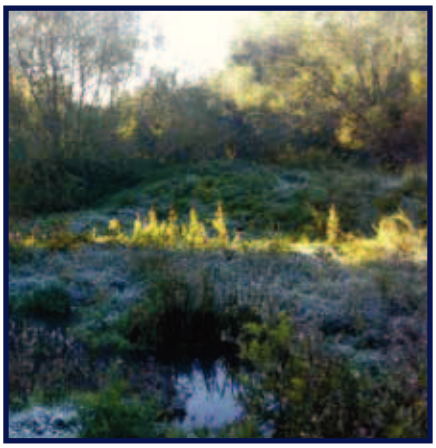
The Depot and Coachworks Widbury Hill Ware Hertfordshire



Geoarchaeological Field Evaluation Report

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Geoarchaeological Evaluation Field Report

The Depot and Coachworks, Widbury Hill, Ware Hertfordshire

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Geoarchaeological Field Evaluation

CgMs Consulting Ltd.

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Geoarchaeological Field Evaluation Report

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Summary

In October 2010 Oxford Archaeology South undertook a geoarchaeological field investigation at the former Depot and Coachworks, Widbury, Ware, in Hertfordshire. The work aimed to map the site's buried palaeotopography and help identify areas of archaeological potential.

Six targeted boreholes were used to ground truth a preliminary deposit model that was generated for the site based on a previous geotechnical investigation. The model identified the higher elevations of the gravel terrace to the north of the site and lower elevations of the floodplain in the south. A buried channel sequence was identified to the west, with two possible floodplain islands. A backwater peat-dominated sequence was also identified in the east associated with a lower-energy environment. The floodplain deposits were buried by up to 2m modern make-up deposits.

No significant archaeological deposits were identified within the borehole survey that would indicate a high concentration of activity within the site area. However, fragments of brick, CBM, charcoal and mortar were recorded at the edge of an area of higher ground within OABH5 which may indicate a focus of activity. This area may warrant further investigation should the impact of the proposed development extend beyond the made-ground.

The deposit model has successfully confirmed that floodplain sequences of potential archaeological significance survive under the foundations of the work buildings. Important evidence of early prehistoric activity dating from the Mesolithic to early medieval periods is often found preserved in similar waterlogged environments. However, any archaeology associated with the terrace edge and upper alluvial sequence is likely to have undergone various levels of disturbance and truncation.

The Depot and Coachworks, Widbury Hill, Ware Hertfordshire

Geoarchaeological Field Evaluation

1 INTRODUCTION

1.1 Location and scope of work

1.1.1 Oxford Archaeology South (OAS) was commissioned by CgMs Consulting Ltd, on behalf of Taylor Wimpey North Thames to undertake a geoarchaeological field investigation at the former Depot and Coachworks, Widbury Hill, Ware, Hertfordshire. The overall purpose of this work was to provide base-line data regarding the character, extent and archaeological potential of the Holocene alluvium and peat stratigraphy.

1.1.2 This investigation formed part of a three stage evaluation strategy for the site consisting of preliminary sediment mapping, targeted borehole survey and geoarchaeological deposit modelling. Cores from six purposive boreholes were retrieved from the site in order to record the sedimentary sequence and provide samples suitable for palaeoenvironmental assessment.

1.2 Geology and topography

1.2.1 The proposed development is situated to the east of Ware in an area that was previously the hamlet of Widbury (TQ 36589 14093). Located approximately 20 miles north of London in the Lea Valley, the site is positioned beside the River Lea (Plate 1), which is a major tributary of the Thames. The site is a series of former coach depots that comprise areas of concrete foundations and hardstanding (Plate 2).

1.2.2 The site lies within the reclaimed floodplain of the River Lea. It has been cut into the valley slope, ascending to the north east from the river to Widbury Hill Road and beyond. Ground level falls from 40.80m AOD in the east to 32.60m AOD in the west.

1.2.3 The site lies on a geological boundary that divides the site from the north west corner to the south east corner. The eastern section of the site is formed on Upper Chalk from the Cretaceous period, while the western section consists of Alluvium over River Gravel over the Upper Chalk (BGS Sheet 239; 1:50,000 Hertford, 1978).

1.3 Archaeological and historical background

1.3.1 The distribution of visible and unknown archaeological resources within the floodplain environments is a key issue, and as such alluvial or wetland areas have to be treated as different to 'dryland' archaeological sites and areas. The inability to detect archaeological features and remains at the surface in alluvial environments is no proxy of the distribution of its buried archaeological potential. This is because the sediments within such environments have vertically accreted throughout the Holocene, containing and then burying archaeological resources, effectively disguising them to surface prospection methods, e.g. aerial photography, fieldwalking, etc. (Brown *et. al.* 2005).

1.3.2 In contrast dryland sites have thin soil profiles and ancient geologies, meaning that the archaeology is cut from just below the present surface, rather than inter-stratified at

depth within a vertically accreting alluvial body. This promotes a completely different visibility of archaeology within wetland sites when compared to dryland sites. The absence of surface finds or remains within an area, does not necessarily always relate to the potential of the buried archaeological resource present within some wetland areas.

1.3.3 Bearing this in mind, the archaeological background to the site, outlined in the DBA provided by CgMs Consulting (2010a), is summarised below:

Prehistoric period (500,000BC – 43AD)

1.3.4 The Lea Valley has a rich prehistoric archaeological resource from the both the Pleistocene and Holocene eras. However, there are no finds from the Palaeolithic or Mesolithic periods within a 1km radius of the site. A Neolithic stone axe hammer was found to the west of the site (HHER, 2096, TL36,14).

1.3.5 The HHER shows a number of Bronze Age and Iron Age settlements beyond a 1km radius from the site, in the form of small farmsteads, generally located on higher ground, although there are no known findspots or sites within a 1km radius. However, a number of cropmarks have been identified on Widbury Hill Farm, to the east of the study site. These cropmarks include a straight ditch, three short linear ditches (HHER 2673, TL3725, 1394), a square enclosure and several perpendicular linear features (HHER 4787, TL 3716, 1394). There are also a number of earthwork fragments that have been interpreted as a univallate enclosure on Widbury Hill Farm (HHER 2012, TL 3722, 1384).

Roman (43AD – 450AD)

1.3.6 A substantial number of Romano-British artefacts and features have been recovered from Ware, suggesting a substantial settlement straddling the important Ermine Street Roman road. This settlement which spans the length of the entire Romano-British period is believed to cover an area of approximately 3 hectares. The core (vicus) of this settlement is to the west of the site. A large number of Romano-British artefacts have been found to the west including coins, building materials, amphora and a skeleton in a stone coffin (HHER 1539, 1542, 4114).

1.3.7 The close proximity of the development to this known Romano-British activity defines a moderate to high potential of the development site to contain Roman archaeology. A key issue is the nature and chronology of the sediment sequence during the Roman period and the date of the peat and alluvial deposition, which will define the potential of the site during this period.

Saxon and early medieval (450AD – 1100AD)

1.3.8 The Post Roman and early medieval periods are poorly understood in Hertfordshire, although Ware is exceptional as it has produced significant remains from these periods. Excavation have shown the focus of human habitation moved eastwards from the Roman settlement, to the natural Ford on the River Lea along Baldock Street to the west of the development site.

1.3.9 There are no recorded findspots or artefacts within a 1km radius of the development site. However, the invisibility of the archaeological resource contained within alluvial environments and the general lower visibility of the archaeological resource from this period should not be confused with defining a low archaeological potential for the site. The original DBA does define the possibility of land division and agricultural activity

from this period and in general the site contains a moderate potential to contain archaeological features from this period.

Later medieval (1100 - 1500AD)

1.3.10 In the Doomsday Book Ware Manor was one of the largest in the county, with an assessment of 24 hides. The manor house, known as Place House, was built in the late 13th century in East Street, to the west of the development site.

1.3.11 During the 11th, 12th and 13th centuries the Saxon settlement of Ware expanded to form a medieval Borough. It is believed that this expansion was stimulated by the Lord of the Manor through the construction of a new bridge and the grant of a weekly market in 1199.

1.3.12 During this later medieval period the development site is interpreted as being used as a water meadow and therefore has a low potential for archaeological remains from this period.

Post-medieval (150AD – 2000AD)

1.3.13 During the Post Medieval Period the early Dury and Andrews map from 1766 shows the development site as unenclosed land, presumably pasture. This description is reinforced in maps published in 1821 (Bryant's map), and an 1849 map (taken from a public health report).

1.3.14 The 1845 Ware tithe map shows the site divided by two land drains, into three meadows. The 1880 Ordnance Survey map shows the same pattern, although a structure is drawn in the north east of the development site and a bridge is recorded crossing the western drain.

1.3.15 This pattern of land use is essentially followed until 1960, when three large buildings are constructed on the site. The two buildings in the northern section are labelled as works and the third building in the southeast corner is labelled a depot. The structures are surround by hard standing and two further smaller building to the north of the depot building called Valley View. Three other structures are visible on the western boundary. By 1972 the two works building have been amalgamated and are described as a coach repair works. Three smaller buildings have been constructed to the south of the works. The site remained essentially the same until 1994, when some of the buildings were demolished.

Previous archaeological Investigations

1.3.16 The desktop studies have identified significant archaeological deposits in the surrounding area. The initial geoarchaeological study by CgMs (2010b) also identified, through geotechnical boreholes, the presence of buried peat deposit sealed beneath alluvium, overlying gravel. It concluded that the site has high potential to uncover early prehistoric archaeology associated with buried land-surfaces and a high palaeoenvironmental potential.

1.3.17 The initial stage of the project involved preliminary mapping of the site's sedimentary sequence based on the previous geotechnical investigations. The results of this work was presented as a short report (OA 2010b) that formed an addendum to the written scheme of investigation (OA 2010a). This work identified a undulating basal topography associated with a floodplain and channel edge environment. A complex sequence of floodplain deposits were identified that could provide an understanding of evolution of

the site's sedimentary sequence. Six boreholes were proposed in order to help ground truth this initial model and provide samples for further assessment.

