ARCHAEOLOGICAL INVESTIGATIONS AT THE FORMER LONGBRIDGE NORTH WORKS CAR PARK, LONGBRIDGE, BIRMINGHAM

Andrew Mann, Chris Patrick and Derek Hurst
With contributions by Katie Head, Keith Wilkinson and Alan Jacobs
Illustrations by Carolyn Hunt

Revision 3 1st August 2006

Historic Environment
and Archaeology Service,
Worcestershire County Council,
Woodbury,
University of Worcester,
Henwick Grove,
Worcester WR2 6AJ

Project 2851
Report 1445
BSMR 20722/20737

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Andrew Mann, Chris Patrick and Derek Hurst

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Part 1 Project summary

Three separate archaeological evaluations were undertaken at Longbridge in Birmingham on the site of the former MG Rover North Works car park and on the site of the former video shop and bank at the west end of Longbridge Lane, in south Birmingham (National Grid reference SP 0090 7755). These evaluations were undertaken on behalf of Halcrow Group Limited and their client St Modwen Developments Ltd, who intend to build a mixed commercial and residential development on the site. The project aimed to determine if any significant archaeology was present and, if so, to indicate its location, date and nature.

Archaeological evaluation has identified the stone and brick walls and cobbled yards surfaces of a building known from cartographic evidence as Longbridge House. Artefactual remains suggest that this building dated from the 18th century. To the north and east of this building a number of palaeochannels were identified, within a broad area of organic alluvium. Environmental analysis and subsequent radiocarbon dating has indicated that the earliest of these deposits date to the early medieval period. The general sequence is one of a wooded riverine landscape becoming cleared and replaced by a grassland landscape that seems to have persisted until the development of the industrial site in the early 20th century.

Part 2 Detailed report

1. Background

1.1 Reasons for the project

Archaeological investigations were undertaken at the former MG Rover North Works car park and on the site of the former video shop and bank at the west end of Longbridge Lane, in south Birmingham (NGR SP 0090 7755; Fig 1), on behalf of Halcrow Group Limited and their client St Modwen Developments Ltd. The client intends to build a commercial development on the site, which is considered by the Birmingham City Council to potentially affect a site of archaeological interest. This report considers the sample excavation of the site as mitigation for the proposed development and combines all earlier phases of evaluation at the North Works car park, including Mann and Hurst (2005) and relevant sections from Patrick et al (2003).

1.2 Project parameters

The projects conform to the *Standard and guidance for archaeological field evaluation* (IFA 1999). The projects conformed to briefs prepared by Birmingham City Council (BCC 2003 and 2005) and specifications prepared by Halcrow Group Limited (Halcrow 2003, 2005a, 2005b). The project also conformed to project proposals (including detailed specification) prepared by WHEAS, formally HEAS (HEAS 2003, WHEAS 2005a and 2005b).

1.3 Aims

The aims of the earlier evaluations (Mann and Hurst 2005; Patrick et al 2003) were to locate archaeological deposits within the area of the former MG Rover North Works car park and within the footprint of two demolished buildings (video shop and bank), and to determine, if present, their extent, state of preservation, date, type, vulnerability and documentation. The purpose of this was to establish their significance, since this would make it possible to recommend an appropriate treatment, which may then be integrated with the proposed development programme.

More specifically the following aims were identified for the evaluations.

- To clarify the presence/absence of Longbridge House and/or any other remains relating to previous land use at the site preceding the factory development;
- To locate any Roman settlement focused on the road or ford/bridge;
- To identify, within the constraints of the investigation, the date, character, condition and depth of any surviving remains within the site;
- To assess the degree of existing and proposed impacts on the sub-surface horizons in order to appraise the extent of archaeological survival;
- To clarify the presence/absence of palaeoenvironmental deposits and undertake a programme of sampling and analysis of remains, including plant macrofossils, insects, pollen and geoarchaeology, with a view to reconstructing the landscape history of the region.

The aims of the present project (Halcrow 2005b) were as follows.

- Clarify the presence/absence of palaeoenvironmental deposits identified in an earlier stage of work on the site and to undertake a programme of sampling and analysis of material to consolidate work carried out to date on this part of the site.
- Establish the significance and where appropriate the dating for material recovered form this site to date.
- To undertake geoarchaeological sampling and analysis of material, in order to provide an interpretation of the site's geological history and site formation.

2. Topographical and archaeological context

2.1 Location

The site is located on the south-eastern side of the A38 Bristol Road, on the site of the former the North Works car park. (BSMR 20722) The site slopes downhill from the A38 eastwards, though it is apparent that this area has been subjected to large-scale landscaping, specifically towards the Bristol Road.

2.2 Geology

The site lies on a succession of solid geological types (from west to east) as follows: Lickey Quartzite, sandstone, red marls/mudstones, sandstones and mudstones. There is alluvium beside the River Rea, which formerly flowed from west to east. The river is now in a concealed culvert on the North Works factory site to the south of Longbridge Lane.

2.3 Historical and archaeological background

A full account of the historical and archaeological background is in the desk-based assessment carried out for an Environmental Statement (Halcrow 2003). The Birmingham Sites and Monuments Record did not register any archaeological sites in the area of the site. The area of the site is, however, believed to have potential for a type of archaeological site known as 'burnt mounds'. These are commonly found close to streams and are dated to the Bronze Age. Surveys of the banks of the River Rea and its tributaries elsewhere in Birmingham have identified many burnt mounds and one estimate for the number of burnt mounds suggests that there are as many as five for every mile of stream (Barfield and Hodder 1989). This type of site is commonly found close to streams and is thought to represent a cooking place or the location of bathing (sauna) activity.

The Roman road between the forts at Droitwich and Metchley (Birmingham University) follows the present line of the Bristol Road, which forms the western boundary of the site. The Roman road would have crossed the River Rea, either via a bridge or ford somewhere in the area and could have formed the focus for a Roman settlement.

The area appears to have been rural during the medieval and post-medieval period. Longbridge House is shown adjacent to the Bristol Road for the first time on the 1840 tithe map, though it is thought to potentially have medieval origins.

The Halesowen railway branch, which forms the southern boundary of the North Works, was built in 1881. A former factory building built for the production and printing of tin boxes by White and Pike Ltd in 1892/4 became the first Austin works in 1906 on the southern side of the line. The area to the north of the railway remained as fields until the North Works was built in 1916, at which time the River Rea was diverted into a culvert running down the length of Longbridge Lane.

3. Methods

3.1 Documentary search

A desk-based assessment carried out for the Environmental Statement collated the relevant sources derived from the SMR, early Ordnance Survey maps and any information supplied by the client (Halcrow 2003).

3.2 Fieldwork methodology

3.2.1 Fieldwork strategy

Fieldwork within the area of the former North Works car park was undertaken on three separate occasions, and a total of eight trenches were excavated (Fig 2).

First evaluation (brief, BCC 2003; specification HEAS 2003; report Patrick et al 2003).

This evaluation was divided into two areas A and B (Patrick *et al* 2003). Area A was the former North Works car park, within which Trenches 1 and 2 were excavated. The presence of services and other below ground obstructions across the site meant that most of the trenches could not be excavated to their proposed lengths or locations. Trench 1 could not be fully excavated due to the presence of 3.5m of modern made-ground in the area and instead 5m lengths (Trenches 1a and 1b) were excavated at either end of the proposed 50m trench.

Second evaluation (brief, BCC 2005; specifications Halcrow 2005a and WHEAS 2005a; report Mann and Hurst 2005).

The trenches of this evaluation were numbered 9 and 10 in continuation of the numbering of trenches across the rest to the St Modwen development area. Two trenches, amounting to just over 183m² in area, were excavated within the footprint of the demolished buildings.

Trench 9 was located within the footprint of the demolished video shop. The trench was widened during the evaluation to the limits of the foundations to establish the extent of initial archaeological observations. Trench 10 was excavated on the western edge of the foundations of the bank, since the demolition of this building revealed extensive damage to the subsurface deposits within its footprint, resulting from the construction of its vaults and safes. The depth of the deposits within this area resulted in the need to step-in the trench to provide a safe working area.

Sample excavation (fieldwork 27th February and 3rd March 2006 (brief BCC 2005; specifications Halcrow 2005b and WHEAS 2005b).

Three trenches were excavated across the site, running in a north-east direction away from the Bristol Road, that were intended to expose and enable the sampling of palaeoenvironmental remains identified in the previous evaluations. These trenches were numbered 11, 12 and 13 in continuation of the numbering of trenches across the rest to the St Modwen development area. The trenches were staggered in order to avoid underground electricity cables and sewer pipes and ran for a total of 62.5m.

Deposits not considered significant were removed using a 360º tracked/wheeled excavator under archaeological supervision. Below the old bank and video shop a toothed bucket was initially used to remove demolition rubble and concrete slabs relating to the demolished buildings. Subsequent to demolition, as in all other trenches, a toothless ditching bucket was employed. After identifying archaeological deposits subsequent excavation was undertaken by hand. Clean surfaces were inspected, and selected deposits were excavated to retrieve artefactual material and environmental samples, in order to determine their nature. Deposits were recorded according to standard Service practice (CAS 1995).

3.2.2 Structural analysis

All fieldwork records were checked and cross-referenced. Analysis was effected through a combination of structural, artefactual and ecofactual evidence, allied to the information derived from other sources.

3.3 Artefact methodology by Alan Jacobs

3.3.1 Artefact recovery policy

The artefact recovery policy conformed to standard Service practice (CAS 1995; appendix 2).

3.3.2 Method of analysis

All hand-retrieved finds were examined. They were identified, quantified and dated to period. A *terminus post quem* date was produced for each stratified context. The date was used for determining the broad date of phases defined for the site. All information was recorded on *pro forma* sheets.

Pottery fabrics are referenced to the fabric reference series maintained by the Service (Hurst and Rees 1992).

3.4 Environmental archaeology methodology by Katie Head

3.4.1 Sampling policy

The environmental sampling strategy conformed to standard Service practice (CAS 1995; Appendix 2). Bulk samples of 10 to 20 litres were taken from undated palaeochannel and organic alluvial deposits in Trench 2 (contexts 2011 and 2006), Trench 10 (contexts 228, 232, 233 and 234) and Trench 12 (contexts 1204, 1206 and 1208) (Fig 3-5). Within Trenches 10 and 12, bulk samples were taken from spits of 10cm through the alluvial deposits in order to create a chronological sequence of environmental change (Table 1).

Context	Context type	Description	Period	Sample vol (L)	Vol processed (L)	Residue assessed	Flot assessed
2011	Fill	Palaeochannel Fill	?	10	1	Y	Y
2011	Fill	Palaeochannel Fill	?	10	1	Y	Y
2011	Fill	Palaeochannel Fill	?	10	1	Y	Y
2006	Layer	Alluvium	?	10	1	Y	Y
228	Layer	Alluvium	?	10	5	Y	Y
232	Layer	Alluvium	?	10	5	Y	Y
1208 0-10cm	Layer	Alluvium	?	10	5	Y	Y
1204 10-20cm	Layer	Alluvium	?	10	5	Y	Y
1204 20-30cm	Layer	Alluvium	1555 cal AD	10	5	Y	Y
1206 30-40cm	Fill	Palaeochannel Fill	?	10	5	Y	Y
1206 40-50cm	Fill	Palaeochannel Fill	948 cal AD	10	5	Y	Y
1204	Layer	Alluvium	?	10	10	Y	Y
1208	Layer	Alluvium	?	10	10	Y	Y

Table 1: List of bulk environmental samples

Within Trenches, 2, 10 and 12 monoliths were also taken for pollen analysis crossing deposits (2006 and 2011), (228 and 232), (1204, 1206 and 1208) respectively. Spot samples for pollen were taken from the top, middle and bottom of context 2012. Six monoliths were also taken from deposits within Trenches 11, 12 and 13, including the palaeochannel fill 1206 and broad organic deposits 1204 and 1208. These were taken for geoarchaeological analysis.

3.4.2 Method of analysis

These evaluations produced evidence of an extensive spread of organic alluvium to the north of Longbridge Lane, which consisted of layers of organic silty clays, alluvium and of a palaeochannels associated with organic fills within Trench 2, 10 and 12. The monoliths were taken through the broad organic spread and through the palaeochannel deposits identified within Trenches 10 and 2. However pollen analysis was not undertaken on these monoliths due to their sandy matrix and relatively low organic content. Pollen analysis was therefore focused upon the monolith taken through the silty organic channel and broad organic deposits from Trench 12 from which 9 sub-samples were taken. The palaeochannel deposits located within Trench 10 (233 and 234) were also discarded due to the likely nature of contamination of deposits where a land drain was revealed. Instead palaeochannel deposits from within Trench 12 were analysed, as the cut for the land drain could clearly be identified, thus avoiding cross contamination.

3.4.3 Plant macrofossils

The bulk samples removed from Trench 2 were sub-sampled and 1 litre was processed by the wash-over technique as follows. The sub-sample was broken up in a bowl of water to separate the light organic remains from the mineral fraction and heavier reside. The water, with the light organic faction was decanted onto a 300µm sieve and the residue washed through a 1mm sieve. The remainder of the bulk sample was retained for further analysis.

Two of the bulk samples from within Trench 12 (1204 and 1206) were also sub-sampled and processed by the wash-over technique to recover material for radiocarbon dating. The plant macrofossils were identified and submitted for AMS radiometric dating to the University of Waikato Radiocarbon Dating Laboratory, New Zealand and calibrated using Bayesian probability methods using the software, OxCal v3.9 (Bronk Ramsey 2003).

