Northern Archaeological Associates

REPAIRS TO A TUNNELED VICTORIAN SEWER AT MICKLEGATE IN THE CITY OF YORK

ARCHAEOLOGICAL WATCHING BRIEF REPORT

On behalf of

COSTAIN

for

YORKSHIRE WATER

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Marwood House, Harmire Enterprise Park, Barnard Castle, Co. Durham DL12 8BN

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Summary

In August 2005 Northern Archaeological Associates were commissioned by Costain on behalf of Yorkshire Water to undertake an archaeological watching brief during sewer repair works to the tunnelled Victorian sewer that runs below Micklegate Bar, in the City of York. Two trenches were excavated through previously undisturbed archaeological deposits, comprising road surfaces and road levelling layers, relating to this historic principal route-way into the city of York.

The results from both Trench 1 and Trench 2 showed a clear stratified sequence of deposits and road surfaces from the Roman though to the post-medieval periods. At a depth of 4.5m the tubular brick sewer was encountered overlain by some 2.5m of sand and gravel. The earliest identified deposits related to construction of a Roman road comprising a foundation layer of large cobbles, overlain by a compacted metalled surface layer of gravel in a red clay matrix. The identification of the main south-westerly road to Calcaria (Tadcaster) in this location, just outside the defences for the Colonia at Eboracum, supports the notion of the medieval Micklegate Bar being founded upon the site of the earlier Roman gateway in the defences. A single Roman 'antoninianus' coin from the period of the Gallic Empire (AD 259-73), a fragment of tegula and a sherd of greyware were recovered from residual medieval and modern contexts. The Roman occupation layers were overlain a humic deposit, containing preserved organic material likely to have derived from an out-door dung heap or from flood debris. This deposit contained six seeds from the japanese-lantern plant (Physalis Alkegenki L), the earliest archaeological record of this species in northern England. Later medieval and post-medieval cobbled and metalled road surfaces were also recorded, some with the addition of waste industrial material for added durability. Several bricks and tiles were recovered, one with the paw print from a small dog on its surface, mostly from within later medieval and post-medieval road surfaces and levelling layers. Documentary evidence records that the tunnelled sewer was probably constructed below Micklegate during extensive sanitation works that took place across the city on the 1890s. The brick-built sewer was seen to have been routed southwest beneath an archway cut through the defences to the north of Micklegate Bar, heading out toward the middle of Blossom Street.

1.0 INTRODUCTION

1.1 This report details the results of an archaeological watching brief undertaken during the construction of a shaft to carry out repairs to the tunnelled Victorian sewer which runs below Micklegate Bar in the City of York. Two trenches were excavated through previously undisturbed archaeological deposits, including cobbled and metalled road surfaces and levelling layers, relating to this historic principal route-way into the City of York (Figure 1).

1.2 Though stratified deposits were observed to a depth of 2.3m within Trench 1, the brick sewer was not encountered. Trench 2 was thus excavated in the opposing carriage-way, where similar deposits were identified. The sewer was located, and subsequently recorded, at a depth of some 4.5m. The watching brief was undertaken by Northern Archaeological Associates for Costain, on behalf of Yorkshire Water Services Ltd and was carried out in August 2005.

2.0 LOCATION, TOPOGRAPHY AND GEOLOGY

2.1 Micklegate Bar, a gateway within the medieval city walls of York, is located on Micklegate (B1277), adjacent to the intersection of Blossom Street (A1036), Queen Street and Nunnery Lane (A19) in the City of York (SE 59738 51446). The trenches were located in south-eastern and north-western carriageways, approximately 15m to the south-west of Micklegate Bar at a ground surface height of some 17m AOD (Plate 1) (Figure 2).

2.2 The street of Micklegate was historically the main entrance to the City of York from the south and the medieval street layout has survived mostly unchanged. Though the route remains the ceremonial entrance to the city, through which dignitaries and the reigning monarch may pass during civic events, the majority of modern traffic is diverted around the city ring road (A19). However, Micklegate remains a busy road, providing access to the portion of the city that overlies the site of the Roman *Colonia.*

2.3 The solid geology of the area consists of undifferentiated Permian and Triassic sandstones, overlain by glacial sands, gravels and alluvial deposits (IGS 1977; 1979). It has been noted that much of Micklegate is constructed upon a clay ridge (Ottaway 1993; RCHME 1962)

3.0 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Prehistoric

3.1 It is likely that the glacial morainic ridge that crosses the Vale of York at York would have formed an important route-way from at least the Neolithic period (RCHME vol 1 1962, xxix). Though there is little evidence in the immediate vicinity of

Micklegate, the numerous Neolithic finds recovered from the higher ground to the south-west of the Ouse suggest that York may have formed a regional focus for prehistoric activity. Bronze Age activity in the locale is suggested by limited pottery finds recovered from Watson Street, located some 500m to the south-east of Micklegate Bar. There is sparse evidence for Iron Age settlement in the vicinity of the York, though the Roman city name *Eboracum* may be of Celtic derivation, meaning the 'place of the Yews' (*op. cit.*). The crouched burials found below later Roman burials during construction of York Station may have been of Iron Age date and suggest the presence of a contemporary settlement to the south-west of the Ouse (YAT 2000a, 12).

Roman

3.2 The establishment of permanent legionary fortress by the Ninth Legion on the northern bank of the river Ouse some time in AD 71 marked the foundation of *Eboracum* (or *Eburacum*). By AD 121 the Ninth Legion had been replaced by the Sixth and a 2nd century 'boom time' saw the city develop and expand to fill an area to the north-east of the fortress and over the river to the south, recognisable today as the area enclosed by the medieval city walls (Ottaway, 1993, 73). By the later 3rd century *Eboracum* was the capital of the newly created province of *Britannia Inferior* (lower Britain) and, in addition, was probably the headquarters of the *Dux Britanniarum*, the commander of the field army for the four British provinces (RCHME 1962, vol 1, xxxiv-xxxviii).

3.3 The civil settlement that grew up on the south-western side of the river is usually referred to as the *Colonia*, thus distinguishing it from the *Canabae*, the settlement to the north-east of the legionary fort (though in the strictest sense both are likely to have become *Colonia,* the highest category of chartered Roman town) (RCHME, 1962, vol 1, xxxv; Ottaway 1993,69). The *Colonia* has its origins as a ribbon development along the south-western road (Margary 28c) to *Calcaria*, modern -ay Tadcaster (Margary, 1973, 417). The route led from the from the fortress and, crossing the river, joined the course of the modern Micklegate somewhere close to the intersection with Barker Lane before proceeding to pass through the gateway in the defences presumed to enclose the *Colonia*, and therefore underlies the site of Micklegate Bar (Ottaway, 1993, 70-1) (Figure 3).

3.4 Whilst the richness of the Roman remains from the many antiquarian discoveries (the mosaics of Toft Green and Tanner Row, for example) have demonstrated the well preserved nature of the Roman townscape (Ottaway 1993, 72), the course of the main south-west road within the confines of the *Colonia* has long been the subject of debate. Wellbeloved (1842, 53-4) scotched previous attempts to prove that Micklegate Bar marked the location of the Roman gateway, stating that 'recent discoveries' had shown that the medieval Micklegate street was too irregular to be of Roman origin. He asserted that the road must have followed the course of the modern Tanner Row and Toft Green, with the gateway in the defences thus being to the north-west of the Bar. This opinion has been subsequently much repeated. In the Royal Commission on Historic Monuments of England (RCHME) book of Roman

York (1962, vol I) the road on this course (though now sited just north-east of Toft Green and Tanner Row) is designated as 'Monument 17' with a smaller road to the south-east, the course of the medieval street of Micklegate, designated as 'Monument 17a'. The sections of road surface excavated just inside the Bar in 1910, with 'central grit channel', and identified close to the intersection of Micklegate and Barker Lane in 1821, are offered as evidence for this road. During these excavations a building of Roman date 'divided into compartments' was identified fronting onto the street (RCHME 1962, vol I, 51-2).

3.5 More recent excavations have mostly been concentrated in the north and north-eastern areas of the *Colonia*. In particular, the excavation of Roman buildings at Wellington Row identified a large section of the main south-western road. Based on the orientation of the road excavated here, Ottaway (1993, 69-71) has proposed that the road should be realigned to link the Roman bridge to Micklegate Bar in one straight section, thus incorporating the sections of roadway excavated in the last 300 years.

3.6 Exterior to the Roman defences a Roman building with paved corridor was identified in 1826 at the intersection of Blossom Street and Queen Street. Excavations to the rear of buildings to the west of Blossom Street in 1953-55 (Wenham 1960) identified several road surfaces, assumed to be the intersection of the *Calcaria* and *Isurium* (Aldborough) (Margary 8a) roads (Margary 1973, 418). Further to the south-west construction in the expanding suburbs in the 19th century led to the discovery of the Mount and Trentholme Drive cemeteries (as well as numerous scattered burials) placed in keeping with the Roman fashion alongside the roads leading from the *Colonia*.

Anglo-Saxon and Anglo-Scandinavian

3.7 The evidence from excavations across York show that despite frequent flooding and overcrowding, York continued to flourish as a vibrant and cosmopolitan trading centre. The continued development of the city in the early 7th century marks *Eoforwic* as a regional capital in the kingdom of Deira prior to unification with the kingdom of Bernicia, forming Northumbria. There are extensive records relating to the early christian church in this period and these, along with the foundation of the Minster church dedicated to St Peter, attest to the importance of the city as a regional centre (Ramm 1972, 244). Throughout the Scandinavian period in York, or *Jorvik* from the 9th century, the development of the city continued unabated. However, as a result of later rebuilding of the defences and alterations to street patterns, the medieval, and thus the recognisably modern, townscape began to emerge.

3.8 The evidence for continued early medieval occupation in the vicinity of Micklegate Bar mostly comprises small finds of pre-Scandinavian date (Ramm 1972, 247). However, in the wider area of the former *Colonia*, particularly at the Wellington Row site, evidence of Anglo-Saxon occupation is seen in the so-called 'dark earth' layers. These dark loam deposits are derived from a mixture of domestic refuse and organic material and are thought to reflect a shift in domestic deposition patterns.

This 'lowering of standards' is arguably related to the decline of municipally organised refuse collection and disposal following the decline of Roman influence (Ottaway 1993, 114).

3.9 The construction of a sunken-floored structure of Anglo-Scandinavian date which respected the newly created route of Micklegate is evidence of the dramatic reorganisation of the Roman street layout (Hall 1994, 36). Ramm (1972, 243) argues that variation from the Roman layout occur at levels below the winter flood-line of this period. In those areas above the flood-line, on Micklegate between Barker Lane and George Hudson Street, the medieval street layout more or less retained the Roman pattern. Many of the city's parish churches are thought to have been founded at this time; the line of churches that existed down Micklegate and across the river along Ousegate and onto Saviourgate emphasises the importance of this cross-city route (Hall 1994, 8). The name Micklegate is also likely to derive from this period, with *mickle* being a reference to the Germanic and Norse 'great' or 'large', and gate deriving from the Norse *gatta* or street, thus highlighting the route as an important entrance to the city. The Medieval variation of Mickle*lith* is thought to derive from Old English or Saxon.

