature	-															
Non-Metric Traits	-															
Pathology	-															
Dental Health	0 tooth positions, 0 teeth present.															
	Right Dentition								Left Dentition							
Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maxilla	<b>8</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
Mandible	<b>8</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Key:** SP = Surface preservation: grades 0 (excellent), 1 (very good), 2 (good), 3 (moderate), 4 (poor), 5 (very poor), 5+ (extremely poor) after McKinley (2004a); C = Completeness; F = Fragmentation: min (minimal), sli (slight), mod (moderate), sev (severe), ext (extreme)

Non-adult age categories: f (foetus, <38 weeks *in utero*), p (perinate, c. birth), n (neonate, 0-1m), i (infant, 1-12m), j (juvenile, 1-12y), ad (adolescent 13-17y)

Adult age categories: ya (young adult, 18-25y), yma (young middle adult, 26-35y), oma (old middle adult, 36-45y), ma (mature adult, 46+y), a (adult, 18+y)

R - Right; L - Left; DJC - degenerative joint changes; OA - osteoarthritis

Present - Tooth presence; am - ante-mortem tooth loss; pm - post-mortem tooth loss; p - tooth present; - - jaw not present

Caries - Calculus; F - flecks of calculus; S - slight calculus; M - moderate calculus; H - heavy calculus; a - all surfaces; b - buccal surface; d - distal surface; m - mesial surface; l - lingual surface; o - occlusal surface

DEH - dental enamel hypoplasia; l - lines; g - grooves; p - pits

Caries - caries; s - small lesions; m - moderate lesions; l - large lesions

Wear - dental wear; numbers from 1-8 - slight to severe wear

**APPENDIX B: OSTEOLOGICAL AND PALAEOPATHOLOGICAL CATALOGUE - DISARTICULATED BONE**

ID	Context	Bone Element	Detailed Description	Side	%	SP	No. Frags	Age	Sex	Other
1	With SK01	Vertebra	Right neural arch of C1	R	100	3	1	F/P/N	-	Unfused neural arch. Found with Skeleton 1
2	With SK03	Humerus	Distal third of shaft and distal epiphysis	R	40	4	1	A	-	No DJC. Found with Skeleton 3
3	With SK03	Humerus	Proximal third, missing proximal epiphysis	R	25	4	1	A	-	Possible same humerus as ID2. Found with Skeleton 3
4	With SK03	Pelvis	Ischium, missing superior and inferior parts of acetabulum	R	20	3	1	A	-	No DJC. Found with Skeleton 3
5	With SK03	Vertebra	Third or fourth lumbar vertebra. Missing transverse and spinous processes, anterior body damaged	-	90	4	1	A	-	No DJC or DDD. Found with Skeleton 3
6	01	Radius	Middle two-thirds of shaft, missing proximal and distal epiphyses	L	75	4	1	A?	-	No pathology
7	01	Tibia	Lateral condyle damaged	R	95	4	1	YJ	-	No pathology
8	01	Frontal	Glabella region and small portion of left orbit	-	20	2	1	A	-	No pathology. Likely same skull as ID8-12
9	01	Parietal	Missing anterior-inferior and posterior-inferior corners, part of right parietal along the sagittal suture	L	60	3	1	A	-	No pathology. Likely same skull as ID8-12
10	01	Parietal	Inferior border with striae	L	10	3	1	A	-	No pathology. Likely same skull as ID8-12
11	01	Parietal	Centre, missing borders	R	40	3	1	A	-	No pathology. Likely same skull as ID8-12
12	01	Occipital	Superior half with occipital crest and superior half of cruciform eminence	-	40	3	1	A	-	No pathology. Likely same skull as ID8-12
13	01	Hand phalanx	Proximal, whole	?	100	1	1	A	-	No DJC or pathology
14	01	Hand phalanx	Proximal, whole	?	100	1	1	A	-	No DJC or pathology
15	01	Tibia	Proximal and middle shaft, missing proximal epiphysis	L	50	3	1	Ad?	-	No pathology
16	01	Metacarpal	Whole, distal epiphysis unfused	L	100	2	1	J	-	No pathology
17	01	Calcaneus	Lateral-inferior surface damaged	R	95	4	1	J	-	No pathology.
18	01	Femur	Proximal two-thirds of shaft missing	L	70	3	1	A	-	Lamellar bone striations around the midshaft
19	01	Skull	x4 skull fragments	-	-	-	4	-	-	-