1.4 Acknowledgements

1.4.1 OA would like to thank Rob Bourn of CgMs Consulting Ltd for his guidance and advice during the project. The borehole survey was undertaken under the guidance of Carl Champness, who also produced this report. The project was managed by Elizabeth Stafford.

2 EVALUATION AIMS

2.1 Aims

2.1.1 The main objectives of the field investigation as outlined within the specification are summarised below:

(i) to develop a deposit model to provide a macro-stratigraphic overview of the sediment sequence at the site;

(ii) to describe and interpret the sediment sequence from the borehole samples in the area of impact, and to recover samples suitable for palaeoenvironmental assessment;

(iii) identify the location and extent of any waterlogged organic deposits and address the potential and likely locations for the preservation of archaeological and palaeoenvironmental remains;

(iv) to identify any archaeological remains (if present) or deposits that the development may remove or impact during any future work;

(v) to assess the potential of the deposits for the use of different dating techniques, in order to help establish a chronological framework to the floodplain sequence.

(vi) to re-assess the archaeological significance of the site and whether further mitigation should be recommended;

3 METHODOLOGY

3.1 General approach

3.1.1 A three tier approach was developed to achieve these objectives. This can be summarised as:

- **Stage 1: Desk-based assessment**
  Through using the existing borehole records a preliminary sediment deposit model was constructed for the site to identify areas to be targeted for further investigation.
- **Stage 2: Field Investigation**
  Cores from six purposive boreholes were recovered from the site for geoarchaeological sediment recording and palaeoenvironmental sampling.
- **Stage 3: Reporting**
  An updated deposit model was generated based on data obtained from the fieldwork.

3.1.2 The fieldwork was carried out according to Hertfordshire County guidelines and in consultation with the County Archaeologist. The project followed standard guidelines for fieldwork and reporting as outlined by the IFA (2001) and English Heritage (2002 and 2004).

3.2 Stage 1: Desk-based assessment

3.2.1 The previous geotechnical data was collated and entered into computer modelling software (©Rockworks14) to identify the main stratigraphic units represented on the site. From this data a preliminary deposit model was generated to examine the sediment sequence, as an aid to identifying areas within the model that require further sampling and ground-truthing.

3.2.2 A brief report (OA 2010b) provided a summary of the sedimentary sequence and a case for targeting areas of the site for further geoarchaeological sampling. This included the mapping of the surface of the terrace gravels and the extent of alluvial deposits and modern made-ground. Six proposed sampling locations were agreed with CgMs and the County Archaeological Officer for approval prior to starting the fieldwork.

3.3 Stage 2: Field investigation

3.3.1 A program of six boreholes were drilled using a Terrier percussion rig in order to recover undisturbed samples suitable for sediment description and palaeoenvironmental assessment (Plate 3). A specialist sub-contractor was employed to operate the drilling rig. Each borehole was drilled to Pleistocene gravels. A continuous sequence of undisturbed core samples was retrieved from each sampling location (Plate 4).

3.3.2 A geoarchaeologist monitored the drilling and logged the cores on site. Each core was recorded on a summary proforma sheet and this included information on sample number, core number, elevation and location with reference to Ordnance Datum and the National Grid, together with detailed sediment descriptions. The lithology was recorded to according to depth below modern borehole ground level (bgl).

3.3.3 The sediments were described according to Jones *et al* 1999, which included information about depth, texture, composition, colour, clast orientation, structure

(bedding, ped characteristics etc), contacts between deposits. Note were also made of any visible ecofactual/artefactual inclusions eg. pottery, daub or charcoal fragments.

3.4 Stage 3: Reporting

3.4.1 The results of the borehole survey were in-putted into geological modelling software (©Rockworks14) in order to correlate the stratigraphy between sample locations and allow various cross-sections to be generated. The fieldwork data was used to ground-truth and refine the preliminary deposit model proposed within Stage 1 of the project.

3.4.2 This model was then used as a basis in which to understand and interpret the sedimentary patterns and identify areas of the site that could preserve archaeological and environmental material.

4 RESULTS

4.1 Introduction and presentation of results

4.1.1 The results presented in the main text of this report provide a detailed overview of the results of the fieldwork. A comprehensive listing of the individual borehole sequences and related lithology data can be found in Appendix A.

4.2 General soils and ground conditions

4.2.1 The boreholes were drilled through thick deposits of modern make-up deposits, onto a moderately well preserved floodplain sequence of alluvium and organic deposits. The site comprised large areas of concrete foundations and hard-standing. Frequent services were present across the site and these required several of the borehole locations to be adjusted in the field. These boreholes were relocated to avoid the services and areas of concreted foundations, but were also moved to locations that still allowed the aims of the project to be achieved.

4.2.2 No problems of high groundwater levels were encountered and this did not hinder the fieldwork. Groundwater was met in nearly all of the boreholes, at c. 1.5m. All boreholes were able to prove Pleistocene gravels, but did not reach bedrock.

4.3 Deposit Model

4.3.1 The results of the borehole survey combined with the previous geotechnical data has helped to map the site's underlying floodplain sequence. A sequence of commonly occurring lithological deposits were identified. These have been correlated into broad stratigraphic units in order to aid in the interpretation of the changing sedimentary environment and to help with the comparisons with other regionally recorded floodplain sequences (Figure 3).

4.3.2 The main stratigraphy units identified within the sequence were relatively consistent and comprised of the following units in order of deposition:

- **Bedrock:** Chalk
- **Sandy gravel:** Grey matrix supported sandy gravel
- **Lower alluvium:** Grey laminated silty sand and sand deposits
- **Peat/organic complex:** Silty peat bedded within silty clay alluvium, and dark brown organic silts.
- **Upper alluvium:** Brownish grey silty clay, slightly organic with occasional black speckles.
- **Made ground:** Thick deposits of sandy gravel, with frequent brick and concrete.

4.3.3 Assignment of individual lithologies to stratigraphic units is based on texture, nature of inclusions and sedimentary contacts. The work did achieve good spatial coverage across the site. However, it should be noted that the correlations are based on only 50 data points and consequently may not be wholly representative of the entire site sequence. Localised sedimentary sequences can often occur in fluvially active environments due to variations in topography and localised sedimentation patterns.

4.3.4 Also the model includes data from the previous geotechnical investigation that record deposits to different levels of detail. The geotechnical data used in the model derived from paper records only and no samples were available to confirm the observations

made in these records. Correlations, therefore, between the two different datasets was problematic in some areas of the sequence and were made with varying degrees of confidence.

4.3.5 It is also evident from visiting the site that it has been levelled in the past and partly cut into the gravel terrace at the base of Widbury Hill. This has involved the truncation of the terrace gravels to the north and the deposition of thick modern make-up deposits in the south over the floodplain. It can therefore be expected a high level of truncation to the north of the site compared to the south. Also the level of truncation is likely to have been significantly more within the footprint of the former works buildings where the foundations may have gone deeper.

Pre-Holocene deposits

Bedrock

4.3.6 The bedrock was recorded as firm blocky chalk, which was encountered at depths of 1.73m bgl (31.71m OD) in WS3 to the north of the site, and 4.80m bgl (27.19m OD) in CPBH4 towards the south-west. The bedrock was not reached within any of the purposive geoarchaeological boreholes.

4.3.7 In the very northern edge of the site modern make-up deposits were found to directly overlie chalk bedrock, indicating that the site has been cut into the base of the hill.

Fluvial sandy gravels

4.3.8 The basal sandy gravels were reached in all six of the targeted boreholes. These gravels were encountered at depths between 1.65m bgl within TP9a (+30.68m OD) to the north and 3.93m bgl in OABH2 (+28.37m OD) in the south. In general higher gravel elevations are recorded to the north of site and decrease towards the south and east. They comprised loose light whitish yellow fine to medium well-sorted sub-rounded sandy gravel, with inter-stratified beds (30-40mm) of moderately firm yellowish fine sand.

4.3.9 These sediments are likely to have accumulated within high-energy braided stream channels at the end of the last glaciation between 20,000-10,000 years ago (Devensian glaciation). The bedded character of the deposits reflects seasonal fluctuations in river discharge and climate fluctuations during this cold stage.

4.3.10 A degree of variation was recorded within the site data related to elevations in the surface of the sandy gravel across the site, that is the early Holocene topographic template (Figures 4 and 7). The higher elevations occur towards the north-west of the site at between 30.5m - 31.0m OD. The gravel surfaces slopes down towards the River Lea in the southeast to 28.95 m OD, but with two possible areas of higher ground or gravel promontories located near to OABH3 / TP5 and to the northeast of TP1a. A possible palaeochannel is located in the west of the site between the gravel terrace and the higher ground in TP5. This is potentially a former channel of the River Lea, that follows a similar path to a drainage channel within the site identified from the historical mapping.

Holocene sequence

Fluvial sands

4.3.11 A sequence of well-banded yellowish sands with 20% sub-rounded pebbles was identified within the base of the sequence overlying sandy gravels. These were thickest

over the floodplain within boreholes OABH2 and OABH4. They were identified at depths between 2.58m bgl (29.87m OD) in OABH4 and 3.21m bgl (28.79m OD) in OABH2, although localised higher deposits were identified in OABH5, and ranged in thickness from 0.10m to 0.72m across the lower elevations of the floodplain.

4.3.12 These deposits represent high-energy fluvial sands that accumulated at the base of the main floodplain sequence. These deposits may represent the transition of Late-glacial incised channels into broader, shallower, meandering channels at the start of the early Holocene. More localised deposits at higher elevations may represent levies or channel edge deposits.

4.3.13 Any archaeological material found within these deposits is likely to have undergone a moderate degree of reworking. However it is possible that the higher channel edge and sand bar areas may have offered temporary staging posts to exploit the floodplain resources. Evidence of significant Mesolithic activity has been identified on the stabilised surface of the sands along the Lea Valley and the other tributaries of the Lower Thames.

