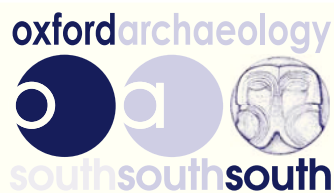


Geopost

Navigation Park
Ponders End
Enfield



Archaeological Evaluation Report



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Geopost, Navigation Park, Ponders End, Enfield

Archaeological Evaluation Report

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Summary

In October and November 2010, Oxford Archaeology South undertook an evaluation at Navigation Park, Ponders End, Enfield on behalf of SEGRO Industrial Properties Ltd.

Seven trenches were excavated and archaeological features were identified in Trenches 3, 5 and 7. In Trenches 3 and 5, these consisted of ditches, a pit and several treeholes, cut into alluvial material and sealed by later alluvial deposits. Trench 7 contained a dog burial of post-medieval date. All of these features appeared to be cut into a comparative and contemporary horizon although the features within Trenches 3 and 5 were not dated by the presence of artefact assemblages. These features were sterile and are likely to represent field drainage ditches reflected by the presence of a contemporary stabilisation land surface.

Trenches 3 and 5 represent a localised area of preservation within a largely disturbed and truncated site. The remaining trenches each displayed significant truncation and levelling caused by the various phases of factory construction undertaken here since the 19th century.

Geoarchaeological test pits were excavated within the trenches across the eastern part of the site revealing a well preserved alluvial sequence within Trench 7 to 3 m below the current ground level. Investigation of the gravel sequence failed to encounter the 'Arctic Bed' deposits and an organic deposit within the upper part of the gravel sequence in Trench 5 proved to be of Bronze Age date.

The result of the fieldwork indicates that there is a low potential for significant archaeological remains to be present and those that were identified present are very localised and not associated with artefact assemblages.



1 INTRODUCTION

1.1 Commission and planning background

- 1.1.1 Oxford Archaeology South (OAS) was commissioned by PACE Project Services on behalf of SEGRO Industrial Properties Ltd to undertake an archaeological evaluation of the Geopost site at Navigation Park, Ponders End, Enfield. A Desk-based Assessment (DBA) that included a deposit model for the site had previously been produced by OAS (2009) to inform the planning application. Subsequently OAS discussed the results of the DBA and an evaluation strategy directly with Kim Stabler of the Greater London Archaeological Advisory Service (GLAAS). Following this, a formal brief was not issued by GLAAS and a scope of works, specification and trench layout was proposed by OAS and agreed with GLAAS directly.
- 1.1.2 Between 25th October and 3rd November OAS excavated seven trenches by intrusive evaluation to investigate the buried archaeological potential of the site. This report outlines the results of the evaluation, the extent and significance of archaeological deposits identified and the likely impact of the development upon these.

1.2 Location, geology and topography

- 1.2.1 The site is bordered by Morson Road to the west and south, the River Lea Navigation to the east and industrial areas to the north. It lies within the historic parish of Enfield, and the administrative authority of Enfield Borough Council (Fig. 1). This evaluation area refers specifically to the southern part of the site boundary investigated within the DBA and encloses an area of 1.27ha centred upon TQ 3624 9516. The surface level of the site prior to development is at approximately 13 m OD.
- 1.2.2 The geology map shows the site to be mainly located on a drift geology of the Kempton Park Gravels (a River Terrace Deposit), with the eastern part lying on Holocene alluvium (silt and clay with peat and organic clay horizons). The underlying solid geology is shown to be London Clay (BGS Sheet 256, Solid and Drift 1:50,000).
- 1.2.3 The site has been subject to detailed geotechnical investigation that was reviewed as part of the DBA and the main stratigraphic bodies are summarised below. The DBA (OAS 2009) should be referred to for detail although the following summaries these descriptions.
- 1.2.4 Site observation and geotechnical data shows that much of the site was covered with modern concrete hardstanding and bituminous surfacing. These lay above deposits of modern made ground of variable thickness and composition. The alluvial sequence was characterised below the made ground with clay and peat deposits present. These were thickest towards the east of the site reflecting the valley topography. Only comparatively thin clay alluvial deposits were present within the western boundary of the site. The alluvial sequence varied in depth from the shallowest to the west at 0.3 m to the deepest to the east at 3.1 m. These deposits overlie the Kempton Park Gravel and Holocene floodplain gravel deposits.

1.3 Archaeological and historical background

The archaeological potential of the site has been previously outlined in detail in the DBA report (OAS 2009). The following section summarises the key points identified within the background section.



- 1.3.1 The earliest deposits of palaeoenvironmental importance known to exist within the vicinity of the site are the 'Lea Valley Arctic Beds'. These deposits are contained within the gravel and sand units of the Lea Valley Gravel and have been shown to contain cold climate or full glacial plant, insect and faunal assemblages (Gibbard, 1994, 109-110 and 192). These sediments comprise dark blue-black organic beds with plant detritus, beetles, shells and occasional animal bones with radiocarbon dates indicating a date range from 28,000 to 21,000 BP (*Ibid*). The first instance of discovery of these deposits was at Pickett's Lock approximately 1.3 km to the south of the Site (*Ibid*).
- 1.3.2 Within the Holocene period the Lea Valley has experienced gradual sedimentation combined with active channel movements across the width of the valley floor. The location of the site is covered within the area of the Lea Valley project commissioned by English Heritage and aimed at investigating the past environment, habitats and archaeological data of the valley. Although the site is included within this study, to date, none of the collated data has been published or made available through other media. However, the project summary recognises the potential of the deposit sequence within the Valley to contain significant archaeological and/or palaeo-environmental remains. With particular reference to this site, the location of this close to the edge of the interface between the river valley and the higher ground of the terrace gravels suggests that it lies within a habitat likely to be favoured for prehistoric populations.
- 1.3.3 As an example of the prehistoric potential of the Lea Valley, approximately 1.8 km to the north of the site at Millmarsh Lane, peat and alluvial sequences were excavated within former river channels. Towards the base of the sequence the peat produced an early Mesolithic radiocarbon date of 7420-7050 BC and the excavation recovered 120 struck flints dominated by flakes and blades. The peat deposits were overlain by alluvial clays and other organic-rich sediments that produced excellent palaeoenvironmental evidence and a late Mesolithic radiocarbon date of 6115-5835 BC.
- 1.3.4 Significant waterlogged deposits dating to the Bronze Age have also been discovered within Enfield to the north of the site. These discoveries are consistent with the exploitation of the wetland margin habitat.
- 1.3.5 Review and modelling of the geotechnical data available for the Geopost site within the DBA has identified likely former edge of channel habitats and deeply buried alluvial/peat sequences within the development boundary although these are not dated to any specific period.
- 1.3.6 Within the later prehistoric period there is comparatively little evidence of occupation and activity within the surrounding area although possible occupation dating to the Iron Age has been identified c 660 m to the south of the site. The River Lea is also believed to have been the boundary between the territories of the two Iron Age tribes of the Catuvellauni to the west, and the Trinovantes to the east (Robbins, 2003, 12).
- 1.3.7 In the Roman period *Londinium* (London) developed as an urban centre and later the provincial capital at the centre of Roman Britain's communication system (Perring, 2000, 147). Enfield was at this time c 12km north of Londinium, and would not have been considered part of its territory. However, a Roman settlement has been identified at Enfield, believed to have originated in the early Roman period as a posting station on Ermine Street (c 2.2km to the west of the Site), the Roman road from London to Lincoln (*Ibid*, 150).
- 1.3.8 The site is located outside of the Roman settlement at Enfield, and evidence for Roman activity within the surrounding area is scarce although a small excavation nearby and to the west did record a ditch of probable Roman date, whilst there have been other



instances of stray Roman finds in the parish. The River Lea was an important route during the Roman period, and river traffic is likely to have passed frequently along it.

- 1.3.9 The name 'Enfield' is of later Saxon origin, the suffix '-field' implying settlement and clearance in woodland. Domesday records the parish of Enfield as mainly woodland with marshes by the river (Weinrebb et al, 2008, 652). A section of land within the eastern part is recorded as belonging to the Ponder family from at least the 14th century, hence the settlement of Ponders End, and the land belonging to them is recorded as having been used for common grazing (Weinrebb et al, 2008, 652).
- 1.3.10 The earliest detailed map that includes the site boundary is the 1754 map of the Parish of Enfield. This shows a change in land use here, from common land in the west and marshland in the east, through the development of the eastern limits of the site to accommodate the canalisation of the Lea with its various locks. By 1803, there is some evidence for a series of irrigation ditches within the western part of the site, which combined with the canalisation of the River Lea Navigation, is likely to have stopped the seasonal flooding of this locality.
- 1.3.11 By 1881 and the record of the 1st Edition Ordnance Survey map, the process of industrialisation had begun and by 1896, 2nd Edition Ordnance Survey map there is major development within the site boundary for the first time. This comprises a number of small buildings labelled as 'Corticine Works (Linoleum)'. Further industrial development occurred during the 20th century with at least three phases of construction/modification taking place here as is evidenced by the 1936, 1960 and 1980 Ordnance Survey maps. Additionally, the William Girling Reservoir was built on an area of former marsh, to the east.

2 EXCAVATION AIMS AND METHODOLOGY

2.1 General aims

- 2.1.1 The evaluation aimed to establish the archaeological potential of the site. To achieve this the general objectives were:
- to establish the presence/absence of archaeological remains within the proposal area,
 - to determine and confirm the character of any remains present, without compromising any deposits that may merit detailed investigation under full area excavation,
 - to determine or estimate the date range of any remains from artefacts or otherwise,
 - to characterise any underlying archaeological strata down to undisturbed geology without significantly impacting upon significant younger (overlying) deposits where possible,
 - to determine the geo-archaeological and palaeo-environmental potential of any archaeological deposits encountered,
 - to establish what archaeological remains/deposits maybe affected by any proposed development,
 - to make available the results of the investigation to inform the planning application and the potential for any further mitigation strategy,
 - to produce a report and full archive,



- to disseminate the results of the investigation at a level appropriate to their importance.

2.2 Specific aims and objectives

2.2.1 The evaluation specifically sought to;

- establish the presence/absence of the Ponders End Arctic Beds within the footprint of the new warehouse construction,
- establish the presence/absence and extent of any organic deposits within the alluvial sequence,
- establish the date range of organic remains (Arctic Beds and Holocene horizons) through the use of C14 dating or other suitable scientific methods as appropriate to the types of deposits encountered,
- establish the likely impact of the construction method (vibro piles) upon any deeply buried remains.

3 PROJECT SPECIFIC EXCAVATION AND RECORDING METHODOLOGY

3.1 Scope of works

3.1.1 The evaluation comprised a 4% sample of the area of development impact within the site boundary. This translated as seven trenches each measuring 20 m by 2 m (Fig. 2). Due to the depth of made ground and the need to investigate deeply buried deposits, each trench, with the exception Trench 4, was excavated at the current ground level with dimensions of c 24m by 6m to accommodate stepped excavations achieving the required final trench dimension at the base. A trench layout was agreed with GLAAS prior to commencing fieldwork based upon the known extent of impacts that would occur within the development. Within this, four of the trenches (Trenches 1-3 and 5) were targeted upon the footprint for the new structure which was to be constructed upon a vibro pile foundation. The remaining three trenches (Trenches 4, 6 and 7) were targeted upon the locations of attenuation tanks required for drainage under car park areas. The construction of the car park areas would not intrusively impact upon any potential buried deposits beyond the depth of the existing made ground.