20	01	Fragments	x3 unidentified	-	-	-	3	-	-	-
21	01	Femur	Missing distal third and greater trochanter	R	70	4	3	J	-	Proximal end unfused. No pathology.
22	01	Frontal	Fragment of frontal bone with part of coronal suture and parietal bone	?	20	3	1	A	-	No pathology
23	01	Humerus	Lateral side of head damaged	R	95	4	1	A	-	Rugged muscle attachments. Osteophytes on proximal joint margins
24	01	Pelvis	Ilium, auricular surface	R	20	4	1	A	-	Surface too damaged to assess age.
25	01	Tibia	Missing proximal and distal epiphyses	L	80	3	2	Ad/A?	-	Lamellar bone striations on the medial surface
26	01	Fibula	Missing proximal and distal epiphyses	R	80	2	3	Ad/A?	-	No pathology
27	01	Rib	Shaft fragment	?	25	4	1	NA	-	No pathology
28	01	Skull	x1 skull fragment	-	-	-	1	-	-	-
29	01	Fragment	x1 unidentified	-	-	-	1	-	-	-

**Key:** SP = Surface preservation: grades 0 (excellent), 1 (very good), 2 (good), 3 (moderate), 4 (poor), 5 (very poor), 5+ (extremely poor) after McKinley (2004a); C = Completeness; F = Fragmentation: min (minimal), sli (slight), mod (moderate), sev (severe), ext (extreme)

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R – Right; L – Left; DJC – degenerative joint changes; DDD – degenerative disc disease; OA – osteoarthritis



## 16. General Discussion

The results of the intermittent watching brief undertaken by University of Leicester Archaeological Services (ULAS), following the acquisition of the building by De Montfort University, and as a condition for conversion of the property into a Business and Law School and other concurrent work, confirm much of what is known of the history and evolution of the Great Hall of Leicester Castle. Its construction in the mid-12th century and subsequent events of repair and alteration over time, illustrated through historical and archaeological evidence is reinforced by the excavations described above and in conjunction with recent dendrochronology analysis undertaken by the Nottingham Tree-Ring Dating Laboratory.

The results of the watching brief have added to some, and confirmed our knowledge in other, key research areas regarding the Great Hall and the Castle Yard precinct. Light has been shed on the archaeology and development of Castle Yard and the earlier graveyard of the Church of Mary de Castro. The later development of the Great Hall of the Castle is well documented historically but the layout and functional arrangement of the interior in its earlier life is much debated. Several areas of debate have been advanced by the work undertaken and are summarised below:

- What was the construction date of the Great Hall and what was the chronology of alterations to the building?
- What evidence is there for the development of the Church and the Castle?
- Which was the high end and which the functional service end of the Great Hall?

### *16.1 Origins of the Building*

Recent dendrochronological analysis and interpretation by the Nottingham Tree-Ring Dating Laboratory suggests that the earliest phase of the existing Great Hall precedes the previously cited date of 'after 1150AD'. A felling date for a timber sample (sample 41) taken from one of the western arcade posts revises this to between 1137-1162AD, confirming that the Great Hall as the oldest standing aisled building in the United Kingdom and possibly Europe. This date was corroborated by samples (CO1) taken from the detached arcade post capital currently at the Jewry Wall Museum. This phase still concurs with the Great Hall being in the ownership of Robert (le Bossu) at the time, who succeeded his father in 1118 AD and died in 1168 AD. He is generally identified as having been responsible for construction of the first stone-built hall at Leicester Castle and the lack of documentary evidence for this is countered by the architectural evidence which is typical of the latter half of the 12th century. The evidence is corroborated by the pottery finds, notably the mid -12th century Stamford ware recovered from a layer just below the possibly medieval floor level of the Hall (see above). The post-conquest period was one of consolidation on the part of the William the Conqueror who pursued a policy of constructing castles in the main towns and along important routes of communication. The origins of the fortified place at Leicester undoubtedly stems from this period along with such castles at Warwick, Nottingham, York, Lincoln, Huntington and Cambridge.