The remainder of the samples from Trench 12 and 10 were processed by paraffin floatation as outlined by Kenward *et al* (1980). This process was primarily intended to recover insect remains, although the flots were also used for plant macrofossil analysis.

The residues were fully sorted by eye and the abundance of each category of environmental remains estimated. The flots were fully sorted using a low power EMT stereo light microscope and plant remains identified using modern reference collections maintained by the Service, and seed identification manual (Beijerinck 1947). Nomenclature for the plant remains follows the *Flora of the British Isles*, 3rd edition (Clapham *et al* 1989).

3.4.4 Pollen

Nine pollen samples were selected at intervals through the section (contexts 1204 and 1208), and through palaeochannel fill (context 1206). Sediment samples of 2cm^3 were measured volumetrically. To remove clays, the samples were soaked for 24 hours and then boiled in tetra-Sodium Pyrophosphate for 30 minutes, sieved through a 120µm mesh, washed onto a 10µm mesh, and the residue collected. 10% Hydrochloric acid was then added in order to remove any calcium carbonate within the sample. To remove siliceous material, the samples were soaked overnight and then digested using Hydrofluoric Acid in a hot-water bath for 15 minutes. As the samples contained organics, they were acetolysed for 3 minutes to break down the cellulose material. Finally the pollen pellet was stained with safranine, washed in alcohol to dehydrate the sample, and preserved in silicon oil.

Pollen grains were counted to a total of 500 land pollen grains (TLP) where possible, on a GS binocular polarising microscope at 400x magnification, and identification was aided by using the pollen reference manual by Moore *et al* (1991) and the reference collection maintained by the Service. Nomenclature for pollen follows Stace (1997) and Bennett (1994), and results are listed in taxonomic order. The pollen diagram was constructed using TILIA, TILIA.GRAPH, and TGView 2.0.2 software (Grimm 1990; 2004).

3.4.5 Geoarchaeology by Keith Wilkinson

Monolith samples were collected by a member of the WHEAS environmental archaeology team towards the end of excavation at the Longbridge site. They were taken from freshly exposed sediment in trench sections by the simple expedient of placing the monolith against the section face and cutting behind the face to remove a sediment block. Samples were subsequently labelled and sealed with plastic film prior to removal to the WHEAS offices for temporary storage.

Following sampling for palynology and radiocarbon dating by the environmental archaeology team at WHEAS the monoliths were transported to laboratories at the Department of Archaeology, University of Winchester for detailed study. In the laboratory a fresh section through the sediments was exposed by removing 20mm of the outer surface using a scalpel. The newly exposed sediment was then described using standard geological criteria (Tucker 1982; Jones *et al*. 1999; Munsell Color 2000). In the descriptions presented in the detailed full report (Appendix 2) monolith units are correlated with archaeological contexts wherever this has proven possible. All further discussion in this report is therefore presented in terms of the WHEAS contexts.

3.5 The methods in retrospect

The methods adopted allow a high degree of confidence that the aims of the project have been achieved. Adequate access to the archaeological remains and sufficient time allowed the site to be investigated and interpreted to a high standard.

4. Results

Where appropriate the results of the earlier evaluation trenching in the area just immediately to the east (Patrick *et al* 2003) are also incorporated below. The trenches of the evaluations within the North Works car park are numbered 1-2 and 9-13 in continuation of the numbering of trenches across the rest to the St Modwen development area.

4.1 Structural analysis

The trenches and features recorded are shown in Figures 2-6. The detailed data relating to the structural analysis are presented in Appendix 1.

4.1.1 Phase 1 Natural deposits

With the exception of Trench 2 natural deposits (contexts 1007, 107, 229, 1105, 1205 and 1305) were identified in all trenches, at a depth of between 0.50-3.50m below the present ground surface. The natural was deepest in Trenches 1a, 1b, and 10, as towards the Bristol Road significant amounts of material had been dumped. The natural consisted of blue/green sandy clays, although in Trench 1 the natural was reddish brown silty clay.

4.1.2 Phase 2 Medieval deposits

No deposits or artefacts from the prehistoric and Roman periods were positively identified during the fieldwork. The alluvial layers identified are the earliest deposits identified on site and date to between the early medieval and the late medieval/early post-medieval periods.

The alluvial deposits and organic clays were located within all the trenches excavated except Trench 9 and were approximately 0.45-0.50m deep. Within Trench 2 an extensive deposit of lighter greyish brown sandy loam (context 2006) appeared to be slightly organic and may have formed in an area of marshland. However, the presence of large rounded pebbles scattered throughout much of this deposit, and its sandy nature suggest some disturbance resulting from high-energy water flow (perhaps flooding). Broad expanses of organic deposits were also exposed in Trench 10, and were visible as a dark grey/black humic silty clay (232). Similar deposits, which were mid-dark greenish/grey organic silty clays, were also identified in Trench 11 (contexts 1104 and 1108), Trench 12 (contexts 1204 and 1208) and Trench 13 (contexts 1304 and 1306; Figs 3-5; Plate 1).

Several palaeochannels were also identified in Trenches 2, 10 and 12 either cutting or being sealed by the aforementioned organic alluvial deposits. In Trench 2 (Fig 3) a narrow east to west aligned channel (context 2011) was filled with a dark greyish brown silty loam, cut into natural sandy deposits. A later -channel(Trench 2, 2012), again aligned east to west, flowed to the south of 2006. Trenches 10 and 12 also contained palaeochannels (contexts 236 and 1207 respectively; Figs 3 and 5; Plates 2 and 3), both were cutting the natural sandy clays. Channel 236 was aligned north-west to south-east and channel 1207 was aligned north-east to south-west. It is possible that these were dug to drain a broad marshy area. Both of the channels in Trenches 10 and 12 had later incorporated a land drain, the re-cut of which was clearly visible within Trench 12. Presumably this was a further attempt to drain the area. The very organic silty clay (232) and the stone bank (231) in Trench 2 on the northern edge of the channel are also presumably the up-cast from the creation of a channel or insertion of the land drain.

4.1.3 **Phase 3 Post-medieval deposits (18th-19th century)**

Structural remains were identified in Trench 9 (Fig 6) consisting of four brick walls and one sandstone wall, and an area of cobbled surface (Plate 4). These are the remains of Longbridge House, as shown on the first edition Ordnance Survey map (1884) and the tithe map of 1840.

The earliest deposit appears to be a layer of dark brown silty clay that overlies the natural clays in much of Trench 1 and probably represents a buried topsoil. This layer was cut by the construction trenches of four walls (103, 105, 140 and 141). The earliest of these was the sandstone wall (105) that was aligned east to west (Plate 5). This wall was made of large sandstone blocks that had been worked to create a visible edge on the northern side and appeared to have been cut by all three other walls that are aligned north to south. Walls 140 and 141 appeared to extend southwards and were visible within the southern baulk of the trench, although these sections had been removed either during the construction or demolition of the video shop.

To the east of the walls was a cobbled surface or yard defined by the walls 141 and 145, that appear to butt one another to the north of the cobbled surface (Plate 6). The cobbled yard surface lay directly upon the natural (107). Further to the east of the yard surface cut into the natural were numerous pits and postholes that presumably acted as some form of yard management or boundary fence to the side of the building. Of particular interest was pit 129 that was square in plan and had at least nine stakes of various diameters around its edge, but its function was not established. A ditch to the north-east of the trench presumably acted as a drainage or boundary ditch to the east of the building.

4.1.4 **Phase 4 Modern deposits (20th century)**

Modern deposits dominated the site especially adjacent to Bristol Road. Within Trenches 1a, 1b and 10 frequent thick levelling layers had been deposited, and were between 1.75-3.0m thick, compared to a maximum of 0.70m across Trench 9 and 0.30m over Trenches 11-13. The later trenches were not covered as deeply as these were only covered by successive layers of car park and road surface. All layers above 232 and 228 (Fig 4) have been interpreted as levelling dumps. Finds from the excessive dumping along the Bristol Road suggests that it had occurred sometime in the 1920s or 1930s.

Overlying much of the archaeology in Trench 9 there were also numerous demolition (108) and levelling layers (109, 110, 111, 147, 149). The latest wall, discovered in Trench 9 (103), represents the final remains of the video shop demolished prior to excavation. The outline of this wall could still be seen in a concrete foundation (112; Fig 6).

4.2 Environmental results by Katie Head

4.3 Radiocarbon dating

Charcoal fragments and one charred cereal grain from context 1204 dated to between 1460 cal AD to 1650 cal AD (95.4% probability, 2σ), (University of Waikato 2006), (Table 2). The mean age of the upper part the sequence, overlying the palaeochannel is therefore 1555 cal AD dating to the late medieval/early post-medieval. *Rubus* seeds and charcoal fragments from context 1206, the underlying palaeochannel, dated to between 890 cal AD to 920 cal AD and 940 cal AD to 1040 cal AD (95.4% probability, 2σ), covering the early medieval period.

Sample	Material	Laboratory code	$\delta^{13}C$ ‰	Radiocarbon age BP	Calibrated age (2σ)	Mean calibrated age
Context 1204, sample 4	Charcoal fragments and cereal indet grain	Wk19031	-25.6 ±0.2	322± 39 ^{14}C BP	1460 cal AD to 1650 cal AD	1555 cal AD
Context 1206, sample 3	Rubus seeds and charcoal fragments	Wk19030	-26.3 ±0.2	1032± 31 ^{14}C BP	890 cal AD to 920 cal AD and 940 cal AD to 1040 cal AD	948 cal AD

Table 2: Radiocarbon results for selected samples

4.4 Plant macrofossils

The organic content of the processed sub-samples from Trench 2, contexts 2006 and 2011 was low, the presence of fragmented charcoal and possibly coal contributing to the dark appearance of the deposits. Highly humified and unidentifiable woody material or bark was the only organic matter recovered (Table 3). The poor results from these deposits were also mirrored within the deposits (232, 238, 1204, 1206, and 1208) from Trenches 10 and 12, although more material was processed. Insect remains were also absent from these samples, although processed in the appropriate manner. It was thus decided not to return to the samples from Trench 2, as processing further material was unlikely to yield any more information regarding the formation or environment of the channels or broad organic layer.

Latin Name	Family	Common Name	Habitat	2011	2006	228	232	1204	1208	1208 0-10cm	1204 10-20cm	1204 20-30cm	1206 30-40cm	1206 40-50cm
Ajunga cf *reptans*	Labiatae	bugle	CD					20						
Ranunculus acris/repens/bulbosus	Ranunculaceae	buttercup	CD								2	1	1	
Rubus cf *idaeus*	Rosaceae	raspberry	CD							6	1			
Rubus fruticosus agg	Rosaceae	blackberry/bramble	CD					9		9	9	2		
Other Remains														
Unidentified herbaceous material				+++++	+++++	+++++	+++++	+++++	+++++	+++++	+++++	+++++	+++++	+++++
Possible fungal spheriods												15	50	

Table 3: Plant remains

The small numbers of plant macrofossils within the samples from Trench 12 were dominated by blackberry (*Rubus fruticosus* agg) and raspberry (*Rubus idaeus*) seeds that are common in woods, hedgerows and marginal ground. These probably survived due to their robust nature. Occasional buttercup (*Ranunculus acris/repens/bulbosus*) seeds were also recovered from context 1206 and 1204. Within a bulk sample taken from context (1204), not within the main column sample probable bugle (*Ajuga* cf *retans*) seeds were recovered, that are native to woods/shady places and damp grassland. The poor survival of plant macrofossils across the site limits the ability to recreate the environment throughout the sequence, although the remains do not contradict the results produced through the pollen analysis.

4.5 Pollen

A pollen percentage diagram was constructed and divided into three pollen assemblage zones, which are described below (Figure 7).

4.5.1 LBN 1: 77cm – 62cm

At the base of the deposits within palaeochannel fill 1206, the pollen sequence was equally dominated by herbs, primarily Poaceae undiff. (grasses), and trees and shrubs. These arboreal values comprised mainly *Alnus* (alder) and *Corylus* (hazel), both taxa rising steadily through this first pollen zone (LBN 1). Other trees and shrubs were in much lower values and included *Betula* (birch), *Quercus* (oak), and *Salix* (willow). Although grasses dominated the herb pollen suite, other taxa included low numbers of *Ranunculus acris*-type (meadow buttercup), Rosaceae such as *Filipendula* (meadowsweet) and *Potentilla*-type (cinquefoil/tormentil), *Plantago lanceolata* (ribwort plantain), Lact. *Cichorium*-type (e.g. *Taraxacum officinale* (dandelion)), and *Bidens*-type (bur-marigold). There were also a few rare types including the wetland herb, *Callitriche* (common water-starwort), and Dipsacaceae most probably *Scabiosa* (scabious) found on banks and drier pastures. *Calluna vulgaris* (heather) was present but in low values, as were spores, dominated by *Polypodium* (polypody fern).

4.5.2 LBN 2: 62cm – 37cm

Throughout the upper half of palaeochannel fill 1206 and throughout the lower half of deposit 1204 Poaceae undiff. (grasses) began to rise, mirrored by a steady but gradual fall in *Alnus* (alder) and *Corylus* (hazel). *Betula* (birch), *Quercus* (oak), and *Salix* (willow) all rose slightly, while there were occasional grains of *Pinus* (pine), *Ulmus* (elm), *Tilia* (lime), *Hedera* (ivy), *Ilex* (holly), and *Viburnum opulus* (guelder rose). Heathland plants also rose slightly, represented by *Calluna vulgaris* (heather). Other herbaceous taxa were similar to the previous zone, although there was a notable rise in both *Filipendula* (meadowsweet) and *Potentilla*-type (cinquefoil/tormentil). This zone also saw the beginnings of a rise in *Plantago lanceolata* (ribwort plantain), continuing to increase up through the profile. There were also new additions to the herb community including occasional grains of *Cirsium*-type (thistle), *Centaurea nigra* (lesser knapweed), *C. scabiosa* (greater knapweed), Apiaceae, and *Sorbus*-type.