3.1.2 One of these trenches, Trench 3, had to be moved from the intended location as this was sited below an existing large mound of bitumen spoil. Specific investigation methodologies are outlined in detailed below with regard to the various trench locations.

3.2 Site specific methodology

3.2.1 All work was undertaken in accordance with the Greater London Archaeological Advisory Service Guidance Notes for fieldwork.

Trenches within the footprint of the new structure

3.2.2 The trenches excavated within the footprint of the new structure were mechanically excavated to the first archaeological horizon or the surface of the underlying gravel depending upon what was encountered first. These trenches were step excavated and attained total depths of 2-2.5 m (Trench 2 two required two depth steps). This style of excavation excavation comprised steps in 1-2 m width margins between successive 1



m depth increases of the trench. Spoil was stored with a minimum margin of 1 m from the edge of the upper step.

- 3.2.3 It was recognised that archaeological deposits may have been stratified within the alluvial sequence above the gravel and particular care was taken to ensure such deposits could be identified during the machine excavation. This occurred in Trenches 3, 5 and 7 where features were found to be sealed by the upper layers of the alluvial sequence. These archaeological horizons above the level of the underlying gravel, were exposed by machine excavation along the length of that trench. Hand excavation of features followed on from this and, once this archaeological horizon had been sufficiently evaluated, the trench was further machine excavated to the next archaeological horizon below this level or the surface of the gravel.
- 3.2.4 Where machine excavation exposed the surface of the gravel, this was investigated through visual examination and cleaning to establish the presence/absence of archaeological remains. In three trenches (one within the footprint, Trench 5, and two within the car park area, Trenches 6 and 7), machine excavated sondage trenches were also excavated to investigate the gravel sequence and evaluate for the potential presence of the Arctic Beds. These were entirely machine excavated and all recording of these deposits was undertaken from the surface of the trench by a qualified OAS Geoarchaeologist (Carl Champness). Grab samples were recovered from intact sediment blocks for C14 dating and environmental assessment.

Trenches within the footprint of the attenuation tanks

- 3.2.5 Machine excavation of these trenches (Trenches 4, 6 and 7) followed the same general principles outlined above. However, the impact of the construction here was identified as being much less than that of the new structure footprint and, as such, limited the depth of evaluation. Machine excavation along the full length of each of these trenches was depth limited to 0.3 m below the greatest impact level (the attenuation tanks). These levels (m OD) were 11.7 m (Trench 4), 11 m (Trench 6) and 11.5 m (Trench 7). As a result of the depth limitations only restricted or no step excavation was needed.
- 3.2.6 Once these horizons had been evaluated, sondages were machine excavated at one end of the trench to investigate the sequence immediately below. These had the specific aim to establish the presence or absence of significant sequences below the main level such as peat deposits underlying the upper horizons of alluvial clay. The deeper sediment sequences were also investigated in Trenches 6 and 7 as described above.

Environmental sampling

- 3.2.7 Samples were taken from the identified archaeological features and deposits, following English Heritage Sampling Guidelines (2002), in order to characterise the deposits and to determine their potential for informing about past environments, diets and economic strategies. A total of six samples were recovered for assessment. These comprised a single sample from the fill of a ditch within Trench 5, a waterlogged organic deposit within Trench 7 and four samples from either palaeochannel or alluvial deposits that had the potential to inform on the past environments of the site. From these a single sample from Trench 5 was selected for C14 dating in order to establish if the Arctic Beds had been positively identified within the evaluation.



4 RESULTS

4.1 Presentation of results

- 4.1.1 The descriptions of the trenches presented below provide a detailed overview. A comprehensive listing of individual trench and associated context data can be found in Appendix A. This should be referred to for factual dimensions which are not otherwise included within the descriptive text unless pertinent to the description.
- 4.1.2 Individual contexts have been uniquely numbered by trench starting at one thousand and then being followed by the individual context (e.g. The first context used for Trench 1 would be 1000).
- 4.1.3 All recovered finds and samples are recorded in the specialist reports in Appendices B, C and D, with relevant inclusions in the detailed trench descriptions and summary information following the trench descriptions. Relevant dating information is also included within the Appendix A tables.

4.2 Soils and ground conditions

- 4.2.1 The risk of contamination was a major consideration during the works on site. Groundwater was encountered in all trenches, usually as soon as the underlying gravel deposits were encountered. In three trenches at the western end of the site, this groundwater was clearly contaminated with hydrocarbons. Because of this, the lower steps in these trenches were not entered and recording was conducted from the uppermost levels prior to backfilling.

4.3 Trench descriptions

Trenches 1 and 2

- 4.3.1 Trenches 1 and 2 were both located within the western end of the of the new construction footprint. Kempton Park gravels were encountered at depths of 1.8-2.0 m and no archaeological features were present. In both instance, these gravels had been truncated by levelling episodes related to historic factory construction at the site and were sealed by redeposited natural under made ground (1001 & 2000). Purplish-black hydrocarbon staining to the upper horizon of the Kempton Park gravel was also noted.
- 4.3.2 A test pit was excavated into the Kempton Park gravel terrace within Trench 1 to confirm that this was not redeposited material. The gravels comprised a sequence of interstratified sands, clayey sands, within sandy gravel deposits (1009-1017).

Trench 3 (Fig. 3)

- 4.3.3 Trench 3 had not suffered the significant truncation witnessed across much of the site. Here the undisturbed natural floodplain gravel surface (3016/3036) was encountered at c 11.3 m OD. This was sealed by a 0.6 m thick sequence of four clayey alluvial deposits (3035, 3034, 3015 and 3017 in earliest stratigraphic order). Each appeared entirely natural in deposition with no artefacts present. However, cut into the surface of the upper deposit in this sequence (3017) was a cluster of features. These comprised two ditches (3021 and 3030), three treeholes (3008, 3018 and 3023) and a small pit (3012).
- 4.3.4 Ditch 3030 was aligned approximately N-S with a shallow U-shaped profile infilled with two sterile silting fills (3031 & 3032). Ditch 3021 was similarly unremarkable and contained a single sterile silting fill (3022) within a similar ditch profile. This ditch was aligned NW-SE. No finds were present within either ditch fill sequence.



- 4.3.5 The southeastern extent of Ditch 3021 within the trench was truncated by a large and irregular-shaped treehole (3018). Two similar treeholes (3008 and 3023) were located adjacent to this and each contained a sequence of fills typical of upcast and redeposited material deriving from the clayey alluvial sequence that these features truncated. No artefacts or other evidence of human involvement in the removal of these trees was present.
- 4.3.6 The small pit (3012) also identified in this feature cluster measured 1.3 m by 0.35 m in depth and was distinguished from the treeholes by the comparative uniformity of profile and fill sequence. This contained three fills (3014, 3025 & 3026), the basal fill (3026) of which yielded a tiny crumb of fired clay and a single small fragment of burnt flint.
- 4.3.7 All of these features were cut into layer 3017 and were subsequently overlain by a sequence of three clayey alluvial deposits (3033, 3007 and 3006 in earliest stratigraphic order). Again, each appeared entirely natural in deposition although a small (5g) and abraded sherd of prehistoric pottery was recovered from deposit 3007. This was recovered above the fill of ditch 3021 although a direct association between the two was not clearly apparent.
- 4.3.8 Two modern brick-built walls (3003 and 3005) orientated at ninety degrees to each other such that they are likely to have formed two sides of a rectangular building were cut into the upper alluvial sequence. These were sealed by made ground (3001) and the modern disturbed concrete surface (3000).

Trenches 4 and 6

- 4.3.9 Trenches 4 and 6 were both located within the footprint of the proposed attenuation tanks below parking and access areas immediately east and south of the new construction. Trench 4 produced a near identical sequence to Trench 2 with made ground (4000-4003) overlying the truncated upper horizon of hydrocarbon contaminated floodplain gravels (4004). The gravel surface was only exposed within a shallow sondage excavated at the western end of the trench at a level of 11.35 m OD with the maximum impact depth of the development at this location limited to 11.70 m OD. No archaeological features were encountered.
- 4.3.10 Trench 6 was similarly devoid of archaeological features. Within this trench the development impact level was identified as c 11 m OD. However, the surface of the floodplain gravel (6003) was encountered between 11.5 and 11.1 m OD and was exposed along the length of the trench. Significant recent and historic truncation had affected this part of the site with only localised survival of clayey alluvial deposits encountered overlying the gravel within the southern portion of the trench (Layers 6004–6007). These had been removed across the greater part of the trench with made ground (6001) directly overlying the truncated and levelled (6010) surface of the gravel within the northern reaches and much of the central/southern portion of the trench affected by a large rectangular cut (6008), which held the concrete and brick-built foundations of a factory building (6009).
- 4.3.11 A single sherd of pottery dating to the 19th -20th centuries was recovered from alluvial layer 6005. This sherd was almost certainly intrusive and most probably relates to either building foundation cut (6008) or the levelling event (6010).
- 4.3.12 A geoarchaeological test pit was excavated at the northern end of Trench 6 (Fig. 6). This revealed a floodplain gravel interface deposit (6003) at a depth of around 2.10m below the current ground level (BGL), overlying clean floodplain sandy gravels (6011). These were of a similar nature to the main gravel deposits identified within Trench 5. Further



excavation within the gravel deposits failed to reveal any organic-rich deposits or other deposits that could be interpreted as Arctic Beds. The test pit was abandoned following the collapse of the overlying made ground deposits at a depth of 3.50m BGL.

