YORK ARCHAEOLOGICAL TRUST

SOUTH TRANSEPT APPROACH,

YORK MINSTER

WATCHING BRIEF AND EXCAVATION REPORT

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YAT York Archaeological Trust

AOD Above Ordnance Datum

1. SUMMARY

Alterations to York Minster's South Transept steps and the landscape of Minster Yard revealed medieval phases of both the steps and the yard surfaces, probably from the 13th century. This was sealed by deposits thought to relate to the completion of the cathedral's eastern arm by the late 15th century. A late-medieval cemetery then developed in Minster Yard and was cleared in the post-medieval period, probably by 1700. 19th century drainage, landscaping and structures were identified, truncated by the 20th century insertion of Deangate.

2. INTRODUCTION

A watching brief commenced on 15th October 2012 during the initial stages of ground works for the renovation of the South Transept Approach of York Minster. This work is part of *York Minster Revealed*, a Heritage Lottery Fund-supported programme of improvements to the visitor experience and access to the cathedral. The scope of the approach works is to create a new combined ramped and stepped access to the South Transept within a new piazza formed in the Deangate/Minster Yard area. This involved an extensive programme of ground reduction and excavation of drainage and ducting trenches beneath the former carriageway of Deangate, followed by a substantial raising of the ground levels to produce the final finished surface.

Archaeological observations were initially limited to a watching brief, during which exposed medieval fabric beneath the former steps was recorded. During the drainage trench excavation, the discovery of intact burials required three small excavations to reach the required depth limit. These were conducted in December 2012 and January 2013, after which observation reverted to watching brief status.

3. METHODOLOGY

The works were conducted in five broad phases. The resulting series of pits and trenches is complex, and for clarity the major interventions have been allocated letters. Please see Figures 1 and 2 for the position of all the works.

The first phase involved partially dismantling the access steps to the South Transept by lifting the large slabs of the first landing by machine and sling. This exposed make-up deposits which on investigation were found to be covering the remains of earlier steps, encased within the later ones. These were exposed and recorded *in situ*.

The second phase involved the removal of the pavement surrounding the steps and the carriageway surface of Deangate, followed by a general ground reduction to differing levels that was observed throughout and described below. During this operation, the gas lamp-posts to either side of the steps were dismantled and removed for renovation and eventual re-instatement. This created two small trenches, GL 1 and 2, which exposed the foundations of the steps and associated deposits and features. Two further trenches, GL 3 and 4 were excavated in front of the new access ramps to create the gas-connection for the new lamp post positions.

The third phase involved the excavation of surface drainage and electricity and gas ducting trenches.

Two surface drains ran along the northern edges of both sides of the new access ramp (Trenches A and B). Trench A encountered medieval burials, which were exposed and recorded, and lifted where necessary to achieve the required depth. A third trench, C, was excavated on an approximate east-west alignment 3m south of the western ramp to carry surface water from the ramps into a new manhole. Along with further medieval burials, this trench also located one of the nineteenth century culverts that still serve the city's sewers. This made it possible to significantly re-design the whole drainage scheme, diverting trench A into trench C to exploit the existing culvert structure via a new, shallow manhole. This raised the depth limit of most of the remaining drain runs above the level of the cemetery and avoided the need to excavate new deep manholes, thus disturbing as few burials as possible. Following this, two trial holes, D and E, were dug immediately south-east of the eastern access ramp to locate the suspected position of a second culvert. Further burials were exposed in trench E that were recorded and left *in situ*; the culvert was located in D and the eastern ramp drain run (trench B) was extended as trench F to meet the culvert, exposing a further burial.

Two parallel north-south aligned service duct trenches, G and H, were excavated from the inside angle of the South Transept south-west corner buttress to the southern edge of Deangate. Trench G carried electric ducting and trench H carried a drain drilled through the fabric of the cathedral at 15.93m AOD for a pump installed in the open Roman culvert in the Undercroft (Plate 32). These trenches were c.0.50m deep with a combined width of c.0.80m. Trench H articulated with trench A to carry pumped water into the culvert. A further 1m wide and 0.50m deep electric ducting trench, I, was excavated south-west – north-east across the site, past the eastern access ramp.

The fourth stage involved the excavation of two east-west aligned drainage trenches along the new kerb-lines of Deangate to carry Birco surface drain ducts. The northern trench, J, was 0.50m and up to 0.60m deep, and was in the main excavated through make-up deposits laid after the drainage works outlined above. The southern trench, K, encountered the gas main and was excavated up to 1.5m wide to locate a position for the Birco line that avoided this. A south-west – north-east aligned spur, trench L, connected drains J and K to the manhole at the junction of trenches A and C; this trench was up to 0.60m deep.

As part of the re-instatement of Deangate, two new gate posts were inserted some 9m east of the original ones, requiring two further trenches, M and N, measuring 2.7m X 1.3m that were excavated in March 2013.

The fifth stage involved lifting the flags of Minster Gates and extending the drain runs and electric ducts to connect to existing services. This work ran between 25th March 2012 and 5th April 2012.

4. LOCATION, GEOLOGY AND TOPOGRAPHY

York Minster is located in the northern quadrant of the historic walled city (Figure 1). The geology of the area consists of drift deposits of Devensian glacial till overlying bedrock of the Sherwood Sandstone group (http://mapapps.bgs.ac.uk/geologyofbritain/home.html, accessed 11/02/2013). The topography of the wider area is generally flat, sloping down gradually to the River Ouse to the south and south-west.

The South Transept Approach is defined as the area of Deangate in front of the South Transept of York Minster, from the gateway by the entrance to the Queen's Path on the eastern side to the entrance to the Minster Shop on the western side, and reaching southwards from the South Transept steps, to the northern end of Minster Gates (Figure 1). The topography of this area has been substantially altered by landscaping associated with the cathedral, and particularly by the creation of Deangate in 1903, which was until the late 1970s the route of the A64 trunk road between Leeds and Scarborough (Milsted, 2010, 7). The pre-*York Minster Revealed* arrangement incorporated a marked dip from the base of the steps at c.15.75m AOD, to the top of Minster Gates at c.15.56m AOD, with the slope up towards the eastern side rising to c.16.20m AOD (Dean and Evans, 2008, 3; Evans, 2008, 3). The new piazza removed this dip, creating a more gradual sloped approach from Minster Gates to the base of the new ramp by lifting the existing York Stone surface of Minster Gates and raising the ground level of the street.

5. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

The history and archaeology of York Minster, from the documentary records of a church in c.627 to the Gothic structure completed c.1450, have been extensively published in many readily available sources. Additionally, the archaeology of the South Transept Approach area was comprehensively surveyed in *Minster Gates and Part of Minster Yard, York*, a desk-based assessment by David Evans of YAT (YAT report 2008/04), and the area was subject to archaeological evaluation, reported in *Minster Yard and Minster Gates, York* (Dean, 2008; YAT 2008/11). These reports form the basis of the following summary.

Documentary evidence suggests that the Minster Yard area was enclosed and paved by the late 13th century, and that buildings and other structures within the yard, some abutting the South Transept of the cathedral, were removed in the 17th century (Evans, 2008, 13). Minster Yard itself was opened up in the early 19th century, when the Old Deanery was demolished (ibid, 7-14) and the current Minster steps replaced a flight built in 1735-6 (Aylmer & Cant, 1977, 254). This replacement is thought to have occurred by 1848 (Stuart Harrison, York Minster Cathedral Archaeologist, pers. com.).

The excavations that took place during the 1967-72 engineering operation to underpin the central tower were chiefly concerned with the interior of the Minster, but a series of trenches were excavated around the exterior, mainly to provide control sequences for the rapidly recovered information from within (Phillips, 1995, 27-30). Three of these trenches, XL, XJ and XK were located in the lawn immediately south of the Choir, and established that the South Transept approach area lies over the site of the *principia*, the remains of which lie at 3.75 - 2.5m BGL (12.25 – 13.50m AOD). Above deposits associated with the collapse of this building were the remains of an Anglo-Scandinavian cemetery, which lies at around 2m BGL (14m AOD) (Phillips, 1995, 75-92). Above this were a complex sequence of metalled surfaces, the earliest of which probably relate to the Norman cathedral of AD1080, and the most of recent to the nineteenth century, at c.0.30m BGL (15.70m AOD) (Evans, 2008, 4; Minster Archive).

Other archaeological observations in the area have seldom penetrated the sequence as deeply. Most, however, have identified a complex pattern of surfaces and possible structures dating from the Norman period onwards, and some, particularly in the Minster Yard area, have encountered fragmentary human remains, associated with a later medieval cemetery and frequently much disturbed by post-medieval and modern services (Evans, 2008, 5). These included the 19th century brick-built culverts that still feed the sewers, which were

observed in Minster Gates and in the area of the statue of Constantine, immediately east of the South Transept steps (Evans, 2008, 5).

The evaluation of the area found that little archaeology survived in the area of Minster Gates, but that to the north, post-medieval surfaces were present only 0.30m below the paved area beneath the steps (Dean, 2008, 6). In particular, in trench 1, at the eastern end of the approach area, the possible remains of the Old Deanery demolished c.1827 were identified (Dean, ibid), and in trench 4 a limestone wall was interpreted as a possible sill wall for the range of medieval buildings shown abutting the South Transept in an engraving of 1656 (Dean, 2008, 7), shortly before they were cleared (Evans, 2008, 13). This wall was cut into deposits containing much human bone, which at only c.0.45m BGL, is likely to relate to the medieval rather than the much deeper Anglo-Scandinavian burials suggested by excavation within the cathedral.

Evaluation trenches 3 and 4 also clarified the construction date of the South Transept steps as nineteenth century. This had been suggested after a review of the available documentary evidence, which additionally suggested that the form of the steps was a re-construction of a 17th century design (Evans, 2008, 14). A 19th century paved surface and a cinder path and railing survived beneath the modern paving as evidence of the later 19th century layout of Minster Yard. This earlier surface matched a weathering line on the bottom riser of the steps some 0.2m below the modern surface ground level, demonstrating how far the pre-*York Minster Revealed* surface had risen over time (Dean, 2008, 7).

6. RESULTS

6.1 THE SOUTH TRANSEPT STEPS

The current steps, 5001-5003, consist of tightly-laid sandstone slabs, tied together with poured lead joints. Beneath the first landing, several earlier construction phases were identified, the earliest of which, 5006, clearly represented an earlier version of the South Transept steps (Figure 3, Plates 1-14). 5006 consisted of two courses of large, dressed limestone blocks up to 0.60 x 0.40 x 0.15m arranged in a similar layout to the current steps. The upper course was observed at c.16.00m AOD, 0.35m below the surface of the removed slab, with the lower course at c.15.82m AOD. 5006 had been cut into the soil beneath, 5007: a firm, dark grey, slightly sandy silt exposed at 15.76m AOD in the south-west corner. The stones of the upper course were clearly worn *in situ*, with the wear pattern suggesting the location of a subsequently removed further course of steps above 5006.

The tooling on the stones of 5006 suggests a medieval date (S. Harrison pers. com.). Steps 5006 were covered with 5002, an extensive deposit of loose, mid-brown sandy mortar which contained 18th century pottery along with frequent rough-hewn limestone blocks with medieval tooling, and occasional fragments of moulded stone, including two probable 12th century shafts (Plates 7 and 8; S. Harrison pers. com.). Overlying 5002 along the northern edge of the exposed area was 5005, which consisted of York stone flags up to 0.50m x 0.50m x 0.10m, laid flat in a bed of off-white lime mortar (Plate 12). The flags of 5005 were too crude to be suggestive of a relict landing and taken together with deposit 5002 were interpreted as levelling laid to provide make-up for new steps. Overlying 5005 was 5004, a pair of York stone flags laid 0.80m apart on top of 5005 in the centre of the steps (Figure 3, Plate 13). Both stones of 5004 displayed wear patterns consistent with foot-traffic along the central axis of the steps and could represent the only surviving remains of the 18th century steps that were replaced in the 1840s. There are two probable interpretations of this sequence. 5002 and 5005 are of a late post-medieval, possibly 18th century date, or that the stones of 5004 were simply re-set from elsewhere during the mid 19th century, and that taken together, 5002, 5004 and 5005 represent the mid-nineteenth century construction of the current steps.

An earlier review of the available images suggested a 17th century date for the current step configuration (Evans, 2008, 28-36), which was supported by the 2008 evaluation excavation (Dean, 2008, 6). On the basis of the current work it is possible that this arrangement was influenced by an earlier, perhaps pre-15th century, version. Steps 5006 clearly survived *in situ*, and although no specific dating evidence was recovered, the known building phases of the cathedral provide possible dating options. Steps 5006 could relate to the construction of the East End in 1420, or to the completion of the central tower by 1471. Alternatively, and preferred in this report, they may instead relate to the completion of the South Transept in the mid 13th century (Brown, 2003, 13). It is possible to project the possible tread depths both up and down (Figure 4), albeit speculatively. The putative upper projection virtually matches the level of the current arrangement, and the position of 5004 may suggest a precursor to the current landing. The suggested downward projection shows good correlations with the deposit phases identified in the wider Piazza work, particularly with the earliest phases. Further discussion of the form and phasing of the steps is made below in **6.2.1** with reference to possible contemporary surfaces.

The exposed area was cleaned and recorded prior to infilling with concrete and the construction of a new, curving ramped access to the South Transept. This structure encased the front of the 1848 steps, leaving these exposed on the eastern and western sides.