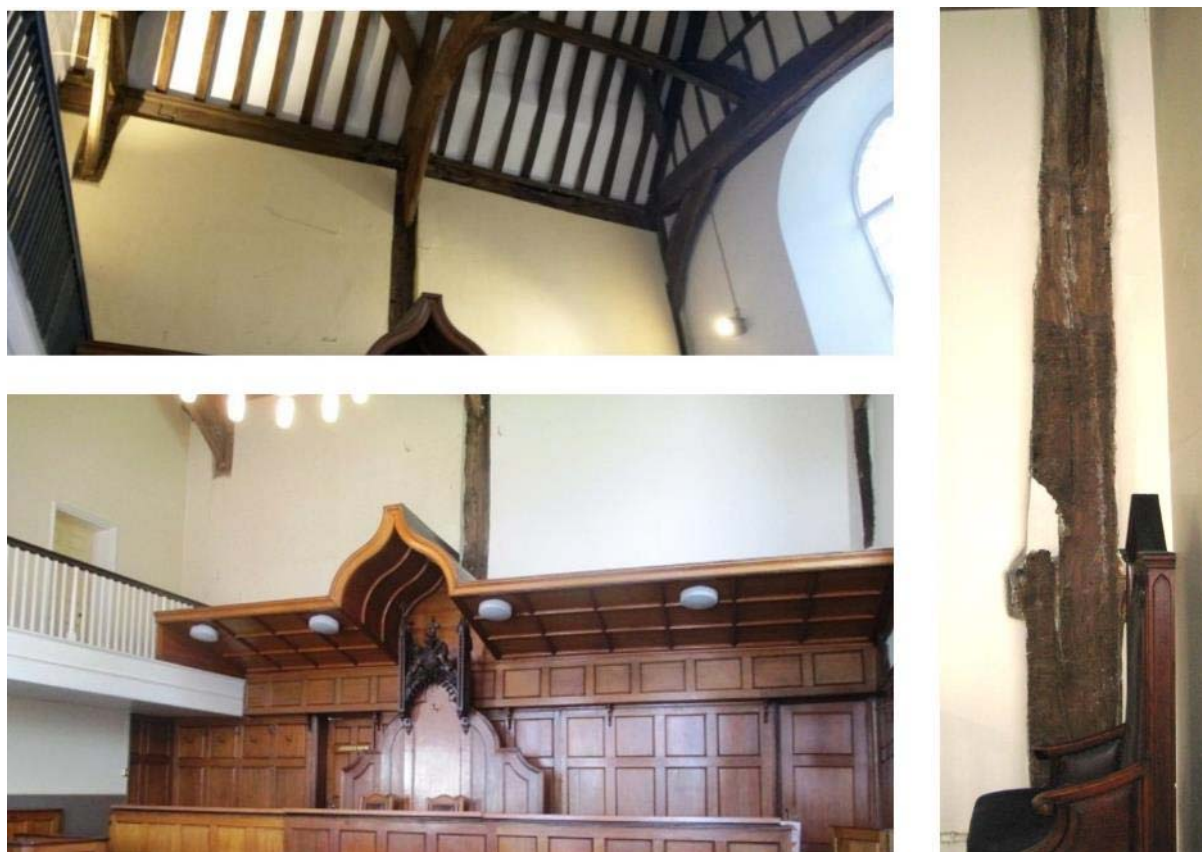


Figure 52: Western aisle arcade posts

Tree-ring samples (sample 42) from the surviving top of the truncated eastern arcade aisle post have determined a felling date of 1344 – 1369 AD, a timber previously believed to have also been felled in the 12th century. This date places the timber in the period when the Great Hall was known to be in the King's hands (1322 – 1399) and when further alterations and perhaps even complete rebuilding of the Hall took place, although this event is not supported through documentary evidence. It was also shortly after this period that both construction of a possible eastern porch was attributed and to which the floor levels identified by the excavations described here may relate. Documentary accounts illustrate these repairs in some detail. The clarification of the levels on the arcade post padstone (Figure 52) sheds light on the development of the Great Hall and requires further consideration.