Trench 5 (Fig. 4)

- 4.3.13 Trench 5 was located within the new construction footprint and was ultimately machine excavated to the surface of the gravel sequence (5014). This was encountered at c 2.1 m BGL (10.9 m OD) with the deeper sequence of gravel deposits investigated by the excavation of a geoarchaeological test pit (Fig. 6). This was excavated to a maximum depth of 3 m BGL and no hydrocarbon staining of the gravels was present such as that recorded within the trenches to the immediate west.
- 4.3.14 The geoarchaeological test pit recorded a sequence of floodplain gravel deposits (5014, 50160–5019). The main gravel body (5014) comprised well sorted sub-rounded pebble gravel within a sandy silt matrix representing high energy fluvial deposition within a braided river system resulting from the melting ice of the last glaciation. Two thin coarse sand lenses were identified within these deposits reflecting fluctuations in the energy of the river system. This was overlain by a 0.1 m thick deposit of brown gravel silt containing small fragments of organic inclusions (5018). Initial on site interpretation identified this as a possible Arctic Bed deposit or other Late Glacial/Early Holocene deposit and samples were recovered for analysis. This was only able to identify a very small wood fragment as a piece of Alder root which was subsequently C14 dated to the Bronze Age period (see Appendix D).
- 4.3.15 The organic gravel deposit was overlain by a sandy greyish sandy silt deposit (5017) a thin loose light greyish well-sorted gravel deposit (5016) and an interface zone with the overlying alluvial sequence. The date of the underlying organic deposit would suggest that these deposits potentially represent gravel colluvial episodes associated with the erosion and instability of the gravel terrace during the later prehistoric period
- 4.3.16 The gravel and sandy silt deposits were sealed by two layers of alluvial clay (5006 and 5005). Both were unremarkable although layer 5005 may represent a stabilised land surface with two features cut into the surface of this deposit. These were a large ditch (5007) and an irregular-shaped shallow treehole (5011). The ditch was 2.3 m wide and 0.95 m deep and contained three silting fills typical of water inundation (5008–5010). The primary fill (5010) was sampled for the recovery of waterlogged remains from which abundant plant and insect fragments have been recorded. *Rubus* sp. (bramble) was the most common species and with at least twelve other species also present, including *Urtica* sp. (nettle) consistent with waste and marginal ground environments that are often found at the edges of fields and tracks.
- 4.3.17 The sample residue also produced several very small fragments of unworked burnt flint, a fragment of mortar and a small quantity of metalworking debris in the form of micro slags that included spherical hammerscale. This could indicate that metalworking was being undertaken nearby at the time that the ditch was open although the sediment deposit is clearly waterborne within the ditch and, as such, these very small items may have been transported along the ditch before coming to rest at this location. No artefacts that could convincingly date the ditch origin and use were encountered.
- 4.3.18 To the east of the ditch and cut at the same stratigraphic level was a small probable treehole (5011). This was very shallow and contained two fills from which a single broken flint flake was recovered.



- 4.3.19 Both infilled features were sealed by two further clayey alluvial deposits (5004 and 5015). The upper horizon (5015) had been truncated by a brick-built foundation (5002) (not illustrated) that was aligned along the length of the trench. This was accompanied by a layer of made ground (5001) and the modern concrete surface (5000).

Trench 7 (Fig. 5)

- 4.3.20 Trench 7 was located within the development boundary known to contain the deepest sediment sequence. Here the development impact was limited to c 11.5 m OD for the attenuation tank and drainage under the parking area. As a result machine excavation was limited to a maximum depth of c 11 m OD along the length of the trench although this was significantly hampered by modern obstructions. A geoarchaeological test pit was also excavated to a maximum depth of 4 m BGL at the northern end of the trench to investigate the deep sediment sequence and the potential of these to provide material suitable for scientific dating should these deposits be associated with human activity.
- 4.3.21 Within the machine excavated test pit the surface of the floodplain gravel sequence was encountered at c 10 m OD (Fig. 6). This was sealed by a transitional deposit of loose light grey silty sand (7014) separating the sandy gravels and the overlying organic deposits. The overlying peat and organic deposit (7013) was fibrous with frequent woody inclusions increasing in frequency towards the upper level of the deposit. This was identified at a depth of between 2.8 m and 3.2 m (10.86 m OD and 10.46 m OD). This produced a single unworked burnt flint and occasional charcoal flecks, although no other finds or evidence of human activity were identified.
- 4.3.22 The peat deposit was sealed by a calcareous silt (7012) rich in snails and nodular tufa. The snail assemblage was dominated by flowing freshwater species, characteristic of a channel edge environment. The sharp undulated contact with peat would suggest that the channel containing this deposit had truncated and eroded the upper surface of the peat.
- 4.3.23 This lower sequence was sealed by up to 2 m of sterile light yellowish brown silty clay alluvial deposits (7004 and 7002). These deposits are likely to represent overbank alluvial deposition on the floodplain. These were separated by a land surface (7003) identified at a depth of 1.50 m BGL (12.16m OD) that represents a period of stabilisation. Also at this level a small pit containing a dog burial (7005) was cut into the surface of deposit 7004. The burial comprised a small dog and the backfill of the pit contained an iron nail and post-medieval tile and coal fragments suggesting a 18th or 19th century origin. Some of the skeleton of the dog was removed by machine excavation prior to the identification and hand excavation the feature.
- 4.3.24 The upper horizon of the alluvial sequence (7002) was truncated by a brick built structure (7008) across the western side of the trench relating to an earlier phase of factory construction. This was sealed by made ground (7001) and truncated by more recent substantial concrete foundations (7010) with a reinforced concrete slab (7000) completing the sequence to the modern surface level.

4.4 Finds summaries

- 4.4.1 Most trenches contained modern finds within the made ground that included brick, tile, glass, metal, plastic and in some cases, textiles. These materials were recorded on the individual context sheets but not recovered. Very few artefacts associated with deposits that pre-dated the made ground and truncation events were encountered. These are summarised below.



Pottery

- 4.4.2 A single sherd of glazed pottery was recovered from Trench 6 dated to the late 19th or early 20th century and is most likely related to the use or subsequent demolition of early factory buildings on site.
- 4.4.3 A solitary sherd of later prehistoric pot was recovered from alluvial layer 3007 in Trench 3. A single tiny crumb of fired clay was also recovered from a pit (3012) within the same trench.

CBM

- 4.4.4 Two fragments of tile were recovered from the upper fill of dog burial 7005. These are dated to the post-medieval period and are most likely 18th or 19th-century in date.

Worked flint

- 4.4.5 A solitary worked flint was recovered in treehole 5011. This piece is a broken flake and is not diagnostic to any period.

Burnt flint

- 4.4.6 A single fragment of burnt, unworked flint, weighing 1g, was recovered from a pit 3012 in Trench 3.

Animal Bone

- 4.4.7 A partial dog skeleton was recovered from a pit (7005) in Trench 7. The skeleton was most likely placed in the pit complete but had been partially truncated during stripping operations. The remains recovered represent an adult male dog of small size.

Other finds

- 4.4.8 An iron nail and small fragments of coal were recovered from the fill of the dog burial in pit 7005.

4.5 Environmental and C14 summary

- 4.5.1 A sample was taken from the basal fill (5010) of ditch (5007) for the recovery of waterlogged plant remains (WPR). This identified several plant species indicative of scrub or waste ground such as bramble and stinging nettles. Insect remains were also present but not identified.
- 4.5.2 Additional samples were recovered from the alluvial and gravel sequences. Two samples (samples 2 and 3) of probable 'organic' gravel were recovered from Trench 5 of which one was processed and organic remains were extracted for C14 dating. This provided a Bronze Age date.
- 4.5.3 Three samples were recovered from a variety of deposits encountered within Trench 7. These were from the snail-rich calcareous deposit (7012) that identified a range of flowing freshwater snail species, peat layer 7013 and clay channel/alluvial layer 7009. The peat layer recorded abundant plant and insect remains indicative of open and relatively dry environments.



5 DISCUSSION AND CONCLUDING REMARKS

5.1 Distribution of archaeological deposits

- 5.1.1 A single focus of very limited archaeological activity was identified within the central north portion of the evaluation. However, these features were generally rather unremarkable other than in the absence of any suitable dating material or other artefacts or ecofacts that would suggest significant human activity in the immediate surroundings. None the less these features were consistent in that they appear to have been cut from a similar stabilisation horizon within both Trenches 3 and 5 (3017 and 5005) with a comparative land surface also present identified within Trench 7 (7004).
- 5.1.2 A number of modern brick-built structures were identified in Trenches 3, 5, 6 & 7. These were clearly modern in date and are likely to relate to the factory buildings that were present since the late 19th century. These structures and related levelling episodes have significantly removed much of the alluvial sequence and potential archaeological remains across the site as represented by the horizon identified within Trenches 3 and 5 and possibly within Trench 7.

5.2 Sedimentary sequence

- 5.2.1 The evaluation revealed a sequence of floodplain deposits that were broadly consistent with the deposit model presented by OAS (2009). However, the intrusive evaluation demonstrated a significant absence of alluvium over much of the western portion of the site. This area appears to have been significantly truncated by the modern factory foundations. Trenches 6 and 7 also demonstrated significant truncation to the upper alluvial sequence although deeper sequences within this part of the site resulted in the presence of the lower deposits unaffected by the factory foundations.
- 5.2.2 The geoarchaeological test pits failed to identify any remains of the late glacial Arctic Bed deposits known to be preserved within the region of Ponders End. This may be due to these deposits being deeply buried or that the test pits were not able to penetrate deep enough within the gravel sequence or even that these deposits are not located within the site boundary. These deposits are known to be fragmentary rather than a consistent identifiable horizon along the valley.
- 5.2.3 The evaluation did successfully identify a moderately well preserved Holocene alluvial sequence within the eastern part of site as predicted by the deposit model. This contained inter-stratified peat and channel edge deposits sealed by up to 2m of alluvium. No human activity was present in association with this sequence and this depth and part of the site will remain largely unaffected by the development.

5.3 Archaeological Interpretation and significance

- 5.3.1 The comparative concentration of archaeological features in Trenches 3 and 5 clearly indicates localised preservation within the evaluation boundary amongst substantial surrounding truncation as opposed to any significant focus of activity. All of the features are not securely dated although the presence of mortar from the primary fill of ditch 5007 does suggest a Roman date at the earliest but with a medieval or post-medieval date more likely. The apparent stabilisation dry land surface associated with these features is of some interest as it suggests a period of decreased alluvial deposition. This may be due to increased land management and drainage as suggested by the large ditch 5007. This ditch could easily represent late medieval or post-medieval drainage and land reclamation. Certainly the lack of any artefactual presence within these features suggests that these were marginal features and not located adjacent to



occupation or activity areas in common with field drainage ditches of low lying fields. The ditch does not conform to the arrangement or alignments of those indicated on the early maps examined as part of the DBA study and may pre-date them. The Dog burial in Trench 7 (Pit 7005) did produce some clear post-medieval material and appears to have cut from a comparative horizon. If so, this suggests that the features within Trenches 3 and 5 are also of post-medieval origin.

5.4 Potential and development impact to the identified remains

- 5.4.1 The archaeological remains located within this evaluation appear to represent very limited archaeological potential. Good environmental remains have been identified as would be expected of waterlogged environments although none of these deposits can be clearly associated with a particular activity or date making them of comparatively limited value for the study of human occupation and impact upon the landscape.
- 5.4.2 The lack of artefacts within the features and generally across the site suggests a very low presence of activity throughout the site history. However, caution must be applied to this interpretation as well sealed deposits may contain very localised evidence for activity that can not be easily identified by evaluation. Although this may be the case the combination of significant truncation across a large part of the site and only localised preservation does suggest an overall low potential.
- 5.4.3 The development impact should also be considered for the part of the site with localised preservation. Trenches 3 and 5 lie within the footprint of the new structure that will utilise a vibro pile foundation. This will be constructed on a 2 m spacing arrangement across the footprint of the new build. Considering the relative value of the features identified and the very localised nature of the preservation, it is unlikely that the vibro pile construction will adversely affect the potential of these features. It is likely that some part of these will remain although the significance and archaeological value that they offer remains as very low. The remaining part of the site will not be subject to significant intrusive impact through the development within the areas that display preservation of the deeper sediment sequence (Trenches 6 and 7).