4.5.3 LBN 3: 37cm – 3cm

Through the upper half of deposit 1204 up to the modern levelling layers for the car park 1202, the pollen sequence recorded a continuing increase in Poaceae undiff. (grasses), and a fall in *Alnus* (alder) and *Corylus* (hazel). The sequence was also characterised by an increase in dandelion vegetation and *Plantago lanceolata* (ribwort plantain), mirrored by a fall in *Filipendula* (meadowsweet). Other herbs were similar to previous zones, although there was a slight increase in some of the rare types including *Cirsium*-type (thistle). A few new introductions, not seen in previous zones, included wet-loving herbs such as *Polygonum persicaria* (persicaria) and *Cicuta virosa* (cowbane), as well as meadowland and grassland

colonisers *Centaurea cyanus* (cornflower), *Ononis*-type (restharrow), *Pastinaca sativa* (wild parsnip), and *Anthemis*-type (chamomile).

4.5.4 Discussion

The base of the sequence, deposit 1206, within palaeochannel 1207 dates to the early medieval period. The rise in grasses from the top of zone LBN 1 some time between 948 and 1555 cal AD begins a trend to a fully cleared landscape. There is no significant change in vegetation at the transition zone between the top of the palaeochannel (Context 1206) and the start of the overlying alluvium (Context 1204), indicating that this landscape change was underway while the channel was still active. There are a few indicators of a wetter environment such as common water-starwort, sedge, and persicaria, but these are only occasionally present and are probably localised to the river edge environment. The only other feature of this transition is the rise in dandelion, which may indicate a slight increase in wet meadowland beside the river. Alternatively, the increase in dandelion and grasses may highlight an increase in cultivation. By zone LBN 3, following the transition, it seems that a mosaic of grassland and woodland developed, with grassland and herb communities expanding as the landscape was farmed.

Alder and hazel continued to decline but it was probably these taxa, which colonised areas beside the river where it was wetter and left undisturbed by human agency. Although only occasionally present, lime may have colonised the surrounding area as pollen percentages provide misleading counts due to this taxon being insect pollinated and therefore a low pollen producer. Lime would have grown within a mixed woodland of oak and some pine, while birch, an early coloniser, may have taken the opportunity to temporarily occupy more open areas as clearings appeared. As the grassland expanded and the landscape opened up, species diversity increased within the herbaceous community forming a mosaic of dry and wetland vegetation dominated by grasses. The presence of cornflower (*Centaurea cyanus*) pollen within zone LBN 3 is notable as Greig (Colledge and Greig, 1992) believes this to be characteristic of medieval but not Roman cornfield weed floras, which agrees with the radiocarbon date of late medieval.

It appears that vegetation development in the Longbridge area was complex, with a mosaic of wetland/meadowland herbs and a mixed alder/hazel woodland beside the river, sections of pasture nearby which gradually expanded, and arable land further removed from the site together with an open mixed woodland of oak and lime on drier slopes in the surrounding area.

To the south of Longbridge Lane better developed alluvial deposits were located during the 2003 evaluation, and the Stage 2 evaluation (Griffin *et al* 2004), as they were relatively more organic (and more clayey) than those in Trenches 2, and 10-13, as well as thicker. Here well-preserved remains of beetles and possibly mites survived (Patrick *et al* 2003), and for instance in the lowermost layer of Trench 4 (4013) seeds of rush (*Juncus* spp) and small wood fragments were moderately abundant. However, attempts to date these deposits to the south of Longbridge Lane, as a first stage in their further analysis, were largely defeated by their highly polluted nature (hydrocarbons in particular – probably from diesel fuel and oil, giving spurious results), though one deposit was successfully dated suggesting that these deposits were again of medieval date (1210-1310 cal AD; Griffin *et al* 2004).

4.6 Geoarchaeology by Keith Wilkinson

4.6.1 Stratigraphy

Three stratigraphic units were encountered in the monoliths. They are reviewed in stratigraphic order in the text below:

4.6.2 **Boulder clay (contexts 1105, 1205 and 1305)**

The base of the stratigraphy in all six monoliths comprises a yellowish-brown diamict of medium sands to clays containing well-rounded quartzite pebbles. The pebbles all appear to be derived from the Mercian Mudstone (MMG). These sediments most likely represent the upper part of boulder clay deposits that are mapped by the British Geological Society. The boulder clays of the Birmingham area formed beneath glaciers during the Anglian (Elsterian) cold stage at c 400,000 BP.

4.6.3 **Overbank alluvium (Contexts 1104, 1204,1304, 1108, 1204, 1208 and 1306)**

The alluvial stratigraphy at Longbridge comprises homogeneous dark grey brown silts containing occasional granular-sized quartzite clasts and charcoal fragments (Context 1204). Iron staining within the unit suggests that water-tables have varied since original deposition. In other words the staining is the product of diagenesis (post-depositional processes). The charcoal content increases significantly towards the top of the unit and as a consequence the colour becomes darker (Contexts 1108, 1208 and 1306). Evidence of rooting also appears at the top of the unit, suggesting increased levels of bioturbation.

The sedimentological properties displayed by these deposits bear all the hallmarks of floodplain deposition. In other words it is likely that the deposits formed as a result of fall-out from suspension of silt and clay-sized particles at the end of flood events. The absence of any sedimentary structures (eg lamination) is not unusual in such circumstances and probably reflects pedogenic processes operating within the sediments between individual flood events. Despite this evidence for pedogenesis, there is no suggestion from the monoliths for the presence of the palaeosol(s) identified by Jordan (2004) in the borehole cores. On the basis of the monolith stratigraphy alone it is difficult to determine the origin of the charcoal inclusions. They could be indicative of human activity on the River Rea floodplain between individual flood events. However, it is perhaps more likely that charcoal fragments have been introduced to the overbank deposits by a mixture of bioturbation (Contexts 1104, 1204 and 1304) and mechanical disturbance/compaction (Context 1108, 1208, and 1306). The latter is certainly the safer conclusion to draw when considering the viability of radiocarbon dating.

Although the overbank alluvium sits conformably above the boulder clay, there is no suggestion that deposition was continuous. Indeed it is almost certain, based on comparison of the stratigraphy from elsewhere in southern Britain that the overbank alluvium formed during the second half of the Holocene. Many authors (eg Robinson 1992) have suggested that such floodplain deposits are the result of human-induced soil erosion within river catchments, dating from the Bronze Age and later.

4.6.4 **Made ground (Contexts 1102, 1202, 1303, 1103, 1203 and 1303)**

Charcoal-rich diamicts were found in the tops of Monoliths 2-5 and equate with Contexts 1102, 1202, 1303, 1103, 1203 and 1303. In all cases these deposits contain a mixture of building debris, coke and reworked fine-grained alluvium of the type discussed in Section 3.2. The ‘Made Ground’ that results was probably emplaced to provide a level platform for construction of the car plant.

4.7 Artefact analysis from Trench 9 and 10, by Alan Jacobs

4.7.1 **Artefactual analysis**

Pottery assemblage were only retrieved from Trenches 9 and 10 and consisted of 69 sherds of pottery weighing 1535g. In addition fragments of tile, brick, tobacco pipe, land drain, glass, bone and an iron nail were recovered. The group came from 14 stratified contexts and could be dated from the post-medieval period onwards (see Table 4). Level of preservation was generally fair with the majority of sherds displaying only moderate levels of abrasion.

Material	Total	Weight (g)
Modern pottery	27	384
Post-medieval pottery	42	1151
Tile	5	182
Brick	8	24170
Land drain	17	4121
Tobacco pipe	4	21
Bone	1	16
Cement	1	9
Glass	3	184
Iron nail	1	53
Total	109	30291

Table 4: Quantification of the assemblage

Fabric		Total	Weight
78	Post-medieval red sandy ware	28	1049
81.3	Nottingham stoneware	2	22
81.4	Modern miscellaneous stoneware	2	258
83	Porcelain	2	3
84	Cream ware	12	80
85	Modern stone china	23	123

Table 5:Quantification of the post-medieval and modern pottery

4.7.2 **Discussion of the pottery**

All sherds have been grouped and quantified according to fabric type (Tables 4-6). Four diagnostic form sherds were present, and the other sherds were datable by fabric type to their general period or production span. The discussion below is a summary of the finds and associated location or contexts by period. Where possible, *terminus post quem* dates have been allocated and the importance of individual finds commented upon as necessary.

Post-medieval Red Sandy ware (fabric 78) comprises the largest single element of the assemblage and ranges in date from the 17th to the 18th century. Forms represented comprise pancheons and a small cup (context 106) the fabric with white laminated inclusions strongly indicating an 18th century date for these forms. A number of creamware forms (fabric 84) and a rim sherd of a Nottingham Stoneware (fabric 81.3) tankard (context 106) and a very small body sherd (context 228) were the only other post-medieval sherds recovered, which were all of 18th century date.

The modern pottery consisted of just three fabrics, and was dominated by modern stone china (fabric 85). Forms in this fabric were predominantly plates and cups (contexts 106, 108, 209 and unstratified), which appear to be mainly 19th century. A few sherds of willow-pattern ware, were possibly intrusive in the case of context 106. Two very small fragments of porcelain (fabric 83) were recovered (context 108), small fragments of a cup and possibly saucer. The two fragments of miscellaneous modern stoneware (fabric 81.4) consisted of the rim and base of a large pancheon (context 108), most probably of 19th century date.

4.7.3 **Ceramic building material**

A number of fragments of medieval/post-medieval tile (fabric 2a & 2c; cf Hurst 1992), fabric type 2a dating to the 13th-18th century and type 2c from the 15th-18th century (context 106). A number of fragments of horseshoe-shaped land drains were recovered, the fabric being closest to 2b in the type series but clearly of early 19th century date. This form of land drain was used from about 1820 to the 1840s when technological improvements replaced this type with round pipes. The horseshoe land drain was produced through an extrusion machine and then shaped over a mould. This has left clear stress marks within the fabric, and a distinctive form (Vanda Bartoszuk pers comm). The material recovered (contexts 108, 142, 228, 230 and 233) was not complete enough to check for stamp marks, which could have dated this form more closely. A number of bricks were recovered as samples and were classified by size (Peters 1969) as dating from the post-medieval period onwards. Two examples dated from 1740-1800 (context 140; fabric 2b) and six (fabric 2b) dating from 1760-1850 (contexts 141, 145 and 153), all having traces of lime mortar on them.

4.7.4 **Other finds**

A single fragment of bone was recovered (108), and a number of undiagnostic tobacco pipe stems of 17th-19th century date (contexts 106 and 108). Finally there was a single square sectioned (handmade) iron nail (context 108), and two fragments of post-medieval glass fragments of the neck and base of a wine or beer bottle (contexts 108 and 216).

4.7.5 **Discussion of artefactual evidence**

In conclusion, no archaeological artefacts clearly dateable earlier than the 18th century were recovered. The post-medieval and modern finds also indicate distinct activity, in particular the draining of farmland in the first half of the 19th century indicated by the dateable horseshoe drains. This gives a very clear picture of 18th century occupation continuing into the 19th-20th century, which closely mirrors the evidence from Longbridge Farm discovered during earlier evaluation and excavation (Griffin *et al* 2004) on an adjacent site.

5. General site discussion

Where appropriate extensive reference is made to the results of a previous stage of evaluation (Patrick *et al* 2003), which took place just to the west of the site reported here.

5.1 Early to late medieval alluvial deposits

The geoarchaeological evidence suggests that both contexts 1204 and 1208 are a single homogenous deposit and context 1208 is visibly darker due to staining. This deposit is likely to represent deposition of sediments during flooding of the River Rea. Although no palaeosols were identified, evidence for pedogensis was identified, suggesting that the ground was stable enough between flooding events to support human activity, although none was identified. The presence of a cut to insert a land drain, context 1209, between these layers also suggests that the deposition of deposits had stabilised at some point. Although there was no clear geological distinctions between the two deposits other than colour they are likely to represent different depositional episodes, prior to and sealing cut 1209.

The organic clays and alluvial deposits in Trench 10 were broadly identical to deposits observed by Patrick *et al* (2003) on the north side of Longbridge Lane. In the light of the initial results from the first evaluation to the north of Longbridge Lane (Patrick *et al* 2003) a further stage of sampling was then carried out in the vicinity of Trench 4 (based on borehole sampling; (Griffin *et al* 2004) to the south of Longbridge Lane. The general vegetation at the North Works car park is comparable to the results of this analysis at that site, with the environment supporting woodland of alder and hazel beside the river, and a mixed woodland of oak, pine, and lime on the drier slopes (Griffin *et al* 2004). These earlier studies remain

undated, however its similarities to the pollen sequence from within the North Works car park suggests that this sequence also dates to the early medieval period.