6.2 THE PIAZZA AREA

6.2.1 PHASE 1

Phase 1 comprised deposits 5112 and 5119, observed in trench F in the western half of the Piazza (Figure 2, Plate 15). These deposits consisted of two areas of tightly packed compacted limestone fragments 50mm-150mm across, set in a 0.15m layer of fine light grey silty clay with mortar flecks as a bonding material. These were interpreted as two parts of the same yard surface, observed at 14.60-14.65m AOD, and were separated by a deeply excavated 19th century culvert (cut 5107 in Phase 5) that cut through the entire sequence.

The surface formed by 5112 and 5119 represents the deepest observed archaeological deposit in the 2012 Piazza works and also the earliest identified stratigraphic feature. Although no specific dating evidence was recovered from either 5112 or 5119, the overlying Phase 2 make-up and graveyard deposits were interpreted as 15th century and later in date. On this basis it is reasonable to suggest the Phase 1 surface as a remnant of the 13th – 15th century Minster Yard, established after the completion of the South Transept in c.1250, particularly as the nearest earlier 11th century surfaces in this area are known to lie some 0.60m lower, at c.14m AOD (Evans, 2008, 4) and 13-15th surfaces were identified in the 1970s 'X' trenches (Minster Archive).

It is possible, albeit speculatively, to project the earliest phase of steps 5006 to exactly meet the level of surface 5112/5119 with an additional five courses below those that were revealed. These may have met the Phase 1 yard level at a point 0.32m further north, and 1m deeper than the lowest 1848 step met the 19th century pavement (Figure 4). If correct, this would resemble later images of the pre-1848 steps. The implications of this are discussed in section **6.3**.

6.2.2 PHASE 2

Cut into surface 5112/5119 and observed in the northern edge of Trench F was a sub-square pit approximately 0.80m wide, cut 5111 (Plates 15 and 16). This was only excavated to a depth of 0.10m as it continued below the depth limit of the excavation at c.14.60m AOD; the fill, 5110, was a friable, mid grey sandy silt with frequent small and medium limestone fragments, and contained several disarticulated human long bones. 5111 was interpreted as a possible charnel pit, and was sealed by 5104 and 5120, a firm, mid grey sandy clayey silt up to 0.40m thick that was interpreted as a make-up deposit. 5104 contained a single fragment of post-medieval pan tile that was clearly intrusive and related to the truncating cut of culvert 5107. 5120 was sampled for environmental remains (Appendix 5) but besides containing a significant amount of mortar was otherwise uninformative.

Sealing make-up deposits 5104 and 5120 in Trench F were 5109 and 5118, representing a significant layer of friable, mid grey sandy silt with frequent limestone fragments and occasional disarticulated human bone fragments (Plate 19). This was 0.30m thick and related compositionally and stratigraphically with similar deposits seen across the Piazza area in trenches E as 5103, C as 5072 and A as 5101. In trench A 5101 sealed 5102, a deposit similar in character, depth and stratigraphic position to 5104/5120 with the addition of much larger quantities of disarticulated human bone (Plate 21). Taken as a collective stratigraphic entity, deposits 5101 (A), 5072 (C), 5103 (E), and 5118/5109 (F) were interpreted as a probable ground make-up soil, representing a major change of land-use from the yard surface of Phase 1. From east to west, the upper surface of this soil fell from 15.20m AOD to 14.82m AOD, a slope that may have been reflected in the modern surface prior to the recent re-landscaping works; alternatively, it may have been truncated by the overlying graveyard activity of Phase 3. This graveyard probably explains the significant intrusive presence of disarticulated human bone in this phase. No specific dating evidence was recovered, but the considerable quantities of construction debris present throughout the deposit of this phase suggest an association with the mid-late 15th century completion of the Minster's east end and the erection of the tower by 1471 (Brown, 2003, 195). Phase 1 surface 5112/5119 and the known archaeology from previous interventions suggest that the construction debris in Phase 2 did not relate to the 13th century building of the South Transept itself.

Perhaps significantly, the upper surface of Phase 2 related closely to the top of the first possible step suggested in Figure 4 by projecting the fall of steps 5006. This may support a pre-15th century date for steps 5006, which would have represented a natural limit for rising ground in the contemporary landscape. In making this interpretation it is important to reiterate that the projection of steps 5006 is speculative.

6.2.3 PHASE 3

Cut into the site-wide make-up deposits of Phase 2 were 11 inhumation burials, in four different trenches (Figure 2, Plates 18-31). Together they represent a distinct cemetery phase, sealed by the make-up deposits of Phase 4 identified across the site. It is likely that a similar density survive in the unexcavated deeper areas between these trenches; the re-design of the drainage to exploit existing manholes, referred to in **3** above, allowed for many potential burials to remain undisturbed.

Six intercutting burials (Skeletons 1 and 4-8; see Appendix 4) were recorded and lifted from the northern end of Trench A, where the insertion of a silt-trap for the surface water drainage

required excavation to 14.78m AOD in an area measuring 1.3m X 1.1m (Figure 2, 20-23 and 25-31). Two burials (Skeletons 2 and 3) were recorded and lifted in the south-western end of Trench C, as the 0.80m wide excavation reached below 14.80m AOD to allow for drainage into a nearby manhole located at the SW end (Plates 24 and 25). One burial (Skeleton 9) was recorded and lifted from the southern edge of Trench F (Plates 18 and 30), and a further two (Skeletons 10 and 11) were exposed and recorded in Trial Trench E and left *in situ* (Plates 17 and 31).

A full osteological report is presented in Appendix 4. These burials formed a coherent group of mainly adult, Christian burials. Widespread evidence for age-related degenerative joint disease (DJD) and the high level of tooth decay suggested a more privileged population than typically seen elsewhere in the city, reflecting a pattern observed in other cemetery populations from the Minster area. The large quantity of disturbed and disarticulated human bone in the grave backfills, and in the underlying ground make-up deposits, suggests a dense population of burials, as also suggested by the high degree of inter-cutting observed in the north-western area in Trench A.

Little direct dating evidence was recovered from the burials. A single sherd of Samian in grave fill 5086 (SK 1) and a single sherd of Roman grey ware in grave fill 5113 (SK 9) are residual. C13-14th pottery in grave fill 5098 (SK 8) may be residual and C16-17th pottery in grave fill 5095 (SK 7) may be intrusive as it was heavily truncated by the 19th century construction cut of the later Minster steps. A sherd in grave fill 5095 may be of Anglian date but its poor level of survival and limited diagnostic elements means that this cannot be confirmed; if Anglian the sherd would be residual. The overlying make-up deposits of Phase 4 contain sufficient C16th and C17th century pottery to provide an early post-medieval *terminus ante quem* of c.1650 for the cemetery. The construction debris within Phase 2, suggestive of the mid-late C15th Minster construction activity, provides a possible *terminus post quem* of c.1450-70.

6.2.4 PHASE 4

Phase 4 is represented by a single deposit, seen in five trenches: 5059 (A), 5061 (A, G, H, J, K, L), 5068 (C), 5116 (GL2) and 5108 (F) (Plate 19). This was a layer of fine, friable, mid-grey silty sand with frequent fragments of limestone and disarticulated human bone, the latter occurring especially in the western part of the Piazza area. Ranging in thickness from 0.16m (5061/A) to 0.30m (5108/F), the upper surface of this phase of deposits lay at 15.17m AOD in the west, rising to 15.45m AOD in the east, and was interpreted as a ground make-up deposit, probably following a clearance of structures from the Minster Yard area. 16th and 16/17th century pottery was recovered from 5061 and 5068, suggests a date of c.1600-1800

for this activity. A clearance event, when buildings attached to the front of the South Transept recorded in 1656 were demolished (Evans, 2008, 13), is known from the later 17th century and would account for the quantities of limestone rubble in the deposit. The underlying cemetery is the suggested source for the human bone fragments.

The upper surface of the levelling deposit in the central steps area was c.15.35m, only 0.04m below the upper surface of one of the projected steps below 5006 (Figure 4). This could support the idea that a new surface had been established. Additionally, the late 17th century date of this surface may relate to the insertion of possible landing 5004, suggesting a tentative correlation with the documented re-working of the Minster steps by the 1730s (Aylmer & Cant, 1977, 254). Without more evidence this correlation remains speculative.

6.2.5 PHASE 5

Phase 5 represents all the nineteenth century activity, encompassing the most extensive site-wide alterations identified during the *York Minster Revealed* works, including the possible 1848 re-building of the South Transept steps described above in **6.1**. Across the Minster Yard area, a network of drains and major culverts was created, and new boundaries established. In the south-eastern part of the Yard, a building was identified in Trench M that may relate to alterations to an earlier Deanery.

Two major culverts were identified, cut into the Phase 4 deposits. In Trench C, in the south-western part of the Piazza area, a 1m wide brick-built culvert aligned north-north-west – south-south-east was identified, along with a 0.60m wide feeder channel, also of brick, aligned N-S and entering the larger channel from the north (Figure 2). The top of the brick vault, 5079, was observed at 15.15m AOD (Plate 33); the floor of the feeder channel lay at 14.74m AOD, with a further drop of c.0.50m to the floor of the main drain at c.14.24m AOD. The fall of the drain ran from north-north-west to south-south-east.

In Trench F, in the eastern part of the Piazza area, a 0.60m wide brick-built culvert aligned south-west – north-east was identified (Figure 2, Plate 16). The top of the vault, 5106, was observed at 14.94m AOD, and the drain sat in a vertically sided 1.03m wide trench, 5107, cut from at least 15.41m AOD. The fall of the drain ran from north-east to south-west and its connection with culvert 5079 was confirmed by the construction team using remote cameras. 4m to the north of this culvert, in the southern end of Trench B, a 0.20m wide, north-east – south-west aligned ferrous pipe, 5117, was identified at 15.09m AOD cut into the Phase 4 deposits and was related to the other nineteenth century services.

In the southern end of Trench A, the truncated remains of a brick-built manhole, 5073, were identified at 15.18m AOD (Figure 2, Plate 34). Two 0.20m wide brick-lined channels fed into the 1m X 0.30m central cavity from the west and one from the east. This feature formed part of the post-1850 Minster Yard layout and was superseded by the twentieth century alterations of Phase 6.

Immediately south of manhole 5073, the truncated foundations of a 0.40m limestone wall, 5084, were identified (Figure 2, Plate 35). This was aligned WNW-ESE, with a 0.30m X 0.30m sandstone block, 5083, in the western section representing a surviving fragment of superstructure. Like the drains, the remains of this wall were sealed beneath later made ground, and it is likely that it represents a fragment of the nineteenth century Minster yard landscape. 5m to the south, in the south-western end of Trench C, the heavily disturbed remains of a N-S aligned single-skin brick wall, 5081, were identified at 14.95m AOD and associated with the Phase 5 Minster Yard.

A similar wall to 5083/4, 5140, was observed in better condition in Trench GL2 (Figure 2, Plate 36). This was aligned N-S, parallel to the 1848 steps and only 0.60m from them, at 15.35m AOD. 5140 consisted of four rough-hewn limestone blocks, up to 0.35 X 0.20 X 0.20m across and bedded in a 0.15m deep foundation of compact, buff, sandy mortar and limestone fragments, 5141. This wall was identified in the 2008 evaluation trench 4 as 4025, and interpreted either as part of the later Minster Yard layout, or possibly a remnant sill-wall of the South Transept structures demolished in the 17th century (Dean, 2008, 7). Despite a lack of direct pictorial evidence, the nineteenth century interpretation is favoured here on the basis of the observed stratigraphic sequence across the piazza area.

The activity described here was all sealed beneath a site-wide make-up deposit seen across the Piazza area. In Trenches GL1, A and C deposits 5058, 5060 and 5067 represented a layer of friable, brown-grey, silty gritty sand with frequent CBM and limestone fragments and occasional disarticulated human bone. This layer was 0.20m thick in the north and up to 0.50m in the south, but was level across the site at around 15.45m AOD. In the eastern side, deposit 5121 in Trenches F and B/D and successive deposits 5128 and 5137 in Trench M represented the equivalent make-up deposit identified at the same height AOD, albeit greyer and more silty. There was a marked increase in animal bone in these deposits, suggesting a mixted and reworked source for the material. The presence of rabbit supported the 19th century date (Appendix 5).

The current South Transept steps were cut into this make-up material (Figure 5, Plate 21), prior to the laying of a paved flagstone surface (5052; Figures 2, 3 and 5, Plate 37). This

paving survived very patchily, and consisted of flagstones up to 0.80m X 0.50m across that are very likely those represented in the 1855 Arnout image of the Minster (Evans, 2008, 32, Figure 17). The suggested construction date of 1848 for the steps provides a *terminus ante quem* for the drainage features described above.

Trench M, in the south-eastern area of the Piazza, contained a heavily robbed double-skinned foundation wall, 5134, that was aligned N-S and had been constructed with limestone blocks up to 0.40m X 0.20m X 0.30m in size (Figure 2, Plates 38 and 39). This was cut into make-up deposit 5137 and was observed in the northern limit of excavation. It may relate to a single block of limestone in the western section on an E-W alignment, 5135, which seemed to define an in-filled area of friable, mixed dark grey sandy silt with much CBM and limestone rubble, 5135. This may represent a fairly small structure of unknown purpose that post-dates 1848.