Medieval

3.10 Despite the rigors of the Norman Conquest and the ensuing 'Harrying of the North', the city's location at the hub of traditional land-routes, along with the advantage of inland waterways, ensured its continued growth and prosperity. In addition York retained both secular and ecclesiastical powers which furthered the city's riches and prospects.

3.11 The earthen bank that had enclosed the Micklegate area of the city since at least the AD 950s and the wooden fortifications at the Old Baile in the south-east, had all been replaced by stone by the mid 13th century (RCHME 1972, vol II, 10-11). The first stone phases of the Bar at Micklegate, set within the earth rampart, are dated somewhat earlier, with the outer arch and passage walls (which included many re-used Roman blocks and sarcophagi) probably constructed in the early 12th century (RCHME 1972, vol II, 95). By the 13th century a house had been constructed above the gate and the addition of the portcullis in the 14th century gave the outer facade of the Bar the appearance visible today. A barbican was also added during this period, extending to the south-west. Many buildings standing along Micklegate are medieval structures, though most have later frontages and additions.

3.12 During the medieval period Micklegate Bar became the ceremonial entrance-way in to the city for visiting monarchs and pilgrims, and as such the suburb of Micklegate enjoyed a high degree of prosperity. The Bar was also the favoured place of display for the heads of many notable national traitors; Harry 'Hotspur' Percy (1403), the Duke of York (1460) and the Earl of Northumberland (1572) among them. It was also the route by which condemned prisoners were led from the city to the place of execution at Tyburn, near The Mount (*op. cit.*).

Post-Medieval

3.13 Though much of York, particularly the area to the east round Walmgate Bar, suffered greatly during the Parliamentarian siege of York during the Civil War in 1644; Micklegate Bar suffered little damage, apparently protected by the Royalist fort on The Mount. Restoration works were carried out on the Bar in the later 17th century and again in the early 18th century; in 1753 an arched passage was cut through the rampart just to the north of the Bar. Despite much public opposition, the barbican was removed in 1826, following a partial collapse in the early part of the century, and a pedestrian arched walkway was added to the south of the Bar during further consolidation works in 1827. It is likely that the gates were removed during these works, for despite being replaced in 1650 they had been left unlocked since c.1797; the keys apparently having been lost by the gatekeepers children (*op. cit.*).

3.14 Public sanitation has a long, if interrupted, history in York, with the earliest sewers dating back to the Roman period (Carver 1987, 33). There are numerous references relating to sewer construction from the post-medieval period onwards, mostly recording the discovery of archaeological remains during sanitation works. 'Street metalling', 'altars' and structures were found during sewer works in 1752 near nos. 88-90 on Micklegate (close to the intersection with Barker Lane), and in 1837 'buildings', presumably Roman in date, were identified during the excavation of a sewer from Priory street to the Bar. There are references to a Roman building with a 'colonnade' being discovered during sewer excavations adjacent to the intersection of Micklegate with Railway Street (now George Hudson Street) in 1853 and in 1946 a Roman building was identified under Micklegate opposite no. 78 (RCHME 1962, vol I, 52) (figure 3).

3.15 In 1850 responsibility for public sanitation was transferred from an ineffectual group of city improvement commissioners to the city corporation. Little had been done prior to this to ease the public health problems related to the prevalence of open dung-heaps and lack of proper drainage at that time. The sewers that did exist flowed into same rivers that supplied much of the city's water supply. It was noted that the property owners in the Micklegate ward were particularly negligent; 'various fluid matters' were left to evaporate in the heat of the sun as there were no private drains or public sewers. Though various reports were commissioned and works undertaken to alleviate the problems of sanitation, it was not until the Improvement Act of 1884 and the implementation of a scheme prepared by James Mansergh that much of the city's sanitation problems were addressed. Work began in 1890 and was completed in 1895 and entailed the construction of some 22 miles of sewers, many of them tunnelled below the city, with associated sewer interceptors and pumping stations (VCH 1961, 281-86 and 460-72).

Modern

3.16 Though the route remains the ceremonial entrance to the city, the majority of modern traffic approaching Micklegate along Blossom Street (A1036) is diverted around the city ring road (A19). However, traffic still passes beneath Micklegate Bar providing

access to this area of the city, and Micklegate remains as busy a road as it has been for almost two thousand years. Repair and maintenance works continue on Micklegate Bar and adjacent defences to the present day. The Bar is now home to a privately owned museum that houses a collection of artefacts and information relating to the history and archaeology of this area of the city.

4.0 AIMS AND OBJECTIVES

4.1 The principle objectives of the archaeological watching brief were:

- to establish the date, nature and degree of preservation of any archaeological remains, particularly related to this historic route-way, encountered during the course of the groundworks
- to investigate and record any archaeological features identified, recover any associated artefacts and establish the potential for the preservation of environmental evidence
- to produce a report and provide a permanent archive for future research and interpretation
- to undertake a scheme of works that meets with the professional standards for archaeological work both nationally and within area of the City of York Historic Environment Record

5.0 METHODOLOGY

5.1 The location of the trenches within the roadway necessitated the partial, and later the total, closure of the portion of road between Micklegate Bar and the intersection of Micklegate with the A1036 and the A19. The site was demarcated and enclosed by Herras fencing (Plate 2).

5.2 Trench 1 was located within the south-eastern carriageway and measured 3m north-east to south-west by 1m and was excavated to a depth of some 5m. The failure to locate the tunnelled brick sewer in the base of Trench 1 led to the excavation of Trench 2, which was located within the north-western carriageway and measured 3m north-east to south-west by 1m north-west to south-east, with the sewer being encountered at a depth of some 4.5m.

5.3 The excavations were undertaken using an 18-tonne 360° mechanical excavator fitted with rubber tyres. Though the nature of the excavation through rubble and cemented surfaces dictated the use of a toothed bucket, works were at all times under the supervision of an archaeologist. Once a depth of some 1.5m to 2m had been achieved, metal trench shoring was introduced to support the trench walls. All

archaeological surfaces and horizons encountered were examined, and where appropriate photographed, prior to being fully recorded in the trench sections.

5.4 A photographic record of the site was taken using monochrome prints and colour slide at a 35mm format. Appropriate sections of trenches were drawn at a scale of 1:10 and a written description of features was recorded on *pro forma* sheets using the NAA context recording system. All finds recovered were appropriately packaged and stored under optimum conditions and submitted for post-excavation assessment. Finds recovery and storage strategies were in accordance with published guidelines (English Heritage 1995; Watkinson and Neal 1998). Bulk palaeoenvironmental samples were taken from appropriate deposits and submitted for assessment. The recovery and sampling of environmental remains was undertaken in accordance with guidelines prepared by English Heritage (2002). Trenches were located with an EDM and levels tied into Ordnance Datum. The site code for the watching brief and excavation was MSY05.

6.0 MONITORING RESULTS

Trench 1

Section 1 (north-east facing) (Figure 4, Section 1)

6.1 Due to the tunnelled sewer not being located within this trench, the deepest deposits encountered were natural brownish-red clayey sands (21) containing occasional rounded river cobbles. These laminated deposits extended from a depth of some 2.3m to the base of the trench at 5m and were overlain by a layer of brown sand (20), some 0.2m thick and containing sub-angular stones (120mm x 100mm). It is likely that these stones did not derive from the natural sands below but were deposited as a result of intrusion from the layer of cobbles above. This layer (19) comprised a 0.25m thick layer of rounded cobbles, measuring up to 180mm x 100mm. Sealing this layer was a deposit of compacted coarse gravel in a brownish-red sandy clay matrix (18), some 0.25m thick (Plate 3).

6.2 The compacted gravel surface was overlain by a 0.31m thick dark silty layer (12), which appeared to thicken to the north-west and contained preserved organic material. (Plate 4).

6.3 Above the dark silt (12) was a levelling layer of grey silt and rounded gravel (17), up to 0.18m thick, which was sealed by successive metalled road surface layers (16, 15) which comprised rounded stones some 20mm to 30mm in diameter within an orange and black silty matrix. These layers were 0.16m and 0.08m thick respectively and were overlain by a 0.16m thick road surface (14) which consisted of medium and large sized rounded cobbles up to 50mm x 80mm. This was in turn sealed by a thin metalled surface (09) (0.05m thick) and a 0.2m thick layer of cobbling (05) (Plate 5), similar in composition to layer 14. A single sherd of 2nd century Roman greyware pottery was recovered from layer 05. Two further metalled surface layers (08, 07)

within orange silty sand and grey silt matrices were in total some 0.08m thick. The latter of these layers appeared to be a repair to a compressed portion of the former. The final pre-modern road surface of the sequence was layer 04, a 0.1m thick metalled surface, containing stones some 60mm in diameter. From this layer medieval and post medieval brick and tile, along with a melted portion of roofing lead, were recovered as rubble within the road surface.

6.4 Sealing this surface were mixed rubble and sand levelling layers 06, containing a single fragment of a late medieval tile, and layer 01 from which a single sherd of medieval pottery and a fragment of Roman tegula were recovered. Truncating these layers was a modern service pipe trench (22) with a mixed gravel and sand backfill (23). The pipe trench was aligned north-east to south-west and extended to a depth of some 1.1m; it had thus truncated all road layers down to surface 16.

6.5 Overlying the pipe trench was a 0.16m thick layer of concrete and the modern 0.1m thick tarmac road surface, which sealed Trench 1.

Trench 2

Section 2 (north-east facing) (Figure 4, Section 2)

6.6 At a depth of 4.5m, tunnelled through natural brownish-red clayey sands (32), the sewer (46) was encountered. It comprised machine manufactured bricks, measuring 230mm x 115mm x 75mm, arranged using a stretcher bond to form the cylindrical sewer. The sewer was aligned north-east to south-west and was found to have an internal diameter of some 420mm and an external diameter of 570mm (Plate 6).

6.7 Layer 32 extended to a depth of some 2.29m from the modern ground surface and was overlain by a layer of grey sand (31) which was 0.14m thick. A layer of black silty sand (13), just 0.15m thick, acted as a bedding deposit for the large rounded cobbles (up to 160mm x 80mm) which comprised layer 30 above. This layer was 0.15m thick overall and was sealed by 0.2m of compacted coarse gravel in a brownish-red sandy clay matrix (29) (Plate 7 and 8).