Figure 53: 1821 Hall with flagstones

The highest compacted earthen/crushed mortar floor (**33**) recorded in the excavations were those that the postholes cut through. This was at a height of 61.84m aOD and may represent the final floor level when the padstones were still visible and before the final alterations had taken place. At the Great Hall of Oakham Castle, the lower of two levels of flagstone floors is believed to represent the original floor, allowing the moulded bases of the columns to be visible. It would be reasonable to suppose that the floor in the Great Hall of Leicester Castle at some point was of similar construction although no archaeological evidence for this survives (Figure 53).



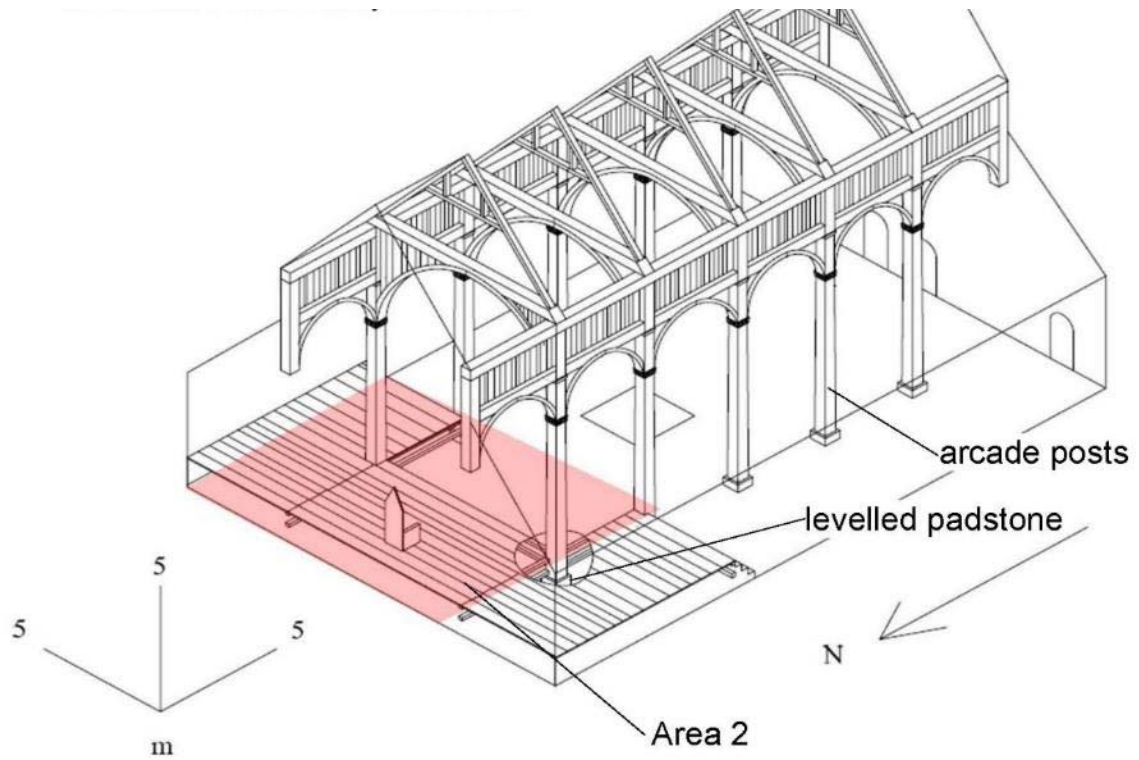


Figure 55: Reconstruction showing position of arcade post



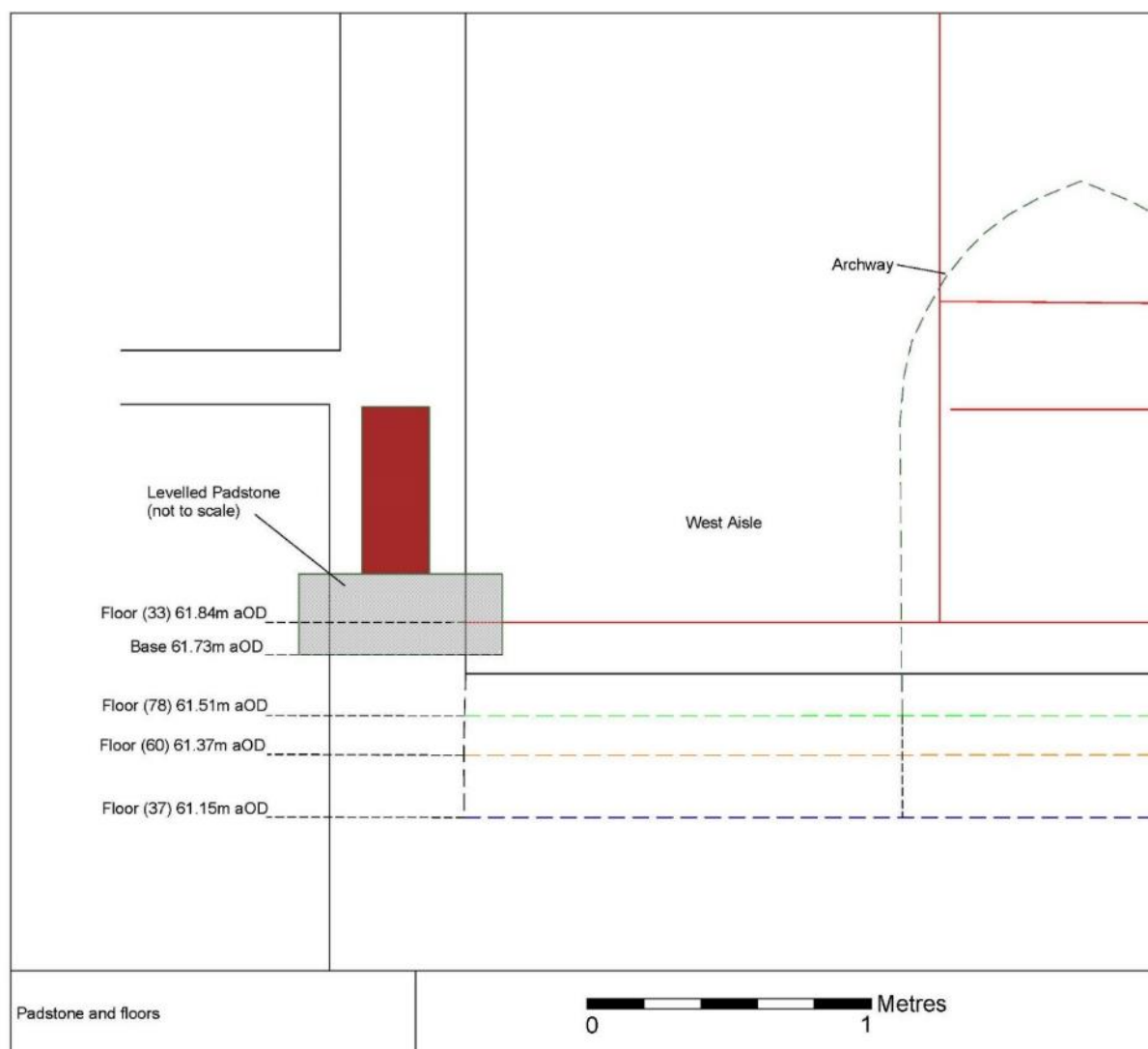


Figure 56: Padstone with floor levels

The floors (78) (60) and (37) could relate to the earlier phases where the arcade posts were in their original ‘earthfast’ positions. The posthole [39] cuts through all these floors and the similar medieval date range (12<sup>th</sup> – 14<sup>th</sup> century AD) of pottery recovered reflects the period of activity.