This interpretation presents difficulties as no buildings are evident in this area in the 1853 or 1895 OS maps. The 2008 evaluation trench 1, 6m to the south, identified a similar limestone wall on a N-S alignment, 1004, associated with demolition debris, 1003 (Dean, 2008, 3). This was interpreted as relating to the Deanery (Ibid, 6), which stood in approximately this location and was demolished c.1830 (RCHMY V, 104). If the wall identified in 2008, context 1004, relates to 5134/5135 this interpretation is problematic, as the underlying make-up post-dates the 1840s. The level of truncation limits the interpretative possibilities of 5134/5135, and it is possible that they in fact represent part of the Minster Yard boundary as established in the second half of the nineteenth century. Wall 1004, if part of the same structure, would seem to define this area well, although given the distance between the observations and the heavy truncation of the sequence by the Phase 6 activity, it is possible that 1004 represents something else entirely, currently unidentified. An additional similar area of crude, packed limestone foundation measuring 2.55m X 1.2m across was identified 12m south-west of Trench M during the last phase of the Piazza works, when the flagstone pavement was lifted. This foundation was cut into the same make-up deposits observed elsewhere, and throughout the flagstone lifting operation; it is possible that it relates to the unidentified structures observed in the 2008 evaluation trench 1 and 2012 trench M. A small patch of cobbles associated with this foundation may relate to the cobbled surface of Minster Yard replaced in 1903 by Deangate (Evans, 2008, 7).

6.2.6 PHASE 6

Phase 6 represents the 20th century construction of Deangate, which involved the demolition and clearance of several buildings in the wider Minster Yard area (Milsted, 2010, 8). The

structure identified in Trench M was demolished and levelled over with 5132, a banded sequence of crushed limestone and sand. Above this, the soil and turf, 5131, of the verge to the north of Deangate was laid, at a level of 16.46m AOD. Cut into this was the modern make-up, 5130, 5129 and tarmac surface, 5128 of Deangate (Plate 40). This surface and make-up was also observed in Trench C, where it extended to a depth of 15.65m AOD, 0.40m below the surface of the road in that area, and had truncated any earlier surfaces. The construction date of the road is known to be 1902 (Aylmer & Cant, 1977, 311), and as it was the main carriageway of the Leeds-Scarborough A64 until the 1990s had been periodically re-surfaced to a high standard.

Immediately in-front of the current South Transept steps was an extensive paved area, 5050, the flagstones of which were laid on a bedding deposit of clean sand, 5051, which had been laid directly on top of the 19th century paving. This surface was removed and replaced with new flagstones in 2012.

6.2.7 PHASE 7

Phase 7 represents the 2008 evaluation trenches 3 and 4, which were located immediately south and west of the South Transept steps respectively, and the backfills of which were exposed during the 2012 works.

6.3 DISCUSSION

The lack of secure dating evidence in Phases 1-3 is problematic. The dating provided above is based in part on correlation with deposits observed in earlier excavations, chiefly the 1966-1972 engineering works, and on the plausible yet speculative projection of steps 5006 and their association with Phase 1 surface 5112/5119, thought to date to the mid 13th century and related to the establishment of Minster Yard after the completion of De Grey's South Transept.

If the projection is correct, steps 5006 would resemble the 'ziggurat' profile suggested by an image of 1685 and several later plans (Evans, 2008, 11). The possibility of a 13th century date for 5006 would support a pre-18th century date for this profile, suggesting a much earlier influence on later design than previously thought. One possible arrangement of 5006 would create a 6.5m wide uppermost landing to meet the Minster's South Door (Figure 4); alternatively, a landing placed directly on a course of stone above the surviving uppermost course of 5006 (as possibly suggested by 5004) would allow for a further flight that would produce an arrangement similar to that of the 1848 steps, and perhaps therefore demonstrating an earlier influence on the steps of the 1730s. This superficially resembles the

lay-out illustrated by several artists and writers, including Drake in 1736 (Evans, 2008, 29, figure 19) in an image that probably shows the 1735-6 steps replaced by 1848. The flag-setting identified as 5004 may represent a survival of this phase, although the documentary information suggests the 18th century work was a complete re-build rather than an alteration. Alternatively, 5004 may be a fragment of the 18th century steps, re-used *ex-situ* as levelling.

Ultimately, the considerable discrepancies between different depictions of the South Transept steps limits their potential to interpret 5006, but it is clear that the general shape of the 1848 steps reflects that of the earlier steps encased by them, and that this form may have been established as early as c.1250.

The evidence for the evolution of Minster Yard is of interest. As summarised above, Minster Yard is held to have been paved and to have been walled, and contained structures from the 13th century onwards (Evans, 2008, 7, 13). The development of a cemetery after c.1450 suggests the paving of the Yard was at best partial, although this is not disputed by the 17th and 18th century images. No references to a late medieval cemetery in this area were identified during the desk-based assessment (Evans, 2008) and the author is not aware of any other references, although subsequent research may reveal one. The nearby 'X' trenches excavated in the 1970s recorded a similar density of burial, which cut down through surfaces dated between the late 13th and 15th centuries (Minster Archive). It is possible that these relate to the Piazza burials and further research may confirm this, and the limits of the cemetery. Although nothing particularly unusual was noted in the burials, which reflected a previously established pattern of greater relative affluence for later medieval burials in the immediate Minster area, their presence suggests that further research into the evolution of Minster yard is required.

The documented 17th century clearance of the Yard is supported by the 2012 Piazza archaeology, and the traces of 18th and 19th century boundaries and drainage, whilst not directly identifiable in contemporary images, do nevertheless support the generally accepted form and sequence of the Yard's development. The only possible exception to this is the structure found in the far eastern area in Trench M and 2008 evaluation trench 1, originally interpreted as the Deanery but on the basis of the stratigraphy must relate instead to a later Yard structure otherwise unrecorded in the documentary sources.

7. LIST OF SOURCES

http://mapapps.bgs.ac.uk/geologyofbritain/home.html accessed 06/01/2014

York Minster Excavation Archive, accessed February 2012 – January 2014

8. ACKNOWLEDGEMENTS

Research and author	I.D.Milsted
Illustrations	I.D.Milsted
Editor	D.Aspden

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APPENDIX 1: FIGURES AND PLATES