Although when first examined, the pollen suite from the North Works car park, suggested that sequence dated to the late Bronze Age/early Iron Age due to the dominance of trees and shrubs, following the radiocarbon results the pollen sequence spans the medieval period, beginning in the early medieval and finishing during the late medieval period. The dominance of trees and shrubs therefore, appears to be due to the riverine situation of the site. Alder and hazel would have thrived in the damp conditions and it appears that this marginal land was not used by Longbridge's earlier inhabitants. Very few pollen sequences or even palaeoenvironmental evidence exist for the Birmingham floodplain area. One exception is the comparable Bourn Brook in nearby Selly Oak which dates to the 15th and 16th centuries (Goad *et al* 2004). Both the pollen in particular, but also the plant macrofossil evidence, reflected is a typical floodplain landscape. This was characterised by wetland or meadowland type herbs such as dandelion suggestive of an open damp grassland environment. The river edge itself would have been colonised by alder (*Alnus)*, or a mixture of alder and hazel (*Corylus*), although values were not as high as that of the North Works car park. At both sites numbers of other arboreal species were comparable suggesting that mixed woodland distant from the site was also present, most probably colonising the drier landscape away from the immediate floodplain.

5.2 Post-medieval and modern (18th-19th century)

The buried remains of Longbridge House visible on the first edition OS map of 1884 were located in Trench 9. Preservation was good despite significant archaeology only being 0.40m below the present ground surface. Damage caused to the underlying archaeology, by the building that later housed the video shop, was limited, although more damage was caused during its demolition and foundation removal. Various phases of sandstone and brick walls were uncovered together with external yard surfaces and structures. All walls, excluding the modern demolished building, dated to between the mid 18th and mid 19th centuries. Although not dated, the postholes, pits and ditch to the east of the walls are assumed to be in some way associated with the building, and therefore contemporary.

During the 19th century (between 1820-1840) to the north of Longbridge House there was evidence of deliberate drainage of a broad marshy area prone to flooding, by constructing a ditch within which a land drain was later inserted. Fragments of land drain within other areas of the organic clays suggest that more than one drain may have been inserted, although no trench cuts were visible.

The level of survival of Longbridge House, therefore, was similar to that found for Longbridge Farm (Trench 3a, Patrick *et al* 2003; Trench 8, Griffin *et al* 2004). Here remains of the farm buildings survived from the late 18th century onwards (Hurst 2004).

5.3 Modern (20th century)

Modern deposits were dominated by the frequent and often thick layers of levelling material and industrial waste dumped on the site. These related to the landscaping of the site after the destruction of the rural buildings adjacent to Bristol Road and during the construction of the North Works factory in 1916. The thicker deposits located across Trench 10 may indicate that the attempts to drain the marshy area implemented around 1820-40 had failed so that a greater depth of material was required to consolidate the wet and boggy ground, as well as lifting the road above the wet surrounding landscape.

5.4 Conclusion

The earliest deposits discovered upon the site shows that the landscape during the early medieval period (948 cal AD) was dominated by trees and shrubs and the alder and hazel, which would have thrived in the damp conditions, suggests that this was marginal land. The woodland sequence present at Longbridge during this period is similar to the secondary woodland that regenerated within the landscape surrounding Metchley fort towards the end of its occupation and specifically after Roman military withdrawal (Hooke 2002). At Metchley this was later replaced by mixed oak woodland that subsequently became woodland pasture, the likes of which formed an extensive and significant type of landscape in the early medieval period in the west midlands (Hooke 2002). The early woodland sequence at Longbridge may indicate that this was an economically useful landscape that may have contained coppiced hazel, which would have provided the significant quantities of wood required during building works during the post-Roman period.

Early in the sequence, between 948 and 1555 cal AD, this woodland began to be cleared. The first structural evidence for human activity within the area that may have influenced the woodland clearance is Hawkesley Moat, Longbridge (BSMR 02014). The earliest features identified on this site date to the 13th century and the later farm constructed on the site, in the 17th-18th century is visible on the 1840 tithe map. The woodland clearance at Longbridge would probably have been taking place prior to the construction of this site in the 13th century, suggesting continued human activity here that has yet to be identified. The clearance of the woodland, probably for pasture, would certainly have been sustained with the construction of this moated site and surrounding farmland. The arable/pastoral landscape surrounding Hawkesley was probably created during the medieval period and remained in use until modern developments. The field system associated with Hawkesley Farm can clearly be seen on the 1840 tithe map. The clearance of the woodland at the North Works car park also gave way to a pastoral/arable landscape alongside the construction of Longbridge Farm and Longbridge House in the 17th and 18th centuries respectively. These are also both situated within farmland on the 1840 tithe map. This farmed landscape remained in use until modern industrial developments in the 20th century, when rural economic practices gave way to heavy industry.

6. Publication summary

The Service has a professional obligation to publish the results of archaeological projects within a reasonable period of time. To this end, the Service intends to use this summary as the basis for publication through local or regional journals. The client is requested to consider the content of this section as being acceptable for such publication.

Three separate archaeological investigations were undertaken at Longbridge in Birmingham on the site of the former MG Rover North Works car park and on the site of the former video shop and bank at the west end of Longbridge Lane, in south Birmingham (National Grid reference SP 0090 7755). These detected the remains of Longbridge House, palaeochannels and a broad area of organic alluvium. Environmental analysis and subsequent radiocarbon dating has indicated that the earliest of these deposits within a palaeochannel date to the early medieval period, 890 cal AD to 920 cal AD and 940 cal AD to 1040 cal AD (95.4% probability, 2σ). Subsequent broad areas of organic alluvium overlying this channel began to form in the late medieval/early post-medieval period, 1460 cal AD to 1650 cal AD (95.4% probability, 2σ). The general environmental sequence observed is one of a wooded riverine landscape becoming cleared and replaced by a grassland landscape that seems to have persisted until the development of the industrial site in the early 20th century. Stone and brick walls and cobbled yard surfaces were recorded below the video shop. Artefactual evidence suggest that this building dated originally to the 18th century, and was, therefore, constructed at much the same time as Longbridge Farm located on the opposite side of the lane.

7. The archive

The archive consists of:

11 Fieldwork progress records AS2

5 Photographic records AS3

2 Trench record sheets AS41

3 Sample records AS17

18 Abbreviated context records AS40

14 Scale drawings

1 Box of finds

The project archive is intended to be placed at Birmingham City Museum.

8. Acknowledgements

The Service would like to thank the following for their kind assistance in the successful conclusion of this project: Simon Griffin of Halcrow Group Limited, Mike Hodder of Birmingham City Council, Keith Wilkinson of the University of Winchester and Derek Hurst for editing this report.

9. Personnel

The fieldwork reported upon was led by Chris Patrick and Andrew Mann and undertaken by Alvaro Mora-Ottomano, Christine Elgy, Elizabeth Pearson, James Goad, and William Crawford. The project manager responsible for the quality of the project was Simon Woodiwiss. The report was written by Andrew Mann, with sections written by Chris Patrick, Derek Hurst, Alan Jacobs (finds), Katie Head (pollen and radiocarbon dating), Keith Wilkinson (geoarchaeology) and Carolyn Hunt (illustration).

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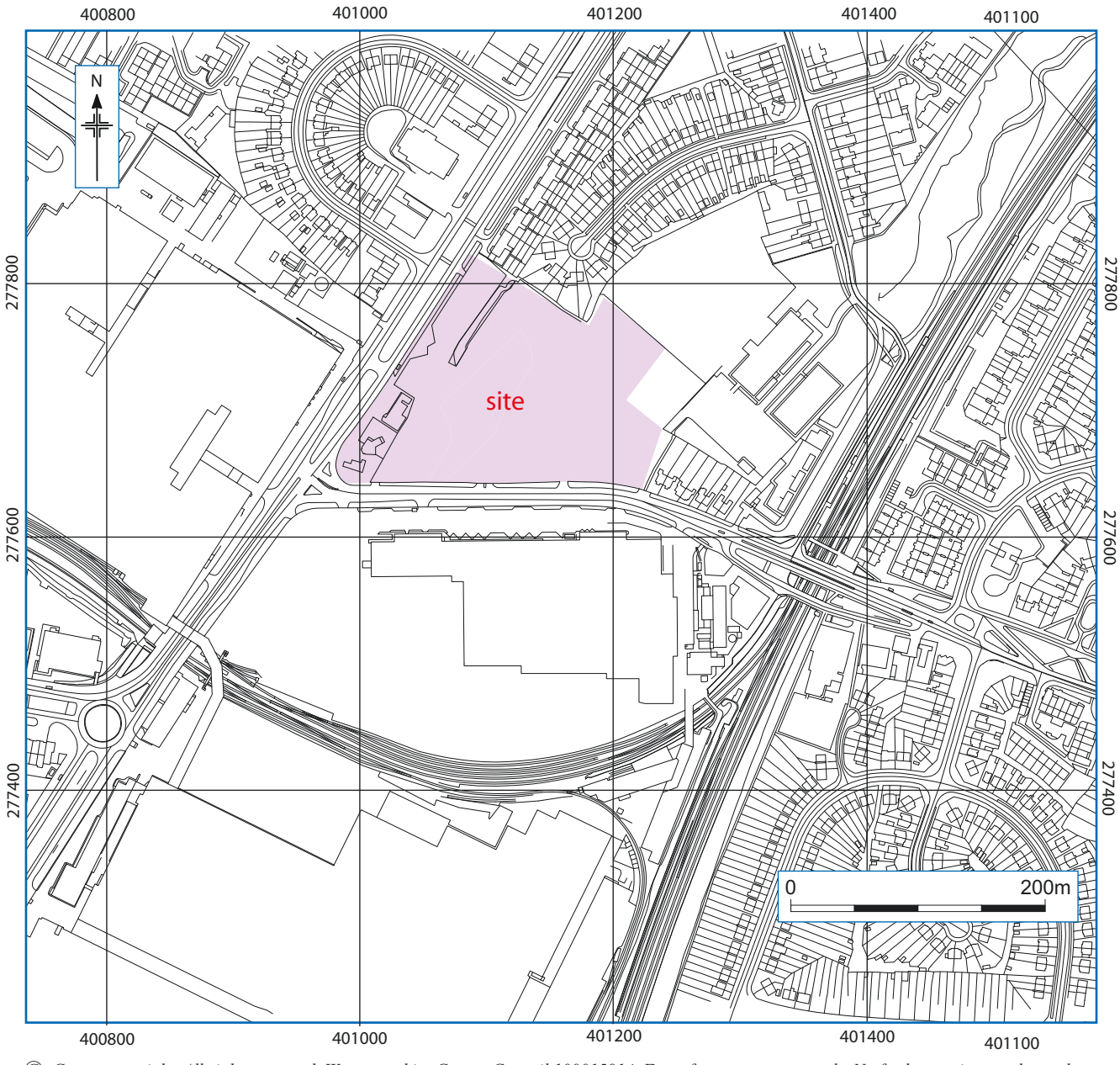
11. Abbreviations

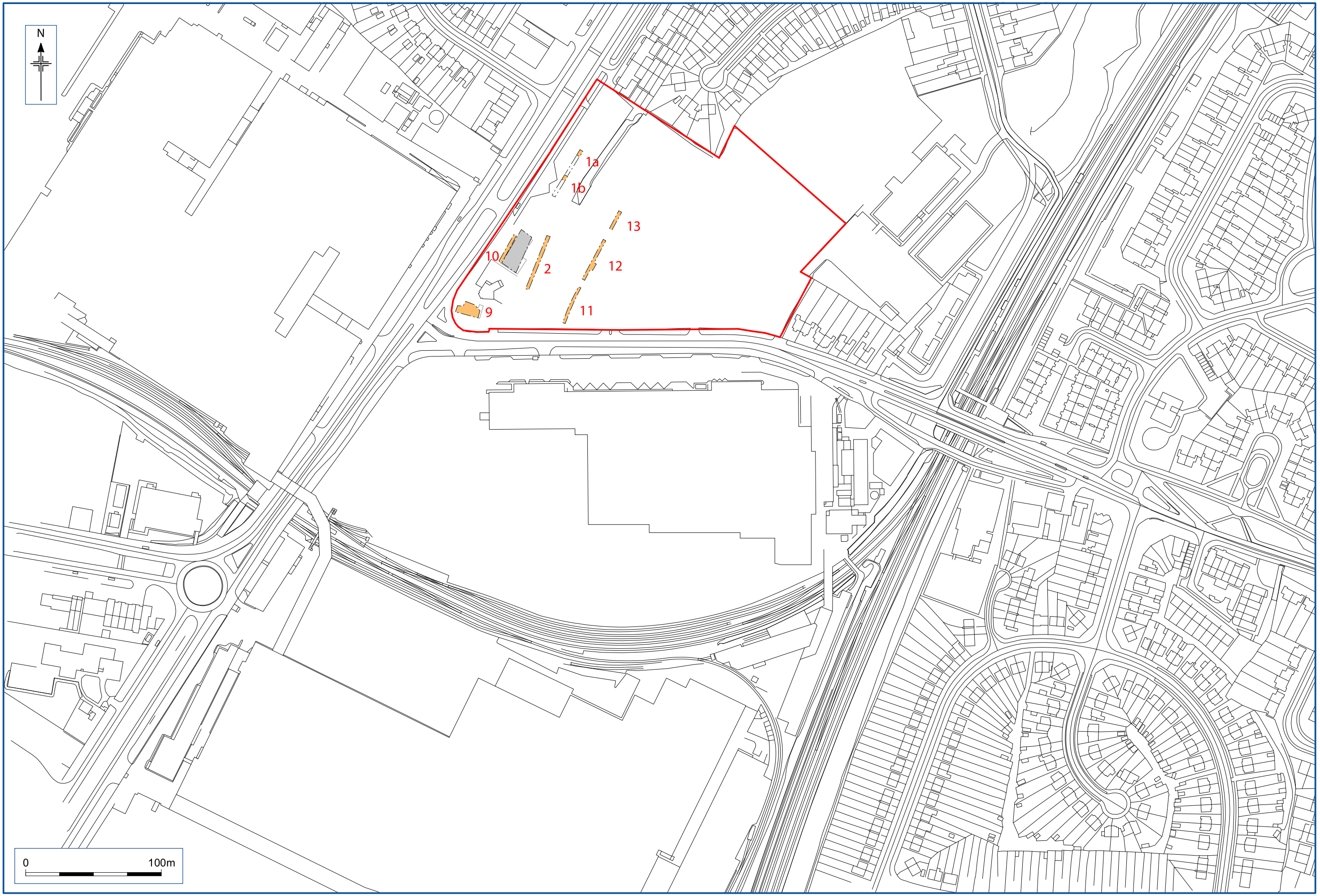
BSMR	Birmingham Sites and Monuments Record.
HEAS	Historic Environment and Archaeology Service
WHEAS	Worcestershire Historic Environment and Archaeology Service