APPENDIX A. TRENCH DESCRIPTIONS AND CONTEXT INVENTORY

| Trench 1 | | | | | | |
|---|-------|-----------|-----------|--|----------------|------|
| General description | | | | | Orientation | N-S |
| Trench 1 revealed a complex sequence of sands and gravels, likely to be the Kempton Park sequence underlying a deep deposit of made ground. No alluvium nor any archaeological features were identified. A test pit was dug into the upper part of the Kempton Park gravel sequence | | | | | Avg. depth (m) | 2 |
| | | | | | Width (m) | 6 |
| | | | | | Length (m) | 18.5 |
| Contexts | | | | | | |
| context no | type | Width (m) | Depth (m) | comment | finds | date |
| 1000 | Layer | | 0.10 | Concrete surface | - | |
| 1001 | Layer | | 1.70 | Made ground | - | |
| 1002 | Layer | | 0.20 | Natural Geology, Kempton Park gravels, petroleum stained | - | |
| 1003 | Layer | | | Natural Geology, Lower Kempton Park gravels | - | |
| 1004 | Layer | | 1.70 | Made ground (same as 1001) | - | |
| 1005 | Layer | | | Natural Geology, Kempton Park gravels | - | |
| 1006 | Cut | | | Cut for made ground levelling event | - | |
| 1007 | Layer | | 0.05 | Redeposited natural made ground/levelling material | - | |
| 1008 | Layer | | 0.32 | Redeposited natural made ground/levelling material | - | |
| 1009 | Layer | | 0.34 | Sandy gravel, petroleum stained. Kempton Park gravels | - | |
| 1010 | Layer | | 0.06 | Grey gravelly sand. Kempton Park gravels | - | |
| 1011 | Layer | | 0.06 | Grey-brown clayey sand. Kempton Park gravels | - | |
| 1012 | Layer | | 0.04 | Orangey-brown sandy clay. Kempton Park gravels | - | |
| 1013 | Layer | | 0.16 | Grey-brown sandy gravel. Kempton Park gravels | - | |
| 1014 | Layer | | 0.14 | Grey-brown sand. Kempton Park gravels | - | |
| 1015 | Layer | | 0.12 | Orange-brown sandy gravel. Kempton Park gravels | - | |
| 1016 | Layer | | 0.26 | Dark grey-black sandy gravel. Kempton Park gravels | - | |
| 1017 | Layer | | | Dark brown sand. Kempton Park gravels | - | |



| Trench 2 | | | | | | |
|---|-------------|------------------|------------------|--|-----------------------|-------------|
| General description | | | | | Orientation | ESE-WNW |
| Trench 2 contained made ground down onto petroleum stained and truncated Kempton Park gravels. No archaeology identified. | | | | | Avg. depth (m) | 1.95 |
| | | | | | Width (m) | 6 |
| | | | | | Length (m) | 22 |
| Contexts | | | | | | |
| context no | type | Width (m) | Depth (m) | comment | finds | date |
| 2000 | Layer | | 1.80 | Made ground | - | |
| 2001 | Layer | | 0.10 | Possible alluvium or redeposited natural | - | |
| 2002 | Layer | | | Kempton Park gravels, petroleum stained | - | |

| Trench 3 | | | | | | |
|---|-------------|------------------|------------------|---|-----------------------|-------------|
| General description | | | | | Orientation | ENE-WSW |
| Trench 3 contained a complex sequence of made ground over multiple alluvial layers over Floodplain gravels with probable 'Arctic Bed' deposits. Within the alluvial sequence several features, including ditches, a pit and tree throws were identified. Finds include prehistoric pottery and burnt flint. | | | | | Avg. depth (m) | 1.9 |
| | | | | | Width (m) | 6 |
| | | | | | Length (m) | 22 |
| Contexts | | | | | | |
| context no | type | Width (m) | Depth (m) | comment | finds | date |
| 3000 | Layer | | 0.10 | Concrete surface | - | |
| 3001 | Layer | | 1.10 | Made ground | - | |
| 3002 | Cut | 0.80 | 0.60 | Foundation trench | - | |
| 3003 | Structure | 0.45 | 0.60 | Brick built wall foundations | - | |
| 3004 | Cut | 0.80 | 0.60 | Foundation trench | - | |
| 3005 | Structure | 0.45 | 0.60 | Brick built wall foundations | - | |
| 3006 | Layer | | 0.05 | Alluvium, very dark greyish-brown clay | - | |
| 3007 | Layer | | 0.30 | Alluvium, mid brown sandy clay | - | |
| 3008 | Cut | 2.20 | 0.35 | Treehole | - | |
| 3009 | Fill | 0.35 | 0.15 | Light reddish-brown silty clay, fill of treehole 3008 | - | |
| 3010 | Fill | 0.80 | 0.25 | Dark purplish-brown gravelly clay, fill of treehole3008 | - | |
| 3011 | Fill | 0.07 | 0.27 | Light yellowish-brown silty clay, fill of treehole 3008 | - | |
| 3012 | Cut | 0.9 | 0.34 | Probable pit | - | |
| 3013 | Fill | 0.80 | 0.26 | Dark greyish-black clay, fill of treehole 3008 | - | |



| | | | | | | |
|------|-------|------|-------|--|----------------------|--------------|
| 3014 | Fill | 0.40 | 0.15 | Dark blueish-grey clay, fill of pit 3012 | - | |
| 3015 | Layer | | 0.30 | Alluvium, mid reddish-brown sandy clay | - | |
| 3016 | Layer | | | Floodplain gravels = 3036 | - | |
| 3017 | Layer | | 0.15 | Alluvium, light yellowish-brown sandy clay | pottery | Prehistoric? |
| 3018 | Cut | 0.70 | 0.30 | Treehole | - | |
| 3019 | Fill | 0.70 | 0.18 | Light reddish-brown clayey silt, fill of treehole 3018 | - | |
| 3020 | Fill | 0.70 | 0.22 | Dark brown-black clayey silt, fill of treehole 3018 | - | |
| 3021 | Cut | 1.05 | 0.22 | Probable ditch | - | |
| 3022 | Fill | 1.05 | 0.22 | Greyish-brown clayey silt, fill of ditch 3021 | - | |
| 3023 | Cut | 0.95 | 0.15 | Natural feature, treehole? | - | |
| 3024 | Fill | 0.95 | 0.15 | Fill of natural feature 3023 | no- | |
| 3025 | Fill | 0.45 | 0.08 | Pale grey/light reddish-brown silty clay, fill of pit 3012 | no | Prehistoric? |
| 3026 | Fill | 0.90 | 0.28 | Very dark greyish-black silty clay, fill of pit 3012 | pottery, burnt stone | Prehistoric? |
| 3027 | Fill | 0.50 | 0.120 | Mid purplish-brown sandy silty clay, fill of treehole 3008 | - | |
| 3028 | Void | | | Voided number | - | |
| 3029 | Void | | | Voided number | - | |
| 3030 | Cut | 0.66 | 0.20 | Ditch | - | |
| 3031 | Fill | 0.66 | 0.10 | Orange-brown clayey silt, fill of ditch 3030 | - | |
| 3032 | Fill | 0.66 | 0.12 | Orange-brown clayey silt, fill of ditch 3030 | - | |
| 3033 | Layer | | 0.08 | Alluvium, dark grey/black silty clay | - | |
| 3034 | Layer | | 0.10 | Alluvium, orange silty clay, sub-division of 3015 | - | |
| 3035 | Layer | | 0.10 | Alluvium, light greyish-orange clay, sub-division of 3015 | - | |
| 3036 | Layer | | | Floodplain gravels = 3016 | - | |



| Trench 4 | | | | | | |
|---|-------------|------------------|------------------|--|-----------------------|-------------|
| General description | | | | | Orientation | ESE-WNW |
| Trench 4 contained made ground down onto petroleum stained and truncated Floodplain gravels. No archaeology identified. | | | | | Avg. depth (m) | 1.3 |
| | | | | | Width (m) | 2 |
| | | | | | Length (m) | 20 |
| Contexts | | | | | | |
| context no | type | Width (m) | Depth (m) | comment | finds | date |
| 4000 | Layer | | 0.20 | Light greyish-yellow sandy gravel hardcore | - | |
| 4001 | Layer | | 0.14 | Concrete surface | - | |
| 4002 | Layer | | 0.75 | Made ground | - | |
| 4003 | Layer | | 0.42 | Made ground | - | |
| 4004 | Layer | | | Floodplain gravels, petroleum stained | - | |

| Trench 5 | | | | | | |
|--|-------------|------------------|------------------|--|-----------------------|-------------|
| General description | | | | | Orientation | ESE-WNW |
| Trench 5 also contained a classic sequence of made ground, multiple alluvial layers and Floodplain gravels with probable 'Arctic Bed' deposits. A single ditch and a possible pit/tree throw were also identified with the latter producing a single struck flint. | | | | | Avg. depth (m) | 2.1 |
| | | | | | Width (m) | 6 |
| | | | | | Length (m) | 22 |
| Contexts | | | | | | |
| context no | type | Width (m) | Depth (m) | comment | finds | date |
| 5000 | Layer | | 0.10 | Concrete surface | - | |
| 5001 | Layer | | 0.60 | Made ground | - | |
| 5002 | Structure | 0.45 | 0.40 | Brick built wall foundations | - | |
| 5003 | Cut | 0.45 | 0.40 | Foundation trench | - | |
| 5004 | Layer | | 0.35 | Alluvium, dark blue-grey clay | - | |
| 5005 | Layer | | 0.25 | Alluvium, mid grey clay | - | |
| 5006 | Layer | | 0.30 | Alluvium, mid grey clay | - | |
| 5007 | Cut | 2.30 | 0.90 | Ditch | - | |
| 5008 | Fill | 2.30 | 0.70 | Mid greyish-brown silty clay, upper fill of ditch 5007 | - | |
| 5009 | Fill | 0.90 | 0.05 | Mid grey silty clay, fill of ditch 5007 | - | |
| 5010 | Fill | 0.85 | 0.20 | Dark grey, organic-rich silty clay, basal fill of ditch 5007 | - | |
| 5011 | Cut | 0.9 | 0.20 | Treehole | - | |
| 5012 | Fill | 0.9 | 0.1 | Light grey silty clay fill of 5011 | - | |



| | | | | | | |
|------|-------|-----|-----|-----------------------------------|-------|--------------|
| 5013 | Fill | 0.9 | 0.1 | Dark grey silty clay fill of 5011 | flint | Prehistoric? |
| 5014 | Layer | | | Floodplain gravels | - | |
| 5015 | Layer | | 0.1 | Alluvium, dark grey clay | - | |
| 5016 | Layer | | 0.1 | Light grey sandy gravel | - | |
| 5017 | Layer | | 0.2 | Greyish-brown sandy silt | - | |
| 5018 | Layer | | 0.1 | Organic sandy gravels | - | Bronze Age |
| 5019 | Layer | | | Light yellow, coarse sandy gravel | - | |