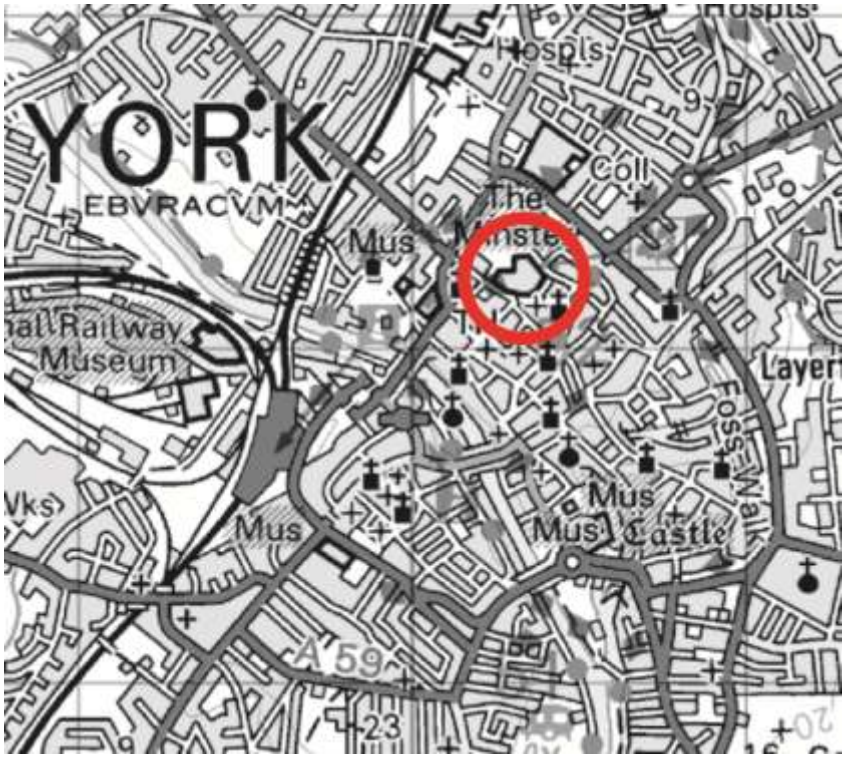

Figure 1 Site location

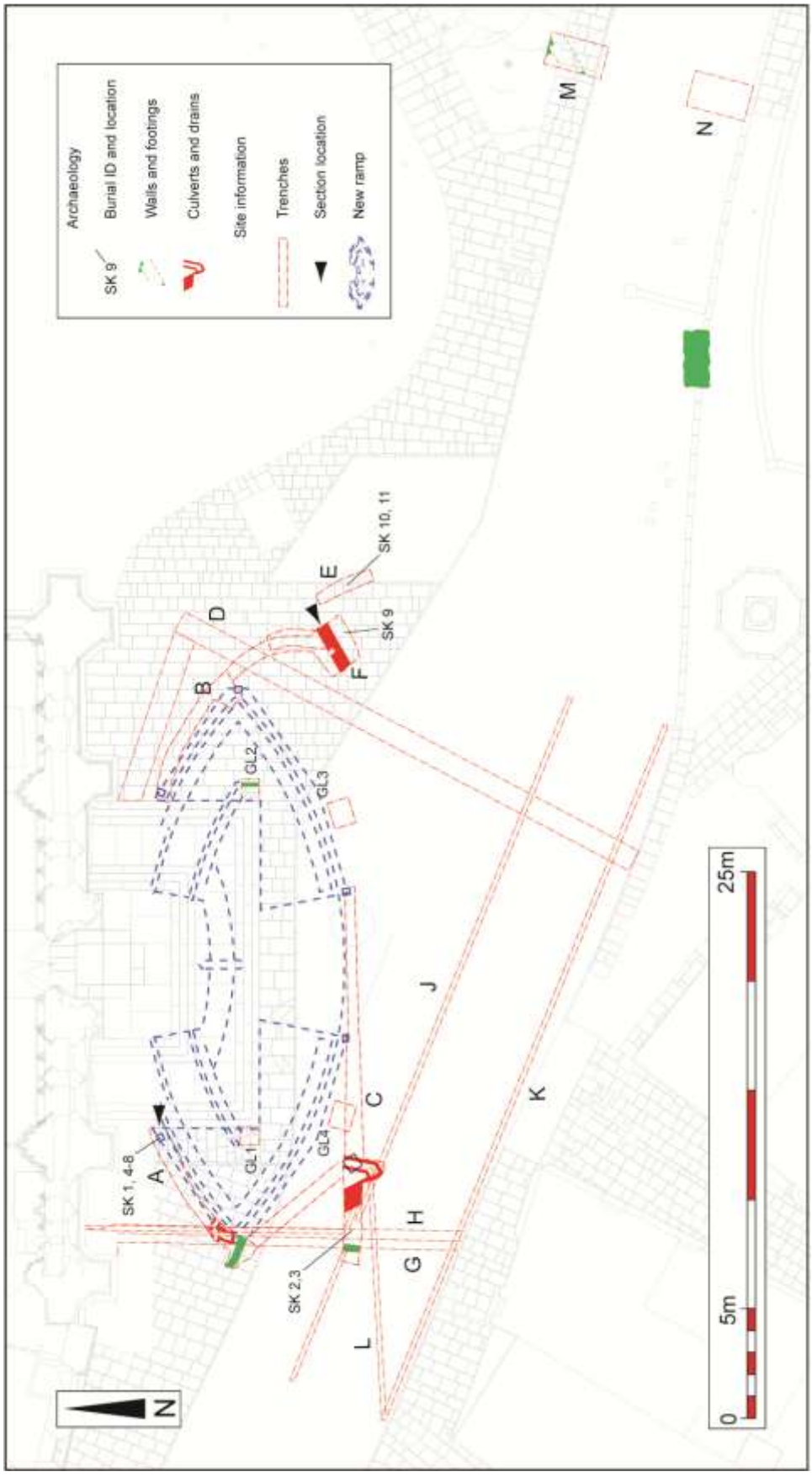

Figure 2 Location of works, trenches and archaeology on the pre-2012 OS map

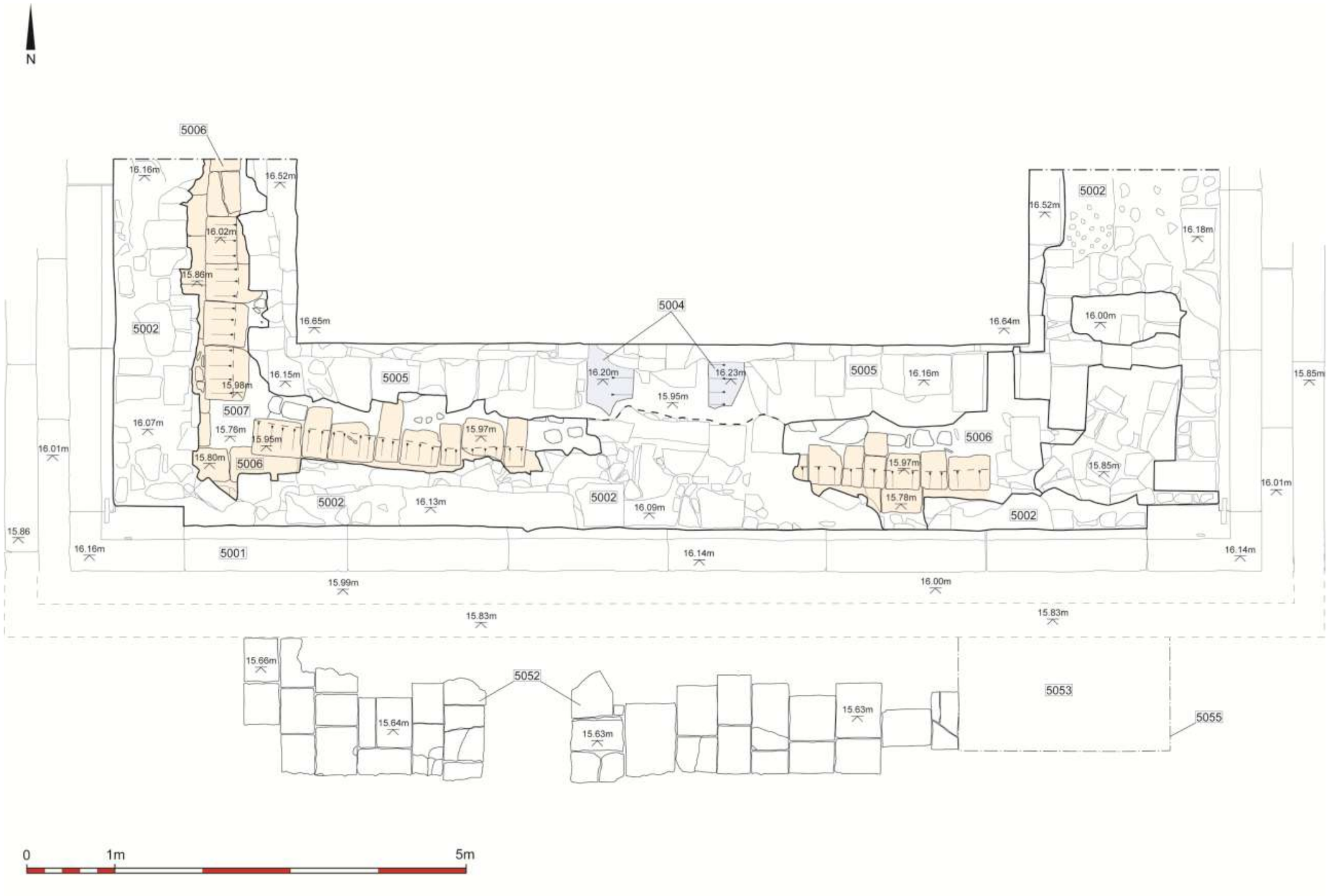

Figure 3 Detailed plan of the South Transept steps excavation

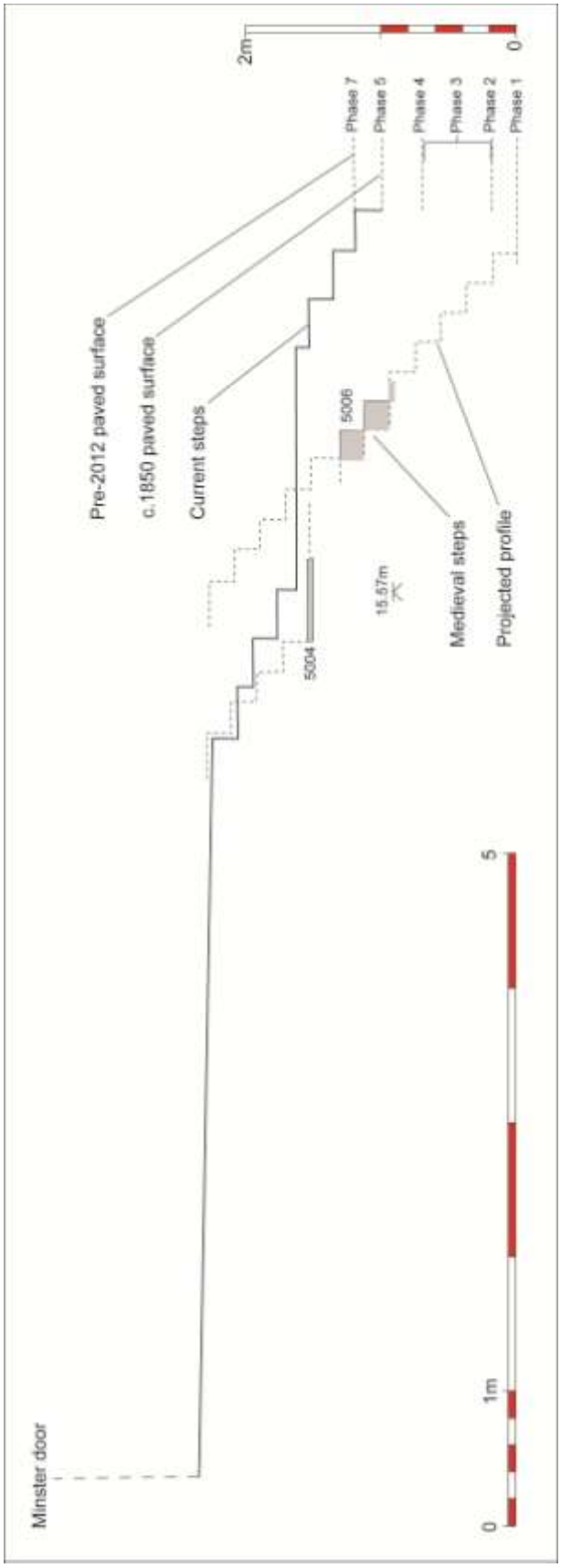

Figure 4 Profile of current steps and projected profile of steps 5006 and 5004

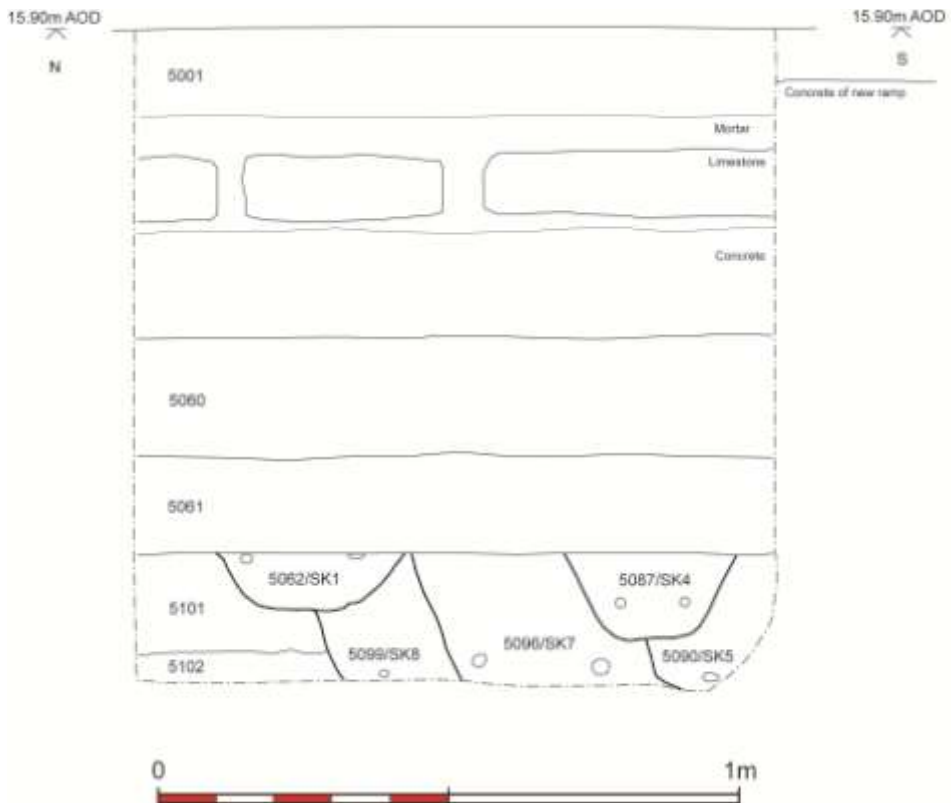

Figure 5 West facing section at northern end of Trench A

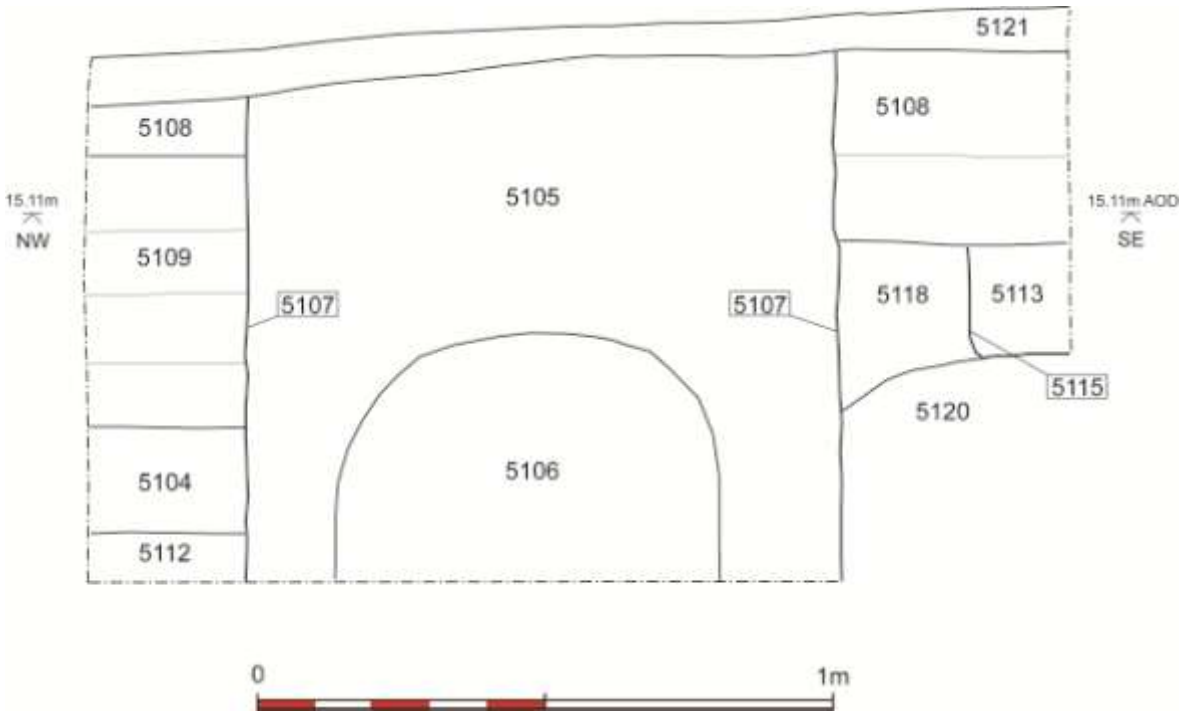

Figure 6 South-west facing section of Trench F

Plate 1 Exposed steps 5006 looking north west

Plate 2 Exposed steps 5006 looking north east

Plate 3 Exposed steps 5006 looking west

Plate 4 Exposed steps 5006 looking east

Plate 5 Additional exposed area of 5006 on western side

Plate 6 Additional exposed area of 5002 on the eastern side

Plate 7 12th century shaft fragments in situ in deposit 5002

Plate 8 12th century shaft fragments assembled

Plate 9 Wear lines on steps 5006, with earlier soil 5007, looking north

Plate 10 Detail of 5006 coursing on western side, looking south

Plate 11 Deposit 5002 overlying steps 5006, looking west

Plate 12 Deposit 5002 overlying 5006, with levelling 5005 in foreground, looking south

Plate 13 5004, either side of the scale, looking north

Plate 14 Construction of new ramp wall into 1848 steps, looking south west

Plate 15 Phase 1 cobbled surface 5112, north to top

Plate 16 Trench F looking west, showing culvert 5106, cobbles 5112 and SK9 grave on left

Plate 17 Trench F with SK9/5114 in situ, looking south west

Plate 18 Trench E to left with initial excavation of Trench F to right, looking south east

Plate 19 Trench F south-west facing section

Plate 20 View of Trench A northern end, looking south east

Plate 21 Trench A west facing section

Plate 22 Skeleton 1, context 5062, looking south

Plate 23 Skeleton 2, context 5070, looking south

Plate 24 Skeleton 3, context 5076, looking north east

Plate 25 Skeleton 4, context 5087, looking north

Plate 26 Skeleton 5, context 5090, looking north

Plate 27 Skeleton 6, context 5093, looking east

Plate 28 Skeleton 7, context 5096, looking south

Plate 29 Skeleton 8, context 5099, looking east

Plate 30 Skeleton 9, context 5114, looking north

Plate 31 Skeleton 10, context 5123 (top) and Skeleton 11, context 5126, looking north

Plate 32 Holes in South Transept south wall for drain in Trench H, looking north

Plate 33 Culvert 5079 in Trench C, looking east

Plate 34 Manhole 5073 in Trench A, looking north

Plate 35 Wall 5084 in Trench A, looking east

Plate 36 Wall 5140 in Trench GL2, looking south

Plate 37 Paving 5052, looking east

Plate 38 Foundation 5134 in Trench M, looking north-east

Plate 39 Foundation 5135 to left and infill rubble 5139 to right, looking south-west

Plate 40 Paving and make-up deposits of Deangate, looking south-east in Trench M

APPENDIX 2: POTTERY BY A. JENNER

Twenty-eight sherds of pottery were retrieved (see Table 1). They range in date from the Roman period to the 19th century. Roman material is limited to two small abraded sherds, perhaps towards the middle of the period of Roman occupation, though their size and level of abrasion suggests that they could be residual.

One sherd from C5095 was thought to be a possible Anglian type but the context is spot dated to the late 16th/17th century by the presence of one sherd of oxidised Ryedale ware.

It is noticeable that there are no Anglo-Scandinavian sherds which are not uncommon on many other sites in York. The paucity of Anglian and in particular Anglo-Scandinavian material may be due to a dearth of activity on the site at this time or the small sample size.