Figures



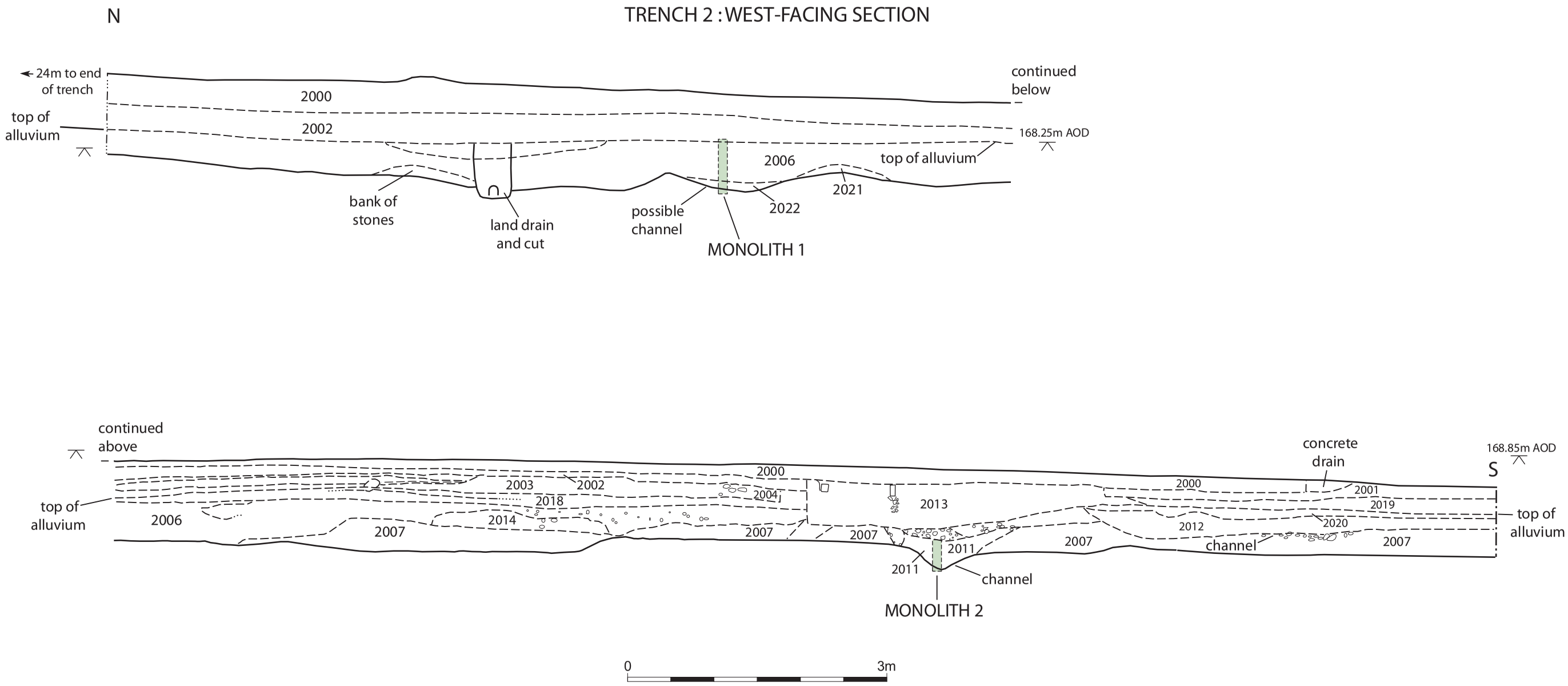
Location of site

Figure 1



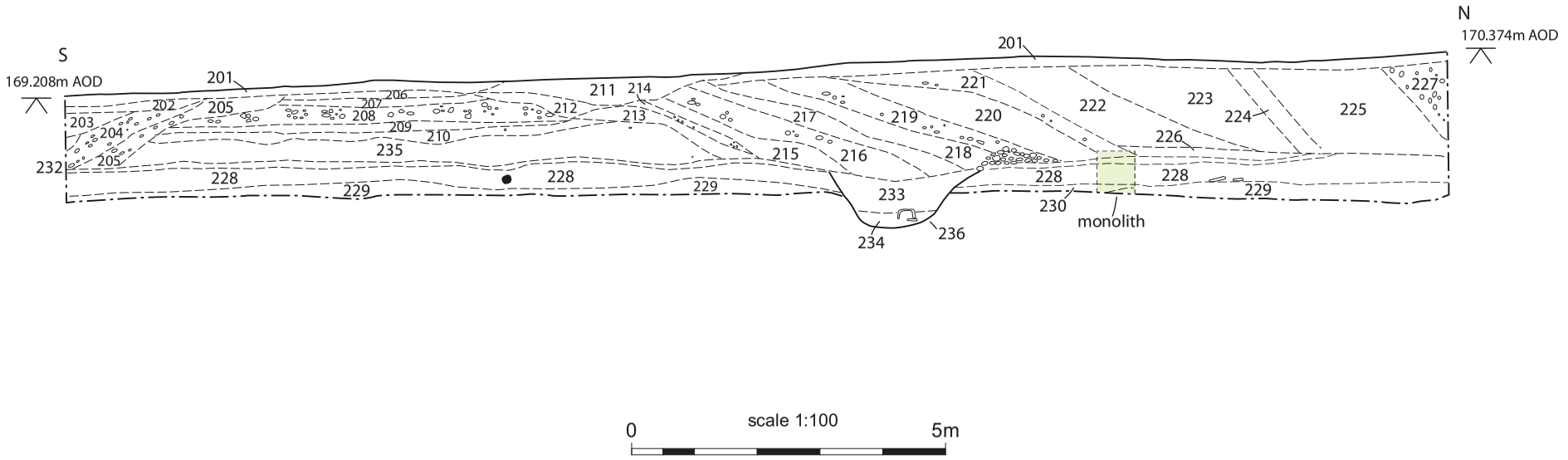
Trench location

Figure 2



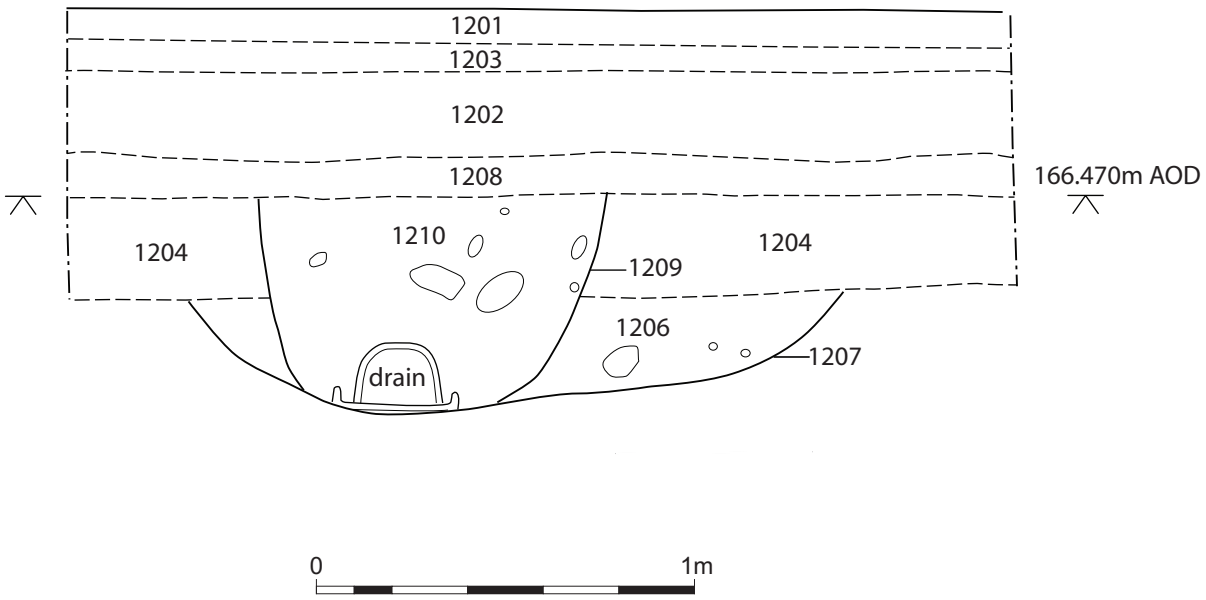
Trench 2: West-facing section, recorded during 2003 evaluation (Patrick et al 2003)