6.8 Overlying this deposit was a road surface layer (28) comprising medium sized cobbles (up to 70mm x 40mm) which was in turn sealed by several successive layers of metalling. This sequence of thin layers (27, 47, 48 26) was some 0.25m thick overall, and comprised rounded gravel no more than 30mm in diameter within matrices which included grey silt, sand and an industrial waste material with an iron stained 'rusty' appearance. The metalled layers were sealed by a further surface (10) which was constructed from large rounded cobbles up to 210mm x 90mm (Plate 8). A copper alloy coin with a hint of silvering was found adhered to a cobble within this 0.14m thick layer and was identified as a Roman *'antoninianus'* coin dated between AD 259-73. This layer was overlain by a similar 0.15m thick cobbled surface (11), though the cobbles were smaller at just 100mm x 60mm. Due to truncation this formed the final pre-modern road surface layer within this section. This layer yielded several fragments of late medieval or early post-medieval bricks

and tiles; one revealing a paw print from a small dog, impressed on the tile prior to firing.

6.9 Cobbled surface 11 was overlain by a 0.06m thick layer of grey silt (25) which was in turn truncated by a north-west to south-east aligned modern service pipe trench (45) filled with gravel and sand (24). The pipe trench was some 0.8m deep and was in turn truncated by north-east to south-west aligned service trench 35, some 1.1m deep and filled with gravel (36), which also cut road surfaces 10 and 11 (Plate 9). The section was sealed by concrete (03), in places up to 0.6m thick, and 0.1m of the modern tarmac road surface (02).

Section 3 (south-west facing) (Figure 4, Section 3)

6.10 This section was recorded to illustrate the level of truncation and disturbance present within some sections of the trenches. The instability of this side of the trench led to the early introduction of metal shoring, thus the section was recorded to a depth of 2m only below the modern street level (Plate 10).

6.11 At the very base of the section a layer of large cobbles, similar in composition to layer 30 in the opposing section, was observed during excavation. However, due to trench collapse it was not possible to make a detailed examination of this layer. Though much truncated, a sequence of compacted metalled and cobbled surface layers was identified in the north-west corner of the trench and grouped as context 44. These layers were in total some 0.7m thick and various grey silt, sand and iron stained matrices were observed, probably in part corresponding to layers 28, 27 and 48 in section 2, though it appeared that the metalling within section 3 was more extensive. These layers were sealed by a further metalled layer (43) some 0.1m thick in turn sealed by a 0.16m thick layer (42) of medium cobbles up to 80mm x 30mm in diameter possibly correlating with layers 48 and 26 in the opposing section. The cobbles were overlain by a road surface (41) comprising large rounded cobbles (up to 160mm x 100mm) apparently bedded upon smaller rounded cobbles (up to 40mm x 50mm). The final road surface layer of this sequence, prior to truncation, was a 0.1m thick layer of rounded cobbles (34) up to 80mm x 50mm. These layers may be the same as 10 and 11 in section 2, whilst the difference in height between all corresponding layers is likely due to the fall of the road to the south.

6.12 A large north to south aligned modern pipe trench (39) was filled by gravel and sand (40) which contained cobbles and stones likely to have derived from the truncated road surfaces. The pipe trench truncated all road layers to a depth of some 2m from the modern ground surface and this service trench was sealed by a 0.5m thick layer of dark brown sand and silt (33), likely to be trench backfill. This was in turn cut by a further north-east to south-west aligned 1.2m deep service trench for a gas pipe (37) filled with gravels and sand (38).

6.13 All deposits in Trench 2 were sealed by concrete (03), in places up to 0.6m thick, and 0.1m of the modern tarmac road surface (02).

7.0 DISCUSSION

7.1 Due to heavy truncation by modern services within the northern portion of Trench 2 the results from this section were inconclusive, though the section did reveal small segments of up to 1.2m of sequential road surfaces that may correlate to the surfaces recorded in section 2. The results from both section 1 in Trench 1 and section 2 in Trench 2 showed clearly a sequence of deposits and road surfaces dating from the Roman though to the post-medieval periods.

7.2 Despite the lack of datable material within the basal road surfaces and layers the construction methodology employed here was identifiably Roman. The road as recorded in both sections 1 and 2 consisted of a foundation layer comprising large stones overlain with an upper metalled layer of compacted clay and gravel. This kind of *agger* construction methodology has been frequently identified in the excavation of Roman roads in Britain. The nature of the underlying geology, the natural sands on Micklegate, coupled with the availability of local materials would be an important factor in the construction of a 'foundation layer' from large stones in order to provide adequate drainage (Bagshawe 1979, 15). However, these so-called 'heavy bottomed' roads were also noted favourites of the military road-builders in the north; seen, for example, on the Stanegate, near Haltwhistle, in Northumberland (Davies 2002, 58). Though the upper metalled road surface excavated at Micklegate Bar is somewhat thin (a maximum of 0.29m) compared to other major Roman roads examined by Davies (*op. cit.*, 56) this may reflect a well compacted surface subject to heavy traffic possibly resulting in erosion. In addition, the road was located on well drained ground at a height of some 15.6m AOD, thus probably just above the usual winter flood level in the city. This may indicate that the thick road surfaces seen elsewhere in York were not required here. In direct contrast the metalling in Wellington Row, well below the flood level, was built up to over 0.8m thick.

7.3 Though the road was only seen in small 1m wide sections, the location of the trenches in opposing sides of the carriageway of the modern road gives an indication of the minimum width of the original Roman road. As no indication of road-side ditches was seen in either trench it can be assumed that both trenches truncated portions of the road upon the *agger*. Davies (2002, 72) records that the average width of the metalled portion of Roman roads in Britain is some 6.51m, almost the precise width of the extrapolated portion of metalled road surface recorded across the two trenches at Micklegate. The excavation of roads that run through, or are in close proximity to, gateways has shown that the width maybe considerably less than this; though the precise relationship of the portions of road excavated here to the Roman gateway is not, at present, known.

7.4 Previous excavations have identified cobbled and metalled surfaces relating to a Roman road on this alignment, thought, until recently, to be a street within the *Colonia* rather than the main road. However, more recent interpretation has reclassified this road and the identification during this excavation of the Roman road exterior to the *Colonia* defences has demonstrated the continuation of the road, particularly from the section identified in 1910 within the defences, forming the

main south-westerly route from *Eboracum*. It is probable that the medieval Micklegate Bar was constructed upon the site of the previous Roman gateway in the defences of the city.

7.5 The copper alloy silvered *'antoninianus'* coin, recovered from medieval road surface 10 was likely to be residual, though possibly revealing levels of disturbance during the medieval period to underlying Roman remains (Appendix D). The recovery, though again in a residual context, of a single sherd of 2nd century greyware pottery from a miniature jar with a South Yorkshire provenance (Appendix B) and a fragment of tegula (Appendix C) attest to the concentration of Roman activity in the vicinity of Micklegate.

7.6 Though datable material was not recovered from the humic layer that overlay the Roman road surface in Trench 1, stratigraphically it can be placed between the Roman and early medieval periods of York's development. Organic material recovered from this deposit was very well preserved; much of the assemblage comprised the remains of wood and straw along with a wide range of wild plant species from both natural and anthropogenic habitats. The recovered faunal remains were, however, limited; though fragments of beetles of the *Aphodius* species, found in dung and decomposing matter, and a human flea were identified. It is suggested that a component of the biological remains are likely to have originated as 'stable-manure' possibly being moved from an indoor stable or building to out-door dung-heap. It is also suggested that part of the assemblage may derive from flood debris, deposited as a result of inundation (Appendix E). The material recovered is consistent with a main thoroughfare that would have received a great deal of trade and traffic, and resulting refuse. Equally, though it is argued that flood levels may not have reached this elevated part of Micklegate, flood debris could well have been moved or deposited from nearby flooded locations. The material recovered is very similar in composition to environmental evidence gathered during excavations on Tanner Row at a site near the General Accident buildings (Ottaway 1993, 85-6). Here too decomposing organic matter and faunal remains were identified as partly originating from stables or similar buildings, though it is suggested that the manner of refuse tipping by the inhabitants in this area of the city may have differed from the traditional assumptions of Roman urban cleanliness. Though the layer recorded at Micklegate is likely to be Roman, the lack conclusive dating means that the possibility that the layer may have been deposited in the immediate post-Roman period cannot be discounted. As such it may be that the layer reflects characteristic of the early-medieval 'dark earth' deposits, though excavations at Wellington Row within the *Colonia* showed these layers to be artefact rich (Ottaway 1993, 113-6) and no artefacts were recovered from the Micklegate deposit.

7.7 A final species of note recovered from the biological remains was the japanese-lantern (*Physalis alkekengi L*), likely to be the first archaeological record of this species in the north of England. As only six seeds were identified they might derive from a single fruit rather then representing large-scale importation. The species is commonly recorded in Central Europe by the Iron Age, but may not have been fully established in England until the later medieval period.

7.8 Given that the organic layer in Trench 1 is likely to date to the late Roman or the immediate post-Roman period, *terminus post quem* dating for the road surfaces above would indicate continuing use of the road into the Anglo-Scandinavian and later medieval periods, though datable artefacts from these phases was lacking. The medieval road surfaces recorded here are, however, very similar both in terms of position in relation to a medieval gateway, and composition, to the 13th to 15th century road surfaces identified at Gallowgate in Newcastle. Though recorded in the context of an open area excavation, these road surfaces were also constructed from rounded river cobbles of various sizes with metalling applied both as a surface and in the form of material for repairs (NAA 2004, 7). Evidence of what could be termed 'true' metalling was identified within some of the surfaces at Micklegate, particularly surfaces 26 and 08, where the probable deposition of industrial waste material with the metalling to improve durability has had the effect of giving the surface an iron stained or 'rusty' appearance. Alternatively, as this effect is often seen on very concreted and compacted surfaces it may also derive from inadequate drainage and disrupted water flow resulting in the deposition iron-pan. Evidence of 'true' metalling was also seen at Gallowgate, and in the Roman road surface excavated in Worcester (Carver 1987, 34).

7.9 As is assumed for the Roman gateway, the road must have decreased in width by at least 2m to pass through the early 12th century outer arch, some 4m in width at ground level. No evidence of stonework, or foundation trenches, related to the medieval barbican were identified within either trench. The presence of post-medieval tile and brick in the latest road surface layers in both trenches provide a *terminus ante quem* for the sequence and although further surfaces are likely to have existed above this level, the excavations for services and the levelling required for the modern road surface appear to have removed any trace. Undisturbed deposits were encountered at some 0.6m below the modern ground level in Trench 1 and it is unlikely that stratified material would be found to have survived above this level in the remainder of the roadway.

7.10 The tunnelled sewers are something of a stratigraphic anomaly, being of Victorian date though buried well below the Roman layers. The presence of the brick-built sewer would seem to confirm the documentary evidence, which indicates that the likely construction date for the sewer would have been between 1892 and 1895. The route of the sewer to the north-east, extrapolated from the alignment observed in the base of Trench 2 and seen during the insertion of a CCTV camera into the sewer during the repair, would suggest it passed beneath the archway constructed through the defences in 1753 and not beneath the Bar itself. To the south-west the sewer appears to be routed down the centre of Blossom Street, though this was not seen on the CCTV camera.