The removal of the lower parts of some of the original eastern arcade posts and their stone bases probably relates to the documented major east aisle alterations of 1695, or to the 1820s when the hall was divided into three spaces in response to urbanisation and the increase in population and crime, with the subsequent need for a larger court and space for a new central entrance hall. Again, the exact date is unclear. An illustration of the interior of the Great Hall in 1821 appears to show the absence of eastern arcade posts in a still open plan interior.

### 16.2 High end or low end?

Much current debate concerns the internal function of the Great Hall and how the known archaeological evidence can be used to determine this. Medieval Castle Halls typically had a ‘high end’ where the Lord’s dais would be located, with associated private rooms, and a ‘service end’ where there would be access to the kitchen, pantry and buttery. Examples of halls describing this arrangement include Oakham Castle Hall and Winchester Great Hall,

constructed in *c.*1180 and *c.*1155AD respectively. Over recent years it has generally been assumed that the northern end of Leicester Castle Hall represented the high end with the service end to the south, but until conclusive evidence is discovered, either documentary, archaeological or otherwise, this remains conjecture.

Structural evidence in the form of doorways, albeit blocked at an unknown date, and archaeological evidence in the form of building foundations and a drain (Mackie 1994), have indirectly supported the southern service end hypothesis. Evidence interpreted from the construction of the roof, such as the possibility that the transverse arch at the northern end of the hall was infilled with planks, possibly decorative, and the tentative evidence for further masonry foundations and a possible oven feature proximal to the southern end of the hall in the yard, if anything, corroborate it. Mackie's excavations identified foundations for buildings to the north-east of the hall and the absence of similar evidence from the 1986 excavations immediately without the north gable, coupled with the fact that the natural land drops rapidly downwards to the north, suggest that the buildings at the high end of the hall were constructed to the east and positioned at right angles to the Great Hall. There may be room before the ground slips downwards for a passageway leading to this complex of rooms, although the area is subject to post-medieval disturbance and there was no material evidence for this. The blocked doorways in the northern gable end wall appear to have opened outwards, presumably into two separate spaces. We understand from documentary sources that the Castle in 1313 also included a chapel, a dancing chamber and a Queen's chamber first mentioned in 1377 (Fox 1944). With mention of other domestic rooms and chambers, it is tempting to see a range of high end buildings under what is now Castle House, although this suggestion is unsupported by the results presented here and is yet to be confirmed archaeologically. It is not inconceivable that the service/high end uses of the hall were changed during the lifetime of the Great Hall, with the north end becoming the later service end, although in the absence of parallel examples this is no more than conjecture. Again, avoiding conjecture, this is only hinted at archaeologically and the debate as to which end is which continues to consider the features of the timber roof structures as circumstantial evidence but overall remains inconclusive and outside the scope of this report.

The entrance to the Great Hall at Oakham Castle was through a porch at the eastern service end and passages were constructed to provide access to other buildings in the complex. Built at a similar time (1180-90) and of comparable construction, with a nave and two aisles supported by arcade posts topped by semi-circular arches, it has up to four blocked doorways at the service end, and remains the focus of similar discussions regarding the range of service buildings and access to them. The main alterations to the spatial arrangements of Oakham probably took place when the courts were fitted in the early 19<sup>th</sup> century.

Likewise, the southern end of the Great Hall still remains the accepted candidate for the location of the service buildings and the results presented here introduce nothing to fundamentally challenge this. The arrangement seen at Oakham may find reflection in the hall in Leicester. Mackie (1994) identified a mortar floor and insubstantial wall footings corresponding to the northern limit of the first bay of the hall, interpreted as representing the entrance porch documented as being erected in 1377-78, at right angles to the original eastern wall of the hall, and a linear trench, parallel to, and probably representing the demolition and removal of, the original eastern wall in *c.*1695. Further evidence for the external floor and demolition events were identified, albeit again without datable material, in the work documented here. The porch that Mackie (1994) and the recent work identified evidence for was still standing in 1715, before being converted into a coalhouse, then demolished by the late

18th century. The robbing episode [09] Area 1, with similar rubble sandstone fill (12) to the 1994 robber, can be seen as further evidence for the demolition of the east wall of the Castle Hall in c.1695 and its replacement with the brick façade. The remains of these alterations were cut by later ‘scaffolding’ pits/holes, possibly for maintenance and comparable to the internal 19th century postholes discussed above. Questions do remain regarding the use of each end of the hall and reasonable arguments exist both ways, based on assumptions derived from structural and documentary evidence. Future work would be required to locate the numerous ancillary rooms and buildings, including the buttery, saucery, spicery and chandlery that typically make up the kitchen solar block, which Fox (1944) maintains existed above or in connection to John of Gaunt’s cellar at the southern end of the Great Hall.