Figure 3



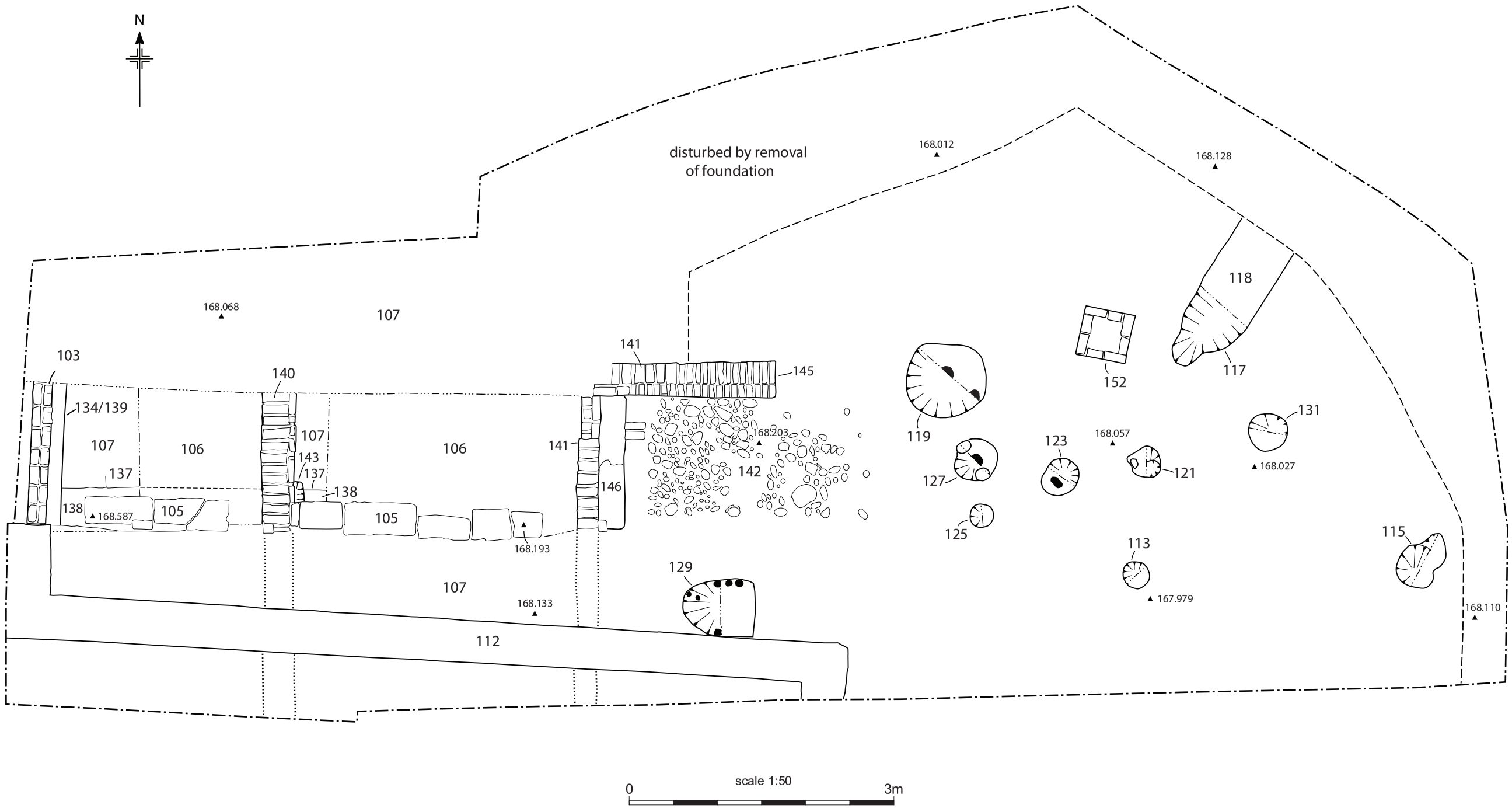
East Facing Section of Trench 10

Figure 4



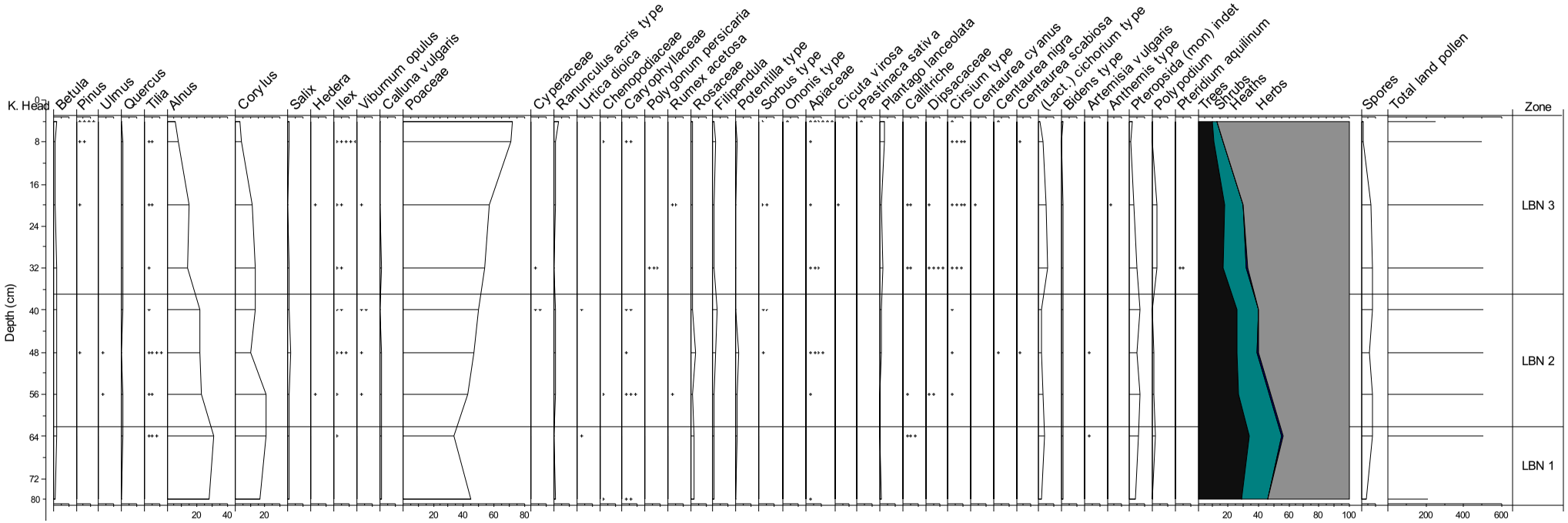
Section showing typical depsits across trenches 11, 12 and 13 site and palaeochannel

Figure 5



Plan of Trench 9

Figure 6



Pollen percentage diagram

Figure 7

Plates

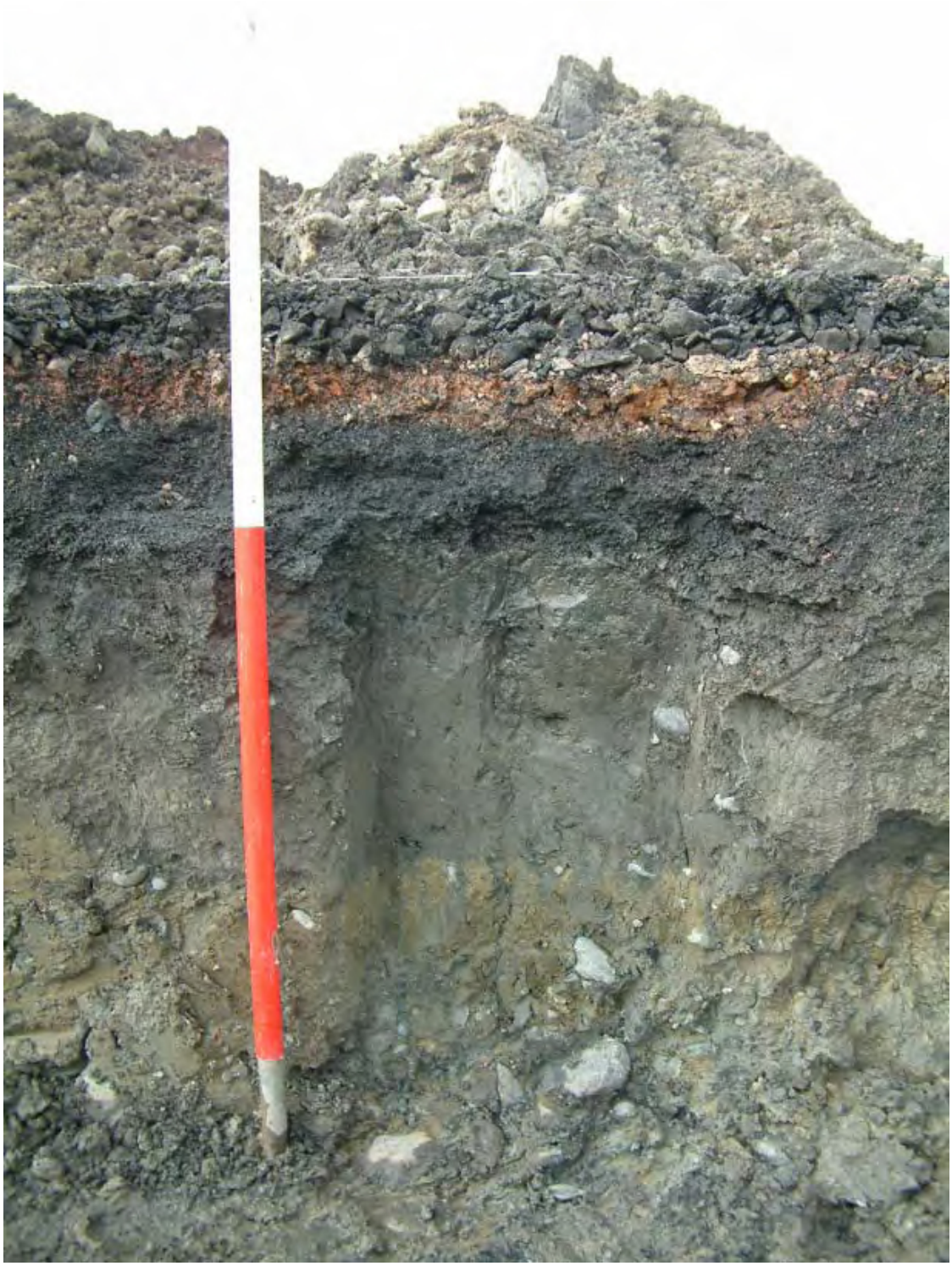


Plate 1: Typical deposits discovered in trenches 11, 12 and 13

Plate 2: Channel 236 looking west

Plate 3: Palaeochannel 1207

Plate 4: Longbridge House looking east showing walls (103, 105, 140, 141 and 145) and cobbled surface (142)

Plate 5: Wall (105) looking north

Plate 6: Cobbled surface (142) and walls (141 and 145) with postholes (113, 119, 123, 125 and 127) visible in the distance. Pit (129) is visible to the right of the image.

Appendix 1: Trench descriptions

Trench 1a

Site area: Area A

Maximum dimensions: Length: 5m Width: 2m Depth: 3.5m

Orientation: North-south

Main deposit description

Context	Classification	Description	Depth below ground surface (b.g.s) – top and bottom of deposits
1000	Car park surface	Modern mixed layer consisting of the tarmac car park surface and its base, an orange brown sandy gravel over a brown grey silty clay.	0-0.5m
1001	Layer	Mixed layer of re-deposited material, medium brown sandy silt mixed with reddish brown sandy silt. Roots found at approximately 2m below the ground surface. Corrugated iron sheet also present in the layer.	0.5-2.5m
1002	Layer	Blue grey sandy silty clay with rounded pebbles particularly towards the base of the layer.	2.5-3.5m
1007	Natural?	Reddish brown silty clay with rounded stones.	3.5m+

Trench 1b

Site area: Area A

Maximum dimensions: Length: 5m Width: 2m Depth: 2m

Orientation: North-south

Main deposit description

Context	Classification	Description	Depth below ground surface (b.g.s) – top and bottom of deposits
1003	Car park surface	Modern mixed layer consisting of the tarmac car park surface and its base of gravel and tar.	0-0.3m
1004	Layer	Mixed layer of orange brown silty clay, blue grey clay and pinkish brown clay. Some rounded pebbles present.	0.3-0.8m
1005	Layer	Dark brown sandy silt with tree roots and small rounded pebbles. Layer of tarmac at base of the layer.	0.8-1.3m
1006	Layer	Reddish brown silty clay with rounded stones.	1.3-2m+

Trench 2

Site area: Area A

Maximum dimensions: Length: 50m Width: 2m Depth: 2m

Orientation: North-south

Main deposit description

Context	Classification	Description	Depth below ground surface (b.g.s) – top and bottom of deposits
2000	Car park surface	Modern mixed layer consisting of the tarmac car park surface and its base.	0-0.14m
2001	Layer	Concrete layer.	0.14-0.24m
2002	Layer	Layer of crushed brick.	0.14-0.2m
2003	Layer	Layer of loose to friable mid-brown silty sand, moderate small rounded stones, occasional larger stones.	0.18-0.38m
2004	Layer	Mid-grey sandy silt.	0.38-0.5m
2005	Layer	Thin lense of charcoal.	0.44-0.46
2006	Layer	Soft brown clay / friable mid brown sandy silt with occasional rounded stones.	0.5-0.84m
2007	Layer	Friable light grey silty clay with occasional rounded stone inclusions.	0.7-1.08m
2008	Layer	Pale grey silty sand.	0.7-0.9m
2009	Layer	Dark grey silt.	0.68-0.82m
2010	Layer	Light grey-brown sandy clay.	0.4-0.78m
2011	Layer	Mid-grey silty clay, fill of a channel.	0.66-1m
2012	Layer / Fill	Friable light grey sandy silt with occasional patches of red clay at the bottom of the layer overlying stones. Probably the fill of a channel	0.4-0.72m
2013	Layer	Backfill of pipe trench.	0.2-0.6m
2014	Layer	Friable orange brown sandy clay.	0.58-0.8m
2015	Layer	Bitumen	0.2-0.25m
2016	Layer	Crushed brick and tile.	0.25-0.35m

Context	Classification	Description	Depth below ground surface (b.g.s) – top and bottom of deposits
2017	Layer	Bitumen	0.35-0.42m
2018	Layer	Mid-grey sandy silt.	0.36-0.46m
2019	Layer	Sandstone rubble layer.	0.28-0.38m
2020	Layer	Friable dark grey sandy silt.	0.38-0.5m
2021	Layer	Grey brown silty clay with abundant rounded stones.	0.78-0.88m
2022	Layer	Dark brown silty clay with organic material.	1.02-1.14m

Trench 9

Maximum dimensions: Length: 17.0m Width: 7.5m Depth: 0.40-0.70m

Orientation: E-W

Main deposit description

Context	Classification	Description	Depth below ground surface (b.g.s) – top and bottom of deposits
101	Layer	Tarmac	0.0-0.08m
102	Layer	Blue/grey road stone levelling below tarmac. Loose and friable.	0.08-0.10m
103	Wall	Remaining brick wall of video shop running E-W in west of trench. Bonded with cement and sits upon a cement foundation.	0.40-0.50m
104	Wall	Brick wall running N-S in western bulk, 2m long, 20cm high. Consists of 2 courses of brick.	0.41-0.61m
105	Wall	Sandstone consisting of 8 large dressed blocks of sandstone not mortared together. Largest block measures 83cm-25cm-37cm. The wall runs in an E-W direction, with the outside edge on the north, as this edge appears to be flush.	0.52-0.77m
106	Layer	Dark brown silty clay, compact and cohesive. Contains frequent charcoal, mortar and pottery fragments and extends over much of trench 1.	0.55-1.0m
107	Natural	Blue/green sandy clay. Contains occasional small rounded stones. Compact and cohesive.	0.60m +
108	Layer	Red/pink angular road stone and demolition rubble. Contains frequent brick and tile fragments. Situated in most of the western half of the trench.	0.43-0.55m
109	Layer	Loose yellow sand levelling layer.	0.38-0.43m
110	Layer	Loose red sand levelling layer.	0.23-0.38m
111	Layer	Mixed red sand and gravel levelling layer.	0.23-0.38m
112	Wall	Concrete foundation of video shop walls.	1.07+m
113	Post hole	Vertical sided posthole 0.50m in diameter.	0.60-0.63m
114	Fill of (113)	Mid brown silty clay with occasional small rounded stone.	0.60-0.63m
115	Post hole	Irregular shaped posthole 0.40m in diameter.	0.60-1.00m
116	Fill of (115)	Grey-brown silty clay. Occasional small rounded stones	0.60-1.00m