8.0 CONCLUSION

8.1 These results of these excavations have provided further evidence for the likelihood that the medieval Micklegate Bar does indeed mark the position of the Roman

precursor and thus the route of the main south-western road from *Eboracum.* The relationship of this portion of road to that identified during the 1953-4 excavations on Blossom Street remains uncertain; however, any further excavations close to or within the road junction at Blossom Street and Queen Street may serve to clarify the route of the Roman road at this point. Should any further trenches be excavated close to the Bar, particularly beneath the pedestrian pavements, it may be possible to determine the width of the Roman *agger* and its relationship to road-side ditches and buildings of the period. The 'stable-manure' and organic matter identified overlying the Roman road show this area to have been a vibrant and crowded thoroughfare and the continued sequence of road surfaces demonstrate the continued occupation and importance of this major city route into the medieval and post-medieval periods.

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Illustrations: Catherine Chisman and Dawn Knowles
Edited by: Paul G Johnson

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Appendix A

CONTEXT AND FINDS CATALOGUE

Sarah Wilkinson

Context	Description	Trench	Section	Ag	animal bone	bm	cbm	lead	pottery	sample	shell
1	Levelling layer of mixed stone and brick rubble	1	1		1		3		1		2
2	Number allocated to modern road surfaces		1								
3	Concrete layer	1, 2	1, 2								
4	Metalled road surface (upper) (60mm diam)	1	1			1	2	1			
5	Cobbled road surface	1	1						1		
6	Levelling layer of sandy backfill sealing layer 04	1	1				1				
7	Metalled surface containing grey silt below layer 04 (20mm diam)	1	1								
8	Metalled surfacewith iron stainig and orange silty sand below layer 07 (20mm diam)	1	1								
9	Grey metalled surface below layer 05 (30m diam)	1	1								
10	Cobbled road surface (sub-rounded 120mm x 70mm)	2	2	1							
11	Cobbled road surface sealing layer 10 (sub-rounded 100mm x 30mm)	2	2				8				
12	Very dark grey/black humic layer	1	1							3	
13	Dark grey/black humic layer (thin)	2	2							1	
14	Mixed surface containing some silt (30mm to 80mm diam)	1	1								
15	Metalled surface with black silt (20mm diam)	1	1								
16	Metalled surface with orange silt (30mm diam)	1	1								
17	Gey silt and stone levelling layer (30mm diam)	1	1								
18	Coarse gravel in a red sandy clay matrix	1	1								
19	Layer of large sub-angular stones in a clay sand matrix (200mm x 300mm)	1	1								
20	Sand with sub-angular stones (120mm x 100mm x 80mm)	1	1								
21	Clean, undisturbed brown red sand - natural?	1	1								
22	Cut of modern pipe trench	1	1								
23	Fill of pipe trench 22	1	1								
24	Gravel backfill in north-west to south-east pipe trench 45	2	2								
25	Layer of grey clay silt	2	2								
26	Metalled road surface in matrix of iron stained material (30mm)	2	2								
27	Series of thin compacted metalled surfaces in grey and iron material matrix	2	2								
28	Cobbled surface (70mm x 40mm)	2	2								

Context	Description	Trench	Section	Ag	animal bone	bm	cbm	lead	pottery	sample	shell
29	Gravel and small stones in a red sand and clay matrix (same as layer 18)	2	2								
30	Layer of cobbles (180mm x 60mm) (same as 19)	2	2								
31	Layer of grey sand (natural?)	2	2								
32	Layer of natural sand and gravel	2	2								
33	Pipe trench backfill comprising dark brown silty sand	2	3								
34	Surace composed of large sub-rounded cobbles (80mm x 50mm)	2	3								
35	Cut of pipe trench	2	2								
36	Gravel fill of trench 35	2	2								
37	"Cut of pipe trench for 15"" gas pipe"	2	3								
38	Orange gravel and sand fill of trench 37	2	3								
39	Cut of large deep pipe trench	2	3								
40	Fill of trench 39 composed of dark grey sandy silt with various sizes of mixed cobbles	2	3								
41	Surface layer composed of very large cobbles (160mm x 80mm)	2	3								
42	Various cobbles in surace layer	2	3								
43	Metalled surface containing grey sandy silt	2	3								
44	Various disturbed road surfaces consisting of cobbles and metalled surfaces and iron staining	2	3								
45	Cut of modern service pipe trench filled by deposit 24	2	2								
46	Brick sewer	2									
47	Metalled surface (above layer 27)	2	2								
48	Metalled surface (below layer 26)	2	2								

Appendix B

POTTERY

Peter Didsbury M. Phil.

Discussion

Two sherds of pottery were submitted for examination, as follows:

- Context [5], metalled surface. A small jar rim fragment in Roman wheelthrown greyware, weight 3 grams. The sherd comes from a jar of c. 140mm rim diameter. The nearest rim form in the York form series is on a miniature jar, possibly 2nd century, of only c. 60mm rim diameter (Monaghan 1997, vessel 3850). A better parallel is probably Gillam Type 170, dated c. AD 130-180. The sandy, white-speckled, blue-grey fabric of the vessel might indicate a South Yorkshire origin, and would be acceptable as a 2nd century fabric.

- Context [1], modern levelling layer. A hard, heavily gritted, body sherd in red-orange fabric, abundantly tempered with mixed stone filler, including quartz. Weight 13 grams. It is difficult to match the fabric to any of the Anglo-Scandinavian gritty wares known to have been used in York, and it seems most likely that this sherd is of relatively modern origin, perhaps an industrial ceramic. John Tibbles also informs me (pers. comm.) that he has seen late medieval roof furniture in similar fabrics.

No further work need be undertaken on these sherds. They may be retained in an appropriate material archive if it is judged necessary.

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Appendix C

CERAMIC AND OTHER BUILDING MATERIALS

J.Tibbles BA (Hons); AIFA

S.E. Tibbles Dip. Arch; Cert. Arch.

Introduction

A visual scan of the building material assemblage recorded a total of 10 fragments weighing 3871gms (See Table 1). It should be noted that the diversity of size and colour within brick and tile caused during the manufacturing process must be taken into consideration when comparing samples within collected assemblages and local typologies. The varying sizes and colours can be attributed to the variation in the clays used, shrinkage during drying, firing within the kiln or clamp and the location of the brick/tile within the kiln. The dating of ceramic building material can be highly contentious due to its re-usable nature and therefore the date range given is that of the known dates where such bricks have been recorded.

Assessment of the assemblage was based upon rapid scanning of the retained material with a more detailed examination of the diagnostic fragments. The resulting information was then compared with the HAP typologies and any correlation recorded (Appendix C1).

Table 1: Assemblage Analysis

	No of Fragments	**Weight**
Brick	4	3325
Flat roof tile	3	300
Ridge tile	1	75
Roman tile	1	141
Unknown	1	30
Total	**10**	**3871 gms**

Methodology

The assemblage was examined using a x15 magnification lens, where applicable, to aid dating, though fabric analysis was not undertaken as this was considered beyond the scope of this assessment. Information regarding the dimensions, shape and fabric (were applicable) was recorded and catalogued accordingly and a Munsell colour code has been incorporated where appropriate. The presence of the original surfaces was also taken into consideration to aid identification

Romano-British Assemblage

One fragment of Romano-British ceramic building material was recovered from the evaluation, (context 01). The fragment was identified as tegula with a fabric colour of Reddish Yellow (5YR/6/8).

The tile bore means of suspension in the form of a finger-smoothed flange, Type 2a. This flange type has also been noted within other Romano-British assemblages within York (Tibbles, J and Tibbles, S 2004(a); Tibbles, J and Tibbles, S 2004 (b)). Remnants of a knife-trimmed upper cut-away were also recorded, though type could not be determined due to damage in antiquity.

Moulding sand from the method of manufacture was evident. White mortar (2.5Y/8/1); though with some degree of discoloration, possibly from soil conditions, was evident on the flange, upper and lower surfaces with remnants over broken edges. Ferrous-based? concretions were recorded over breaks (10YR/7/3), again, probably from soil conditions.

Romano-British Assemblage Discussion.

On its own, the tegula is of limited potential, although evidence of re-use is indicated by the post-breakage mortar adhesions. However, from the site information provided, there is limited evidence to ascertain that the tile may have been incorporated within one of the road surfaces or metalling layers encountered within Trench 1. Contexts dated to the Roman period were not apparent.

Overall, the absence of other Romano-British forms; such as bessales, pedales and imbrex and its stratigraphic location within levelling layer (01) above modern backfill (06), would suggest that the tile is re-deposited evidence of Romano-British activity within the area.

The Medieval and Post-Medieval Assemblage

Approximately 80% of the assemblage comprised of medieval and post-medieval bricks and tile.

Bricks

Bricks were manufactured to the shapes required, the standard rectangular shape for common usage and the more specialised shapes to form architectural features around arches, doors, windows and vaults. Bricks and tiles were both made in a similar fashion by the insertion of a wad of prepared clay into bottomless moulds, moistened and often covered in sand to facilitate the removal of the formed clay. The excess clay would be struck off and the form tipped out onto a palette board and removed to prepared area of ground until partially dried and ready for firing.

Dating of bricks is highly contentious due to their re-use nature as a valuable building commodity. At York in 1505 bricks were standardised at 10" x 5" x 2 ½", Parliament in 1571 decreed that the size of a brick should be 9" x 4 ½" x 2 ¼" and again in 1725 the brick size should be 9" x 4 ½" x 2". It should be noted that although these statutes were binding it would be naive to believe that all tile and brickmakers adhered strictly to these sizes at all times.

Of the four fragments of brick within the assemblage, all samples were hand-made and either slop-moulded or sand moulded of a medieval date. All the samples displayed mortar adhesions or stains indicating their use within structures. The single example from cobble surface 11 displaying burning is more likely to be the result of demolition rather then usage within a hearth.

Roof tiles

Positions of the nibs and peg holes are usually described from the nib side of the tile, i.e. the underside as hung, not necessarily as made. Demand normally dictated the size and quality of flat roof

tile which often varied until a statute was instigated in 1477 (17 Edward IV, c iv) that dictated the size. A flat tile was fixed at 10 inches by 6 inches by 5/8 inch (255 mm x 153 mm x 16mm), a ridge tile 13 inches long by 1/2 inch thick and a hip tile 10 inches in length with a convenient width and thickness (Celoria et al 1967,218). Early flat roof-tiles were suspended by projecting nibs or by peg/nails Alternately flat tiles were often secured by iron nails, as were ridge and hip tiles. Each layer of tiles overlapped the layer below and to make them weatherproof were bedded on moss. The lowest layers, and sometimes all the layers, were often pointed or rendered with mortar (Salzman, 1952. 233)

Flat roof tile

Three fragments of flat roof tile were identified within the assemblage all displaying thickness only and therefore were not possible to equate within regional typologies. All the fragments bore either residual mortar or stains indicating their use within roofing structures.