The medieval period is represented by one small scrap of late 12th/early 13th century York glazed ware and no more than two late 13th/early 14th century Brandsby-type ware sherds. One Humber ware sherd may be datable to the 15th century but another is of a later Humber type more common from the 16th century onwards.

Two tin glazed wares are described as abraded and may either be early types, or more probably intrusive in C5061 and possibly also in C5068.

Brown and black glazed earthenware pancheon and tankard or jug sherds are the only 18th century wares. White salt glazed fine table wares are noticeable by their absence as are cream wares which might indicate moderate wealth and status.

The emphasis on everyday earthenwares continues into the 19th century which is represented by banded slipwares and Heworth type earthenwares.

Transfer printed ware and white earthenware table wares were common and though finer than the earthen kitchen wares, do not indicate any particular level of wealth.

There are no further recommendations for work.

Context	Find	Quantity	Dating	Details	Phase
5002	BF16	5	18th century	1 brown-glazed tankard sherd, 2 Black wares, including possible jug base, 1 oxidised Ryedale strap handle, 1 open pancheon form	5
5008	BF17	1	17th/18th century	1 oxidised Ryedale ware	
5009	BF18	3	19th century	1 transfer-printed ware, 1 banded slipware, 1 brown glazed, yellow stripe pancheon	
5010	BF25	1	13th century	1 scrap of York Glazed ware	
5060	BF26	1	17th/18th century	1 rim from brown-glazed jar or jug	5
5061	BF27	4	16th/17th century	1 abraded tin-glazed earthenware, 1 Brandsby-type ware, 2 Ryedale	4
5067	BF28	5	19th century	1 Heworth-type vessel, 3 joining sherds of transfer-printed ware, 1 white glazed earthneware with streaked painted design	5
5068	BF29	2	16th century	1 very abraded tin-glazed earthenware, 1 late Humber ware	4
5086	BF30	1	Roman	1 sliver of samian	3
5095	BF31	2	16th/17th century	1 coarse ? handmade oxidised coarsely gritted sherd (?Anglian), 1 oxidised Ryedale	3
5098	BF32	1	13/14th century	1 sherd of ?Brandsby-type ware	3
5105	BF33	1	15th century	1 Humber jug sherd	5
5113	BF34	1	Roman	1 abraded Roman grey ware	3

Table 1 Pottery by context

APPENDIX 3: SMALL FINDS BY N. ROGERS

A total of seven small finds were recovered from deposits in these excavations. Three of the small finds comprised iron nails (SFs4-6), all of which derived from Phase 3 grave fills and are thus presumably coffin nails. Also from a Phase 3 grave fill, a copper alloy pin fragment (SF8) is possibly part of a shroud pin.

The three other small finds (SFs3, 7, 9) derive from Phase 5 make-up levels, and comprise spillage from lead alloy working (SF3), an unidentified copper alloy fragment (SF7), and fired clay tobacco pipe fragments including a bowl of the first half of the 17th century (SF9).
No further work on these finds is recommended, and all could be discarded.

Small Find	Context	Material	Keywords
SF3	5002	Lead Alloy	Spillage
SF4	5086	Iron	Nail Fragment
SF5	5086	Iron	Nails
SF6	5089	Iron	Nail
SF7	5060	Copper Alloy	Fragment
SF8	5113	Copper Alloy	Pin Fragment
SF9	5002	Fired Clay	Tobacco Pipe

Table 2 Small finds by context

APPENDIX 4: HUMAN BONE BY R.WHYTE

1. SUMMARY

Osteological analysis of the skeletal remains from York Minster was undertaken in order to establish age, sex and pathology where possible. Nine partially recovered articulated individuals were analysed, in addition to disarticulated human bone found in the grave backfills. The articulated individuals consisted of seven adults and two juveniles. Within the adults there were three males, one female, and three of undeterminable sex. Preservation varied slightly between the individuals but was generally good. Analysis revealed that the individuals were from the medieval period, and of relatively high status.

2. INTRODUCTION

A total of nine partial skeletons were submitted for osteological analysis to determine the age, sex, stature, pathology and ultimate identity of each individual. Additionally seven bags of disarticulated human bone collected from the graves' backfills were submitted for analysis. Quantitative demographic analysis was not performed due to the small number of individuals recovered. Individuals were recorded and described individually to gain an overall understanding of the group as a whole. The skeletal remains were also assessed for potential for further research and analysis.

3. METHODOLOGY

MINIMUM NUMBER OF INDIVIDUALS

A count of the minimum number of individuals (hereafter MNI) was carried out as standard procedure, in order to establish the minimum number of people represented by both the articulated and disarticulated bone recovered. The MNI was calculated by counting all major skeletal elements; including cranial elements, long bones, and pelvises. Each of these types of skeletal elements were then divided into complete and incomplete, before being subdivided by side, sex and age category where possible. The greatest number was then taken as the MNI. The MNI of a site is often lower than the true number of skeletons originally interred, but demonstrates the minimum number of individuals that can be proved to be present.

ARTICULATED BURIALS

The nine articulated burials were laid out anatomically in laboratory conditions. They were then analysed at macroscopic level under laboratory lighting in order to establish sex, age and pathology of each individual, as detailed below.

3.2.1 DETERMINATION OF SEX

For each adult individual, sex was determined through consideration of a variety of factors across the body. Five sexually dimorphic cranial features were recorded; the nuchal crest, the mastoid process, the supraorbital margin, the supraorbital ridge, and the mental eminence. These features were each scored on a scale from 1 – 5, where 1 denotes a probable female, 2 a possible female, 3 indeterminate, 4 a possible male, and 5 a probable male. This was done with reference to diagrams of each stage from Walker, in Buikstra and Ubelaker (1994).

Four elements of the pelvis were recorded to aid the determination of sex. The greater sciatic notch was scored in a scale from 1 – 5, again where 1 denotes probable female, to 5 which denotes a probable male. This was done with reference to diagrams from Walker, in Buikstra and Ubelaker (1994). Additionally the ventral arc and subpubic concavity, which are only present in females, were also used as sexing factors. Similarly the difference in the shape of the medial aspect of the ischiopubic ramus, which is sharp in females and blunt in males, was taken into consideration.

Once all available factors were recorded the results were then considered as a whole for each individual, in order to give a probable sex.

Although juvenile sex determination is sometimes attempted it is considered controversial, because the human skeleton only develops truly sexually dimorphic traits during puberty. Methods to determine juvenile sex have high error rates, and are widely discouraged (Saunders 2000, Scheuer and Black 2000, Roberts 2009). Therefore in the case of juvenile remains in this assemblage sex determination will not be attempted.

DETERMINATION OF AGE

As with sex, age was determined using a number of different factors across the body. For juvenile individuals age was estimated through observation of the stages of fuision and epiphyseal closure for each skeletal element, with reference to Schaefer, Black and Scheuer (2009). The stage of eruption of dentition was also considered, with reference to Ubelaker (1979), Hilson (1996), and Schaefer, Black and Scheuer (2009).

The age of adult individuals was recorded using a range of factors. The surface of the pubic symphasis was observed with reference to Todd's (1920) ten age phases of pubic symphasis modification, and the Suchey-Brooks six phase pubic symphasis scoring system from Brooks and Suchey (1990). Similarly the auricular surface was observed with reference

to Lovejoy's scoring system of modal changes to the auricular surface with age from Lovejoy et al. (1985). The level of dental attrition was also recorded with reference to Brothwell (1981).

Where applicable, pathological conditions commonly associated with age have been, where applicable, used as a secondary indicator of age. However, as advised in White and Folkens (2005), degenerative conditions have not been used as a primary deciding factor for age of individuals.

Once all available factors were recorded the results were then considered as a whole for each individual, in order to give an estimate of age. Each individual had been assigned into one of the following categories; foetus (up to 40 weeks in utero), neonate (around time of birth), infant (newborn to 1 year old), juvenile (1-12 years old), adolescent (13-17 years old), young adult (18-25 years old), middle adult (26-45 years old), mature adult (46+ years old), and adult (where age could not be determined more accurately than 17+). Where possible, more specific age approximations have been suggested, however these are definitive.

PATHOLOGY

For each individual all skeletal elements were examined closely in order to ascertain the presence of any pathological conditions. This was done in reference to Brothwell (1981), White and Folkens (2005), Waldron (2009) and Roberts and Manchester (2010).

STATURE

Where possible, stature was estimated for each adult individually through measurement of complete long bone length. These lengths were then placed into Trotter's (1970) formula for stature estimations.

NON-METRIC TRAITS

Non-metric traits are skeletal anomalies such as foramina, additional facets and sutures found in a minority of skeletons. Most are thought to have a genetic link, while a small number are considered to be occupational stress markers. Therefore any non-metric traits present in the individuals were recorded, with reference to Berry and Berry's (1967) 30 points of cranial non metric variation, and Finnegan's (1978) 30 points of sub cranial non-metric variation.

BACKFILL CONTEXTS

Of the nine graves excavated, seven had backfills that contained human remains (SK1, SK3, SK4, SK5, SK7, SK8, SK9). These human remains were also analysed under laboratory conditions. As these remains were disarticulated they were primarily recorded to contribute to the MNI. Therefore the following basic variable were recorded for each bone; skeletal

element, completeness, siding, possible sex, approximate age category, and the presence of any pathological conditions.

4. RESULTS

MNI

The MNI for the entire skeletal assemblage is 11. This is the lowest possible estimate of individuals present. However given that the majority of the remains were partially truncated by the Minster steps, articulated and in separate grave cuts, the actual number of individuals interred is most likely to be higher than this.

SK1

SK1 was partially recovered, adjacent to the 19th Century steps of the Minster entrance. The upper part of SK1 extended beyond the Northern limit of the excavation. Similarly the distal end of SK1 extended beneath the 19th Century steps. SK1 was found in a supine position, in an east to west orientation, with both hands crossed over the pelvis. No coffin or grave goods were recovered. It is thought that this was possibly a medieval shroud burial.

PRESERVATION

The preservation of SK1 was moderate. Due to the truncation of the lower part of the individual by the 19th century steps, and the upper part extending beyond the limit of excavation, only an estimated 30% of the individual was recovered. Within the recovered percentage of the individual, most skeletal elements were present. The right clavicle was complete, as was the right scapula, with some fragmentation around the medial margin. The right humerus, radius and ulna were all complete. In the right hand all but one of the carpals were present and complete; with only the pisiform missing. All right metacarpals were present, as were all the right proximal and medial phalanges. The third, fourth and fifth right distal phalanges were also present. In the left arm, only the radius was complete. The distal third of the left ulna is missing. All left carpal bones were present, including the pisiform. Similarly all left metacarpals, proximal, medial and distal phalanges were present. The sternum and manubrium were almost complete, with only a small amount of fracturing around the top of the sterna body. The ribs were some of the most fragmented of the skeletal elements present. Nine right and seven left rib heads were identified. Additionally six right and three left rib sterna ends were identified, and 7 right and 11 left rib shaft fragments.

The pelvis was similarly fragmented. Three major fragments of the left hip were recovered. The left illium was intact; however it had broken way from the pubis and the ischium. The

right hip was fragmented in six separate parts. The right illium was found in three fragments with a physical fit. A fragment of the right ischium was also found as well as two small fragments of the pubis.

The proximal thirds of both femurs were present and intact. The sacrum was completely recovered although was in two pieces. All five lumbar vertebrae were recovered, with all vertebral processes intact. Ten thoracic vertebrae were recovered and are thought to be T2-T11, with T1 and T12 missing. No cervical vertebrae were present.

SEX

No cranial elements were recovered, therefore limiting the available sexing factors. However many sexually characteristic pelvic features were present. The greater sciatic notch was very narrow, matching point 5 of Buikstra and Ubelaker's (1994) scale; suggesting a probable male. The ventral arc and the subpubic concavity were not present, again suggesting a possible male. The medial aspect of the ischiopubic ramus was flat and blunt, also suggesting a male. Overall all available sexing factors suggest that the individual was probably male.

AGE

Neither the maxilla nor the mandible was recovered, meaning assessment of age through dental wear was not possible. However assessment of age using the pubic symphysis and auricular surface was possible. The pubic symphysis modification was rated as phase 4 when compared to the Suchey-Brooks (1990) method, suggesting an age between 23-57 years old. It was rated as phase VII against Todd's (1920) method, suggesting an age between 35-39 years old. The auricular surface was rated at phase 4 of Lovejoy's (1985) method, similarly suggesting an age between 35-39 years old. Overall SK1 appears to be a 'middle adult'; potentially in their mid to late 30s.

STATURE

Three complete long bones were recovered from SK1; the right humerus, radius and ulna. Therefore a rough estimation of stature could be made. Using Trotter's (1970) formula for calculating male stature, the right humerus suggested a stature of 158.538 cm (±4.05. The right radius suggested a stature of 157.634cm (±4.32). The right ulna suggested a stature of 158.04cm (±4.32). Overall these suggest an individual between 157 – 158cm in height (±4.32). However it should be noted that this estimation is made on only three long bones, all from the right arm.

NON METRIC VARIATION

The only non metric trait observed was a pre-auricular sulcus on the left side of the pelvis.

PATHOLOGY

No pathological lesions or signs of pathological conditions were observed.

SUMMARY

Osteological analysis of SK1 has demonstrated that the individual appears to be an adult male, roughly 158cm tall and potentially in his mid to late 30s. The individual shows no signs of pathology.

SK2

SK2 was a partially recovered juvenile burial. The grave was truncated to the west by the 19th century Minster wall. SK2 was found in a supine position, orientated east to west. No coffin materials or fittings were found, nor were any grave goods recovered.