Context	Classification	Description	Depth below ground surface (b.g.s) – top and bottom of deposits
		and wood fragments.	
117	Terminus of ditch	Flat based ditch with gradually sloping sides. Running in an NE-SW direction. Only 1.5m exposed, 1.0m wide.	0.37-0.62m
118	Fill of (117)	Compact and cohesive mid brown silty clay with lenses of dark grey clay. Very sterile.	0.37-0.62m
119	Post hole	Large, 1.0m wide, post with flat bottom and gently sloping sides. Cut by posthole (135) on northern edge.	0.27-0.42m
120	Fill of (119)	Grey silty clay with occasional fragments of wood.	0.27-0.42m
121	Stake hole	Thin V-shaped stake hole with vertical sides	0.27-0.55m
122	Fill of (121)	Red-brown silty clay with occasional small rounded stones.	0.27-0.55m
123	Post hole	Small shallow post hole with rounded and base and concave sides, 0.35m wide.	0.35-0.60m
124	Fill of (123)	Mid grey-brown silty clay. Cohesive with frequent wood inclusions.	0.35-0.60m
125	Post hole	Post hole 0.20m wide with vertical sides and flat base. Occasional wooden fragments.	0.30-0.50m
126	Fill of (125)	Dark grey silty clay, cohesive and very sterile.	0.30-0.50m
127	Post hole	Wide post hole with stone post packing around edge, 0.20m deep with concave base.	0.30-0.50m
128	Fill of (127)	Light grey silty clay containing large stone around the edge of the cut.	0.30-0.50m
129	Pit	Pit cut, rounded square in plan, 0.70m in diameter with gently sloping sides and concave base. Around the edge of the pit are at minimum of 9 stakes were visible. These varied from 1-8cm in diameter.	0.35-0.55m
130	Fill of (129)	Light grey-brown silty clay with occasional small rounded stones.	0.35-0.55m
131	Post hole	Post hole with vertical sides and flat base, 0.35m in diameter.	0.30-0.40m
132	Fill of (131)	Pale yellow-brown sandy silt, cohesive and sterile.	0.30-0.40m
134	Foundation cut	Foundation cut for modern video shop wall (103), 0.61m wide, 0.10m wide.	0.40-0.50m
135	Post hole	Post cutting post hole (119) on northern edge, 0.30m wide with steep concave sides and flat base.	0.27-0.42m

Context	Classification	Description	Depth below ground surface (b.g.s) – top and bottom of deposits
136	Fill of (135)	Grey-brown silty clay, with frequent inclusions of small round silty clay.	0.27-0.42m
137	Foundation cut	Foundation cut for sandstone wall (105) running E-W. 0.45m wide with vertical sides.	0.52-0.85m
138	Fill of (137)	Fill of foundation cut for sandstone wall. Cohesive, dark brown silty clay with frequent small rounded stones and occasional mortar fragments.	0.52-0.85m
139	Fill of (134)	Grey clinker ash and gravel backfill of foundation cut. Very loose and friable.	0.40-0.55m
140	Wall	Brick wall running N-S, 3 courses high, bonded with pink cement mortar, 1.42m long, 0.28m wide, 0.33m thick.	0.43-0.0.76m
141	Wall	Brick wall running N-S, turning to E-W, 3 courses high. 3.03m long, 0.23m wide, 0.30m thick. Bonded with light brown cement mortar.	0.43-0.0.73m
142	Surface	Cobbled yard surface 2.30m long, 1.25m wide. Made of small to large rounded stone, lying directly upon the natural.	0.35-0.45m
143	Post hole	Small oblong posthole directly below wall (140). 0.10 wide, 0.19m long, 0.25cm deep.	0.43-0.68m
144	Fill of (143)	Mid brown silty clay with occasional wooden fragments.	0.43-0.68m
145	Wall	Brick wall running E-W, with brick lying on side. Two courses thick, 1.43m long, 0.40m wide.	0.35-0.45m
146	Foundation	Concrete foundation of wall (141), only visible on eastern side of wall. 0.20m wide, 0.30m thick. Seems to be a later addition perhaps to bolster the wall.	0.40-0.0.70m
147	Layer	Black clinker and ash levelling layer visible within the northern bulk. Very loose and friable.	0.08-0.43m
148	Floor	Layer of industrial bricks below (147), 12 bricks wide.	0.43-0.53m
149	Layer	Mixture of loose clinker ash levelling and red gravels, very loose and friable.	0.53-0.70m
150	Drain	Square drain within natural, each side containing 2 bricks, 0.20m wide.	0.37-0.47m
151	Wall	Brick wall running E-W in southern bulk, 5.0m long, 0.45m high. Contains both red brick and sandstone blocks similar to those in wall (105).	0.30-0.75m

Trench 10

Maximum dimensions: Length: 22.0m Width: 1.85m Depth: 1.75-2.75m

Orientation: N-S

Main deposit description

Context	Classification	Description	Depth below ground surface (b.g.s) – top and bottom of deposits
201	Layer	Mixture of loose clinker ash levelling and blue/grey gravels, very loose and friable.	0.0-0.15m
202	Layer	Mid brown sandy silt, moderately compact with frequent small rounded stones.	0.15-0.30m
203	Layer	Light brown/grey silty clay. Moderately compact and very sterile.	0.30-75m
204	Layer	Red sandy silt. Friable with frequent small-medium rounded stones.	0.15-1.50m
205	Layer	Mid brown sandy silt with occasional small-medium rounded stones and small charcoal fragments.	0.15-1.50m
206	Layer	Heavily striated sand layers (red, orange and grey). Very compact.	0.15-0.25m
207	Layer	Mid brown-grey sandy gravel. Moderately compact frequent small rounded stones.	0.25-0.40m
208	Layer	Red sands and gravels. Very friable with frequent small-large angular stones.	0.40-0.60m
209	Layer	Yellow-orange sandy silt, moderately compact with occasional small rounded stones.	0.60-0.75m
210	Layer	Dark grey-black organic clay moderately compact.	0.75-1.0m
211	Layer	Mid brown sandy silt, moderately compact with frequent small rounded stones.	0.15-0.50m
212	Layer	Orange sandy gravels. Frequent small-mod angular stone.	0.50-0.60m
213	Layer	Mid brown silty sands and gravels. Very compact and sterile.	0.60-1.40m
214	Layer	Light brown grey silty sand. Moderately compact with occasional small-medium rounded stones.	0.60-1.40m
215	Layer	Mid brown silty sands and gravels. Very compact and sterile.	0.40-1.75m
216	Layer	Light brown/yellow silty sand. Moderately compact	0.40-1.75m

Context	Classification	Description	Depth below ground surface (b.g.s) – top and bottom of deposits
		with small-medium rounded stones and patches of blue organic clays.	
217	Layer	Red sands and gravels, moderately compact.	0.15-1.90m
218	Layer	Light brown/yellow silty sand. Moderately compact with small-medium rounded stones and patches of blue organic clays.	0.15-1.90m
219	Layer	Red sands and gravels, moderately compact.	0.15-1.90m
220	Layer	Light brown/yellow silty sand. Moderately compact with small-medium rounded stones.	0.15-1.60m
221	Layer	Light brown/yellow silty sand. Light brown/yellow silty sand. Moderately compact with small-medium rounded stones compact with small-medium rounded stones.	0.15-1.35m
222	Layer	Light brown sands and gravels, moderately compact with frequent small-medium rounded stones.	0.15-1.35m
223	Layer	Dark brown silty sand. Very compact with frequent small-medium rounded stones.	0.15-1.35m
224	Layer	Dark brown silty sand. Moderately compact with frequent small-medium rounded stones.	0.15-1.35m
225	Layer	Dark brown silty sand. Very compact with frequent small-medium rounded stones.	0.15-1.35m
226	Layer	Orange sands and gravels, very compact and cohesive. Frequent small rounded stones.	1.35-1.55m
227	Layer	Red sands and gravels, very compact and cohesive. Frequent small rounded stones.	0.15-1.10m
228	Layer	Dark grey organic sandy clay. Moderately compact and cohesive, contains moderate wooden and organic fragments.	1.25-1.50m
229	Natural	Blue/green sandy clay. Contains occasional small rounded stones. Compact and cohesive.	1.60m +
230	Layer	Light yellow-orange silty clay. Very compact and cohesive, containing frequent medium-large rounded stones.	2.0-2.10m
231	Layer	Large deposit of small-large rounded stones on northern edge of channel (236).	1.48-1.75m
232	Layer	Dark grey-black silty clay , very organic with frequent wooden fragments.	1.15-1.25m

Context	Classification	Description	Depth below ground surface (b.g.s) – top and bottom of deposits
233	Fill	Fill of palaeochannel 236. Dark brown/grey silty clay very humic. Moderately compact and cohesive.	1.75-2.0m
234	Fill	Fill of palaeochannel 236. Dark brown/black silty clay very humic. Moderately compact and cohesive	2.0-2.85m
235	Layer	Mid brown sands and gravels. Moderately compact containing frequent small rounded stones.	1.0-1.15m
236	Channel	Palaeochannel running E-W in base of trench, cut into natural (229), 1.50m wide with concave sides and base. Contains two fills (234) and (233).	1.75-2.85m

Trench 11

Maximum dimensions: Length: 28.0m Width: 1.85m Depth: 1.40-1.20m

Orientation: NE-SW

Main deposit description

Context	Classification	Description	Depth below ground surface (b.g.s) – top and bottom of deposits
1101	Layer	Present tarmac and hardcore of car park.	0.0-0.10m
1102	Layer	Mixture of loose clinker ash levelling a very loose and friable.	0.10-0.40m
1103	Layer	Red gravel/sandstone levelling. Loose and friable	0.15-0.35m
1104	Layer	Dark green/grey organic silty clay, with occasional clinker ash inclusions. Moderately compact and cohesive.	0.40-0.60m
1105	Natural	Blue/green sandy clay. Contains occasional small rounded stones. Compact and cohesive.	0.80m +
1106	Fill	Fill of ditch 1107. Dark brown/red silty clay. Very compact and cohesive.	0.40-1.30m
1107	Ditch	Machine cut ditch running NE-SW. 1.20m wide vertical sided. Not fully excavated due to depth and and probability of it being a modern sevice.	0.40-1.30m
1108	Layer	Mid green/grey organic silty clay with occasional charcoal flecks. Moderately compact and cohesive. Overlies 1104	0.30-0.40m

Trench 12

Maximum dimensions: Length: 33.0m Width: 1.85m Depth: 1.20m

Orientation: NE-SW

Main deposit description

Context	Classification	Description	Depth below ground surface (b.g.s) – top and bottom of deposits
1201	Layer	Present tarmac and hardcore of car park.	0.0-0.10m
1202	Layer	Mixture of loose clinker ash levelling a very loose and friable.	0.10-0.40m
1203	Layer	Red gravel/sandstone levelling. Loose and friable	0.15-0.35m
1204	Layer	Dark green/grey organic silty clay, with occasional clinker ash inclusions. Moderately compact and cohesive.	0.40-0.60m
1205	Natural	Blue/green sandy clay. Contains occasional small rounded stones. Compact and cohesive.	0.80m +
1206	Fill	Fill of palaeochannel 1207. Light green/brown silty clay, firm and compact. Contains occasional small rounded cobbles.	0.65-1.0m
1207	Palaeochannel	Palaeochannel running E-W in base of trench, cut into natural 1205. 1.60m wide with concave sides and base. Contains fill 1206.	0.65-1.0m
1208	Layer	Mid green/grey organic silty clay with occasional charcoal flecks. Moderately compact and cohesive. Overlies 1204.	0.30-0.40m
1209	Ditch Cut	Cut within Palaeochannel fill 1206 to insert ceramic land drain. Slightly concave vertical sided cut, with flat base.	0.40-1.0m
1210	Fill	Fill of ditch cut 1209. Mid green/brown organic silty clay with occasional charcoal flecks and frequent small to large rounded stone. Moderately compact and cohesive.	0.40-1.0m

Trench 13

Maximum dimensions: Length: 14.0m Width: 1.85m Depth: 1.20m

Orientation: NE-SW

Main deposit description

Context	Classification	Description	Depth below ground surface (b.g.s) – top and bottom of deposits
1301	Layer	Present tarmac and hardcore of car park.	0.0-0.10m
1302	Layer	Mixture of loose clinker ash levelling a very loose and friable.	0.10-0.40m
1303	Layer	Red gravel/sandstone levelling. Loose and friable	0.15-0.35m
1304	Layer	Dark green/grey organic silty clay, with occasional clinker ash inclusions. Moderately compact and cohesive.	0.40-0.60m
1305	Natural	Blue/green sandy clay. Contains occasional small rounded stones. Compact and cohesive.	0.80m +
1306	Layer	Mid green/grey organic silty clay with occasional charcoal flecks. Moderately compact and cohesive. Overlies 1304	0.30-0.40m

Appendix 2: Geoarchaeology report

Geoarchaeology

ARCA

June 2006

Report Number: 0607-2

LONGBRIDGE, WEST MIDLANDS: GEOARCHAEOLOGICAL REPORT ON MONOLITH SAMPLES

Prepared for Worcestershire County Council

Keith Wilkinson

ARCA
Department of Archaeology
University of Winchester
Winchester
SO22 4NR
http://www.arcauk.com

Contents

Summary

Monolith samples were collected during Worcestershire County Council Historic Environment and Archaeology Service's (WCCHEAS) excavation of part of the former Longbridge car plant, West Midlands in early 2006.

Descriptions of the six monoliths from the site suggest that three stratigraphic units are present. The basal unit comprises boulder clay (till) which formed beneath a glacier during the Anglian cold stage approximately 400,000 years ago. It is overlain by floodplain alluvium derived from the River Rea and which is most likely to date from the second half of the Holocene. There is little evidence for human activity in this layer except wood charcoal. This is likely to have been derived from overlying deposits as a result of bioturbation and mechanical mixing. The floodplain alluvium is in turn sealed by made ground deposits. These contain building debris, charcoal and coke and were most likely deliberately deposited to provide a level platform on which to build the Longbridge car plant.

The deposits sampled in the monoliths taken from the Longbridge site all have low archaeological and palaeoenvironment potential. The boulder clay dates from a period when hominids were not present in Britain, the overbank alluvium has no indication of human activity other than reworked charcoal and the made ground relates to very recent activity associated with construction of the Longbridge works. For these reasons no further work on the monoliths is recommended.