Ridge tile

A single fragment of possible ridge tile was identified from road surface 6, its form and fabric suggesting a late medieval or early post-medieval date.

The Medieval and Post-medieval Discussion

The diversity of brick/tile colour and size caused during manufacture must be allowed for when making comparisons with typologies. The brick assemblage shows typical evidence of hand-made brick manufacture.

The part bricks were classified adopting a best-fit policy based on surviving dimensions, fabrics and general characteristics. No definitive identification was made with regional typologies; however, based upon the above method a general comparison could be made heavily biased towards width and thickness.

During the 16th century the Brick Standard in York was designated as 10" x 5" x 2 ½". The brick samples within the assemblage although of a similar width are much thinner and therefore are likely to be earlier in date.

Plain roofing tiles and ridge tile were in use from the 13th century in York and although York was manufacturing brick by the 14th century (Kaner 1980) by the 15th century bricks [Walteyles] were being 'imported' from Broomfleet (Reader 1972).

Animal impressions within brick and tiles are not uncommon in ceramic building material assemblages. York, for example, animal prints have been recorded at Skeldergate (dog) (Tibbles 2005) and Walmgate (cat and dog) (York Series No 1).

Single irregular fragment of mortar-like residue was recorded within context 4, which was found to be non-reactive to Hydrochloric acid.

Statement of potential

The ceramic building materials can provide valuable information as to the method of construction of the buildings, fabric and their possible form, that once stood on this site. It can also show the

construction techniques of hearths, ovens and chimneys and their possible uses, particularly the local industries. Brick was also used for the construction of kilns, well linings, floors and culverts.

Bricks and tiles alone cannot provide a firm date because of their re-usable nature but it is possible to date types of brick and roof tile by their earliest occurrence within dated contexts. The identification of new brick or tile types would supplement the existing regional typology and there is potential for comparison with CBM assemblages from elsewhere in the region. The presence or absence of hip and ridge tile suggests a variety of roof forms.

Recommendations

No further work is regarded as necessary on these assemblages, which are of limited evidential value. It is recommended upon completion of work on the ceramic building material assemblage a selective discard policy implemented prior to deposition of the finds assemblage as whole within the appropriate museum.

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Appendix C1: Catalogue

Context	Layer type	Fragment count	Weight	Description
01	Modern sand & backfill	1 fragment	141 gms	Tegula. Finger-smoothed Flange, Type 2a. Flange Width: 18mm to 24mm, Height Including Flange: 35mm to 38mm. Tile Thickness: 16mm. Knife-trimmed upper cut-away. Cut-Away Width: 18mm, Cut-Away Height: >18mm. White mortar (2.5Y/8/1) on original surfaces including remnants over breaks. Knife-trimmed edge. Reduced core.
04	Road Surface	3 fragments	220 gms	Single fragment of brick 35mm thick. Sandy red fabric 10R/5/8. Residual moulding sand and mortar.
				Single fragment of flat roof tile 15mm thick. Light red 2.5YR/6/6 fabric. Residual mortar stains.

Context	Layer type	Fragment count	Weight	Description
				Single irregular fragment of mortar-like residue? Non-reactive to Hydrochloric acid
Context 06	Road Surface	1 fragment	75 gms	Single fragment of ridge tile? Displaying concave and convex surfaces. 25mm thick . Dense fabric with frequent quartz. Mortar stains.
Context 11	Cobbled surface	8 fragments	3435gm	Fragment of hand-made brick. Dimensions ?mm x 128mm x 40mm (?" x 5" x 1 ¾").
				Red 7.5R /5/8 straw-tempered sandy fabric. Residual mortar.
				Fragment of hand-made brick. Dimensions ?mm x 140mm x 40mm (?"x 5 ½"x 1 ¾").
				Red 7.5R /5/6 fabric. Residual moulding sand and mortar.
				Fragment of hand-made brick. Dimensions ?mm x 114mm x 50mm (?" x 4 ¾" x 2").
				Red 10R /5/8 fabric with red pellet inclusions. Residual mortar. Burning on one surface.
				Single fragment of flat roof tile 17mm thick. Light red 7.5YR/5/8 fabric (YORK 1). Residual mortar.
				Single fragment of flat roof tile 13mm thick. Light red 7.5YR/5/8 fabric (YORK 1). Residual mortar. Impression of domestic dog paw (Canis familiaris) on one surface.

Appendix D

COINS

R.J. Brickstock
(University of Durham)

The 2005 excavation of the Micklegate sewer produced only one (incomplete) copper alloy coin, found adhering to a piece of stone. Both surfaces of the coin were almost completed obscured by corrosion products, and no useful detail was visible on the initial x-ray image. It was provisionally identified, from a hint of silvering, as a Roman denarius of the 1st-early 3rd centuries. Careful cleaning, however, removed a portion of the obscuring material, sufficient to reveal a radiate head, allowing a partial identification as an 'antoninianus' (probably a double denarius) of the period of the Gallic Empire (AD 259-73). This particular coin is unfortunately too corroded to allow any assessment of circulation wear, so it is impossible to estimate the amount of time that might have passed before it was deposited. 'Radiate' coins (and copies) are extremely common elsewhere in York and indeed throughout Roman Britain generally, and appear to have continued in circulation at least until the demise of Allectus (AD 293-96).

MSY 05, Context 741, Sf. no. 10 AA; x-rays 5407/5562

Ruler	Illegible radiate fragment
Denomination	'Antoninianus'
Catalogue ref	-
Obverse	Radiate head, right
Reverse	-
Date of issue	AD 260-73
Condition	C/C
Diameter	18 mm
Weight	0.4 g
Die-axis	6?

Appendix E

BIOLOGICAL REMAINS

Alexandra Schmidl and Enid Allison
(Palaeoecology Research Services)

Introduction

An archaeological evaluation excavation was carried out by Northern Archaeological Associates at Micklegate Sewer, Micklegate, York (NGR SE 59738 51446) during August 2005. The works were undertaken to locate the position of a tunnelled Victorian brick sewer in order for repairs to be carried out and for an inspection chamber to be installed.

Two trenches were excavated approximately 15 metres to the south-west of Micklegate Bar within the road close to the intersection of Blossom Street, Queen Street and Nunnery Lane in the City of York. Deeply stratified archaeological deposits, including several road surfaces, were observed to a depth of 2.2 metres and the brick-built Victorian sewer was encountered at a depth of approximately 5 metres in Trench 2.

Remains recovered from two sediment samples ('GBA'/'BS' sensu Dobney et al. 1992) processed by NAA were submitted to Palaeoecology Research Services Limited (PRS), County Durham, for an evaluation of their bioarchaeological potential (Carrott and Akeret 2006). Subsequently, one of these, a sample from a deposit in Trench 1, was selected for further analysis and this report presents the results of these investigations. No interpretatively valuable biological remains were recovered from the second evaluation sample.

Methods

The sediment sample was inspected in the laboratory and its lithology recorded, using a standard pro forma, prior to processing by paraffin flotation to extract insect remains following the methods described by Kenward et al. (1980; 1986b). The sediment was weighed and then disaggregated in water for at least 24 hours before processing and its volume recorded in a waterlogged state.

Plant remains were recorded using a low-power microscope (x7 to x45) and identified by comparison with modern reference material at PRS and the use of published works (Cappers et al. 2006, Jacquat 1988, Körber-Grohne 1964). Identifiable taxa and other components being listed on paper. Nomenclature for plant taxa follows Stace (1997).

The flot produced was examined for the presence of insects and other invertebrates. Beetles and bug remains were removed onto moist filter paper for identification using a low-power microscope (x10 – x70). Identification was by comparison with modern insect material and by reference to published works. Numbers of individuals and taxa of beetles (Coleoptera) and bugs (Hemiptera) were recorded, and taxa were divided into broad ecological groups following Kenward et al. (1986a). Nomenclature for insect remains follows Kloet and Hincks (1964-77). Other invertebrate taxa were recorded briefly by scanning.

The flot is currently stored in industrial methylated spirits (IMS) in a plastic jar.

Results

The results of the analyses are presented below, with archaeological information provided by the excavator presented in square brackets.

Context 12 [0.3 metre thick layer of very dark humic silty material revealed in Trench 1]

Sample AA/T2 (18.75kg/11.8 litres sieved to 300 microns, with washover and paraffin flotation; no unprocessed sediment remains)

Moist, light to mid brown to mid grey-brown, crumbly to unconsolidated, very stony (stones of 2 to 60 mm were common and there were some larger stones present), slightly silty clay sand.

The flot (~10 ml) and the washover (~80 ml) were relatively small given the quantity of sediment processed. Both contained small plant fibres, wood fragments (to 30 mm) and fine charcoal (to 3 mm). There was also 'straw-like' material (possibly herbivore dung) and large numbers of other well preserved waterlogged plant macrofossils.

The identifiable component of the plant assemblage was dominated by waste ground species – e.g. common nettle (Urtica dioica L.), knotgrass (Polygonum aviculare L.), parsley-piert (Aphanes arvensis L.), sheep's sorrel (Rumex acetosella L.) – and wet places such as ponds, ditches and marshy fields – e.g. blinks (Montia fontana L. ssp. chondrosperma (Fenzl) Walters), compact/soft/hard rush (Juncus conglomeratus L./J. effusus L./J. inflexus L.), lesser spearwort (Ranunculus flammula L.), marsh pennywort (Hydrocotyle vulgaris L.), spike-rush (Eleocharis) and toad rush (Juncus bufonius L.). There were small numbers of other taxa characteristic of grassland, including lesser hawkbit (Leontodon saxatilis Lam.), meadowsweet (Filipendula ulmaria (L.), parsley water-dropwort (Oenanthe lachenalii C. C. Gmel.), perforate St John's-wort (Hypericum perforatum L.), selfheal (Prunella vulgaris L.) and tormentil (Potentilla erecta (L.) Raeusch.). Areas of damp grassland were implied by the presence of meadow/creeping buttercup (Ranunculus acris L./R. repens L.). Remains of deciduous shrubs, e. g. hazel (Corylus avellana L.) and blackberry (Rubus fruticosus L. agg.), were also numerous.

Insect remains (in the flot) were highly fragmented and many fragments were pale and eroded. Preservation varied from very poor to good, with the majority of remains being in poor condition. Fragments were often too small to identify conclusively.

Although insect remains appeared to be quite common (because of the high fragmentation) relatively few individuals were represented. There were an estimated 35 individuals of 26 beetle and bugs, with few taxa represented by more than one individual. The main exceptions to this were Aphodius species: there were five Aphodius granarius (Linnaeus), four of an undetermined Aphodius, and single individuals of two other species. Although most Aphodius are associated with various kinds of herbivore dung, some species, including A. granarius, also exploit foul vegetable matter (Jessop 1986, 24). There were also fragments of a dor beetle Geotrupes, a taxon distinctly associated with herbivore dung.