PRESERVATION

The preservation of SK2 was moderate. Apart from the left ischium, only the legs and feet were recovered. The left femur was intact, with only the distal epithesis present. The right femur was fragmented and only partially preserved; the distal third of the femur and distal epithesis were recovered, as was a shaft fragment. Both left and right tibias were complete, and both had distal epiphyses present. Both left and right fibulas were roughly 2/3 complete, and were both missing the proximal third. In the left foot the calcanius and all metatarsals were recovered. In the right foot the calcanius, talus and all metatarsals were recovered.

SEX

Estimation of sex for SK2 was not attempted because it was a juvenile skeleton.

AGE

Due to the limited number of skeletal elements present, estimation of age was based solely on the development and fusion of the available elements. It is estimated that the individual was between the ages of 3-5 years old.

STATURE

Stature calculations were not attempted because they are deemed to be inaccurate for juvenile remains.

NON METRIC VARIATION

No non metric traits were observed.

PATHOLOGY

No pathological lesions or other signs of pathological conditions were observed.

SUMMARY

Osteological analysis of SK2 has demonstrated that the individual was between the ages of 3-5 years old. Due to the limited number of skeletal elements present, no other information can be provided about the individual.

SK3

SK3 was only partially recovered, due to being truncated by a 19th century culvert to the east of the burial. The burial also extended beyond the northern limit of the excavation. SK3 was found in a supine position, orientated east to west. No coffin materials or fitting were found, and no grave goods were recovered.

PRESERVATION

The preservation of SK3 was poor. Very few skeletal elements were recovered, and those that were present were highly fragmented. The left clavicle was recovered completely. The sternum was partially preserved, as was the manubrium. The right first rib was present, as well as a further nine right rib heads. Four right rib sterna ends were recovered, as well as an additional ten right rib shaft fragments. Three left rib sternal ends and four left rib shaft fragments were found. An additional eleven unidentifiable highly rib shaft fragments were found. All seven cervical vertebrae were recovered in intact condition. Thoracic vertebrae 1-10 were recovered and were mostly intact, with only a small number of transverse processes missing. The mandible was complete; however it was recovered in three pieces forming a physical fit. The maxilla was recovered in two pieces. The remainder of the cranium was partially recovered, however was highly fragmented. The occipital, parietal, frontal and temporal bones were mostly recovered, however were fragmented into a total of 28 large pieces. A large number of extremely fragmented cranial pieces were also recovered.

SEX

Due to the limited preservation of the individual only one sexing criteria was available. This was the mental eminence, and was comparable with point 4 of Buikstra and Ubelaker's (1994) scale, suggesting that the individual was a possible male. However it should be noted that his is only one of many sexing factors and thus cannot be taken as a firm conclusion.

AGE

No pelvis was recovered; therefore no pelvic aging techniques could be employed. Similarly, although the maxilla and mandible were both present, the extent of ante and post mortem tooth loss meant that age estimation through dental wear was also not possible. Therefore no age estimation beyond 'adult' could be made.

STATURE

No long bones were recovered; therefore calculation of stature was not possible.

NON-METRIC VARIATION

Non non-metric traits were observed.

PATHOLOGY

SK3 showed signs of a number of pathological conditions. Osteophyte formation was found on the first, eighth, and ninth thoracic vertebrae. Osteophyte formation was also found on the vertebral bodies of the third, fourth, fifth, sixth and seventh cervical vertebrae. This is characteristic of degenerative joint disease, and is one symptom of osteoarthritis.

The right articular facets of the sixth and seventh demonstrated eburnation. When combined with the osteophyte formation, this is a certain sign of osteoarthritis.

The individual also demonstrated extensive ante mortem tooth loss. It was observed that on the mandible the left first, second and third molars, the left first premolar, the right second premolar, and the right first second and third molars were all lost ante mortem. On the maxilla the left first, second and third molars, the left canine, the right canine, the right first, second and third molars were also all lost ante mortem. There is no evidence of periodontal disease and thus no cause for ante mortem tooth loss can be found.

In addition to the ante mortem tooth loss, there are also caries in the left lower second premolar, the lower right second premolar, the lower left canine, and the lower right canine.

SUMMARY

Osteological analysis of SK3 has revealed that the individual was an adult, and possibly male (although this cannot be said with any great certainty). The individual was suffering from osteoarthritis of the spinal column, in both their thoracic and particularly their cervical vertebrae. They also displayed significant ante mortem tooth loss and four caries in their lower dentition. Heavy tooth loss and a high number of caries may be indicative of a diet consisting heavily of starch-rich plant foods. Although no accurate age estimation can be

given beyond 'adult', the presence of osteoarthritis and extensive tooth loss and decay do suggest that this individual may have been a more mature adult.

SK4

SK4 was partially recovered. The distal end of the skeleton was truncated by the Minster steps to the east. SK4 was found in a supine position with hands crossed over the pelvis, orientated east to west. No grave goods were found. No coffin materials or fittings were found, however at the time of excavation it was noted that the hands were scattered, which was thought to be indicative of a coffin burial rather than a shroud burial.

PRESERVATION

The preservation of SK4 was good. The main body of the cranium, including the parietal and occipital bones, were present and intact. The frontal bone was present, although fragmented from the rest of the cranium in two pieces. The temporal bones were also present, although also detached from the cranium. The maxilla was present, in two pieces. The rest of the cranium was also present, however was extremely fragmented into a large number of bone chips. The mandible was present and partially complete; fragmented in three places; the left condyle and left coronoid process were missing.

The hyoid was present but highly fragmented. The left clavicle was present and complete. The right clavicle was also present, however was recovered in three pieces; fragmented at both the sterna and acromial ends. The left scapula was partially recovered. The glenoid fossa, acrimonion, lateral margin and inferior angle were rpesent, along with a number of small fossa fragments. The right scapula was similarly fragmented, with only the scapula spine and the lateral margin partially intact, along with a number of small fossa fragments. The sternum and manubrium were both partially recovered. Nine right rib heads were recovered, along with two right rib sternal ends and ten right rib shaft fragments. Four left rib heads were recovered, along with seven left rib sterna ends and nine left rib shaft fragments. The right humerus was present and almost complete, although was missing the lateral epicondyle. The left radius was present, however was missing the radial head. The left ulna was present, recovered in two pieces. All right carpal bones were present, as were all right metacarpals and all right proximal, medial and distal phalanges. Similarly the left hand was completely intact, with all carpals, metacarpals, proximal, medial and distal phalanges present. The first and second cervical vertebrae (the axis and atlas), were present and complete. The third, fourth, fifth, sixth, and seventh cervical vertebrae were also present, however were extremely delicate and fragmented. Thoracic vertebrae four to twelve were present and were more robust, however all had missing transverse processes. All lumbar vertebrae were present and intact. The sacrum was also present and intact. The pelvis was

partially recovered; The left illium and acetabulum were intact. There was also a fragment of the left superior pubic ramius, and fragments of the left ischial tiberosity. The right illium and acetabulum were present but more fragmented. A fragment of the right superior pubic ramius was also recovered. The proximal and medial thirds of both the left and right femurs were recovered; the distal thirds were truncated by the Minster steps.

SEX

The good preservation of SK4 meant that a good number of sexing factors were available. All cranial features in Buikstra and Ubelaker's (1994) scoring system were present. The nuchal crest corresponded with point 4, suggesting a possible male. The mastoid process corresponded to point 2, suggesting a possible female. The supraorbital margin corresponded with point 3, which is undetermined. The supraorbital ridge corresponded with point 4, suggesting possible male. Lastly the mental eminence corresponded with point 2, suggesting a possible female.

The only pelvic sexing feature was the greater sciatic notch, which corresponded with point 4, suggesting a possible male.

Overall the available sexing factors grouped between the middle of the scale, giving a generally inconclusive picture. Point four, or possible male, was the most frequent rating. Additionally the greater sciatic notch, commonly considered to be one of the most reliable sexing factors, was rates as possible male. Therefore it is concluded that SK4 was a probable male.

AGE

The extent of ante and post mortem tooth loss made analysis of age from dental wear impossible. Fortunately the pelvis was available for analysis. The pubic symphysis modification was comparable with phase five of the Suchey-Brooks (1990) method, suggesting an age between 27-66 year old. When compared with Todd's (1920) method it was rated at phase IX, suggesting an age between 44-50 years old. Examination of the auricular surface in comparison to Lovejoy's method rated at phase 7, suggesting an age of 50-59 years old. When all available aging factors were taken into consideration the individual was considered to be a mature adult, most likely between the ages of 40-60 years old.

STATURE

Two long bones were complete and intact; the right humerus and the right radius; and were therefore suitable for stature calculations. Using Trotter's formula for stature estimation, the

length of the right humerus suggested a stature of 171cm (±4.05), and the length of the right radius suggested a stature of 169cm (±4.32). It should be noted that these stature measurements were calculated using the formula for white males, and therefore works on the previous assessment that the individual was a possible male.

NON METRIC VARIATION

No non metric traits were observed.

PATHOLOGY

SK4 demonstrated a range of pathology. Extensive bone remodelling around the tooth sockets of the mandible suggest widespread ante mortem tooth loss. It is likely that only the left 1st incisor, left 2nd incisor, left canine and left 1st premolar were still present at death. The remaining teeth were recovered separately from the mandible, having been separated in post mortem loss. Similarly in the maxilla extensive ante mortem tooth loss was evident, with only the left 1st incisor, right 1st incisor, right 2nd incisor, right canine and right 1st premolar still present at death. These were again recovered separately from the maxilla after post mortem detachment.

Five teeth demonstrated dental caries; the lower left 1st incisor, the lower left canine, the lower left 1st premolar, the upper left 1st premolar and the upper right canine.

The 11th and 12th thoracic vertebrae demonstrated obvious osteophyte formation around the edge of the vertebral bodies on both the superior and inferior sides. This is indicative of degenerative joint disease (DJD). The extend of the osteophyte formation would suggest that the DJD is well developed.

Extensive osteophyte formation was observed in the left hip, around the edge of the acetabulum. A similarly severe amount of osteophyte formation was also observed around the left femoral head. Extensive eburnation was also observed on the anterior side of the femoral head. The combination of the osteophyte formation and eburnation was a certain sign of osteoarthritis in the left hip. The extent of both symptoms suggested that the osteoarthritis was very well developed.

SUMMARY

Osteological analysis of SK4 has revealed that the individual was a mature adult, possibly between 40-60 years old. The individual was a possible male. The individual is thought to have been approximately 169cm in height. The individual also suffered from a number of pathological conditions. Extensive tooth loss and dental caries may be indicative of a starch-

rich diet. The individual also suffered from osteoarthritis in the SIDE hip. It should be noted that extensive tooth loss, tooth decay and osteoarthritis are more prevalent in mature adults, therefore supporting the age estimation of 40-60 years old.

SK5

SK5 was partially recovered. It was truncated to the west by cut 5094. The distal end of the skeleton also extended beyond the south east limit of the excavation, truncated by the 19th century minster steps and 21st century ramp. The individual as found in a supine position, orientated east to west, with hands crossed over the pelvis. No coffin materials or fittings were apparent, and no grave goods were recovered.

PRESERVATION

The preservation of SK5 was fair. Due to the truncation of cut 5094, the 19th century steps and the 21st century ramp, the individual's right torso was largely not recovered, nor was the body from the knees down. The parietal and occipital bones of the cranium were partially recovered. The mandible was also partially recovered, with only the right condyle and mandible neck missing. The hyoid was recovered but was highly fragmented. Both clavicles were present and complete. The sternum and manubrium were present but only partial. The ribs were the least well preserved skeletal elements. Ten right rib heads and nine left rib heads were recovered, as were six left rib sterna ends and one left rib shaft fragment. The left scapula was recovered almost completely, with only slight fragmentation around the medial margin. The left humerus, radius and ulna were all present and complete. All left carpals and metacarpals were present. The second, third, fourth and fifth proximal phalanges were present, as were the third, fourth and fifth medial metacarpals, and the fifth distal phalange. All vertebrae were present except the 1st cervical (or atlas). The vertebral processes were all present and mostly attached, with some spinous processes in the thoracic and cervical vertebrae separated from their vertebral bodies. The sacrum was present and almost intact, with only the apex missing. The pelvis was partially recovered, with the left illium, left aretabular fossa and left ischium intact. The proximal and medial thirds of the left femur were recovered in two pieces.

SEX

Due to the limited preservation of the cranium and pelvis, only two sexing characteristics were available for analysis. The mental eminence corresponded to point 3 of Buikstra and Ubelaker's (1994) sexing scale; and was therefore an undeterminable feature. In the pelvis, the greater sciatic notch corresponded with point 2 of the scale, suggesting a possible female. Therefore on the evidence available it is deemed that this individual was a possible

female, although it is important to note that this is not conclusive given that only two characteristics were available.

AGE

Due to the partial preservation of the pelvis, the pubic symphysis was not available for age estimation. Fortunately the auricular surface was, and dental preservation in the mandible allowed for tooth wear analysis. When compared with Lovejoy's (1985) method the auricular surface corresponded to phase 4, suggesting an age between 35-39 years old.

Due to partial preservation of the mandible the right third molar was not present. The left third molar was present in the mandible but not erupted. Eruption of the third molar usually happens around the age of 20. This would suggest an age of 20 or lower, however it should be noted that in some cases the third molar can erupt slowly, or at a later age. Similarly, the third molar does not always erupt. Therefore this alone is not a deciding factor.