### *16.3 The Castle Yard*

By the 13th century, documentary sources allude to numerous ancillary building including a barbican, chamber and kitchen, stable and room, prison house, buttery, flat chamber, cellar, gardrobe, vineyards and chapels. By the late 14th century a new water mill, dancing chamber, countess’s chamber, scullery, brewery, saucer, spicery, chandlery and forester’s house are all mentioned, and 15th century additions included a new chamber built at the Castle entrance. In the 18th century a brick house was constructed. It appears the exterior and yard of the Castle saw continued and diverse activities from its origins and at least some of the archaeological remains observed during the works, although too limited to be clearly interpreted, represent evidence of some of these activities, along with deposition related to the general repair and rebuilding of the precinct buildings.

The archaeological remains from the service trench (Area 1) were located at a comparable depth to that of the 1994 Mackie investigations (c.0.36m and c.0.40m below present ground surface respectively). The latter excavations revealed the remains of granite wall, robbed walls, a drain running downhill from west to east in line with the building immediately south of the Great Hall, yards surfaces, post-medieval pits and later 18th century postholes (Mackie 1994). The recent work has also produced evidence for undated mortared stone structural remains (27) and cobbled surfaces (16) a possible hearth or oven feature (22). Overall, the archaeological evidence for activity within the Castle yard remains rather meagre.

### *16.4 The Western side*

The western front of Great Hall was remodelled and the western aisle rebuilt in brick with the addition of an extra storey, between 1856 and 1858. New windows and a new slate roof were fitted. The investigative test pit and trench to the west of the Great Hall in advance of landscaping work added little to our understanding of the building and revealed no evidence for the earlier fabric or other archaeological remains.

### *16.5 The Interior Courtrooms*

Leicester Castle Hall is unusual in being in use as a court from the late 13<sup>th</sup> century until 1990, a continuity of use for over 800 years. Only Oakham Castle Hall, still occasionally in use as a court, has retained this function longer. Rapid urbanisation in the early 19<sup>th</sup> century created a need for more courts and whereas many English towns and cities such as Lancaster Shire and Lincoln County Court opted for the construction of new purpose built premises, Leicester opted to renovate the Castle Hall into court rooms. In light of this longevity, and despite the many

19th century alterations, renovations and re-orderings, the final removal of the court furniture, particularly of the northern Civil Court, is a significant episode in the history of the building.

#### *16.6 The Church of Mary de Castro and graveyard*

The Church of St. Mary de Castro was founded as a collegiate Chapel for the Castle by Robert de Beaumont in c.1107 and completed by c.1143, although there may have been a Saxon predecessor on the site. It was rebuilt with two transepts in a cruciform plan after 1173 following the sacking of the town. Originally built as a long, narrow, aisleless building, the tower and south aisle was enlarged and the tower added in the 13th century followed by intermittent and occasionally ruthless alterations thereafter, notably in 1800 when the 13th century arcade and clerestory was destroyed due to demand to see a celebrated preacher. The spire, deemed structurally unstable in 2013 was taken down shortly afterwards.

The archaeological evidence from the recent watching brief, particularly the presence of inhumation burials, probably of medieval date (see below), suggest that the graveyard of the church extended further westwards than the present boundary. Alternatively the burials could represent an earlier use of the site, conceivably of late-Saxon date, burials from the graveyard of an earlier church or even execution victims from the Castle itself. Inhumations, possibly from execution, were discovered when the motte of the Castle was levelled off for a bowling green in the late 18th or early 19th century. Documentary sources suggest that the consideration of privacy rather than defence was a priority at the start of the 15th century and this may have made the exclusion of the church more desirable and resulted in some revision of the Castle and/or church boundaries. The suggestion that they were burials within a shifted grave yard may be supported by excavations in 1994 where inhumations, including those of children in coffins, were discovered. At this stage only further dating analysis on the archaeological human remains would shed more light on this.