Plant feeders included the semi-aquatic weevil Bagous found on wetland plants and a wetland component was noted in the plant assemblage (see above). The only other water beetle in the assemblage was a single Helophorus. Two oxytelines Anotylus nitidulus Gravenhorst and Platystethus

cornutus group and the ground beetle Pterostichus diligens (Sturm) indicated damp ground, and Acidota is usually found in moss (Joy, 1932, 103).

Two Lathridus minutus group individuals and a Cryptophagus may indicate that the deposit included material derived from a building, occupied either by humans or animals. A human flea Pulex irritans Linnaeus could belong with this group but does not necessarily imply that the refuse came from human dwellings since human fleas are often found in structures housing animals (Smit 1957, 22). A grain weevil Sitophilus granarius (Linnaeus) may also belong with this group, particularly if stable refuse was represented, but is equally likely to have come from a nearby grain store as part of the background fauna.

The large residue (dry weight 11.2 kg) was mostly stones (to 110 mm), with sand and traces of brick/tile (to 15 mm; 1 g), ?pottery (to 10 mm; <1 g) and unidentified bone (to 30 mm; 7 g). The few artefactual remains were returned to the excavator.

Discussion

All of the identifiable plant remains recovered from this context were very well preserved, by waterlogging, and a wide range of species was represented (Table 1). The assemblage was primarily of wild plant taxa from natural and anthropogenic habitats in the vicinity, such as wetlands (ponds/ditches), hedges, waysides or waste places, generally places with significant human influence and usually with a nitrogen-rich soil. Remains of various rush species such as compact/soft/hard rush, spike-rush and toad rush occurred in large numbers and indicated a vegetation such as that which occurs along wet tracks or pond edges in disturbed, trampled places. The invertebrate remains also indicated that ground conditions may have been fairly damp, at least in places – a wetland weevil was recorded but there was little other evidence for aquatics. It may well be that these wetland plants (and the associated invertebrates along with them) were imported to the site, however (see below).

There was very little evidence of food plants; their remains being restricted to single fruit stones of each of cherry/plum (Prunus) and fig (Ficus carica L.).

Overall, the deposit appears to have contained a component of 'stable manure' (sensu Kenward and Hall 1997), a mixture of dung and litter – rubbish derived from other sources at this site and including flora and fauna associated with buildings (amongst which could be rushes used as a floor covering or for animal bedding). Concretions of organic 'straw-like' material, perhaps animal dung, were frequently recorded. The halophilous plant species sea arrowgrass (Triglochin maritimum L.) was probably introduced in herbivore dung from animals grazed on saltmarsh – similar evidence of imported saltmarsh plants from urban deposits has been recorded elsewhere in York from other periods, at Coppergate (Kenward and Hall 1995) and Skeldergate (Hall et al. 1980), for example.

Insect remains were present at a very low concentration in the sample, so any conclusions made from the assemblage must be tentative, but there was a suggestion from a few taxa that the deposit may have included material derived from a building. Carrott and Akeret (2006) noted in their evaluation report that wood and 'straw' were the main components of the plant assemblage from this deposit and this has been borne out by the further analysis reported here. This material could represent litter from within a building. Kenward and Hall (1997) have identified a number of key groups of plant and animal remains that appear to indicate the presence of 'stable manure'. There were members of at least three of these indicator groups within the insect assemblage, albeit not in impressive numbers: the building fauna noted above, a flea, and a grain pest. However, there was little or no evidence

(from the insect remains) of two other important groups, in particular there were none of the decomposers associated with open-textured moist nutrient-rich decomposing organic matter and there was only a single (unidentified) fly puparium.

The most numerous beetles in the assemblage were scarabaeids associated with foul decomposing matter. Aphodius granarius is a particularly eurytopic species found in dung (typically of cattle) and foul plant material (Jessop 1986, 24). Aphodius species are not a typical element of stable manure as accumulated within a building, although A. granarius may have exploited stable litter deposited in the open. Both dung and vegetable waste are likely to have been common in York in the past and various Aphodius species were probably a significant part of the background fauna of the area.

There is, therefore, a fairly strong suggestion that this deposit may represent material originating as bedding within a stable, or other animal housing, but subsequently cleared to an outside dung heap which was then exploited by the beetles and colonised by nitrophile plants. However, given the relatively low concentrations of remains, there is also the possibility that the organic component may have arrived as flood debris brought from a dung heap, or perhaps a variety of habitats, nearby rather than representing in situ deposition.

One unusual plant record is worthy of a final remark. The seeds of japanese-lantern (Physalis alkekengi L.) may well be the first archaeological records of this species for the North of England (Allan Hall pers. comm.) and likely to be contemporary with the plant being introduced into the country.

Retention and disposal

The biological remains recovered from the deposit should be retained as part of the physical archive of the site.

Archive

All material is currently stored by Palaeoecology Research Services (Unit 8, Dabble Duck Industrial Estate, Shildon, County Durham), along with paper and electronic records pertaining to the work described here.

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Table 1. Micklegate Sewer, York: Plant macrofossil taxa from Context 12, Sample AA/T2. Nomenclature follows Stace (1997). Semi-quantitative records are shown as + – present, ++ – common.

Identifiable plant remains	**Vernacular name**	**Part recorded**	**Count**
Anagallis arvensis L.	pimpernel	seed	1
Aphanes arvensis L.	parsley-piert	achene	121
Apiaceae	carrot family	mericarp	1
Carex	sedge	caryopsis	27
Chenopodium album L.	fat-hen	seed	32
Cirsium arvense (L.) Scop.	creeping thistle	achene	4
Corylus avellana L.	hazel	nut shell	31
Cyperaceae	sedge family	nut	41
Eleocharis	spike-rush	nut	92
Ficus carica L.	fig	fruit stone	1
Filipendula ulmaria (L.) Maxim.	meadowsweet	achene	3
Fumaria officinalis L.	common fumitory	achene	2
Hydrocotyle vulgaris L.	marsh pennywort	mericarp	19
Hypericum perforatum L.	perforate St John's-wort	seed	2
Juncus bufonius L.	toad rush	seed	++
Juncus conglomeratus L./J. effusus L./J. inflexus L.	compact/soft/hard rush	seed	++
Leontodon saxatilis Lam.	lesser hawkbit	achene	1
Linum catharticum L.	fairy flax	seed	5
Mentha arvensis L.	corn mint	nutlet	1
Montia fontana L. ssp. chondrosperma (Fenzl) Walters	blinks	seed	6
Oenanthe lachenalii C.C. Gmel.	parsley water-dropwort	mericarp	1
Papaver dubium L./P. rhoeas L.	long-headed/common poppy	seed	8
Persicaria	knotweed	achene	3
Physalis alkekengi L.	japanese-lantern	seed	6
Poaceae	grass family	caryopsis	8
Polygonum aviculare L.	knotgrass	achene	11
Potentilla	cinquefoil	achene	3
Potentilla erecta (L.) Raeusch.	tormentil	achene	10
Prunella vulgaris L.	selfheal	nutlet	9
Prunus	cherry/plum	fruit stone	1
Ranunculus aquatilis L.	common water-crowfoot	achene	4
Ranunculus acris L./R. repens L.	meadow/creeping buttercup	achene	53
Ranunculus flammula L.	lesser spearwort	achene	19
Raphanus raphanistrum L.	wild radish	mericarp	3
Rubus fruticosus L. agg.	blackberry	fruit stone	3
Rumex acetosella L.	sheep's sorrel	achene	31
Stellaria media (L.) Vill.	chickweed	seed	6
Triglochin maritimum L.	sea arrowgrass	carpel	1
Urtica dioica L.	common nettle	achene	61
Urtica urens L.	small nettle	achene	1
Other plant remains:			
charcoal			++
plant fibres			++
'straw-like' concretion			++
wood 'chips'			+

Table 2. Micklegate Sewer, York: Invertebrate macrofossil taxa from Context 12, Sample AA/T2. Nomenclature for beetles and bugs follows Kloet and Hincks (1964-77), except for the Carabidae and Scarabaeidae which follow Lindroth (1985, 1986) and Jessop (1986), respectively. The abundances of those taxa not used in statistics were recorded as follows: + – present. Figures given are minimum numbers of individuals.

Ecological codes given in square brackets after beetles and bug taxa follow Kenward et al. (1986a): d – damp ground or waterside taxa; g – grain-associated taxa; l – wood-associated taxa; oa – certain outdoor taxa; ob – probable outdoor taxa; rt – generalised decomposers; rd – dry decomposers; rf – foul decomposers; p – strongly plant-associated taxa; w – aquatics; u – not allocated.

Taxon		**Context 12**
Oligochaeta sp. (egg capsules)		+
Forficula auricularia Linnaeus		+
Heteroptera sp. indet. [u]		1
Diptera sp. (puparium)		+
Pulex irritans Linnaeus		+
Dyschirius sp. [oa]		1
Pterostichus diligens (Sturm) [oa-d]		1
Carabidae sp. [u]		1
Helophorus sp. [oa-w]		1
Cercyon ?analis (Paykull) [rt]		1
Cercyon sp. [u]		1
Histerinae sp. [rt]		1
Acidota sp. [u]		1
Platystethus cornutus group [oa-d]		1
Anotylus nitidulus Gravenhorst [rt-d]		1
Neobisnius ?villosulus (Stephens) [u]		2
Staphylininae sp. [u]		1
Geotrupes sp. [oa-rf]		1
Aphodius granarius (Linnaeus) [ob-rf]		5
Aphodius spp. [ob-rf]		6
?Scarabaeidae sp. [u]		1
Cryptophagus sp. [rd]		1
Lathridius minutus group [rd]		2
Sitophilus granarius (Linnaeus) [g]		1
Bagous sp. [oa-p-w]		1
Curculionidae spp. [oa-p]		2
Coleoptera spp. [u]		1
Acarina spp.		+