| Trench 6 | | | | | | |
|---|-------------|------------------|------------------|---|-----------------------|-------------|
| General description | | | | | Orientation | NE-SW |
| Trench 6 contained a sequence of made ground with four alluvial layers surviving at the southern end of the trench, overlying floodplain gravels. The northern end had made ground onto truncated gravels while a substantial modern concrete and brick structure occupied the central portion of the trench. | | | | | Avg. depth (m) | 1.8 |
| | | | | | Width (m) | 5 |
| | | | | | Length (m) | 22 |
| Contexts | | | | | | |
| context no | type | Width (m) | Depth (m) | comment | finds | date |
| 6000 | Layer | | 0.10 | Concrete surface | - | |
| 6001 | Layer | | 0.84 | Made ground | - | |
| 6002 | Layer | | 0.84 | Context same as 6001 | - | |
| 6003 | Layer | | 0.30 | Floodplain gravel interface | - | |
| 6004 | Layer | | 0.12 | Alluvium, very dark brown-black organic silty clay | - | |
| 6005 | Layer | | 0.20 | Alluvium, dark greyish- brown/black silty clay | pottery (intrusive) | |
| 6006 | Layer | | 0.08 | Alluvium, light grey silty clay | - | |
| 6007 | Layer | | 0.30 | Alluvium, light orange-brown silty clay | - | |
| 6008 | Cut | 3.20 | 1.50 | Foundation cut | - | |
| 6009 | Structure | 3.20 | 0.50 | Concrete and brick foundations for factory building | - | |
| 6010 | Cut | | 0.95 | Levelling cut into alluviums | - | |
| 6011 | Layer | | | Floodplain gravels | - | |



| Trench 7 | | | | | | |
|---|-------------|------------------|------------------|---|-----------------------|---------------|
| General description | | | | | Orientation | N-S |
| Trench 7 lay within Site 2 and had a much thicker cover of concrete. Much of the length of the trench contained concrete stanchions and in the centre, a thick and substantial concrete foundation. The walls of a factory building were also present. Alluvial material was present here as was a layer of peat which sat immediately over Floodplain gravels. A single pit containing a dog burial was discovered within the alluvial sequence. The presence of an iron nail, coal fragments and some pieces of tile indicate a post-medieval date. | | | | | Avg. depth (m) | 2.2 |
| | | | | | Width (m) | 5 |
| | | | | | Length (m) | 22 |
| Contexts | | | | | | |
| context no | type | Width (m) | Depth (m) | comment | finds | date |
| 7000 | Layer | | 0.45 | Thick reinforced concrete surface | - | |
| 7001 | Layer | | 0.50 | Made ground | - | |
| 7002 | Layer | | 0.24 | Alluvium, light brown silty clay | - | |
| 7003 | Layer | | 0.08 | Buried soil, stabilisation event, dark brown silty clay | - | |
| 7004 | Layer | | 0.60 | Alluvium, dark brown silty-clay | | |
| 7005 | Cut | 0.74 | 0.29 | Dog burial pit | - | post-medieval |
| 7006 | Fill | 0.6 | 0.08 | Dark brown silty clay, lower fill of pit 7006 around dog skeleton | bone, iron nail | post-medieval |
| 7007 | Fill | 0.74 | 0.18 | Mid brown silty clay, upper fill of pit 7006 | coal, tile | post-medieval |
| 7008 | Structure | 0.45 | 0.50 | Brick built wall foundations | - | |
| 7009 | Layer | | 0.90 | Alluvium, blueish-green silty-clay | - | |
| 7010 | Structure | 1.00 | | Concrete drain sump | - | |
| 7011 | Cut | 0.80 | 0.50 | Foundation trench | - | |
| 7012 | Layer | | 0.15 | Fluvial, yellowish-white calcareous silt | - | |
| 7013 | Layer | | 0.4 | Peat | - | |
| 7014 | Layer | | 0.15 | Interface layer with the floodplain gravel | - | |
| 7015 | Layer | | | Floodplain gravels | - | |



APPENDIX B. FINDS REPORTS

B.1 Pottery

By John Cotter and Dan Stansbie

- B.1.1 A total of 3 sherds of pottery weighing 37 g. were recovered from three contexts. For each context the total pottery sherd count and weight were recorded on table below.
- B.1.2 The solitary prehistoric sherd (Context 3007) is quite small with moderate-heavy crushed and burnt flint temper. On the basis of the temper and sherd thickness, a late Bronze Age to Iron Age date seems most likely. The tiny crumb from context (3026) is too small to allow for proper identification and it may in fact be a tiny piece of fired clay rather than actual pot. One context produced a post-medieval glazed yellow ware rim sherd dated to 19th early 20th century. No further work on the assemblage is recommended.

| Context | Spot-date | No. | Weight (g) | Comments |
|--------------|-------------------|----------|------------|---|
| 3007 | Later Prehistoric | 1 | 5 | Single sherd with crushed flint temper, probably LBA-IA in date |
| 3026 | ? | 1 | 1 | Tiny crumb, either fired clay or pottery |
| 6005 | 19C-early 20C | 1 | 31 | Yellow Ware, rim sherd, probably 19C |
| Total | | 3 | 37 | |

B.2 Ceramic building material (CBM)

by John Cotter

- B.2.1 The CBM assemblage comprises 2 fragments (89g), from upper fill (7007) of a dog burial pit. As usual, the dating of broken fragments of ceramic building material is an imprecise art and spot-dates derived from them are necessarily broad and should therefore be regarded with caution. The pieces are both post-medieval in date and are largely undiagnostic, but probably date from the late 18th-19th centuries. No further work on the assemblage is recommended.

B.3 Worked flint

By Michael Donnelly

- B.3.1 A solitary worked flint was recovered from the fill of treehole 5011, Trench 5. This piece is a broken flake of dark grey-black flint with weathered chalk cortex. It resembles a broken core on a flake or possible a broken large implement which has split at the early stages of manufacture.



- B.3.2 The piece is undiagnostic and as such helps little in refining our understanding of human activity in the vicinity. However, it does confirm a limited prehistoric presence here and add to the pottery evidence which could indicate that the features identified in Trenches 3 and 5 may be of prehistoric date.

B.4 Metal

By Ian Scott

- B.4.1 A single iron nail was recovered from Pit 7005. This is hand made and may date from any time within the Roman to post-medieval periods. However, a post-medieval date seems most appropriate in date for this item and context of discovery.

B.5 Coal

By Geraldine Crann

- B.5.1 Three fragments of coal (26g), were recovered from context 7007. A single fragment of modern composite material (6g), was recovered from context 6004.

APPENDIX C. ENVIRONMENTAL REPORTS

C.1 Waterlogged and charred plant remains

By Julia Meen

- C.1.1 Five samples were recovered during the evaluation for the assessment of environmental potential. Sample <1> (5010), taken from the basal fill of a ditch, was noted on site to contain waterlogged organic material. Samples <2> and <3> were duplicate samples taken from deposit 5018, an organic gravelly clay from the floodplain sequence. Of these, one was retained and the other was processed for the recovery of organic material suitable for radiocarbon dating. Sample <4> was taken from deposit (7012), a snail-rich calcareous silt within in the alluvial sequence of Trench 7. Sample <5> was taken from deposit (7013), a waterlogged peat layer from the lower alluvial sequence noted in the field to contain burnt flint. Sample <6> was taken from (7009), a channel fill noted in the field to contain charcoal.
- C.1.2 Sample <6> was processed for the recovery of CPR by hand flotation over a 250µm mesh. The heavy residue was sieved to 500µm, and both flot and residue were dried in a heated room, after which the residue was sorted by eye for artefacts and ecofactual remains. From samples <1>, <3>, and <5>, a 1 litre subsample was hand-floated for the recovery of WPR and the flot and the residue were collected separately on 250µm meshes and stored in water-filled containers in cold storage, with the remaining sediment retained from samples <1> and <3>. The remaining sediment from sample <5> was wet-sieved for the recovery of bones and artefacts, as a burnt flint was recovered from this context in the field. Additional sediment from sample <1> was also processed for the recovery of CPR by water-flotation using a modified Siraf style flotation machine. 2L of sample <4> was processed by hand-flotation for the recovery of snails, with both flot and residue collected and dried on 500µm meshes. The remaining



0.8L of this sample was hand-floated for the recovery of WPR after it was observed to be waterlogged, in the same manner as above. Sample <2> was retained for future analysis subject to the results of the C14 date on sample <3>. The dry flots were scanned for charred plant remains and the waterlogged flots were scanned for WPR and insects using a binocular microscope at approximately x15 magnification. Identifications were made without reference to Oxford Archaeology's reference collection and as such, are provisional. Nomenclature for the plant remains follows Stace (1997).

Plant remains results

- C.1.3 Table 1 summarises the assessment results for waterlogged plant remains (WPR) from samples <1>, <3>, <4> and <5> and of charred plant remains (CPR) from sample <6>. For each WPR flot, 1 tsp of flot was scanned using a binocular microscope at approximately x15 magnification.
- C.1.4 Sample <1>, from ditch fill (5010), produced a waterlogged flot of approximately 80ml. Abundant indeterminate plant stem material was present. Wild seeds were common, with *Rubus* sp. (bramble) the most common species and with at least twelve other species also present, including *Urtica* sp. (nettle). Further waterlogged wood was recovered from the dried residue of the portion floated for CPR. Beetle remains occurred fairly frequently, with elytra, head and leg parts noted, plus one example of a mite. No charred material or molluscs were observed.
- C.1.5 Sample <3>, an organic gravelly clay (5018) recovered from the floodplain gravel sequence, produced a waterlogged flot of approximately 60ml, much of which consisted of waterlogged plant stem and root material. No insects or seeds were observed. However, fragments of waterlogged wood occurred frequently, some reaching 15mm in diameter, which were sufficient material for radiocarbon dating to establish the date of this deposit.
- C.1.6 Sample <4>, from a calcareous silt deposit (7012) from the alluvial sequence, produced a waterlogged flot of approximately 50ml. Abundant waterlogged, indeterminate plant stem material was present, and one seed of *Sambucus* sp. (elder) was noted. Molluscs occurred frequently but no insects were observed. Charcoal was frequent, and occasional waterlogged wood fragments could also be seen.
- C.1.7 Sample <5>, a peat deposit (7013) from the lower alluvial sequence, produced a waterlogged flot of 200ml, of which the greater part was indeterminate plant stem and woody material, with occasional charcoal flecks also present. Three weed seeds were observed, one of which was *Urtica* sp. (nettle). However, a number of additional seeds were recovered from the dried heavy residue where the remainder of the sample was wet-sieved for the recovery of bones, artefacts and larger plant material, including a whole hazelnut (*Corylus avellana*), as well as further wood fragments. Beetle remains were present in the waterlogged flot, most of which were fragmented, although rare leg parts and elytra were observed. One mite was also noted.
- C.1.8 Sample <6>, a channel deposit (7009) was recorded on site as containing abundant charcoal, actually produced very few charred plant remains in its 5ml dry flot. The majority of the black material proved to be coal, supplementing that recovered from the heavy residue, with charcoal limited to rare, highly fragmented flecks. Occasional molluscs were also present, as well as a small number of modern seeds and root material.