Peat and organic sequence

4.3.14 A complex sequence of inter-stratified peats and organic silty clay deposits were identified across parts of the site. These deposits were identified at a depth of 1.1m bgl (31.2m OD) in OABH1 and 1.75m bgl (30.55m OD) in OABH2. Several peat and peaty clays were also noted in the geotechnical logs but the actual depth was not consistently recorded. The modelled peat thickness is shown in Figure 5, with the thickest deposits located towards the south-eastern area associated with a possible backwater channel or embayment, and the main area next to the present River Lea. Here the organic sequence had a maximum thickness of 1.82m.

4.3.15 These deposits appear to represent a rise in the water-table, probably during the prehistoric period, that created a drowned landscape over much of the lower elevations of the floodplain. This would have resulted in creating islands on the high elevations on the floodplain that may not have been submerged until later. These islands may have been attractive locations for human activity in the past. Unfortunately the targeted boreholes were not able to sample the main backwater area of the site and therefore could not ground truth the geotechnical descriptions of this area.

4.3.16 Artefacts associated with these peat deposits are likely to have undergone only limited lateral transportation and would have been rapidly sealed by later flooding. The rate of channel flow appears to have been significantly reduced during the accumulation of the peat, possibly as a result of the channel being either cut-off or dense vegetation encroaching onto the floodplain. Early flint scatters have been previously identified along the Lea and Colne valleys, between the peats and sands at the edge of the floodplain.

Upper alluvium

4.3.17 The overlying bluish grey silty clay accumulated across most of the site between 0.46m bgl (31.84m OD) in OABH1 and 1.32m bgl (30.90m OD) in OABH6. These deposits represent periods of overbank alluviation associated with increased flooding and floodplain sedimentation and were on average about 0.80m in thickness.

4.3.18 Previous environmental studies in the Lea Valley record a similar sequence of minerogenic silts overlying peats sitting on gravels, reflecting rising water-level and increased alluviation on the floodplain during the late prehistoric period.

4.3.19 Any artefacts identified within these silty clay deposits are likely to have undergone a moderate degree of lateral transportation and possible size sorting. Human activity is likely to be found towards the edges of the floodplain or islands which would have provided dry staging points in which to exploit the floodplain resources.

Modern made-ground deposits

4.3.20 A series of modern make-up deposits were present across the site overlying the upper alluvium. These deposits varied in thickness from between 2.0m to the west and to 1.0m in the east. They consisted of numerous layers of mixed sands, silty sands and gravels.

4.3.21 The modelled thickness of the made ground deposits are shown in Figure 6. The distribution over the site varies considerably due to the localised impact of services and building foundations. But there is a general trend of the greatest thicknesses occurring towards the south-east over the floodplain peats. These deposits represent ground-raising associated with the construction of the Coachworks and Depot and are of 20th century date.

4.4 Finds summary

4.4.1 There was a very low rate of finds recovery across the site from the borehole samples, although given the small sample size this is not always a reliable indicator of the presence/absence of archaeology on a site. A concentration of brick, charcoal and CBM with mortar was identified at a depth from 1.38m beneath alluvium in OABH5 (Plate 3). Most of the brick fragments were undiagnostic, but one abraded piece of possible Roman CBM or tessarae, with mortar attached was identified. The Roman piece is potentially residual, with clear signs of abrasion. However, the concentration of material within the sample may indicate a brick built structure at the edge of the floodplain island dating potentially from between the Roman to post-medieval periods.

4.5 Palaeoenvironmental summary

4.5.1 The floodplain sequence identified at the site has good potential for the preservation of palaeoenvironmental remains and materiel for dating purposes. The waterlogged nature of the lower alluvial sequence and peat deposits means there is good scope to interpret the changing environmental and hydrological conditions on the floodplain. Well dated palaeoenvironmental sequences for the upper Lea Valley are quite rare and could add to our understanding of the sequence of environmental change within the area.

5 Discussion

5.1 Reliability of field investigation

5.1.1 The borehole survey and geotechnical data provided good coverage of the available site. The boreholes were located in such a manner as to try to maximise the probability of mapping the main sedimentary units. The survey did not detect any significant archaeological remains preserved within the alluvial sequence. Only a few fragments of brick, CBM and mortar were identified within rubble deposits in OABH5, which may indicate possible structural remains dating from the Roman to post-medieval periods. However, this does not discount the possibility that archaeology could still be identified within the buried floodplain sequence. Evidence may comprise flint scatters, trackways, jetties or fish traps which are not always laterally extensive and difficult to detect during small-scale evaluations.

5.1.2 The fieldwork also identified significant evidence for modern truncation, only the deeper parts of the floodplain sequence were preserved in the south and east. The pre-Works soils were only preserved in isolated pockets and much of the terrace edge deposits have been either disturbed or removed. This truncation was more severe along the northern end of the site.

5.2 Interpretation and significance

5.2.1 The borehole survey has been able to successfully retrieve samples of the site's sedimentary sequence for detailed description and provide material suitable for palaeoenvironmental assessment. This sequence can be considered in light of previously investigated sequences in the Lea Valley (Molas 2007 and 2008; Wessex forthcoming). More definitive correlations, however, would depend on additional scientific dating evidence.

5.2.2 The earliest potential archaeological surface directly overlies the gravel and sands, which would have stabilised during the early Holocene. This generally occurred within an environment of stable channels confined by well-vegetated banks. Mesolithic activity could be found associated with the surface of the sands and gravels, where remains of temporary hunter camps have been found along the Rivers Lea and Colne. In-situ flint scatters are often found associated with periods of soil formation or in an semi-abraded condition associated with channel edge environments.

5.2.3 The wetland/dryland interface is likely to have been a key area targeted for later Mesolithic resource exploitation, as resources from different environments would be easily available. Thus in addition to the potential of areas in and around the watercourses during the Early Mesolithic, the encroaching wetland front during the later Mesolithic period will add a further zone of the slightly higher elevations found at the floodplain edges and around floodplain islands. Mesolithic activity in this period is well known from the basal peat/sand interface in the Rammey Marsh to Broxbourne area. It is also known from the shores of the 'Bermondsey Lake' in the Thames floodplain, just upstream of the Lea/Thames confluence.

5.2.4 The effect of rising relative sea-level on the floodplains of the Thames tributaries was the waterlogging of previously dry river valleys. Subsequently marine and brackish conditions (salt marsh and mudflats) progressively migrated up the tributary valleys of the Lower Thames, causing alluviation over much of the lower elevations of the floodplain. This had a knock on effect within the upper valley sequences by causing a backing-up of freshwater systems and rising water-levels within the upper valley

floodplains. This may have resulted in the accumulation of the organic/peat deposits that are recorded within the site, especially within the area of the backwater embayment. The expansion of these wetland environments across the floodplain have been mapped by dating the base of the peat where it overlies previously dry sandy surfaces. However more dates are urgently required, especially within the upper Lea Valley, in order to help refine the proposed sedimentary model (Molas 2007 and 2008; Wessex forthcoming).

5.2.5 Vast expanse of 'blanket peat', characteristic of the organic sequence identified at the site, typifies the Neolithic mid valley floor of the Thames and its tributaries. A mosaic of different environments would have existed within these wetlands. These wetland were probably freshwater consisting of a lightly wooded reed swamp or fen environment. A better understanding of its characteristics, would be obtained from the examination of environmental remains from the organic sequence identified, such as insects, snails, plants, pollen etc. Such information would contribute to our understanding of the early prehistoric utilisation of the area and place it within the evolving landscape of the wider region.

5.2.6 Neolithic and Bronze Age trackways have been previously identified within the peat in the Lower Lea at Fort Street in Silvertown (Crockett *et al* 2002) and Bramcote Grove (Greenwood *et al* 1993). These structures are typically found at the interface between the peat and the overlying alluvial clay. Very few remains of this type have been identified in the upper Lea Valley, but evidence for Bronze Age settlement in the form of crannogs (dwellings set on piles driven into marginal and wetlands) have been identified to south at Stratford. Three such similar settlements are also known at Low Maynard Reservoir, Warwick Reservoir and Banbury Reservoir in Chingford. Although no such finds are as yet known from the immediate area, the possibility of similar structures having been present on the site cannot be discounted as the area has evidence of both nearby Bronze Age and Iron Age settlements.

5.2.7 The overlying alluvial silty clays most likely accumulated in an environment of rising water-levels on the floodplain and rivers during the later prehistoric and historic periods. Rising sea-levels since the end of the last glaciation caused a migration of estuarine conditions further upstream of the tributaries of the lower Thames. This would have had a significant impact on the vegetation and hydrology of the Upper Lea. These deposits are likely to be of late Bronze Age to historic date and represent a range of environments of channel edge and seasonally flooded floodplain meadows.

5.2.8 Archaeological activity would probably have been forced to retreated from the former dry landsurfaces of the floodplain to areas of higher ground during the mid-late prehistoric periods. Terrace edges and floodplain islands like those identified within the model would have become particular attractive environments to exploit the resources of the floodplain and provide crossing points across the rivers. Evidence for activity and occupation have previously been found on similar 'islands' in nearby areas of the Thames Valley and its tributaries (Allen *et al* 1996). These floodplain deposits could also produce evidence of wooden bridges, boats and platforms that were used to traverse between the floodplain islands. Votive offerings have also been frequently recovered from these wetland deposits within the Lea and Thames. The margins of the higher areas and wetland interface zones are often found to be the focus of this activity. Thus the areas adjacent to the higher 'island' might have some potential for these remains. As might the fringes of the wetland areas themselves in this period.

5.2.9 It is also worth noting that the River Lea would have acted as a major transport link into London during Roman times. The presence of a Roman settlement just to the west of

site means that there is high potential of Roman archaeology and artefacts to be preserved within the upper alluvial sequence and at the floodplain edges. It is not currently known whether deposits of this date are preserved on site and by how much they have been affected by the modern truncation. Certainly any Roman archaeology at the edge of the gravel terrace is very likely to have been significantly disturbed and only the deepest Roman features may still survive.

5.2.10 During the Later medieval and post-medieval the site appears to have been used as water meadows dissected by fresh water streams and drainage channels. A possible infilled drainage channel was identified within the model towards the west of the site. The building remains identified within OABH5 at the edge of the island and channel may represent the remains of a demolished building within this area. Elsewhere activity on the floodplain may have been intermittent or seasonal. Remains may include structures such as fishtraps, water mills or stake alignments delineating fence lines or animal pens. However activity associated with the upper deposits and stabilised alluvial sequence is less likely to be preserved on the site due to the level of modern truncation present.