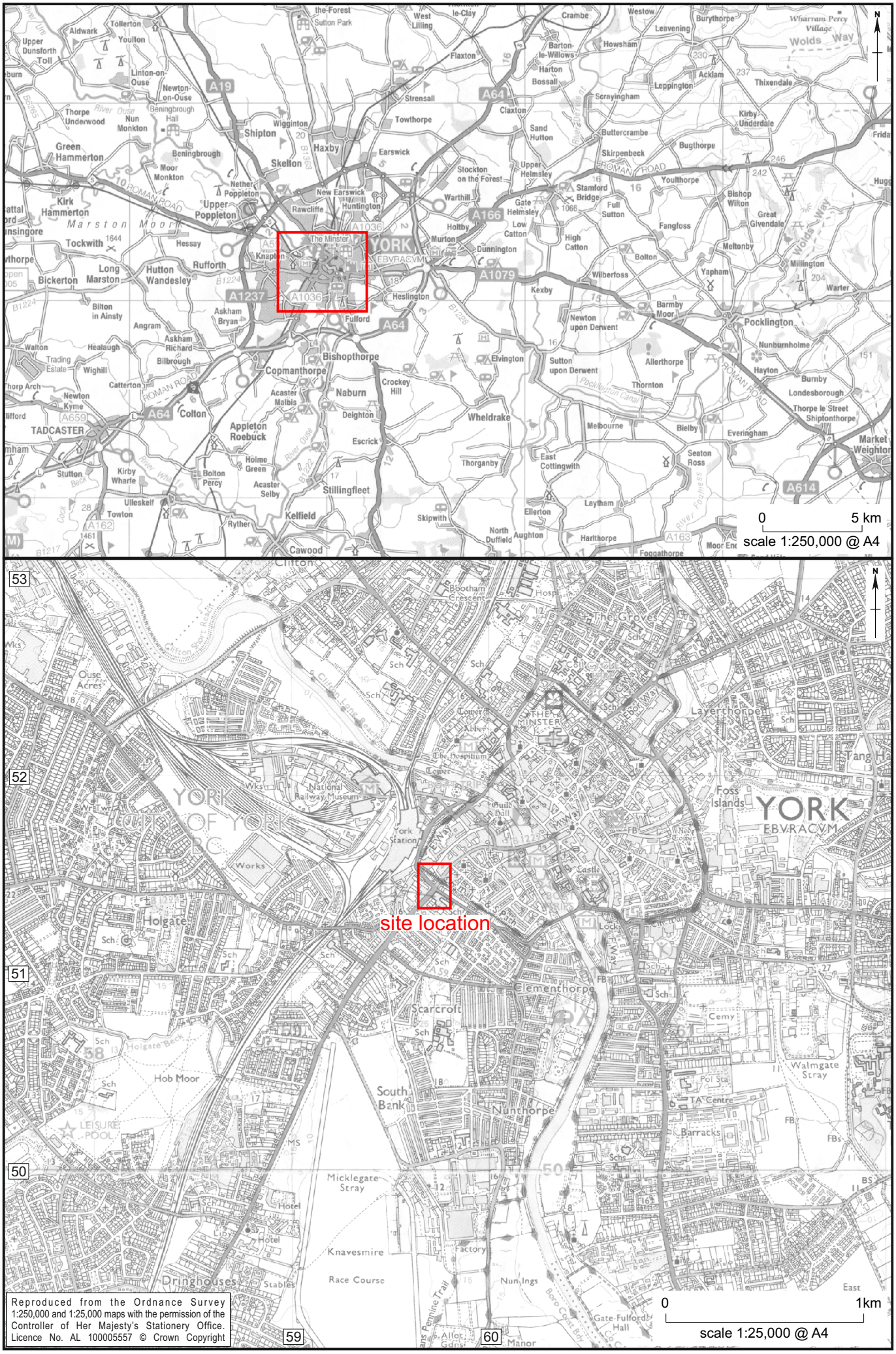

Figure 1 Micklegate, York: site location

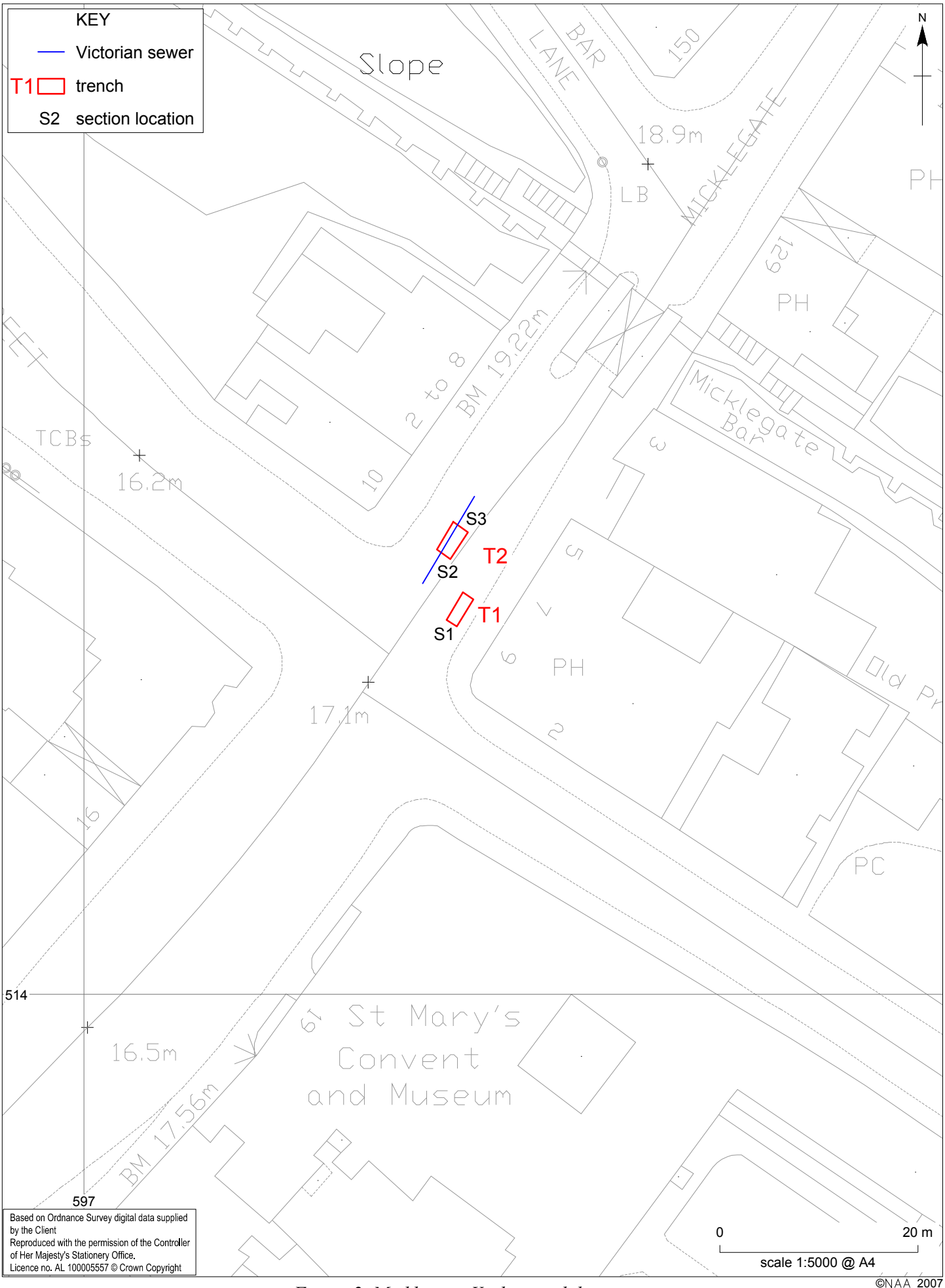

Figure 2 Micklegate, York: trench locations

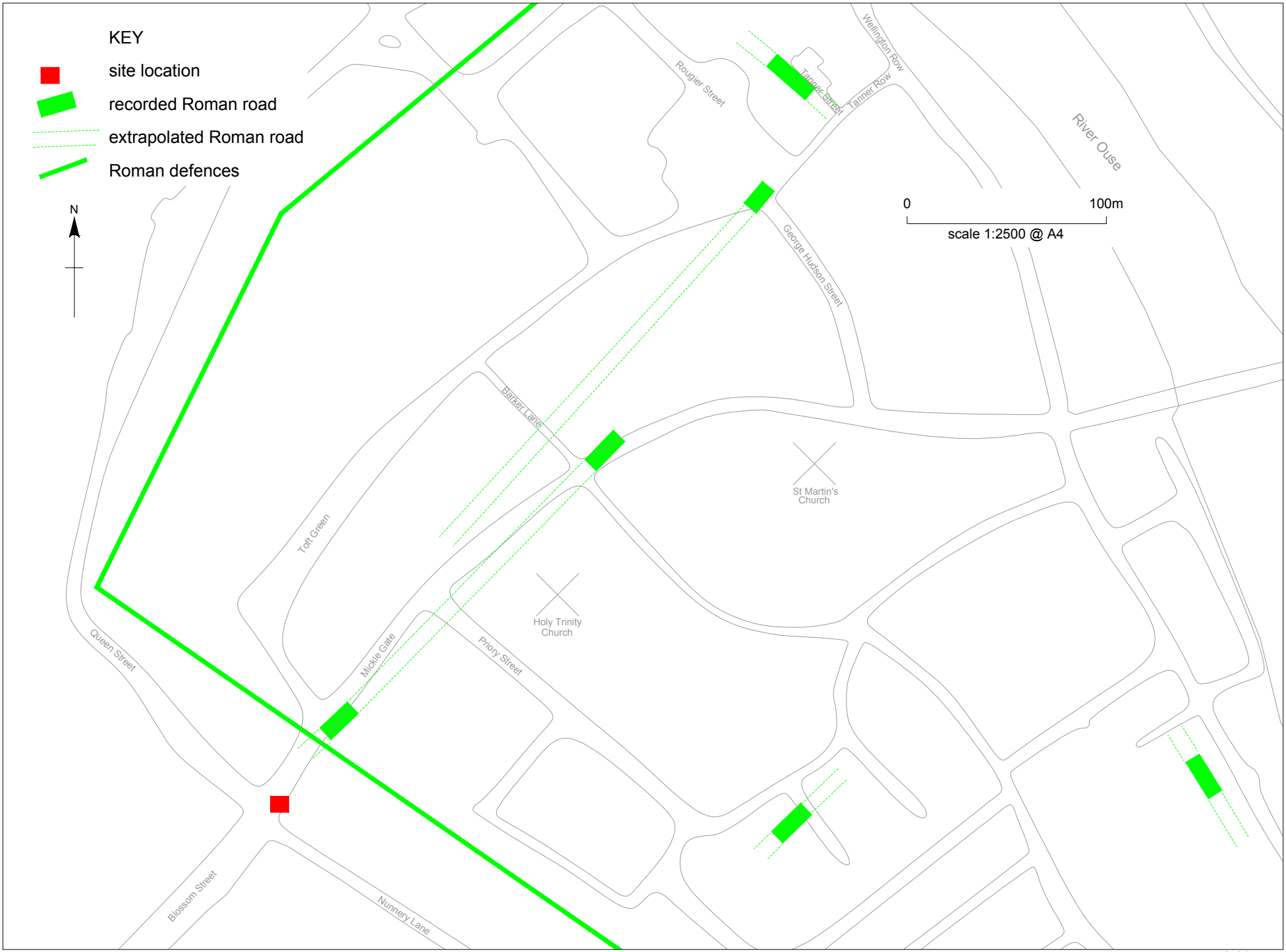

Figure 3 Micklegate, York: recorded sections of Roman roads

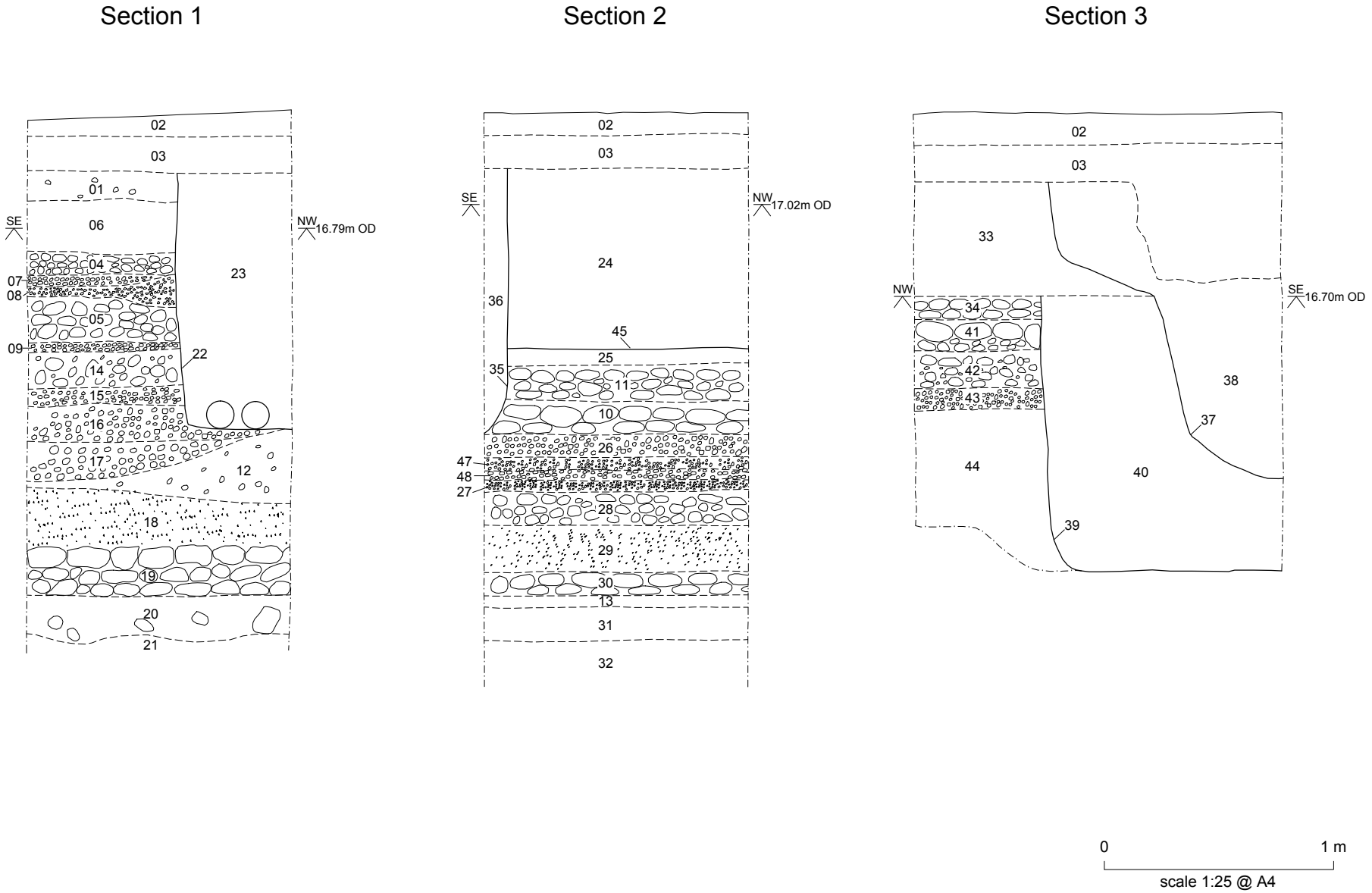

Figure 4 Micklegate, York: trench sections

Plate 1 Micklegate, York: overview of the site from Micklegate Bar looking south-west along Blossom Street.

Plate 2 Micklegate, York: Shot of the site area looking toward Micklegate Bar

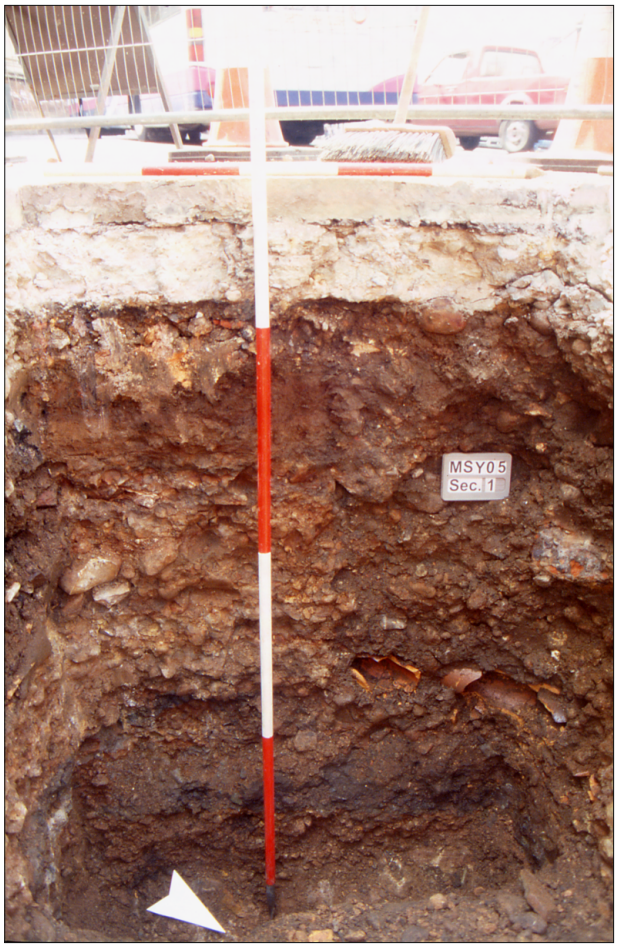

Plate 3 Micklegate, York: north-east facing section of Trench 1 showing Roman foundation stones in the base overlain by red gravel metalling and 'black earth' deposit.