Artefact results

- C.1.9 Finds from the samples are detailed in Table 2. Several small fragments of burnt flint were recovered from sample <1>, a basal ditch fill, as well as a fragment of mortar. A small quantity of metalworking debris was also recovered from this context, including slag and spherical hammerscale, indicating that metal was being worked within the surrounding landscape at the time that the ditch was open.
- C.1.10 No additional burnt flint was recovered from sample <5> to supplement that which was collected from this context in the field, although there was also a very small fragment of bone. Two small pieces of coal and a small square of tile were recovered from sample <6>. The dried residue of sample <3> was sorted to assess the presence of small mammal bones; however no bones were present. The snail residue of sample <4> was also checked for finds before being retained; again no finds were recovered.



Geopost Site, Navigation Park, Ponders End, Enfield

Table 1

| Sample No. | Ctxt No. | Feature/Deposit Type | Sample Volume | Flot Volume | Charcoal | Weeds | Other WPR | Insects | Molluscs | Comments |
|------------|----------|---|---------------|-------------|----------|-------|-----------|---------|----------|--|
| 1 | 5010 | Ditch | 1L | 80ml | | +++ | ++++ | ++ | | Abundant indeterminate plant stem material was present. Wild seeds were common, with <i>Rubus</i> sp. (bramble) the most common species and with at least twelve other separate species also present, including <i>Urtica</i> sp. (nettle). Beetle remains occurred fairly frequently, with elytra, head and leg parts noted, plus one example of a mite. No charred material or molluscs were observed. |
| 3 | 5018 | Gravelly clay from floodplain gravel sequence | 1L | 60ml | | | ++++ | | | Abundant waterlogged plant stem/root material was present. No insects or seeds were observed, but pieces of waterlogged wood up to 15mm in diameter occurred frequently. |
| 4 | 7012 | Calcareous silt from alluvial sequence | 0.8L | 50ml | ++ | + | +++ | | ++ | Abundant waterlogged indeterminate plant stem material was present. One seed of <i>Sambucus</i> sp. (elder) was noted. Molluscs occurred frequently but no insects were observed. Charcoal is frequent as well as occasional waterlogged wood fragments. |
| 5 | 7013 | Peat from lower alluvial sequence | 1L | 200ml | | + | ++++ | ++ | | Flot predominately composed of indeterminate plant stem/woody material, with occasional charcoal flecks. Three weed seeds were observed, one of which was <i>Urtica</i> sp. (nettle). Beetle remains were present, mostly fragmented, although rare leg parts and elytra were observed. One mite was also noted. |
| 6 | 7009 | Channel fill | 0.8L | 5ml | + | | | | ++ | 100% of dry flot scanned. Rare charcoal flecks present, all of very small size. Frequent coal fragments present. Occasional molluscs. |

Table 2

| Sample | Burnt Flint | Coal | Bone | Magnetic material | Tile | Mortar |
|--------|-------------|------|------|-------------------|------|--------|
| 1 | ++ | | | +++ | | + |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | + | | + | | | |
| 6 | | + | | | + | |



C.2 Land and freshwater snails

By Elizabeth Stafford

C.2.1 A single sample <4> recovered from layer 7012 was submitted for the assessment of Mollusca. Shell was very abundant and well-preserved in both flots and residue. The assemblage almost entirely comprised freshwater molluscs wholly dominated by flowing water species, suggesting relative autochthony. The most abundant species was *Bithynia tentaculata* (common bithynia), although *Valvata piscinalis* (common valve snail), *Valvata cristata* (flat valve snail), *Theodoxus fluviatilis* (river nerite), and *Bathymphalus contortus* (twisted ram's horn) were also numerically significant. Shells of *Pisidium* sp (pea mussels) were frequent, occasionally with valves still attached. Occasional *Gyraulus* sp. and *Lymnaea* sp. were also noted. The only terrestrial species was a single shell of *Discus rotundatus* (rounded snail). Overall the assemblage is consistent with a calcareous, well-oxygenated aquatic environment, most likely a watercourse or channel with a moderate to slow moving current.

APPENDIX D. SCIENTIFIC DATING REPORTS

D.1 C14 sample

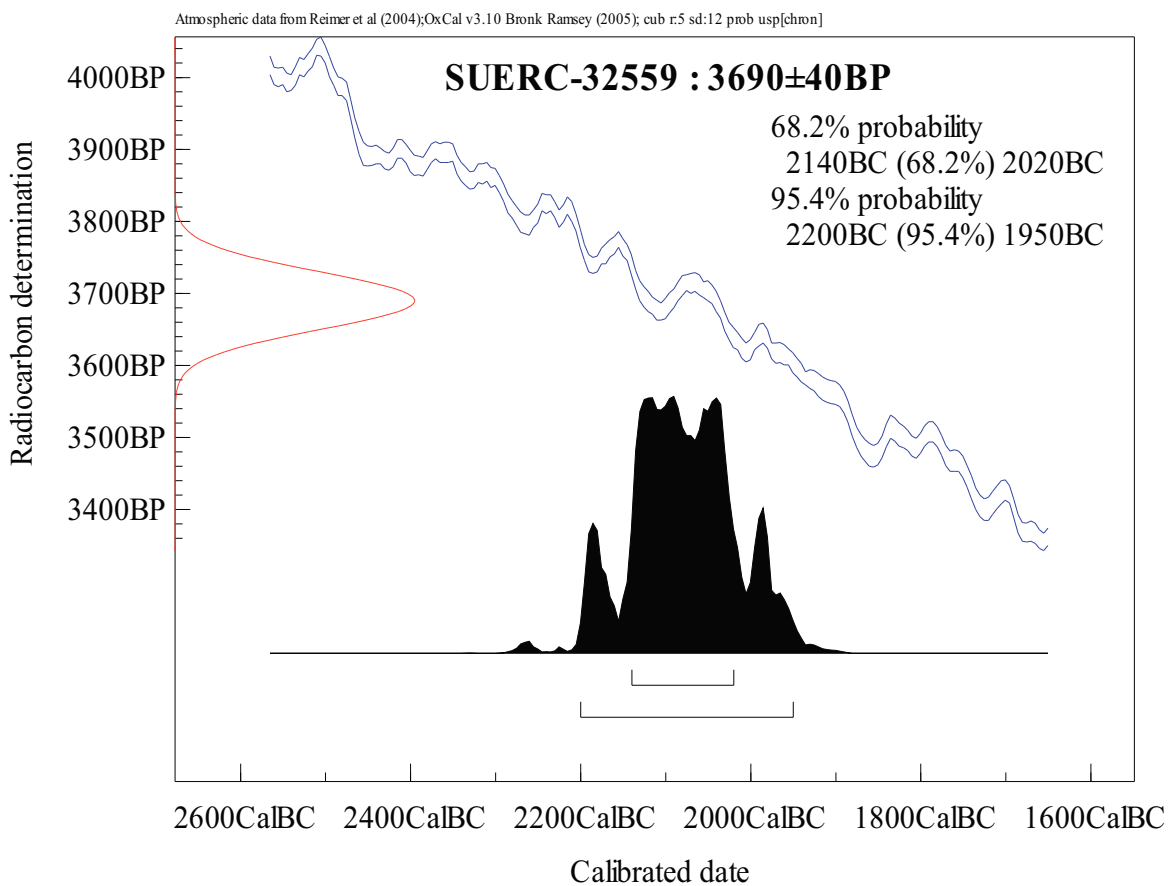
by Scottish Universities Environmental Research Centre

D.1.1 A single sample of organic material was submitted for C14 dating. The following presents the certificate and calibrated date plot.

| | |
|--|--|
| Laboratory Code | SUERC-32559 (GU-23048) |
| Submitter | Oxford Archaeology Janus House Osney Mead OXFORD, OX2 0ES |
| Site Reference | Ponders End, Enfield |
| Context Reference | 5018 |
| Sample Reference | NVP10 sample 3 |
| Material | waterlogged wood : <i>Alnus</i> sp. |
| $\delta^{13}\text{C}$ relative to VPDB | -27.9 ‰ |
| Radiocarbon Age BP | 3690 ± 40 |

The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).





APPENDIX E. BIBLIOGRAPHY AND REFERENCES

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APPENDIX F. SUMMARY OF SITE DETAILS

| | |
|---------------------------|---|
| Site name: | Geopost, Navigation Park, Ponders End, Enfield. |
| Site code: | NVP 10 |
| Grid reference: | TQ 3624 9516 |
| Type: | Evaluation |
| Date and duration: | 25th October to 3rd November 2010 |
| Area of site: | 1.27 ha |

Summary of results:

In October and November 2010, *Oxford Archaeology South* undertook an evaluation at *Navigation Park, Ponders End, Enfield* on behalf of *SEGRO Industrial Properties Ltd*.

Seven trenches were excavated and archaeological features were identified in Trenches 3, 5 and 7. In Trenches 3 and 5, these consisted of ditches, a pit and several treeholes, cut into alluvial material and sealed by later alluvial deposits. Trench 7 contained a dog burial of post-medieval date. All of these features appeared to be cut into a comparative and contemporary horizon although the features within Trenches 3 and 5 were not dated by the presence of artefact assemblages. These features were sterile and are likely to represent field drainage ditches reflected by the presence of a contemporary stabilisation land surface.