5.3 Archaeological potential

5.3.1 The archaeological potential of the site has clearly been significantly reduced by the construction of the former works buildings and how these were terraced into the base of the hillside. This would have significantly disturbed or truncated any archaeological deposits that were present on the terrace edge or within the upper alluvial sequence. Floodplain deposits do survive at depth within the site under between 1-2m of modern made-ground deposits, particular towards the south. Any significant impact beyond the depths of the made-ground deposits in this area has the potential to impact upon deposits with archaeological potential.

6 References

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APPENDIX A. BOREHOLE LOGS

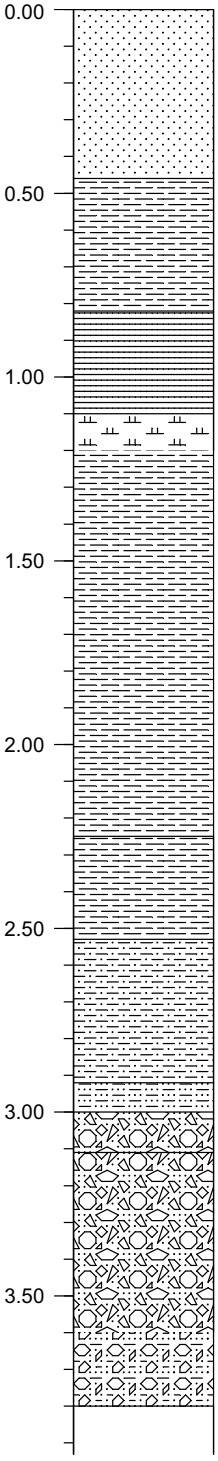
GEOARCHAEOLOGICAL SERVICES

Oxford Archaeology

FIELD SEDIMENT LOGGING SHEET

SITE CODE: WAWDH10 NG EASTING: 536617.39733

BH NO: OABH1 ELEVATION: 32.3 NG NORTHING: 214029.67481 LOGGER: CH

Depth	Lithology	Cores	Description
0.00			0.00, 0.46 Dark brownish grey, loose sand with pebbles (20%) and brick and mortar fragments (40%). MADE GROUND
0.50			0.46, 0.82 Brownish yellow loose clayey sand with small to large pebbles (30%). MADE GROUND
			0.82, 1.10 Dark greenish grey firm clayey silt with small pebbles (30%). MADE GROUND
1.00			1.10, 1.20 Very dark greenish grey soft organic rich silt. ORGANIC SILT
			1.20, 2.25 Greenish grey soft clayey silt with small flecks of charcoal (1%). ALLUVIUM
1.50			
2.00			
			2.25, 2.53 Greyish brown loose gravelly sand with lenses of sand and silty clay. FLUVIAL / ALLUVIAL DESPOSIT
2.50			2.53, 2.92 Black soft organic silt, stratified, lenses of pale brownish grey fine sand. PEAT
			2.92, 3.00 Dark greenish grey soft silty clay. ALLUVIUM
3.00			3.00, 3.11 Dark greenish grey loose sand with small to large pebbles (80%).
			3.11, 3.60 Dark brownish red gritty sand with small to large pebbles (80%).
3.50			
			3.60, 3.80 Grey and brown small to large subangular to rounded pebbles of flint. PLEISTOCENE
			3.80, 4.00 Lost sediment core.

NOTES:

Voids at 0.98 - 1.18m and 3.00 - 3.20m below ground level.

GEOARCHAEOLOGICAL SERVICES

Oxford Archaeology

FIELD SEDIMENT LOGGING SHEET

SITE CODE: WAWDH10 NG EASTING: 536617.39733

BH NO: OABH1 ELEVATION: 32.3 NG NORTHING: 214029.67481 LOGGER: CH

Depth	Lithology	Cores	Description
4.00			

NOTES:

Voids at 0.98 - 1.18m and 3.00 - 3.20m below ground level.

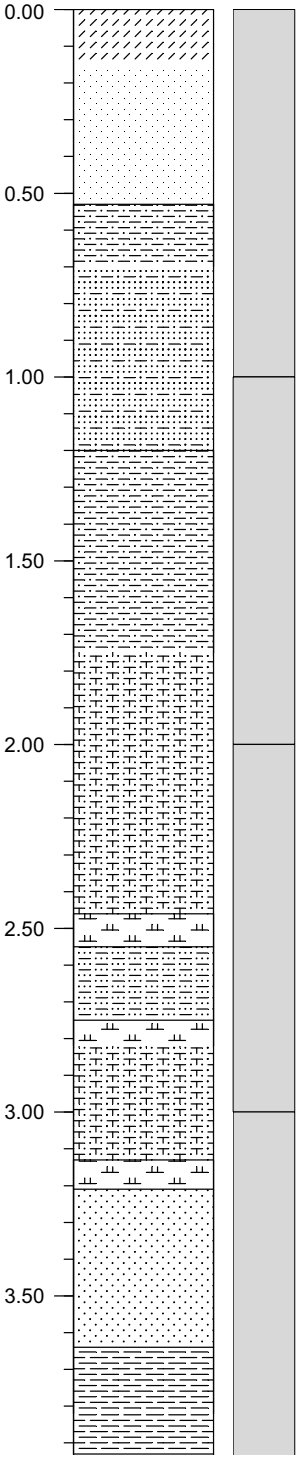
GEOARCHAEOLOGICAL SERVICES

Oxford Archaeology

FIELD SEDIMENT LOGGING SHEET

SITE CODE: WAWDH10 NG EASTING: 536595.49871

BH NO: OABH2 ELEVATION: 32 NG NORTHING: 214042.83508 LOGGER: CH



Depth	Lithology	Cores	Description
0.00			0.00, 0.15 Dark brown soft silty loam with grass roots. TOPSOIL
0.15			0.15, 0.53 Yellowish brown soft sandy clay with small to large pebbles (40%) with rare fragments of mortar and CBM. MADE GROUND
0.53			0.53, 0.70 Dark olive brown firm sandy silt with small to large pebbles (30%) and CBM (1%).MADE GROUND
0.70			0.70, 1.20 Dark greyish brown firm sandy loam with pebbles (10%) fragments of CBM ((2%) and charcoal (1%). MADE GROUND
1.20			1.20, 1.75 Very dark greenish grey soft sandy silt with few small pebbles and rare frag. of CBM (1%) and mortar (1%) and lens of sandy clay. DEPOSIT
1.75			1.75, 2.46 Olive brown soft silt with lenses of organic rich silt inclusions (5%). ALLUVIUM
2.46			2.46, 2.55 Dark brownish grey soft organic rich silt with a lens of silt. ORGANIC RICH SILT
2.55			2.55, 2.75 Brownish grey soft laminated silty sand. FLUVIAL SAND
2.75			2.75, 2.82 Dark olive brown soft organic rich silt. ORGANIC RICH SILT
2.82			2.82, 3.13 Dark olive brown soft to firm silt. ALLUVIUM
3.13			3.13, 3.21 Black soft organic rich silt. ORGANIC RICH SILT
3.21			3.21, 3.64 Light olive brown loose gritty sand. with small to large pebbles (80%). EARLY HOLOCENE / PLEISTOCENE FLUVIAL SAND
3.64			3.64, 3.82 Brownish yellow loose coarse sand with medium flint pebbles (20%) and rare organic inclusions. EARLY HOLOCENE / PLEISTOCENE
3.82			3.82, 3.93 Pale brown soft clayey silt. EARLY HOLOCENE / PLEISTOCENE

NOTES:

Voids 1.00 - 1.07m, 2.00 - 2.04m, 3.00 - 3.13m below ground level.

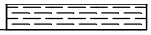
GEOARCHAEOLOGICAL SERVICES

Oxford Archaeology

FIELD SEDIMENT LOGGING SHEET

SITE CODE: WAWDH10 | NG EASTING: 536595.49871

BH NO: OABH2 | ELEVATION: 32 | NG NORTHING: 214042.83508 | LOGGER: CH

Depth	Lithology	Cores	Description
4.00			3.93, 4.00 Brownish yellow gritty sand with flint pebbles (20%). PLEISTOCENE

NOTES:

Voids 1.00 - 1.07m, 2.00 - 2.04m, 3.00 - 3.13m below ground level.

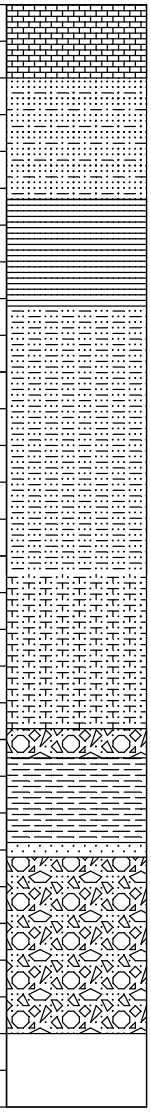
GEOARCHAEOLOGICAL SERVICES

Oxford Archaeology

FIELD SEDIMENT LOGGING SHEET

SITE CODE: WAWDH10 NG EASTING: 536554.53844

BH NO: OABH3 ELEVATION: 32.3 NG NORTHING: 214118.42151 LOGGER: CH

Depth	Lithology	Cores	Description
0.00			0.00, 0.20 TARMAC
			0.20, 0.53 Dark brown soft sandy loam with flint pebbles (60%) and inclusions of mortar and CBM. MADE GROUND
0.50			0.53, 0.82 Brown firm clayey silt with small pebbles (30%), CBM fragments and tarmac. MADE GROUND
			0.82, 1.55 Yellowish brown soft silty clay. ALLUVIUM
1.00			
1.50			1.55, 1.97 Brown soft silt. ALLUVIUM
2.00			1.97, 2.05 Dark greenish grey loose clayey sand with small to large flint pebbles (80%).
			2.05, 2.28 yellowish olive loose sand with small to large flint pebbles (40%).
			2.28, 2.32 Pale yellowish brown loose gritty sand.
2.50			2.32, 2.80 Brownish yellow loose gritty sand with small to large flint pebbles (70%). PLEISTOCENE
			2.80, 3.00 Lost sediment core
3.00			

NOTES:

Voids at 1.00 - 1.26m and 2.00 - 2.20m below ground level.