The dentition of SK5 was in a notably good condition. Analysis of the dental wear of the mandible using Brothwell's (1980) standards suggested an age range of 25-35 years old. Similarly, using Miles's standards suggested an age range of 25-30 years old.

Overall the various aging criteria suggest a wide age range. Although the left third molar had not erupted, all other factors suggested an age between 25-39 years old.

STATURE

Three complete long bones were recovered; the left humerus, radius and ulna. These were all used to calculate possible stature, using Trotter's (1970) method. The left humerus suggested a stature of 161.122cm (±4.45). The left radius suggested a stature of 158.736 cm (±4.24). The left radius suggested a stature of 159.813 (±4.30). It should be noted that these were calculated using the formula for white females, based on the previous estimation of sex.

NON METRIC VARIATION

Due to the limited preservation many areas of non metric variation could not be analysed. One non metric trait was recorded; a pre-auricular sulcus on the left illium.

PATHOLOGY

SK5 demonstrated pathology throughout the spinal column. The 1st, 2nd and 3rd lumbar vertebrae had a small amount of osteophyte formation in their vertebral bodies. The 3rd to 12th thoracic vertebrae also showed more developed osteophyte formation in the vertebral bodies. This suggests degenerative joint disease (DJD) throughout the spinal column. The

level of osteophyte formation suggests that the DJD is in its early stages; however it is widely spread throughout the vertebrae.

SUMMARY

Osteological analysis of SK5 has revealed an adult individual, thought to be between the ages of 25-39 years old. The individual is possibly female, although it should be noted that only one determining sexing characteristic suggested this. The individual was between 158-161cm (±4.45) in height. The individual demonstrate one non metric trait; a pre-auricular sulcus on the left illium. The individual also demonstrated early signs of DJD throughout the thoracic and lumbar vertebrae.

SK6

Only the feet of SK6 were recovered; the rest of the individual extended beyond the western limit of the excavation. It is possible that the individual was buried in a supine position, in an east to west orientation. No coffin materials or fittings were apparent, nor were any grave goods recovered.

PRESERVATION

Only the feet of SK6 were recovered, however preservation of the recovered skeletal elements was good. The lower third of the left tibia and fibula were recovered. All left and right tarsals were recovered, as were all left and right metatarsals and proximal phalanges. The left second and fourth, and right second, third and fourth medial phalanges were also recovered, as were all right distal phalanges, and the first, second, fourth and fifth left distal phalanges.

SEX

Due to the limited number of skeletal elements recovered, estimation of sex was not possible.

AGE

Due to the limited number of skeletal elements recovered, estimation of age was not possible beyond the observation that the individual was an adult.

STATURE

No long bones were recovered completely; therefore estimation of stature was not possible.

NON METRIC VARIATION

No non metric traits were observed.

PATHOLOGY

No pathology was observed.

SUMMARY

Overall very little detail can be given about SK6 beyond the fact that the individual was an adult.

SK7

SK7 was partially recovered. The burial was truncated to the west and south by grave cuts 5994 and 5091. Additionally it was also truncated to the east by the minster steps. Consequently only the left side of the torso was recovered. The individual was found in a supine position, orientated east to west. No coffin materials or fittings were apparent and no grave goods were found.

PRESERVATION

The recovered part of SK7 consisted of the left side of the torso only. Within this, preservation was fair. The left clavicle was present and complete. A small fragment of sternum was recovered. The first left rib was complete. Additionally ten left rib heads, four left rib sterna ends, and seventeen left rib shaft fragments were recovered. The left scapula was partially recovered but extremely fragmented. The left humerus was present and complete. The 4th to 12th thoracic vertebrae were recovered, as were the 1st and 2nd lumbar vertebrae. All recovered vertebrae had missing transverse processes on the right side.

SEX

Due to the limited number of skeletal elements recovered, estimation of sex was not possible.

AGE

Due to the limited number of skeletal elements recovered, estimation of age was not possible beyond the observation that the individual was an adult.

STATURE

One long bone, the left humerus, was recovered in its entirety. Therefore a basic estimation of stature could be made. Since no sex was determined, stature was measured twice using both the male and female stature formulae from Trotter (1970). If the individual was male, then the right humerus indicated a stature of 178.25cm (±4.05). If the individual was female then the right humerus indicated a stature of 175.57cm (±4.45). However it should be noted that these are calculated on just one long bone measurement.

NON METRIC VARIATION

No non metric traits were recorded.

PATHOLOGY

Two points of pathology were observed for SK7. Osteophyte formation was present on the vertebral bodies of the 12th thoracic and 2nd lumbar vertebrae. This is indicative of degenerative joint disease (DJD). The level of osteophyte formation suggests that the DJD was in its early stages.

Additionally the left 1st rib showed signs of inflammation, suggesting osteomyelitis, a bacterial bone formation.

SUMMARY

Osteological analysis of SK7 has revealed an adult individual of unknown age and sex. If the individual was male they were approximately 178.25cm (±4.05) in height. If the individual was female they were approximately 175.57cm (±4.45) in height. The individual showed signs of osteolyelitis in the left first rib, and also showed signs of early stages of DJD in their lower thoracic and upper lumbar vertebrae.

SK8

SK8 was partially recovered. The burial was heavily truncated to the west and south by grave cuts 5097, and was also truncated to the east by the steps of the Minster. Consequently only a few fragmented skeletal elements were recovered. The individual as buried in a supine position, orientate east to west. No coffin materials or fittings were evident, and no grave goods were found.

PRESERVATION

SK8 was the least preserved individual in the assemblage. The proximal half of the right humerus was recovered. One left rib head and one left rib sterna end were also recovered. The vertebral processes of the 3rd cervical vertebrae, and the vertebral bodies of the 4th, 5th, 6th and 7th cervical vertebrae were also recovered. Half of the vertebral body of the 2nd thoracic vertebrae were also recovered.

Additionally a tibia shaft fragment, a cranial fragment and a second left metatarsal were recovered with the individual. However it was unclear if these were part of the articulated individual, since they are from parts of the body thought to be truncated by other grave cuts and the Minster steps.

SEX

Due to the limited number of skeletal elements recovered sex could not be estimated.

AGE

Due to the limited number of skeletal elements recovered age could not be estimated beyond the observation that the individual was an adult.

STATURE

No complete long bones were recovered; therefore stature could not be estimated.

NON METRIC VARIATION

No non metric traits were recorded.

PATHOLOGY

Osteophyte formation was observed on the left superior aritcular process on the 4th cervical vertebra, and the right superior articular process of the 5th cervical vertebra. This is indicative of degenerative joint disease (DJD). Given the level of osteophyte formation, the DJD is thought to have been well developed.

SK9

SK9 was almost completely recovered. The individual was recovered adjacent to the 19th century culvert. The individual was a juvenile, found in a supine position, with their hands crossed over the pelvis, orientated east to west. No coffin materials or fittings were apparent, nor were any grave goods recovered. It is thought that this individual may have been shrouded at the time of burial.

PRESERVATION

The overall preservation of SK9 was good, although it was fragile in places. The cranium was partially recovered. The occipital and frontal bones were largely intact and partially fused along the sutures. The temporal bones were recovered separately. The zygomatic bones were also recovered, broken away from the cranium along the sutures. The mandible was also recovered in two pieces. Both clavicles were recovered intact. The right scapula was recovered completely; the left was partially recovered in a number of small fragments. The right humerus was recovered completely, with the proximal epiphysis. The right radius was recovered intact, but without any epithyses. The right ulna was completely recovered in two refittable pieces. The right 1st, 3rd and 4th metacarpals were recovered; the 3rd with its distal epiphysis. The right 1st, 3rd and 4th proximal phalanges were recovered, as was the right 3rd medial phalanx, and the 1st, 3rd and 5th distal phalanges. The proximal half of the left

humerus was recovered, along with the proximal and distal epithyses. The left radius was recovered intact, but without eithyses. The left ulna was partially recovered; missing the proximal third. The second and third left metacarpals were recovered, as were the 1st, 2nd, 3rd and 4th left proximal phalanges. The second and third left medial phalanges were also recovered, as were the 1st 2nd and 3rd left distal phalanges. The manubrium was recovered, as was the sternum, although it was not fused. All vertebrae were recovered intact. The sacrum was recovered completely, although it was also not fused. The left side of the pelvis was recovered completely, in three unfused elements; the illium, ischium and pubis. The right side of the pelvis was partially recovered; the illium was fully recovered, and the pubic was partially recovered in two fragments. The left femur was recovered intact, as was the femoral head, not yet fused. The right femur was also recovered in two refittable pieces, along with the unattached femoral head. The left tibia was recovered in three refittable pieces. The left fibula was partially recovered in three pieces, and was also missing its proximal third. Only the distal third of the right tibia was recovered, along with its unfused distal epiphysis and a fragment of proximal shaft. The right fibula was recovered in four refittable pieces. All tarsals and metatarsals were recovered for both feet. Additionally the 1st, 2nd and 3rd proximal phalanges were present for each foot, as was the 1st and 4th distal phalanges, and the 1st and 2nd right distal phalanges.

SEX

Due to the individual being sub adult, sex was not estimated.

AGE

Recording of the development and fusion of all skeletal elements present suggested an age between 6-14 years old. Analysis of tooth eruption with reference to Ubelaker's dental development diagrams demonstrated that the individual was 8 years old (±24months).

STATURE

Stature calculations were not made due to the individual being sub adult.

NON METRIC VARIATION

No non metric traits were observed.

PATHOLOGY

No pathology was observed.

SUMMARY

In summary SK9 represents a juvenile individual, most likely between the ages of 6-10 years old.

BACKFILL CONTEXTS

Disarticulated human bone was recovered from seven of the nine grave backfills. Their disarticulation meant that they could not be dates with any great certainty, and little information could be gathered beyond basic recording of skeletal element, age, siding and preservation. This information is displayed in table 1. Consequently the data gathered was primarily used to calculate MNI for the recovered skeletal material.

DISCUSSION

SUMMARY OF ANALYSIS

The osteological analysis of nine individuals and the associated backfill contexts dating to the medieval period from York Minster has provided an opportunity to increase current understanding of the individuals buried around this well known site. The number of individuals recovered in this excavation is too small to construct a demographic profile of the population. Consequently no quantitative interpretations can be made. However the individuals in this study can be compared to other sites in the area.

All of the nine individuals were buried in a supine position, orientated east to west, with no evidence of coffins and no grave goods. This type of burial is highly characteristic of the medieval period, and it is probable that they were shroud burials (Roberts & Cox 2003:222). The grave backfills were mostly rich in disarticulated human bone, suggesting a high rate of land reuse and intercutting of previous graves. This is again accepted to be a common practice of the medieval period (Roberts & Cox 2003:22). Additionally the range of individuals recovered demonstrates that this area was not designated for the burial of any particular section of society; both juvenile and adults, male and female individuals were buried in this area.

The pathology demonstrated in the nine individuals was relatively minor. The most notable condition was the well developed osteoarthritis demonstrated in SK4's left hip. However this is not surprising given that the individual was a mature adult. Several of the individuals demonstrated DJD in the spinal column, however in most cases this was not developed to a chronic stage. This is not an uncommon condition in middle or mature adults. Ante mortem tooth loss was seen in most individuals, and caries were also common. Again this is not

unusual for adults from this period. The prevalence of caries may be an indication that the individuals' diets included starch-rich plant foods.

WIDER CONTEXT

Large medieval cemetery sites in York have been widely excavated and well researched. Consequently the nine individuals in this report do not contribute vast new knowledge to our understanding of medieval York. It is, however, interesting to note how they fit into the wider picture. Holst (2005) gives a general comparison of the differences in cemetery populations in medieval York. She suggests that previously analysed skeletons from York Minster were probably the most privileged population in comparison to those of Fishergate House, St Andrews Fishergate, St Helen-on-the-walls, and Jewbury. This conclusion was drawn from the fact that previous York Minster individuals displayed low child mortality, low fracture rates, low infectious disease, and low dietary deficiencies, as well as tall stature, a majority living to old age and a high rate of age related conditions such as DJD and dental caries. The nine individuals analysed here fit in well with this assessment of the York Minster population. Low levels of disease and stress indicators, coupled with a high prevalence of age related conditions suggest that these individuals were of a privileged status.

RECOMMENDATIONS

Full osteological analysis was performed on the nine interments in this report. Therefore it is advised that further osteological analysis would not reveal any further information on these specific individuals. It is however advised that the information gained from them could be combined with previous analysis of other burials from York Minster, and any remaining individuals in store that have not been fully analysed or catalogued. Synthesising all this data together would provide enough information to create a demographic profile of the medieval population buried at York Minster.