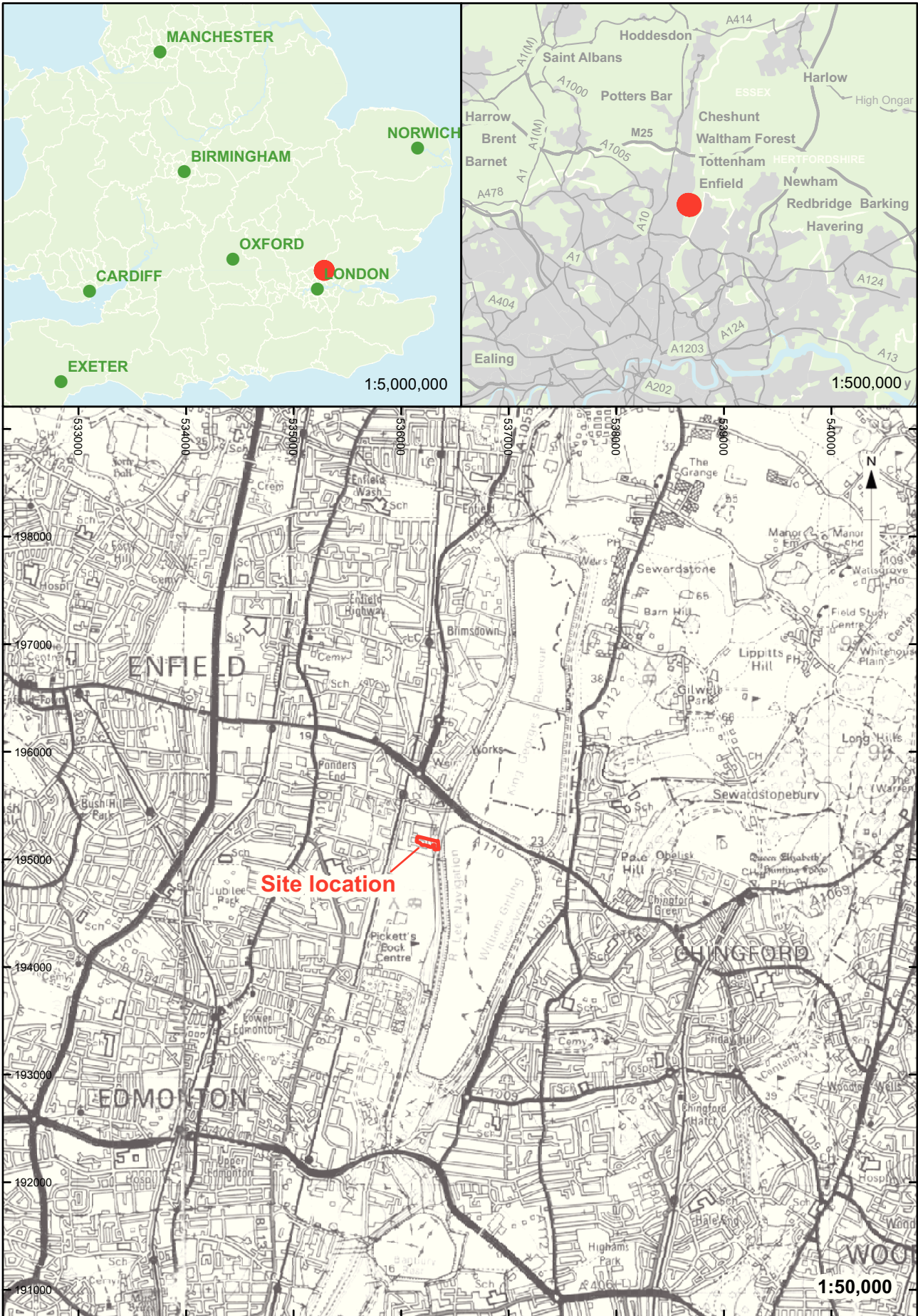
Trenches 3 and 5 represent a localised area of preservation within a largely disturbed and truncated site. The remaining trenches each displayed significant truncation and levelling caused by the various phases of factory construction undertaken here since the 19th century.

Geoarchaeological test pits were excavated within the trenches across the eastern part of the site revealing a well preserved alluvial sequence within Trench 7 to 3 m below the current ground level. Investigation of the gravel sequence failed to encounter the 'Arctic Bed' deposits and an organic deposit within the upper part of the gravel sequence in Trench 5 proved to be of Bronze Age date.

The result of the fieldwork indicates that there is a low potential for significant archaeological remains to be present and those that were identified present are very localised and not associated with artefact assemblages.

Location of archive:

Location of archive: The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES, and will be deposited with the Museum of London in due course, under the accession number: NVP 10.



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Figure 1: Site location

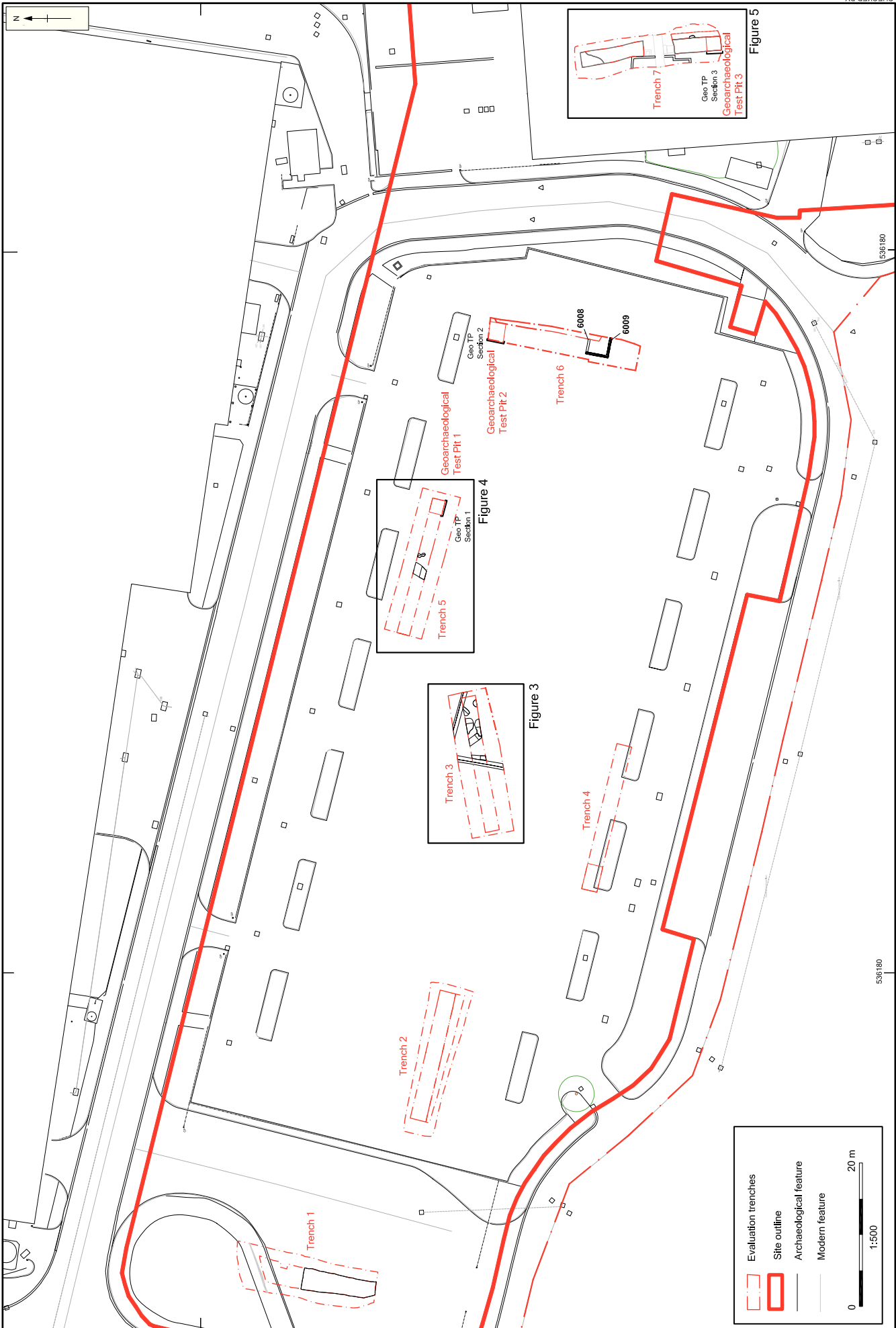


Figure 2: Trench plan

CHECKED BY:

Trench 3

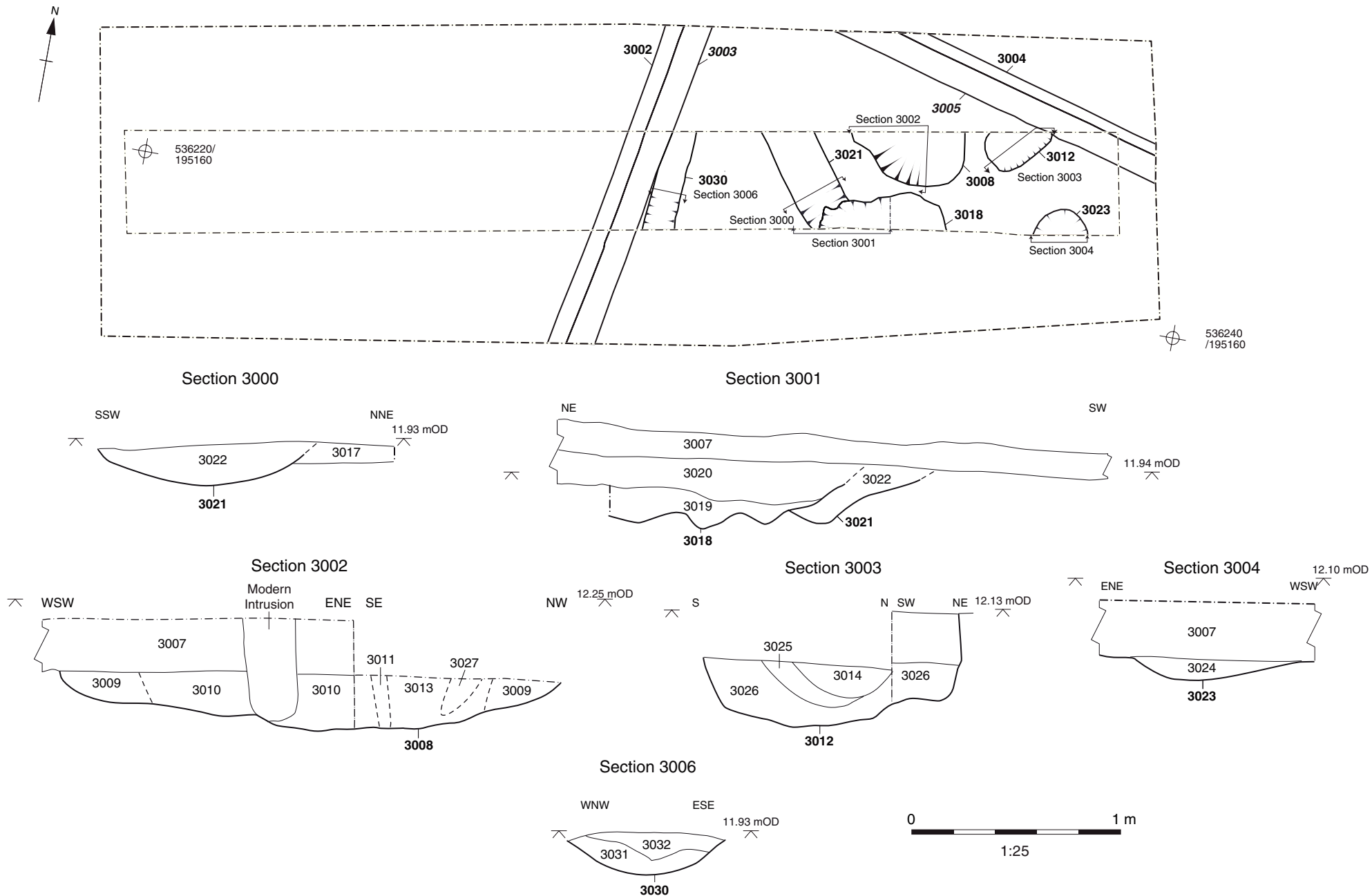
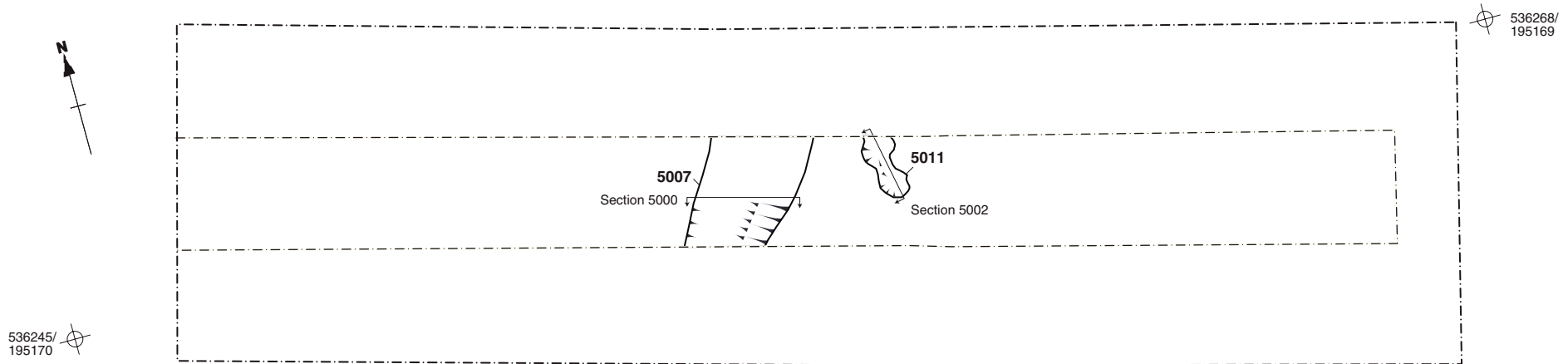
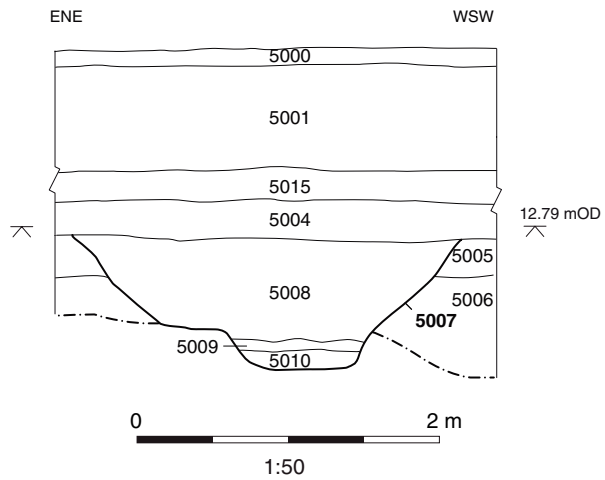