Plate 4 Micklegate, York: north-east facing section of Trench 1 showing complete sequence of road surfaces.

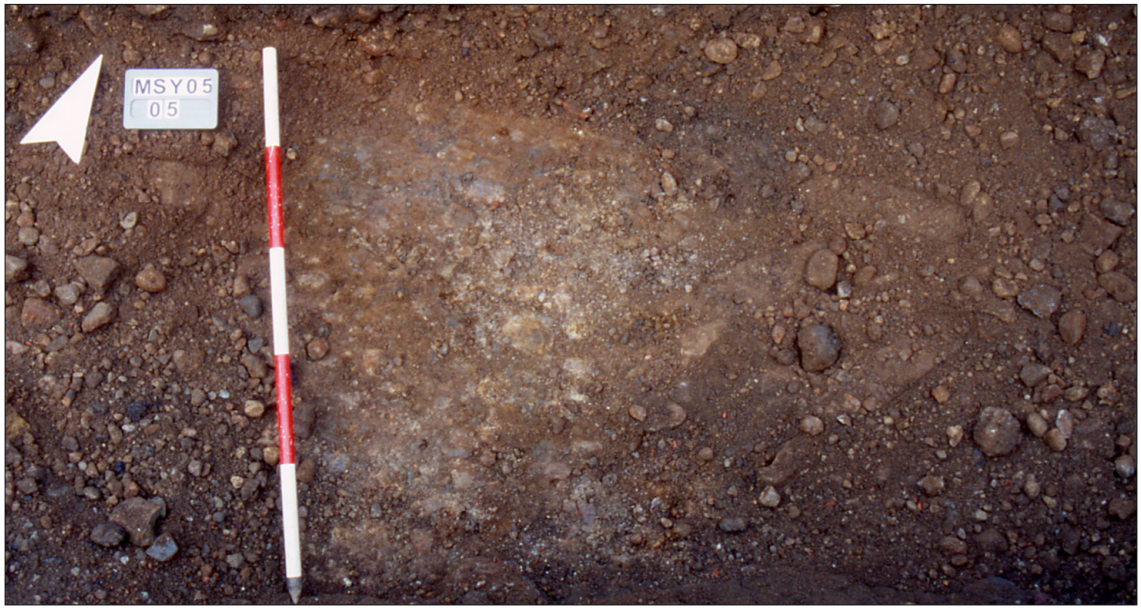

Plate 5 Micklegate, York: medieval road surface 05 in Trench 1.

Plate 6 Micklegate, York: the Victorian tunneled sewer in the base of Trench 2.

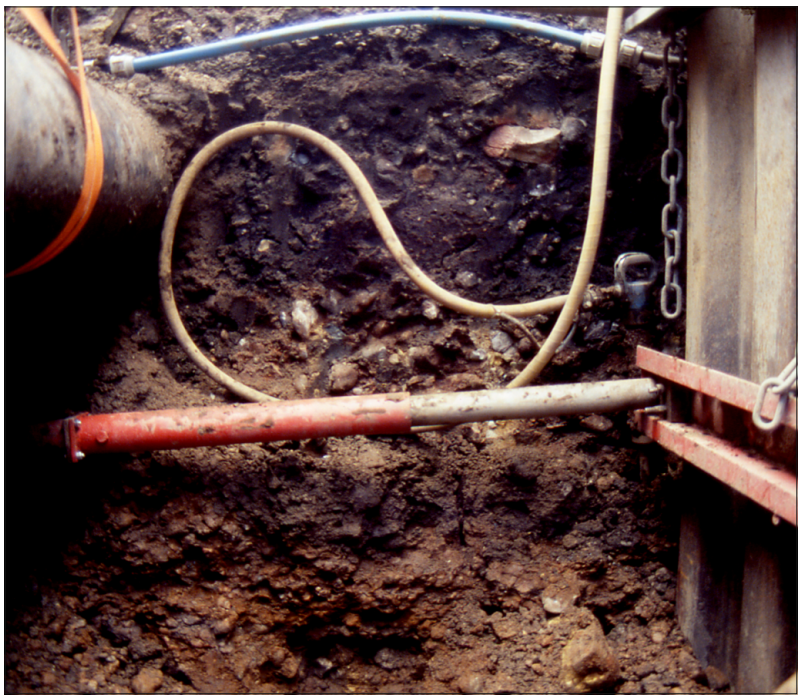

Plate 7 Micklegate, York: lower portion of north-east facing section of Trench 2, showing Roman metalling at the base.

Plate 8 Micklegate, York: upper portion of north-east facing section of Trench 2.

Plate 9 Micklegate, York: medieval road surface 10 in Trench 2

Plate 10 Micklegate, York: south-west facing section of Trench 2.