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Backfill context number	Associated Skeleton	Skeletal elements present
5063	SK1	1 adult 1st lower right incisor
5075	SK3	1 adult medial phalanx 1 Juvenile distal end of right radius
5086	SK4	1 adult 2nd cervical vertebra (axis) 1 adult partial 1st cervical vertebra (atlas) 1 adult 2nd left metatarsal 1 adult 3rd left metatarsal 1 adult 3rd right metatarsal 1 adult distal end of right humerus 1 adult head of left rib 1 adult distal end of right fibula 1 adult femur shaft fragment 1 adult fibula shaft fragment 1 juvenile right orbital ridge 1 juvenile left orbital ridge 7 juvenile cranial fragments 1 juvenile left temporal bone fragment 1 juvenile left femoral head and neck 1 juvenile left clavical 1 juvenile right illium

		1 juvenile lumbar vertebra 1 juvenile proximal end of right radius 1 juvenile partial left scapula 1 juvenile right mandible head 1 juvenile thoracic vertebra 1 juvenile talus 1 juvenile vertebral spinal process 1 juvenile sacral fragment 1 juvenile femoral shaft fragment 1 juvenile left rib 1 juvenile right rib 2 juvenile metatarsals 1 juvenile metacarpal 1 juvenile patella 1 juvenile proximal tibial epithesis 1 juvenile distal tibial epithesis
5089	SK5	1 adult thoracic vertebra 1 adult thoracic vertebra 1 adult 1st cervical vertebra 1 adult 2nd cervical vertebra 1 adult left 1st rib 3 adult left rib fragments 1 adult right rib head 1 adult right rib shaft fragment 5 adult sternum fragments 1 adult manubrium 1 adult left rib head 1 adult right 2nd metatarsal 1 adult left 3rd metatarsal 4 adult proximal foot phalanges 1 adult medial foot phalanx 1 adult 4th right metatarsal 1 adult proximal end of ulna 1 adult rib shaft fragment 1 juvenile cranial fragment 1 juvenile left rib 1 juvenile left rib fragment

		1 juvenile partial sternum 1 juvenile right rib fragment 1 juvenile distal end of femur 1 juvenile left tibia 1 juvenile left calcanius 1 juvenile left radius distal end 1 juvenile proximal end of fibula 1 juvenile fibula shaft fragment 1 juvenile right femoral head 1 juvenile proximal radial epithesis 1 juvenile distal tibia epithesis 1 juvenile right sterna rib end 1 juvenile metacarpal 1 juvenile metatarsal
5095	SK7	3 adult left rib shaft fragments 1 adult partial mandible 1 adult left mandible head 1 adult right 1st rib 1 adult lumbar vertebra 1 adult cranial fragment 1 adult illium fragment 1 adult left 2nd metatarsal 1 adult right 3rd metatarsal 1 adult right 5th metacarpal 1 adult vertebral process fragment 2 adult rib shaft fragments 1 adult cervical vertebra 1 juvenile metatarsal 1 juvenile pubic symphysis
5098	SK8	1 adult partial right scapula 2 adult cranial fragments 2 adult lumbar vertebrae 1 adult thoracic vertebra 1 adult cervical vertebra 1 adult right navicular 1 adult rib shaft fragment 1 adult 1st left metatarsal

		1 adult proximal hand phalanx 1 adult 4th right metacarpal 1adolescent proximal epithesis of tibia
5113	SK9	1 juvenile distal end of left humerus 1 juvenile pelvic fragment 7 juvenile rib fragments 3 juvenile rib sterna ends 2 juvenile partial metacarpals

Table 3 Catalogue of disarticulated skeletal elements from grave backfills.

APPENDIX 5: ANIMAL BONE BY C. RAINSFORD

INTRODUCTION

The faunal remains from the South Transept Approach, York Minster, were assessed with a view to providing a preliminary characterisation of the species composition and preservation condition of faunal material from the various phases. 132 fragments were recovered from 16 contexts at the site, predominantly dating to post-medieval use of the area. The assemblage was assessed in full.

METHODS

All material was identified to the lowest taxonomic level possible, and identifications were confirmed by comparison to reference specimens from the Department of Archaeology, University of York. Where identification to taxon was not possible (eg. for ribs, vertebrae, and shaft or cranial fragments without identifiable features), fragments were counted as unidentified. Elements were recorded as "sheep" unless positively identified as "goat", owing to the difficulty of distinguishing between these two taxa, and the relative lack of goat elements in material from York. Basic age data (adult / sub-adult / juvenile) and level of fragmentation (completeness relative to whole bone) was recorded for each identifiable bone, and any further taphonomic information was recorded by means of notes for each context. Bone was defined as "adult" if fully-fused or teeth with wear; "sub-adult" if unfused; and "juvenile" if showing a poorly-mineralised bone texture and / or clearly juvenile size.

For each context, the overall assemblage condition was recorded using a qualitative scale (very good / good / reasonable / poor / variable), and the overall fragmentation was also recorded ("mostly complete" (A), "moderately fragmented" (B) or "highly fragmented" (C)). Brief taphonomic descriptions, including colouration and weathering, were also made for each context.

Bone was kept bagged by context following analysis. Data were stored as Excel spreadsheets. NISP (Number of Identified Specimens) has been used as a descriptive quantification method throughout. The assistance of Terry O'Connor in identification of problematic elements and taphonomic signatures is gratefully acknowledged.

RESULTS

In total, 132 fragments were recovered from 16 contexts at the South Transept Approach site. 44 fragments (c.33%) were considered identifiable to taxon level. The majority of the assemblage derives from Phase 5 (1800-1900), which comprises 55% of overall fragments, and 59% of identifiable material (Table 1). As only 6 of the 16 contexts yielding animal bone were assigned to Phase 5, this represents a real increase in the amount of animal bone per context. The remainder of the assemblage derives from phases 2-4, and predominantly from

contexts described as “graveyard soils” or “grave fills”. By contrast, the bone from Phase 5 is described as deriving from make-up layers, and therefore the increased amount of bone is likely to reflect changes in depositional practice at the site.

TAPHONOMY

Subjective assessment was made of the condition of the material from York Minster, in addition to a more thorough recording of specific taphonomic features affecting individual elements. Material from phases 2 & 3 was described as being in “reasonable” or “good” condition, with fragmentation predominantly recorded as “C – heavily fragmented”, and colouration as “mid-fawn” or “mid-brown”. Phases 4 & 5 were described as containing material in “good”, “reasonable” or “variable” condition, with fragmentation described as “B – moderately fragmented” or “C – heavily fragmented”. Material from phase 4 was largely “mid-fawn”, while the assemblage from phase 5 exhibited more colour variation. The heavy fragmentation, small quantity and relatively even condition of material in phases 2 & 3 may indicate that this represents incidental inclusion of animal bone into graveyard deposits. The increasing level of variability in phase 5 may indicate a greater diversity of taphonomic pathways contributing to the assemblage, which may include reworking of material from earlier deposits. However, the presence of rabbit (see below) in this phase, which became more common in the city during the post-medieval period, indicates that at least a proportion of this material is likely to derive from the 19th century.

One element from context [5105], phase 5, displayed rodent gnawing, indicating the presence and low-level activity of rodents in this period. No other notable taphonomy was recorded.

SPECIES DISTRIBUTION

Cattle and sheep are the most common taxa at the South Transept Approach site, representing 39% and 32% of the identified assemblage respectively, with pig representing 14% (Table 2). The remaining taxa, represented by one or two elements each, comprise chicken and goose, horse, dog, cat and rabbit. With the exception of chicken and goose, these all occur only in phase 5. The species diversity in Phase 5 is concomitantly higher than the preceding phases (8 taxa compared to 1-4 in phases 2-4). The range of taxa present in phase 5 and their relative quantities are consistent with other post-medieval assemblages of a similar date from elsewhere in the city (eg. Hungate).

The small number of identified fragments from phases 2-4 and the uncertainty of the provenance of this material mean that no conclusions can be drawn regarding temporal variation in species representation from this assemblage. Similarly, while basic age data was noted for all phases, the data is too sparse for useful comment. One peri-natal element each of cow and sheep was noted in phase 5. Younger cattle tend to be more common in York in

the post-medieval period than in preceding periods (Bond & O'Connor 1999), so this can be seen as reflecting patterns in the city as a whole.

RETENTION RECOMMENDATIONS

Little further information is currently retrievable from this assemblage, and no further work is recommended. This is the only assemblage of post-medieval date to be recovered from the York Minster Revealed excavations. However, the small size and uncertain taphonomic integrity of the assemblage limit its further information potential.

REFERENCES

Bond, J. & T. O'Connor 1999 *Bones from Medieval Deposits at 16-22 Coppergate and Other Sites in York*. The Archaeology of York 15/5; York: Council for British Archaeology

Phase	Description	No. frags	Contexts	ID	unid mammal	Unid bird	unid fish	Fragmentation	Condition
2	medieval disturbance	12	1	2	10			C	reasonable
3	Minster Yard 1472-1700; graveyard	29	6	8	20	1		mostly C	good / reasonable
4	Minster Yard 1600-1700; clearance & steps	18	3	8	10			B	reasonable / variable
5	Minster Yard 1800-1900; service, walls, surfaces, new steps	73	6	26	47			B/C	good / reasonable / variable
TOTAL		**132**	**16**	**44**	**87**	**1**			

Table 4 Quantity of bone by phase from South Transept Approach, York Minster Revealed. "Contexts" refers to the number of contexts from which animal bone was retrieved. No animal bone was retrieved from phases 1, 6 or 7.

	2	3	4	5	Total	%Total NISP
cow	2	1	5	9	**17**	**38.6**
sheep		3		11	**14**	**31.8**
pig		3	2	1	**6**	**13.6**
horse				1	**1**	**2.3**
dog				1	**1**	**2.3**
cat				1	**1**	**2.3**
rabbit				1	**1**	**2.3**
chicken		1		1	**2**	**4.5**
goose			1		**1**	**2.3**
Total	**2**	**8**	**8**	**26**	**44**	**100**

Table 5 Taxon representation by phase, South Transept Approach, York Minster Revealed.

APPENDIX 6: ENVIRONMENTAL SAMPLE ANALYSIS BY S.CARSON

SUMMARY

Analysis of a sample representing activity at York Minster during the medieval period revealed evidence of construction and demolition debris, re-deposited as waste material in levelling deposits.

INTRODUCTION

One bulk sample was selected and submitted for specialist analysis. This was processed and analysed to determine the range of inorganic material and environmental evidence retained within the deposit, to contribute to the overall understanding of the archaeology related to the site

METHODOLOGY

BULK SAMPLE PROCESSING

The bulk sample was received within a 10 litre plastic tubs, sealed to exclude light and air. It was floted for the recovery of environmental evidence and artefacts using standard methods and a *Siraf* flotation system including a bespoke pumped recycled water system with four settling tanks. The sample was disaggregated by agitating in water over a 500µm diameter mesh supported over a flotation drum. Light, primarily organic materials that floated as wash-over (flots) were retained on 500µm and 1mm calibrated mesh diameter *Endicot* sieves whilst other materials larger than 500µm that did not float remained on the mesh as the retent.

The wet retents was spread out on a plastic tray and examined visually before being tagged and dried. The flot material was wrapped in blue acid-free paper, tagged and recorded before being air dried on a tray in a warm drying room. Once dried, the retent was sieved using 4mm and 2mm *Endicot* sieves and sorted using magnified illuminated lamps for all categories of artefacts and ecofacts. A magnet was employed to locate magnetized stone and metals.

Sorting of the flot was undertaken using a *Nikon 93756* binocular microscope at variable magnifications of between x8 and x40 with associated *Schott KL-1500 LCD* cold light source. Sorted materials were bagged and labelled for submission to specialists and weighed (where

relevant) using an *Ohaus CS200* digital scale calibrated to 0.01g. The sorted residue was also weighed on a digital scale, bagged and stored pending decision regarding disposal.

BOTANICAL MATERIAL IDENTIFICATION

Botanical material from the sorted flotation retent was added to the corresponding flot before being sorted through a 500µm, 1mm and 4mm sieve. Charcoal >4mm was 100% identified in order to characterise the assemblage present. Charcoal identification was undertaken with reference to Schweingruber (1990) using the reflected light of a Zenith metallurgical microscope at X63 magnification. The botanical assemblage was 100% analysed for carbonised cereals, seeds and other macroplant remains. Plant nomenclature follows Stace (1997).

Molluscs, Marine Bivalves and other Shell Identification

Marine bivalves were generally fragmented, although occasional larger fragments were observed and identification was achieved using McMillan 1968.

RESULTS

SOUTH TRANSEPT APPROACH

<1> (5120) this sample described as an occupation deposit overlying a 13th century surface

The sample contained a significant amount of mortar which was grey/white in colour with a number of pebble inclusions, but the CBM assemblage was fairly small. A small amount of oyster shell was recovered and one shard of pottery which was orange in colour with a grey fabric and in a poor state of preservation.

A moderate amount of modern roots were noted, and the charcoal assemblage consisted of very small flecks with only four larger fragments identified as oak (*Quercus*). The sample did not contain any other biological components other than one mussel shell fragment and one oyster shell fragment.

Sample <1> (5120) was assessed alongside samples recovered from the Minster Undercroft excavation and is included in the tabulated data in YAT report number 2013/42 (Milsted, 2012, *York Minster Revealed*, *Undercroft Treasury*) in Table 13 on page 82.

DISCUSSION

Significant volumes of CBM and mortar were recorded, suggesting inclusions of demolition debris from various sources or general dilapidation of buildings. Collectively, the building material assemblage may reflect intentional dumping of waste for levelling purposes, which corroborates the initial interpretation of this deposit.

The identifiable charcoal fragments were very small and appeared relatively young, potentially branch wood. None were obviously from large trunk wood, suggesting they are perhaps less likely to have originated from the burning of structural timbers. However, the possibility cannot be excluded that they could reflect waste from small item turnery, such as dowels, wattle uprights or industrial hearths, all of which have long association with young to medium aged oaks. The majority of the charcoal fragments recorded in the flot analysis were small flecks, with no further recordable qualities other than relative abundance.

REFERENCES

McMillan, N.F. 1968 *British Shells*. Warne & Co: London

Schweingruber, FH 1990 *Anatomy of European Woods* Haupt, Berne & Stuttgart

Stace, C. 1997 *New Flora of the British Isles*. Cambridge: Cambridge University Press