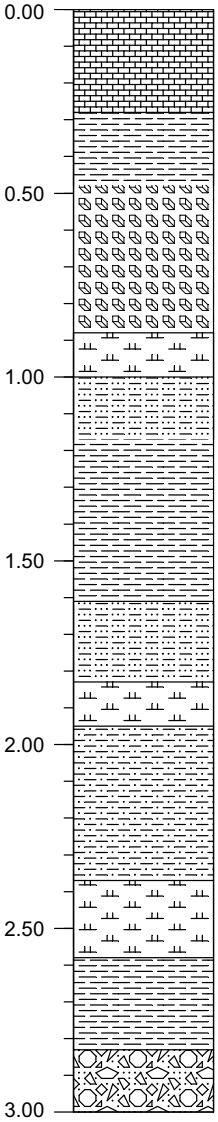
GEOARCHAEOLOGICAL SERVICES

Oxford Archaeology

FIELD SEDIMENT LOGGING SHEET

SITE CODE: WAWDH10 NG EASTING: 536557.34253

BH NO: OABH4 ELEVATION: 32.45 NG NORTHING: 214102.25391 LOGGER: CH

Depth	Lithology	Cores	Description
0.00			0.00, 0.28 TARMAC
			0.28, 0.48 Yellowish Olive loose sand with small to large flint pebbles (30%). MADE GROUND
0.50			0.48, 0.88 Dark greyish brown firm loam with small to large pebbles (20%) and fragments of slag, mortar and brick. MADE GROUND
			0.88, 1.00 Very dark brownish grey firm organic rich silt with medium to large pebbles (20%). MADE GROUND
1.00			1.00, 1.17 Dark greyish brown firm silty clay with small pebbles (5%) and fragments of glass and brick. MADE GROUND
			1.17, 1.61 Brownish yellow soft to firm clayey silt. ALLUVIUM
1.50			1.61, 1.83 Dark grey soft to firm silty clay, few flecks of charcoal. PALAEOSOL
			1.83, 1.95 Very dark grey firm organic rich silt. ORGANIC SILT
2.00			1.95, 2.37 Black pseudofibrous organic silt. PEAT
			2.37, 2.58 Very dark grey soft organic rich silt. ORGANIC SILT
2.50			2.58, 2.83 Olive brown loose sand with small to large flint pebbles (40%). PLEISTOCENE
			2.83, 3.00 Greyish brown loose sand with small to medium pebbles (80%). PLEISTOCENE
3.00			

NOTES:

Voids at 1.00 - 1.16m and 2.00 - 2.20m below ground level.

GEOARCHAEOLOGICAL SERVICES

Oxford Archaeology

FIELD SEDIMENT LOGGING SHEET

SITE CODE: WAWDH10 NG EASTING: 536539.333

BH NO: OABH5 ELEVATION: 31.89 NG NORTHING: 214098.5441 LOGGER: CH

Depth	Lithology	Cores	Description
0.00			0.00, 0.50 Very dark greyish brown friable clayey sand with flint and red sandstone pebbles (30%). MADE GROUND
0.50			0.50, 0.75 Dark greyish brown soft to firm silt with small pebbles (5%) and rare charcoal, mortar and brick fragments. DEPOSIT
			0.75, 1.05 Yellowish brownish firm sandy loam small pebbles (10%) and rare charcoal, mortar and brick fragments. DEPOSIT
1.00			1.05, 1.35 Light brown soft clayey silt. ALLUVIUM
			1.35, 1.51 Greyish brown soft clayey silt, small pebbles (5%), rare charcoal and mortar. DEPOSIT
1.50			1.51, 1.62 Yellowish brown sand with small pebbles (30%), rare brick fragments.
			1.62, 2.14 Light brown gritty sand with small to medium flint pebbles and rare abraded CBM. FLUVIAL SAND
2.00			
			2.14, 2.64 Loose reddish brown gritty sand with small to large flint pebbles (60%). PLEISTOCENE
2.50			
			2.64, 3.00 Lost sediment core.
3.00			

NOTES:

Voids at 1.00 - 1.20m and 2.00 - 2.36m below ground level.

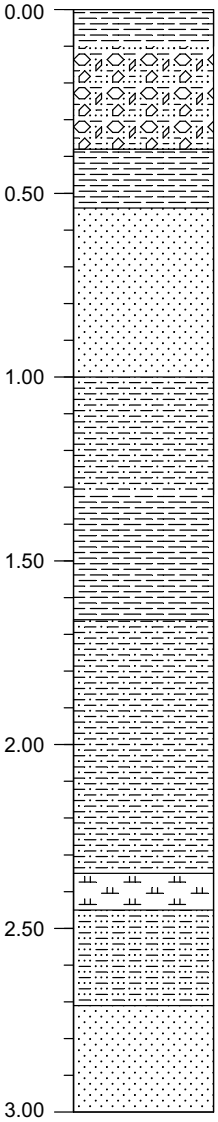
GEOARCHAEOLOGICAL SERVICES

Oxford Archaeology

FIELD SEDIMENT LOGGING SHEET

SITE CODE: WAWDH10 NG EASTING: 536603.78152

BH NO: OABH6 ELEVATION: 32.22 NG NORTHING: 214138.16805 LOGGER: CH

Depth	Lithology	Cores	Description
0.00			0.00, 0.10 Very dark greyish brown gritty sand with angular pebbles and slag. TOPSOIL
			0.10, 0.38 Grey and brown loose angular pebbles of flint. MADE GROUND
0.50			0.38, 0.54 Greyish brown loose coarse sand with small angular pebbles and slag. MADE GROUND
			0.54, 1.00 Brownish yellow firm clayey sand with medium to large pebbles (40%). MADE GROUND
1.00			1.00, 1.32 Yellowish brown firm loam with small flint pebbles (20%) and rare brick fragments (2%).MADE GROUND
			1.32, 1.66 Dark greyish brown firm humic rich clayey silt with small pebbles (5%). PALAEOSOL
1.50			1.66, 2.35 Black firm pseudofibrous organic silt, with wood fragments (25%). PEAT
2.00			
			2.35, 2.45 Very dark greyish brown soft organic silt. ORGANIC SILT
2.50			2.45, 2.71 Light greenish grey soft silty clay, roots present. ALLUVIUM
			2.71, 3.00 Grey loose fine sand with rare small pebbles (5%) and rare organic inclusions. EARLY HOLOCENE / PLEISTOCENE FLUVIAL SAND
3.00			

NOTES:

Voids at 1.00 - 1.05m, 1.41 - 1.54m and 2.00 - 2.10m below ground level.

APPENDIX B. PLATES

Plates

Plate 1: Site conditions

Plate 2: Borehole sampling

Plate 3: Borehole samples


Plate 4: River Lea adjacent to the site

Appendix C. Summary of Site Details

Site name:	Widbury Hill, Ware, Hertfordshire
Site code:	WAWDHEV
Grid reference:	TQ 36589 14093
Type:	Evaluation
Date and duration:	October 2010
Area of site:	1.6 Ha
Summary of results:	A stratigraphic deposit model was developed for the site based on 6 targeted boreholes and previous geotechnical data. The model identified a range of different sedimentary environments and mapped the buried floodplain topography. In spite of the modern truncation present on the site, a thick alluvial sequence still survives with the potential to preserve important archaeological and palaeoenvironmental evidence.
Location of archive:	The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES, and will be deposited with the Hertfordshire County Museum in due course, under the following accession number: WAWDHEV.

APPENDIX D. HER AND OASIS SUMMARIES

APPENDIX

HISTORIC ENVIRONMENT RECORD SUMMARY SHEET

<table>
<tr><td colspan="3">Site name and address: The Depot and Coachworks
Widbury Hill
Ware
Hertfordshire</td></tr>
<tr><td colspan="2">County: Hertfordshire</td><td>District: East Hertfordshire</td></tr>
<tr><td colspan="2">Village/Town: Ware</td><td>Parish: Ware</td></tr>
<tr><td colspan="3">Planning application reference: 3/08/1399/OP</td></tr>
<tr><td colspan="3">HER Enquiry reference: -</td></tr>
<tr><td colspan="3">Client name, address, and tel. no.: Taylor Wimpey North
Imperial Place 2
Maxell Road
Borehamwood
Hertfordshire
WD6 1JN
0208 2363800</td></tr>
<tr><td colspan="3">Nature of application:</td></tr>
<tr><td colspan="3">Present land use: Industrial (derelict site)</td></tr>
<tr><td colspan="2">Size of application area: ha</td><td>Size of area investigated:1.6 ha</td></tr>
<tr><td colspan="3">NGR (to 8 figures): TL 36620 14115</td></tr>
<tr><td colspan="3">Site code (if applicable): WAWDH10</td></tr>
<tr><td colspan="3">Site director/Organization: Carl Champness (Oxford Archaeology)</td></tr>
<tr><td colspan="3">Type of work: Geoarchaeological field evaluation</td></tr>
<tr><td>Date of work: October 2010</td><td>Start: 21st October 2010</td><td>Finish: 22nd October 2010</td></tr>
<tr><td colspan="3">Location of finds & site archive/Curating museum: Hertfordshire County Museum/Ware Museum</td></tr>
<tr><td colspan="2">Related HER Nos: -</td><td>Periods represented: Prehistoric-Historic (sediments and palaeoenvironmental remains)</td></tr>
<tr><td colspan="3">Relevant previous summaries/reports: N/A</td></tr>
<tr><td colspan="3">Summary of fieldwork results:

A stratigraphic deposit model was developed for the site based on 6 targeted boreholes and previous geotechnical data. The model identified a range of different sedimentary environments and mapped the buried floodplain topography. In spite of the modern truncation present on the site, a thick alluvial and peat sequences still survive buried beneath, with the potential to preserve important archaeological and palaeoenvironmental remains.</td></tr>
<tr><td colspan="2">Author of summary: Carl Champness</td><td>Date of summary: 01/06/11</td></tr>
</table>