Figure 3: Trench 3, plan and sections

Trench 5



Section 5000



Section 5002

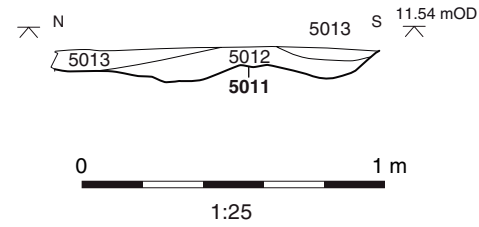


Figure 4: Trench 5, plan and sections

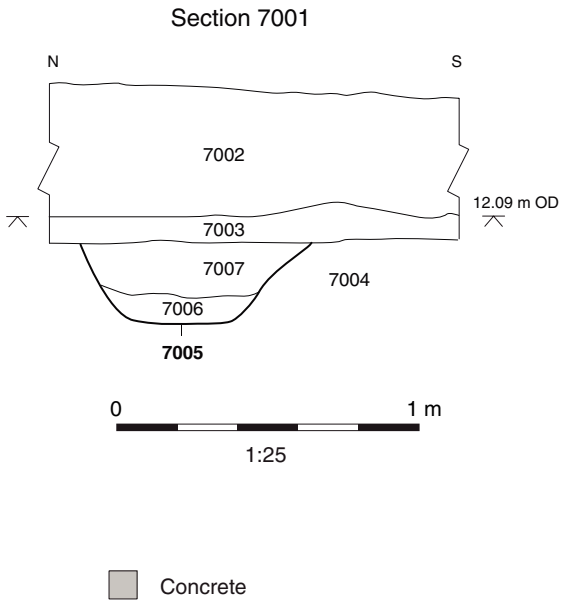
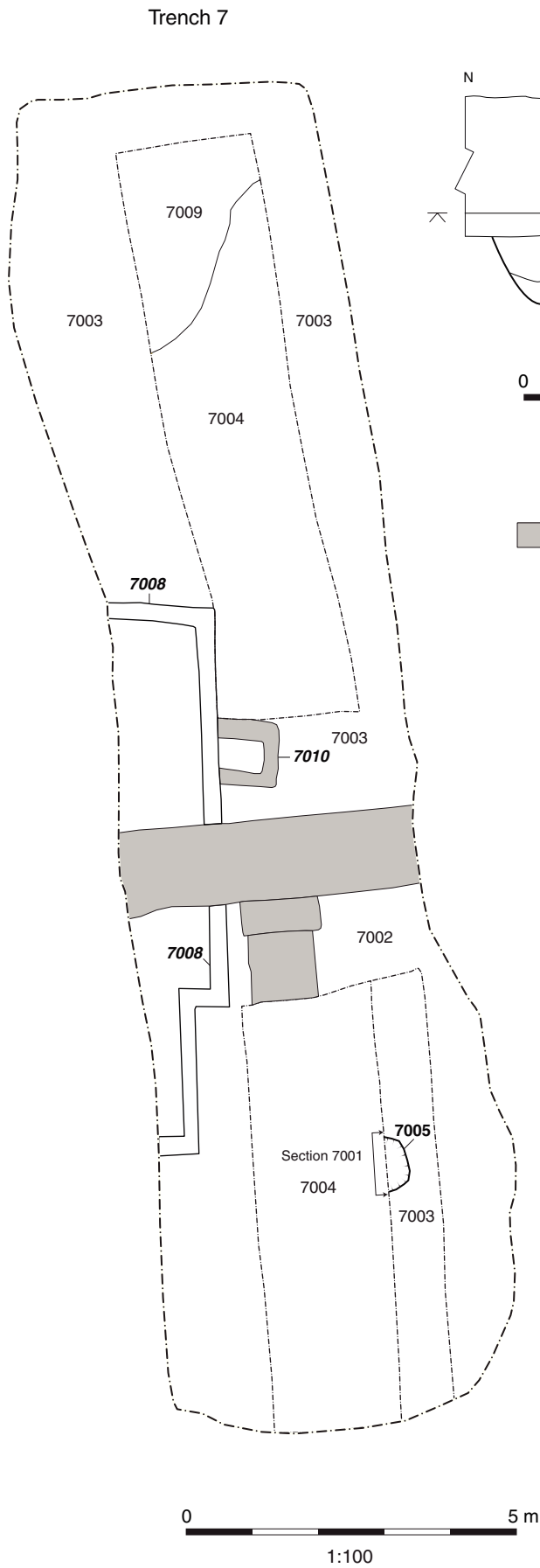


Figure 5: Trench 7, plan and section

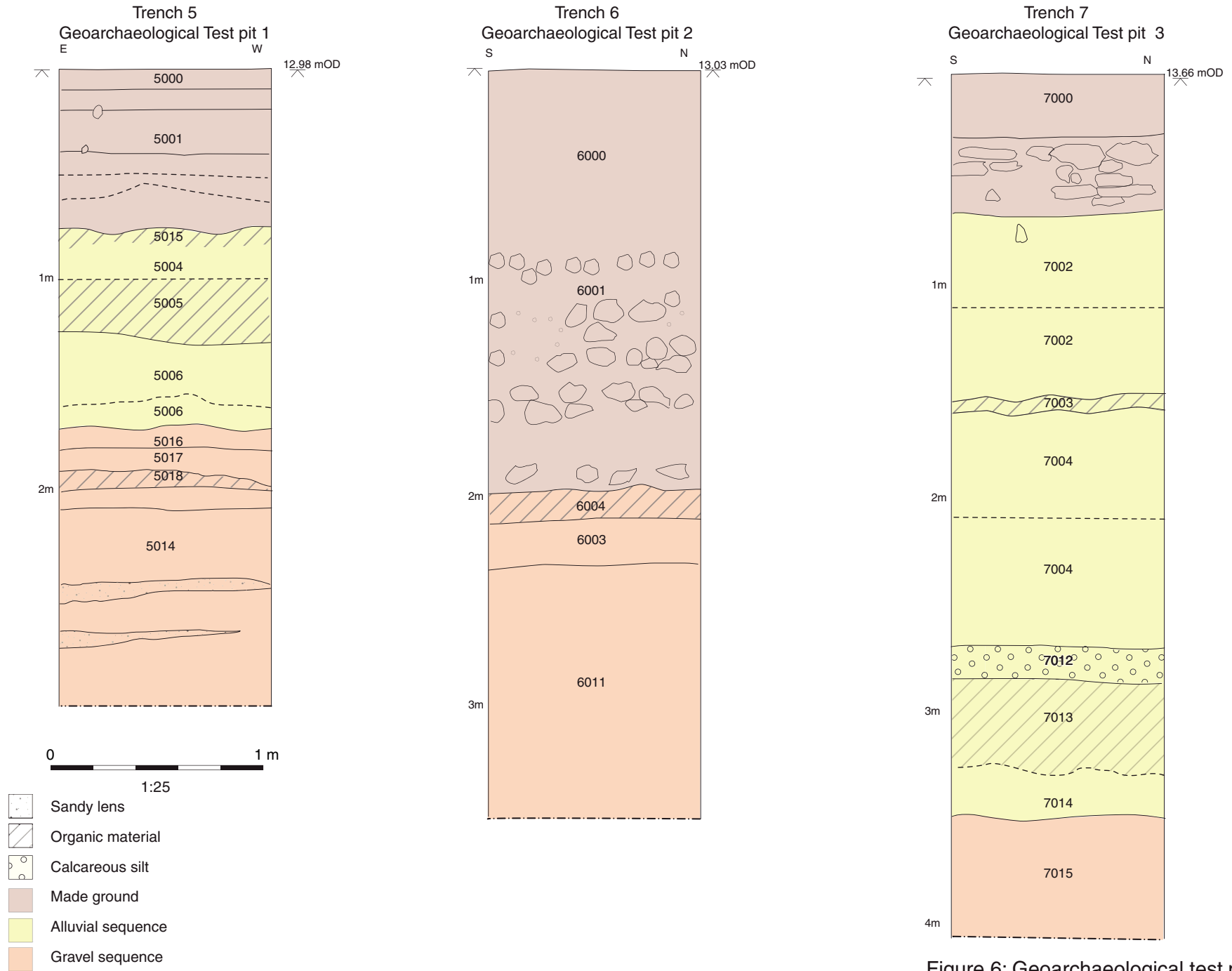


Figure 6: Geoarchaeological test pit sections



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