1. Introduction

1.1 An archaeological excavation was undertaken of part of the former Longbridge car plant in early 2006 by Worcestershire County Council Historic Environment and Archaeology Service (WCCHEAS). As part of the excavation a series of 0.5 and 1.0m long 'monolith' samples were taken through the stratigraphy by a member of the WCCHEAS environmental archaeology team. Following completion of the excavation and sampling of the monoliths for palynological and ^{14}C analysis, ARCA was subcontracted by WCCHEAS to describe and interpret the sediments recovered in the monoliths.

1.2 This document reports on the stratigraphy of the monoliths, assesses their archaeological and palaeoenvironmental significance and makes recommendations on further geoarchaeological work that could usefully be carried out as part of a post-excavation programme.

1.3 Longbridge is located on at NGR SP 015 775. According to the British Geological Survey (BGS) (1950) the study area sits on deposits of the Mercia Mudstone Group (MMG) dating to the Triassic period. These marls and sandstones are overlain by Boulder Clays and fluvioglacial sands and gravels (BGS 1950, Jordan 2004). According to a previous borehole study of the site, Holocene fine-grained (presumably overbank) alluvium derived from flooding of the River Rea overlie the Pleistocene deposits (Jordan 2004). Visual examination of the cores and magnetic susceptibility measurement suggested that pedogenesis had occurred in parts of the Holocene alluvial sequence suggesting that episodes of stability (i.e. low deposition rates or non-deposition) had occurred (Jordan 2004).

2. Methodology

2.1 Monolith samples[1] were collected by a member of the WCCHEAS environmental archaeology team towards the end of excavation at the Longbridge site. They were taken from freshly exposed sediment in trench sections by the simple expedient of placing the monolith against the section face and cutting behind the face to remove a sediment block. Samples were subsequently labelled and sealed with plastic film prior to removal to the WCCHEAS offices for temporary storage.

2.2 Following sampling for palynology and ^{14}C dating by the environmental archaeology team at WCCHEAS the monoliths were transported to laboratories at the Department of Archaeology, University of Winchester for detailed study. In the laboratory a fresh section through the sediments was exposed by removing 20mm of the outer surface using a scalpel. The newly exposed sediment was then described using standard geological criteria (Tucker 1982, Jones *et al*. 1999, Munsell Color 2000). In the descriptions presented in Appendix 1 monolith units are correlated with archaeological contexts wherever this has proven possible. All further discussion in this report is therefore presented in terms of the WCCHEAS contexts.

2.3 The archive resulting from the study of the Longbridge site comprises a paper and digital record (a hard copy of the latter is included in Appendix 1). The monoliths will be retained for three months from the date of this report, pending decisions on an analytical programme[2].

[1] In this case monoliths comprise half section pieces of drainpipe of 100mm diameter

[2] Monoliths of the size taken at Longbridge ARE difficult to store for any length of time. Even if they are carefully wrapped in plastic film and are placed in cold storage they tend to dry out.

3. Stratigraphy

3.0.1 Three stratigraphic units were encountered in the monoliths. They are reviewed in stratigraphic order in the text below:

3.1 Boulder Clay (Context 1105, 1205, 1305)

3.1.1 The base of the stratigraphy in all six monoliths comprises a yellowish-brown diamict of medium sands to clays containing well-rounded quartzite pebbles. The pebbles all appear to be derived from the MMG. These sediments most likely represent the upper part of boulder clay deposits that are mapped by the BGS. The boulder clays of the Birmingham area formed beneat glaciers during the Anglian (Elsterian) cold stage at c 400,000 BP.

3.2 Overbank alluvium (Contexts 1104, 1204, 1304, 1108, 1208 and 1306)

3.2.1 The alluvial stratigraphy at Longbridge comprises homogeneous dark grey brown silts containing occasional granular-sized quartzite clasts and charcoal fragments (Contexts 1104, 1204 and 1304). Iron staining within the unit suggests that water tables have varied since original deposition. In other words the staining is the product of diagenesis (post-depositional processes). The charcoal content increases significantly towards the top of the unit and as a consequence the colour becomes darker (Contexts 1108, 1208 and 1306). Evidence of rooting also appears at the top of the unit, suggesting increased levels of bioturbation.

3.2.2 The sedimentological properties displayed by these deposits bear all the hallmarks of floodplain deposition. In other words it is likely that the deposits formed as a result of fall out from suspension of silt and clay-sized particles at the end of flood events. The absence of any sedimentary structures (e.g. lamination) is not unusual in such circumstances and probably reflects pedogenic processes operating within the sediments between individual flood events. Despite this evidence for pedogenesis, there is no suggestion from the monoliths for the presence of the palaeosol(s) identified by Jordan (2004) in the borehole cores. On the basis of the monolith stratigraphy alone it is difficult to determine the origin of the charcoal inclusions. They could be indicative of human activity on the River Rae floodplain between individual flood events. However, it is perhaps more likely that charcoal fragments have been introduced to the overbank deposits by a mixture of bioturbation (Contexts 1104, 1204 and 1304) and mechanical disturbance/compaction (Contexts 1108, 1208 and 1306). The latter is certainly the safer conclusion to draw when considering the viability of ^{14}C dating.

3.2.3 Although the overbank alluvium sits conformably above the boulder clay, there is no suggestion that deposition was continuous. Indeed it is almost certain, based on comparison of the stratigraphy from elsewhere in southern Britain that the overbank alluvium formed during the second half of the Holocene. Many authors (e.g. Robinson 1992) have suggested that such floodplain deposits are the result of human-induced soil erosion within river catchments, dating from the Bronze Age and later.

3.3 Made ground (Contexts 1102, 1202, 1302, 1103, 1203 and 1303)

3.3.1 Charcoal-rich diamicts were found in the tops of Monoliths 2-5 and equate with Contexts 1102, 1202, 1302, 1103, 1203 and 1303. In all cases these deposits contain a mixture of building debris, coke and reworked fine-grained alluvium of the type discussed in Section 3.2. The ‘Made Ground’ that results was probably emplaced to provide a level platform for construction of the car plant.

4. Assessment

4.1 Archaeological significance

4.1.1 Boulder clay as with all glacial deposits, has a LOW archaeological potential. This is because the sediments formed beneath a glacier (on which hominids are very unlikely to have been active) and at a time when hominids are not thought to have been present in Europe (e.g. White and Schreve 2000)

4.1.2 The archaeological significance of the overbank alluvium has been determined by the archaeological excavation undertaken by WHEAS. The stratigraphic descriptions of the monoliths add little to the archaeological data obtained from the trenches, except to warn that:

a. Contexts 1104, 1204, 1304 and 1108, 1208 and 1306 are part of the same deposit and that any colour differences are likely to be the result of the presence of intrusive charcoal.
b. That charcoal in the overbank alluvium is likely to be derived from the Made Ground.

4.1.3 The archaeological potential of the Made Ground was investigated by the archaeological excavation and is not considered further here.

4.2 Palaeoenvironmental significance

4.2.1 The boulder clay has NO palaeoenvironmental potential.

4.2.2 The fine-grained overbank deposits have a LOW palaeoenvironmental potential. This is because:

a. Organic preservation appears to be relatively poor.
b. It is highly likely that the deposits have been heavily bioturbated
c. Reliable chronometric dating of the overbank deposits is not possible. In other words even were it possible to reconstruct palaeoenvironments, it is uncertain to what period they might be attributable.

4.2.3 The Made Ground has a LOW palaeoenvironmental potential. These deposits are a. derived, in other words it is not certain where any enclosed biological remains might come from, b. are not waterlogged, suggesting that biological preservation other than by charring or mineral replacement is likely to be low, and c. are of recent date.

5. Recommendations

5.1 No further geoarchaeological work is recommended on the existing monoliths. Should a further phase of excavation take place it is, however, recommended that a geoarchaeologist visit the site to describe and interpret the stratigraphy exposed in the trench sections.

6. Acknowledgements

6.1 ARCA would like to thank Andy Mann and Dr Katie Head of Worcestershire County Council, Historic Environment and Archaeology Service for their help during the course of the project.

6.2. This text has been copy-edited by Fine Line Archaeological Language Services (http://www.finelinetext.com).

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8. Appendix: Monolith descriptions

Monolith	Depth-1	Depth-2	Lithology	Description
1	0.00	0.10	No Recover	
	0.10	0.25	Silt	10 YR 3/2 very dark greyish brown silt with moderate rooting. Abundant charcoal throughout. Equivalent of Context 1110. Grading into:
	0.25	0.45	Silt	10 YR 4/2 dark greyish brown silt with occasional quartzite granules and occasional granular-sized charcoal fragments. Iron staining occurs throughout the unit. Equivalent of Context 1104. Diffuse boundary to:
	0.45	0.80	Diamict	10 YR 4/6 yellowish brown diamict of medium sand to silt (slight clay content) matrix containing moderate well-rounded granular-pebble-sized quartzite clasts. Occasional rooting. Equivalent of Context 1105. Diffuse boundary to::
	0.80	1.00	Gravel	10 YR 5/4 yellowish brown matrix-supported gravel of abundant sub to well-rounded quartzite granules-pebbles in a medium sand matrix. Occasional iron staining. Equivalent of Context 1105.
2	0.00	0.15	No Recover	
	0.15	0.30	Silt	10 YR 3/1 very dark grey silt with frequent granular sized charcoal fragments. Equivalent of Unit 1110. Diffuse boundary to:
	0.30	0.60	Silt	10 YR 4/2 dark greyish-brown silt containing moderate well-rounded quartzite pebbles, Moderate rooting throughout increasing to frequent rooting at base of unit. Equivalent of Context 1104. Diffuse boundary to:
	0.60	0.95	Diamict	10 YR 4/4 dark yellowish-brown diamict of medium sand to silt (some clay) matrix containing moderate sub to well-rounded quartzite granular to pebble clasts. Matrix increases in proportion downwards. Very occasional rooting. Equivalent of Context 1105.
	0.95	1.00	No Recover	
3	0.00	0.05	No Recover	
	0.05	0.10	Overburden	10 YR 5/1 grey diamict of granular sized charcoal fragments, coke and granular to pebble sized quartzite clasts. Equivalent of Context 1203. Sharp boundary to:
	0.10	0.20	Silt	10 YR 3/1 very dark grey fine sand to silt with moderate sub-rounded granular quartzite clasts and occasional granular-sized charcoal fragments. Moderately sorted. Equivalent of Context 1210. Diffuse boundary to:
	0.20	0.43	Silt	10 YR 4/2 dark greyish brown silt containing occasional sub to well rounded quartzite granules. Moderately sorted. Equivalent of Context 1204. Diffuse boundary to:

	0.43	0.67	Diamict	10 YR 4/2 dark greyish brown diamict of fine sand to clay containing moderate granular to cobble sized angular to well-rounded quartzite clasts. Equivalent of Context 1205.
Monolith	Depth-1	Depth-2	Lithology	Description
4	0.00	0.05	No Recover	
	0.05	0.08	Overburden	10 YR 5/1 grey diamict of granular sized charcoal fragments, coke and granular to pebble sized quartzite clasts. Equivalent of Context 1202. Sharp boundary to:
	0.08	0.25	Silt	10 YR 3/2 very dark grey brown fine sand to silt with frequent granular-sized charcoal and coke pieces. Occasional iron stains. Equivalent of Context 1210. Grading into
	0.25	0.45	Silt	10 YR 4/2 brown silt/clay with occasional well-rounded quartzite pebble clasts. Moderately sorted. Equivalent of Context 1204. Diffuse boundary to:
	0.45	0.50	Silt	10 YR 5/4 yellowish brown fine sand to silt. Equivalent of Context 1204. Diffuse boundary to:
	0.50	0.70	Diamict	10 YR 5/4 yellowish brown diamict of clay containing abundant sub-angular to well-rounded granular to pebble clasts of quartzite and sandstone lithologies.
5	0.00	0.05	Overburden	10 YR 5/1 grey diamict of granular sized charcoal fragments, coke and granular to pebble sized quartzite clasts. Equivalent of Context 1302. Sharp boundary to:
	0.05	0.19	Silt	10 YR 3/1 very dark grey fine sand and silt containing moderate granular-sized charcoal fragments and occasional well-rounded pebble sized quartzite clasts. Moderately sorted. Equivalent of Context 1310. Diffuse boundary to:
	0.19	0.30	Silt	10 YR 4/2 greyish brown silt-clay with occasional granular-sized charcoal fragments and angular to sub-rounded granules-pebbles of well-rounded quartzite. Occasional iron staining. Equivalent of Context 1304. Diffuse boundary to:
	0.30	0.50	Diamict	10 YR 4/4 yellowish grey-brown diamict of silt-clay containing abundant granular to cobble-sized sub-angular to well-rounded quartzite clasts. Equivalent of Context 1305.
6	0.00	0.38	Silt	5 YR 3/3 dark reddish brown silt-clay containing occasional sub to well-rounded pebble-sized quartzite clasts and moderate granular-sized charcoal fragments. Iron stained. Diffuse boundary to:
	0.38	0.44	Silt	5 YR 3/3 dark reddish-brown fine sand-silt containing occasional well-rounded quartzite pebble clasts. Diffuse boundary to:
	0.44	0.50	Diamict	7.5 YR 4/4 brown diamict of clay containing moderate sub-angular to well-rounded granular to pebble-sized clasts of quartzite lithology