## **18. Archive**

The site archive will be held by *Leicester Museums Service*, under accession no. *A10.2016*.

The archive contains:

- 21 Watching Brief recording sheets
- 3 context summary records, 83- context sheets
- 4 photographic recording sheets
- 1 Sample records sheet
- 1 Skeleton index record sheet
- 1 Drawing Index sheet and 11 primary drawings
- 1 CD containing digital photographs and report
- 1 Unbound copy of this report
- Thumbnail prints of digital photographs



	<b>Oasis No</b>	universi1_326342		
	<b>Project Name</b>	An Archaeological watching brief at Castle Hall, Leicester		
	<b>Start/end dates of field work</b>	June 2016 – June 2017		
	<b>Previous/Future Work</b>	Yes / Not known		
	<b>Project Type</b>	Watching Brief		
	<b>Site Status</b>	Scheduled		
	<b>Current Land Use</b>	Other		
	<b>Monument Type/Period</b>	Inhumations/ ?Medieval Cobbled surface/ Medieval Oven/Medieval Mortar surfaces/ Medieval Floor layers/ Medieval Pits/ Medieval Robber trenches/ Medieval Posthole/ Post-Medieval Masonry Walls/ Post-Medieval		
	<b>Significant Finds/Period</b>	Human Bone/ ?Medieval Pottery / Roman, Medieval Pottery / Post-Medieval		
	<b>Development Type</b>	Educational		
	<b>Reason for Investigation</b>	NPPF		
	<b>Position in the Planning Process</b>	Planning condition		
	<b>Planning Ref.</b>			
	<b>Site Address/Postcode</b>	Castle Hall, Castle View, LE1 5WH		
	<b>Study Area</b>	c.130 square metres		
	<b>Site Coordinates</b>	SK582 041		
	<b>Height OD</b>	60m aOD		
	<b>Organisation</b>	ULAS		
	<b>Project Brief Originator</b>	Local Planning Authority (LCC)		
	<b>Project Design Originator</b>	ULAS		
	<b>Project Manager</b>	Dr Richard Buckley		
	<b>Project Director/Supervisor</b>	Stephen Baker		
	<b>Sponsor/Funding Body</b>	De Montfort University		
		<b>Physical</b>	<b>Digital</b>	<b>Paper</b>
	<b>Recipient</b>	LCC MusService	LCC MusService	LCCMusService
	<b>ID (Acc. No.)</b>	A10-2016	A10-2016	A10-2016
	<b>Contents</b>	Human bone Pottery	Photos	Watching brief records Field Notes Context info' Primary drawings
	<b>Type</b>	Grey Literature (unpublished)		
	<b>Title</b>	An Archaeological watching brief at Castle Hall, Leicester		
	<b>Author</b>	Stephen Baker		
	<b>Other bibliographic details</b>	ULAS Report No 2016-120		
	<b>Date</b>	2018		
	<b>Publisher/Place</b>	University of Leicester Archaeological Services / University of Leicester		
	<b>Description</b>	Developer Report A4 pdf		

OASIS data entry

## 19. Publication

A summary of the work will be submitted for publication in the local archaeological journal *Transactions of the Leicestershire Archaeological and Historical Society* in due course. The report has been added to the Archaeology Data Service's (ADS) Online Access to the Index of Archaeological Investigations (OASIS) database held by the University of York.

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## 21. Acknowledgements

The fieldwork was undertaken for De Montfort University and was carried out by Stephen Baker, assisted by Mireya Rodriguez Gonzalez and Mathew Morris of ULAS. Richard Buckley managed the project. Grahame Appleby of LCC HNET monitored the work on behalf of the planning authority. York Osteoarchaeology Ltd analysed the human bone

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