OASIS DATA COLLECTION FORM: England

Printable version

OASIS ID: oxfordar1-102181

Project details

Project name	The Depot and Coachworks, Widbury Hill, Ware
Short description of the project	In October 2010 Oxford Archaeology South undertook a geoarchaeological field investigation at the former Depot and Coachworks, Widbury, Ware, in Hertfordshire. The work aimed to map the site's buried palaeotopography and help identify areas of archaeological potential. A stratigraphic deposit model was developed for the site based on 6 targeted boreholes and previous geotechnical data. The model identified a range of different sedimentary environments and mapped the buried floodplain topography. In spite of the modern truncation present on the site, a thick alluvial and peat sequences still survive buried beneath, with the potential to preserve important archaeological and palaeoenvironmental remains.
Project dates	Start: 21-10-2010 End: 22-10-2010
Previous/future work	Yes / Not known
Any associated project reference codes	WAWDH10 - Sitecode
Type of project	Field evaluation
Current Land use	Industry and Commerce 1 - Industrial
Monument type	N/A None
Significant Finds	CERAMIC BUILDING MATERIAL Uncertain
Methods & techniques	'Augering'
Development type	Not recorded
Prompt	Planning condition
Position in the planning process	Planning applicatioion submitted 5th Novemebr 2010 (3/08/1399/OP)

Project location

Country	England
Site location	HERTFORDSHIRE EAST HERTFORDSHIRE WARE The Depot and Coachworks, Widbury Hill
Study area	1.60 Hectares
Site coordinates	TL 36620 14115 51.8084885927 -0.01808162593430 51 48 30 N 000 01 05 W Point

Project creators

Name of Organisation	Oxford Archaeology
Project brief originator	CgMs Limited
Project design originator	CgMs Limited
Project director/manager	L. Stafford
Project supervisor	C. Champness

Project archives

Physical Archive Exists?	No
Physical Archive notes	Fragments of brick, charcoal and ceramic building material were observed on site but not retained
Digital Archive recipient	Oxford Archaeology
Digital Archive ID	WAWDH10/ WAWDHEV
Digital Contents	'Stratigraphic'
Digital Media available	'Images raster / digital photography','Text'
Paper Archive recipient	Ware Museum
Paper Archive ID	WAWDH10
Paper Contents	'Stratigraphic'
Paper Media available	'Photograph','Plan','Report','Survey ','Unpublished Text'

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	The Depot and Coachworks, Widbury Hill, Ware, Hertfordshire. Evaluation Report
Author(s)/Editor(s)	Champness, C.
Date	2011
Issuer or publisher	Oxford Archaeology
Place of issue or publication	Oxford
Description	A4 bound client report

Entered by	Susan Rawlings (susan.rawlings@oxfordarch.co.uk)
Entered on	1 June 2011

OASIS:

Please e-mail English Heritage for OASIS help and advice

Cite only: /d1/export/home/web/oasis/form/print.cfm for this page

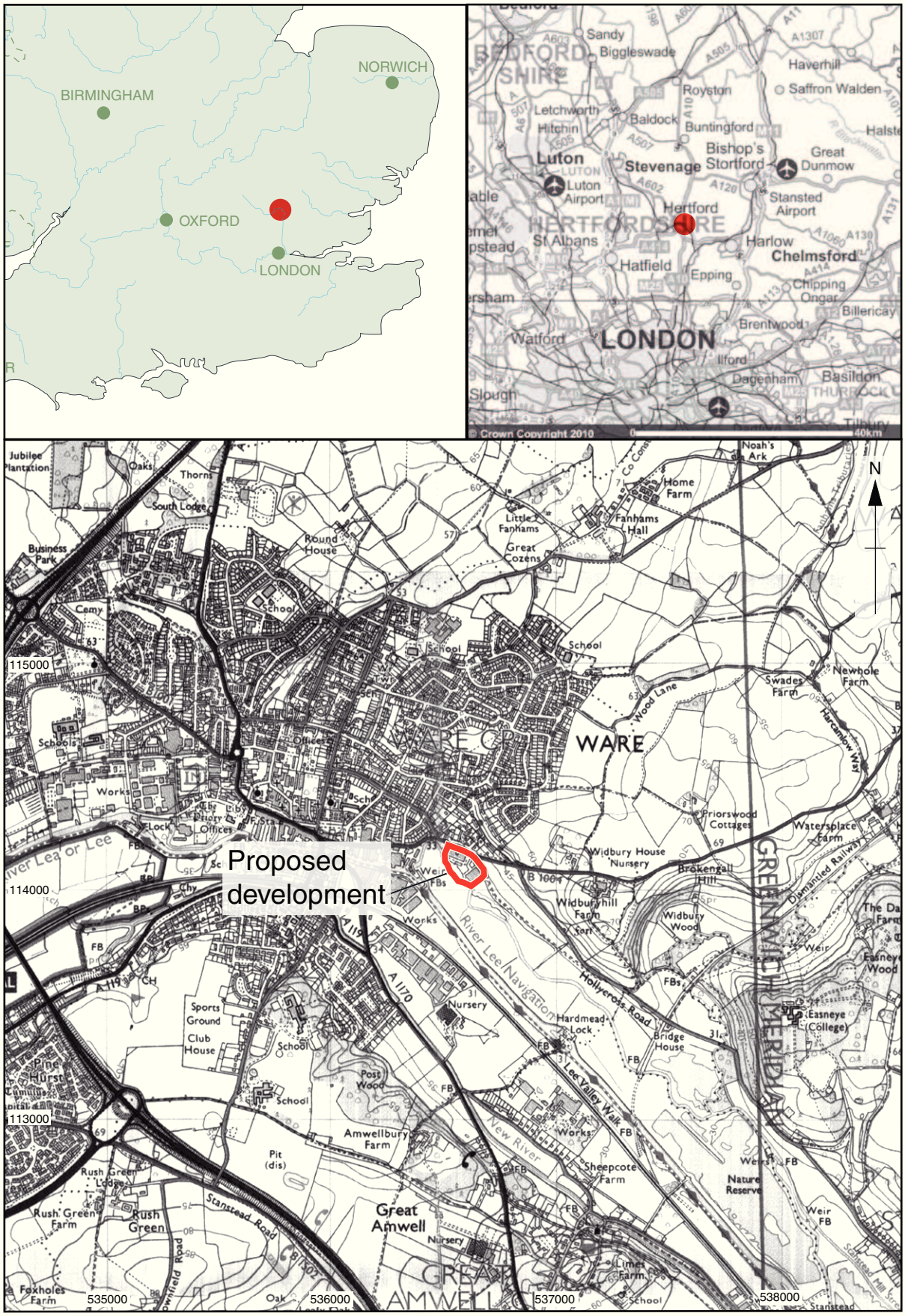


Figure 1: Site location

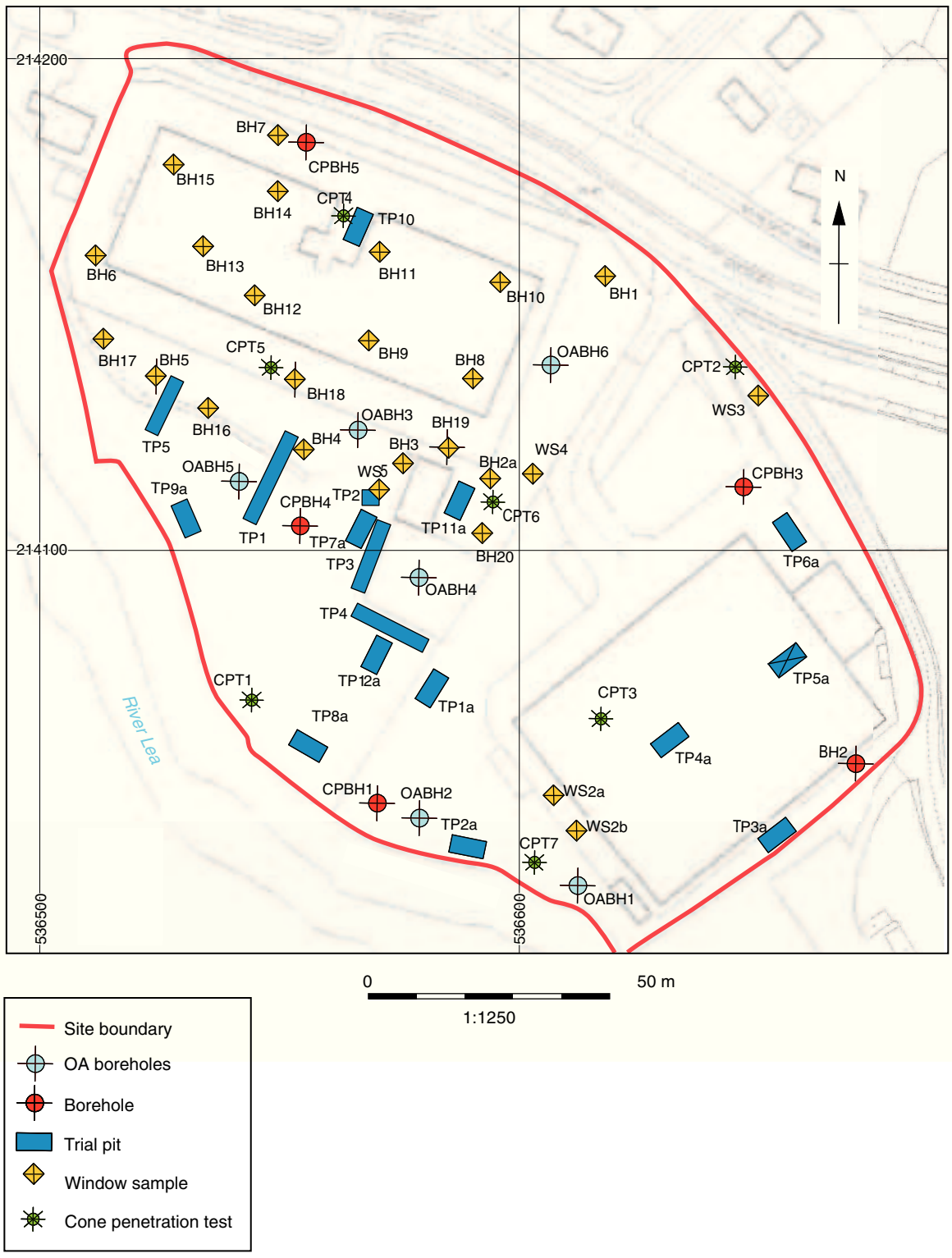


Figure 2: Location of targeted boreholes and geotechnical interventions

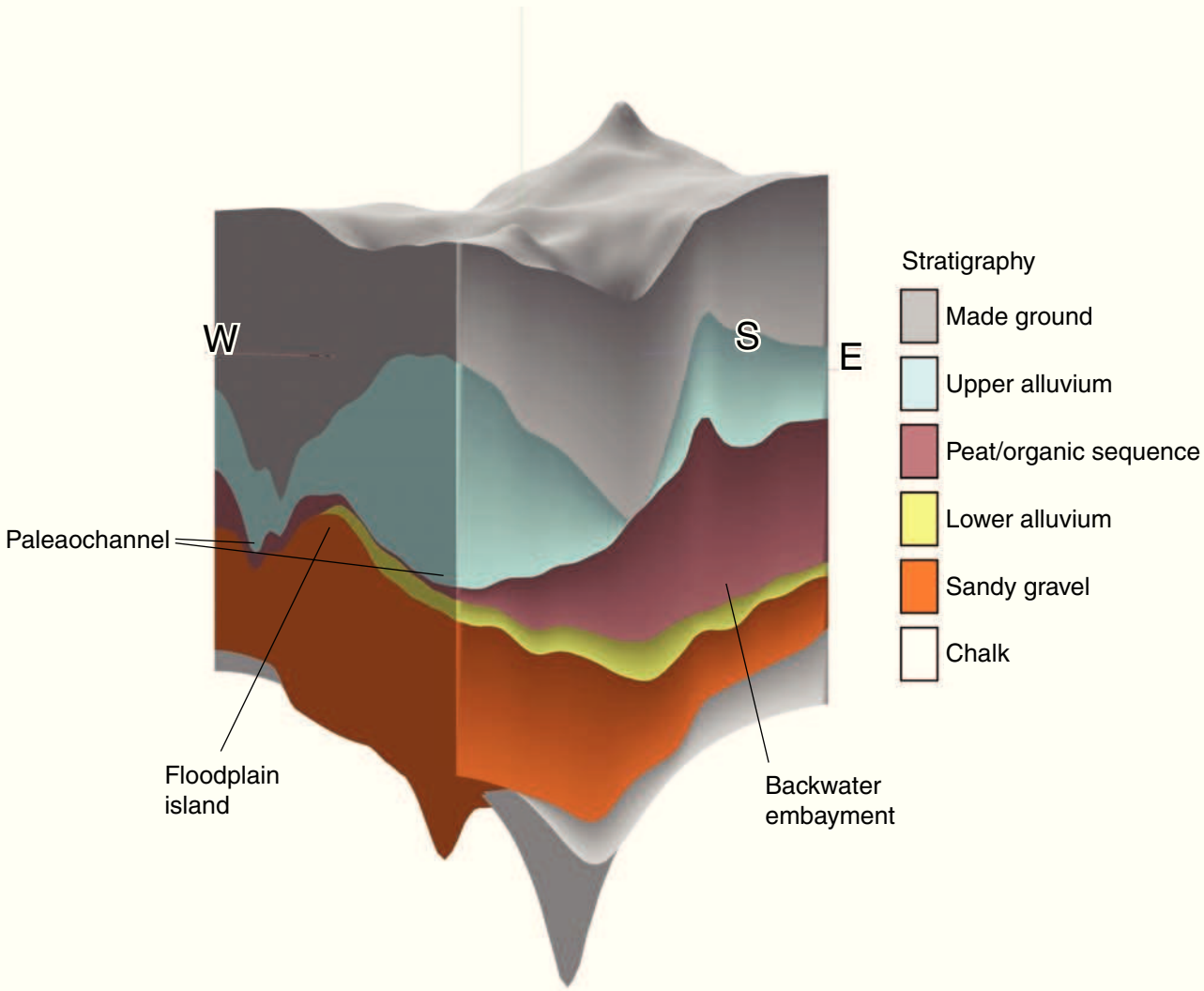


Figure 3: 3-D stratigraphic model

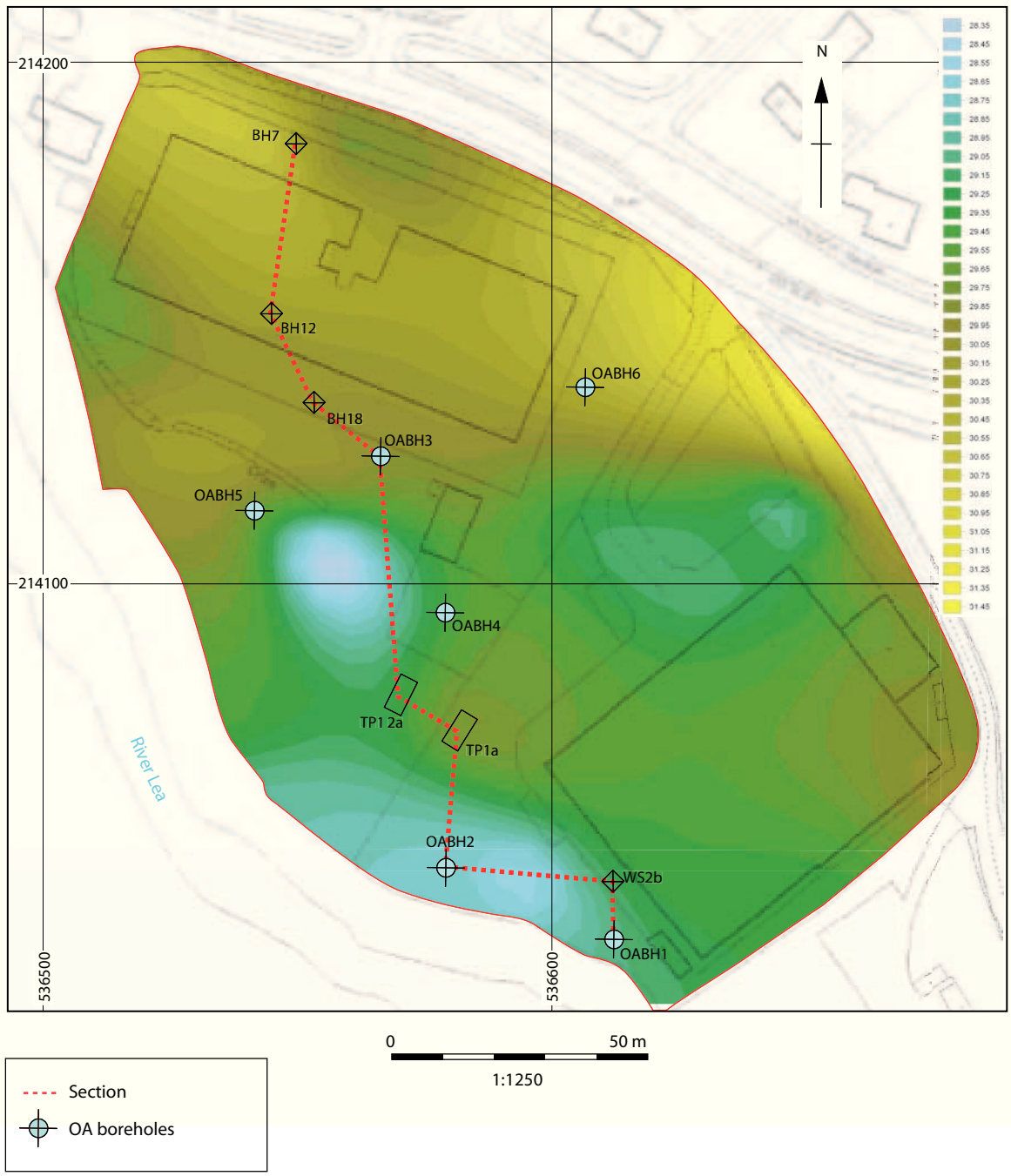


Figure 4: Modelled surface of Pleistocene gravel (m OD)

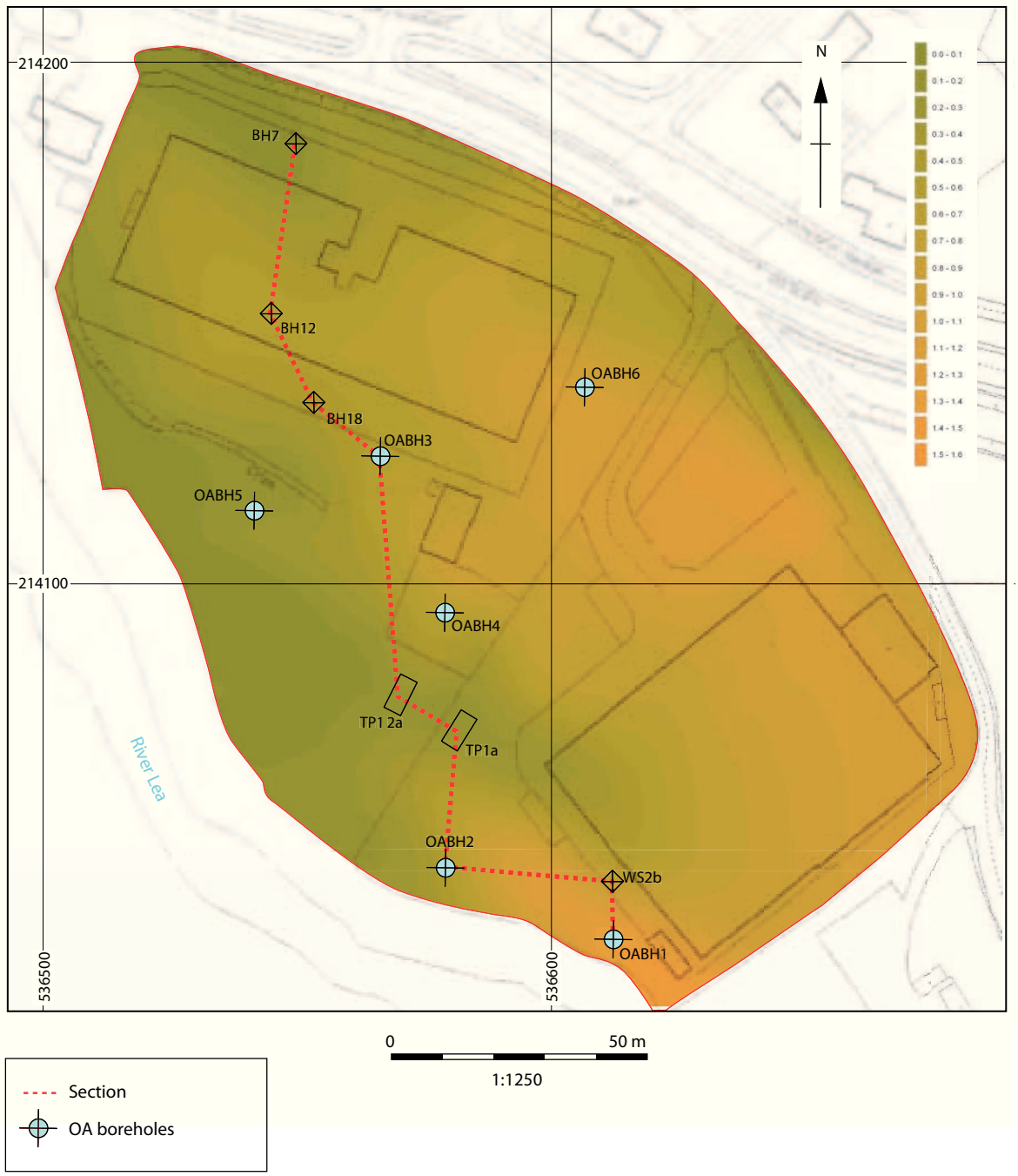


Figure 5: Modelled thickness of organic/peat deposits (m)

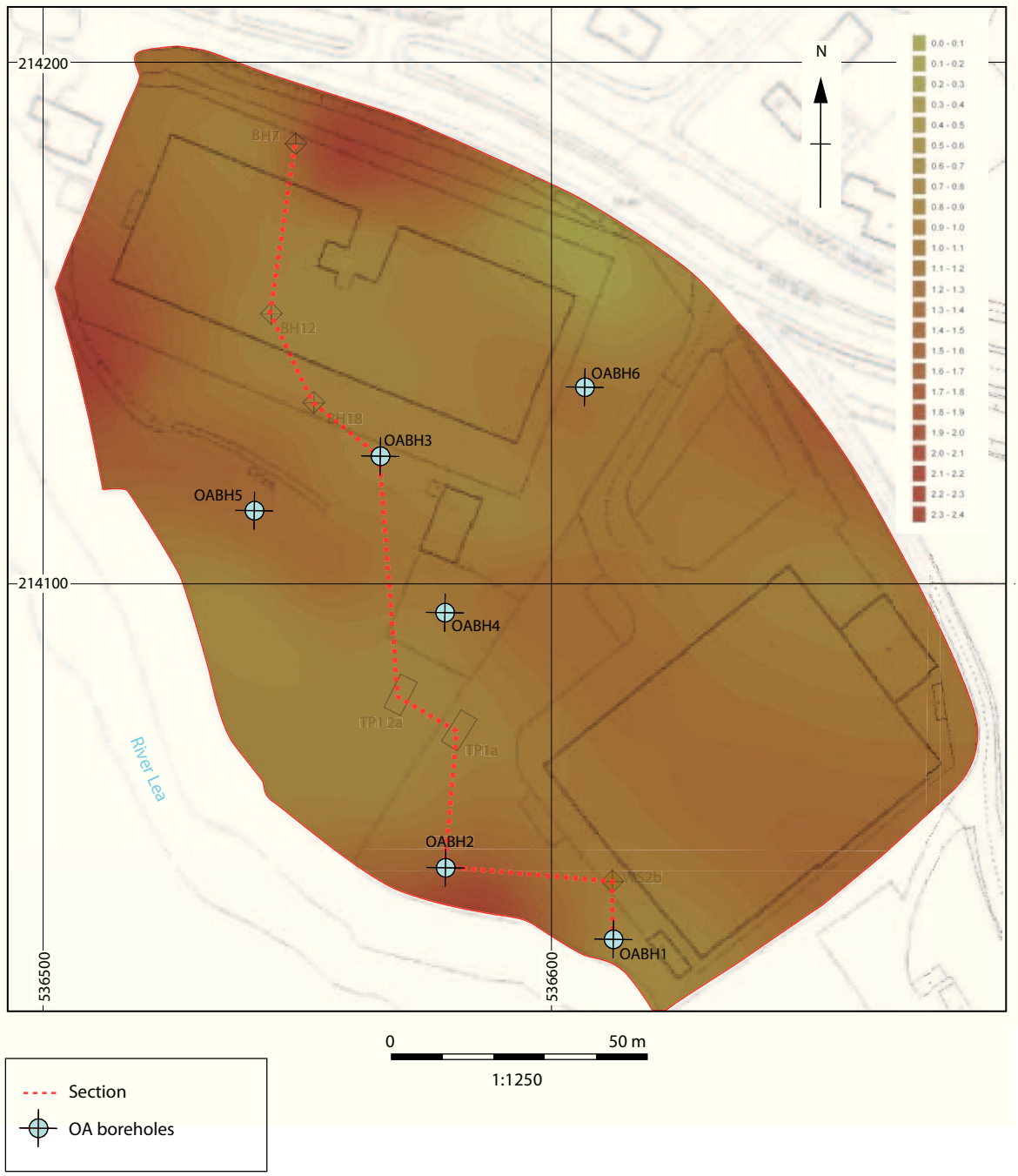


Figure 6: Modelled thickness of made ground deposits (m)

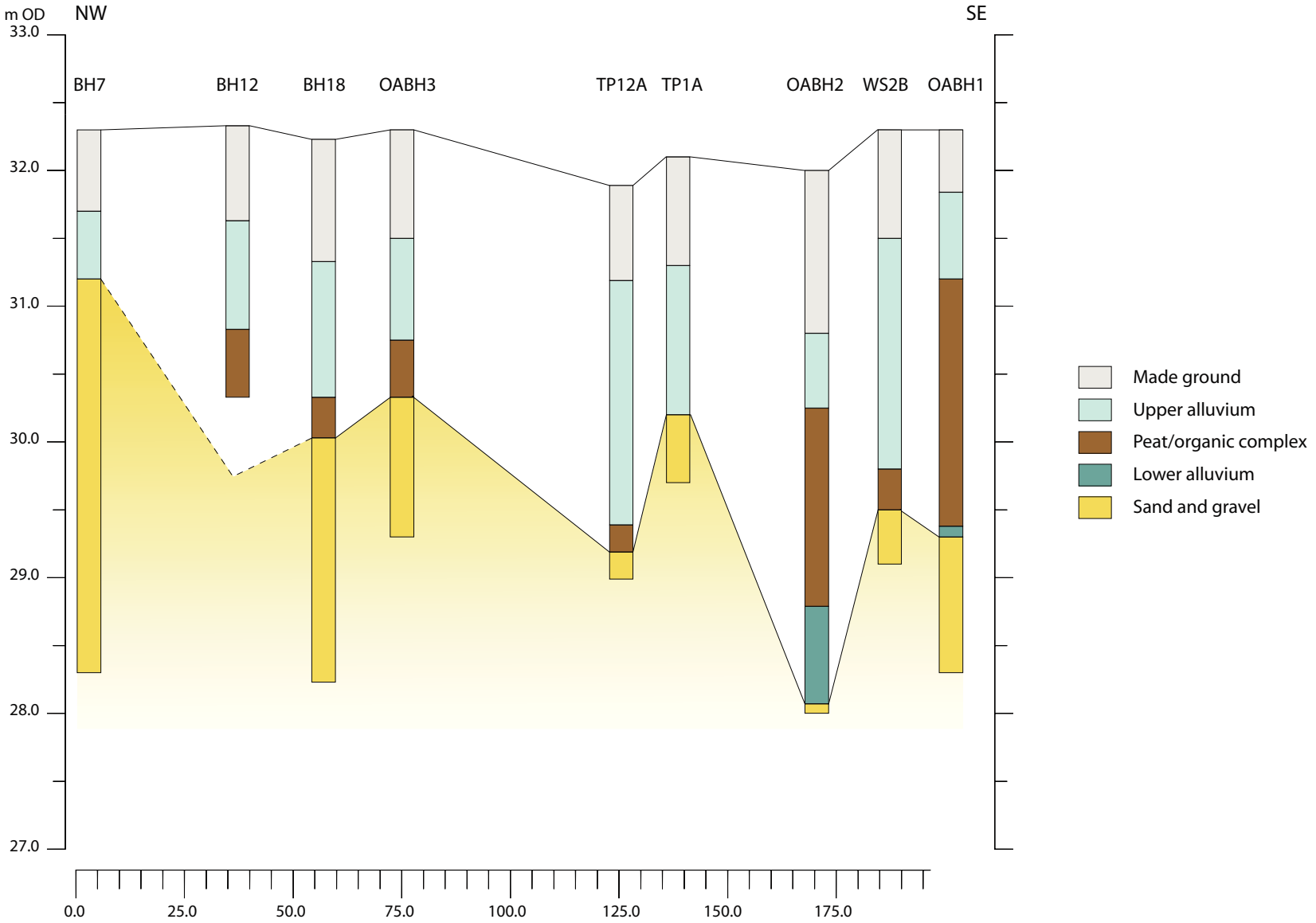


Figure 7: Borehole cross-section

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