QUEST
QUATERNARY SCIENTIFIC

University of Reading

COOKS ROAD BLOCK B, LONDON BOROUGH OF NEWHAM

Geoarchaeological Deposit Model Report

NGR: TQ 3787 8330
Site Code: CBB16
Date: 14th December 2016
Written by: D.S. Young MSc

QUEST, School of Archaeology, Geography and Environmental Science, Whiteknights, University of Reading, RG6 6AB

Tel: 0118 378 7978 / 8941
Email: d.s.young@reading.ac.uk
http://www.reading.ac.uk/quest

CONTENTS

1. NON-TECHNICAL SUMMARY

A programme of geoarchaeological fieldwork and deposit modelling was carried out at the site in order to: (1) clarify the nature of the sub-surface stratigraphy, in particular the possible presence and thickness of alluvium and peat across the site, and (2) evaluate the potential of the sedimentary sequences for reconstructing the environmental history of the site and its environs. The results of the deposit modelling have revealed a sequence of Late Devensian Lea Valley Gravel, overlain by Holocene alluvium (in places containing peat) and modern Made Ground. The deposit models indicate that the Gravel surface at the site is relatively even, lying at between -0.20 and 0.40m OD, consistent with previous investigations in this area by Corcoran *et al.* (2011; the Lea Valley Mapping Project). A locally-present horizon of peat is recorded within the alluvium in selected boreholes, lying at elevations of between *ca.* 0.4 and 1.8m OD and present in thicknesses of between 0.10 and 1.30m; the patchy, generally thin nature of the peat is consistent with other investigations in this area of the Lea Valley: peat horizons broadly equivalent in depth, but of variable age (including Mesolithic through to Medieval), have been recorded at other nearby sites. A programme of environmental archaeological assessment was therefore recommended on one borehole (CR-QBH2) recovered from the site. With regards to the archaeological potential of the present site, the Gravel surfaces recorded are not significantly lower than those at the Olympic

Park *ca*. 320m to the north, where evidence of prehistoric occupation was recorded on the Gravel surface. In addition, although only locally present, the peat horizons recorded would have represented semi-terrestrial land surfaces which might have been utilised by prehistoric people (as described above). Further archaeological investigations at the site are therefore considered appropriate.

2. INTRODUCTION

2.1 Introduction

This report summarises the findings arising out of the geoarchaeological investigations undertaken by Quaternary Scientific (University of Reading) in connection with the proposed development of land at Cooks Road Block B, London Borough of Newham (National Grid Reference: centred on TQ 3787 8330; Figure 1). The work was commissioned by CgMs Consulting. The site occupies *ca*. 1.4 ha on the floodplain of the River Lea about 3km upstream from the confluence with the Thames, bounded on the south-east by the Bow Back River and on the south-west by Cooks Road; Barbers Road lies a short distance to the north-west and Pudding Mill Lane lies to the north-east. The present-day channel of the River Lee is about 0.5 km to the west, and close to the edge of the alluvial floodplain. The City Mill River and the Channelsea River, subsidiary channels of the Lea, lie to the east. The site remained undeveloped until the late 19th century (post-1869), but has been occupied continuously by industrial/commercial premises since then.

2.2 Site context

The British Geological Survey (1:50,000 Sheet 256 North London 1994) shows the site underlain by the Alluvium of the River Lea, overlying bedrock London Clay. In fact, the London Clay is immediately overlain by sand and gravel forming the Late Devensian Lea Valley Gravel of Gibbard (1994), equivalent to the Shepperton Gravel of the Thames. These gravels were deposited under cold climate conditions in a braided river environment, and their surface is often characterised by longitudinal gravel bars separated by inter-bar channels in which finer-grained deposits may be preserved. The relief amplitude of the gravel surface is generally *ca*. 2.0-3.0m. The Holocene alluvium rests on this gravel surface and its accumulation has progressively buried the sand and gravel, subduing the valley-floor relief and leading eventually to the creation of a low relief alluvial surface. The 1869 Ordnance Survey plan shows the ground between the Cooks Road Block B site and the City Mill River occupied by 'Brick Field', presumably working the floodplain alluvium.

The site lies within the area that has been investigated in the Lea Valley Mapping Project (Corcoran *et al.,* 2011). In this project the Lea Valley has been divided into Landscape Zones characterised by their Holocene landscape history based largely on sedimentary evidence derived from borehole records. The Cooks Road Block B site lies at the boundary between Landscape Zones 1.11 and 2.1, where the Lea Valley Gravel surface is described as lying at *ca*. 0.0-0.4m OD, although the gravels are incised to significant depths in places indicating the main course of the channel and scour associated with tributary channels (Corcoran *et al.,* 2011). The overlying (Holocene) sediments are described as predominantly silty clays up to 3m in thickness and representing a range of different depositional environments (Corcoran *et al.,* 2011).

During geotechnical investigations at the site a total of five shallow boreholes (MWS101, 102, 103, 106 and 107; CgMs Consulting, 2014) and more recently 15 deeper boreholes (BH201-205; MWS201-210; Idom Merebrook, 2015) have been put down at the site (Figure 2). Boreholes MWS101 and MWS102 were put down within the site to a depth of 3.0m below ground level (bgl); they passed respectively through 2.0 and 2.5m of Made Ground into clay, slightly stony in borehole MWS102 and with lenses of peat present in borehole MWS101. Boreholes MWS106 and MWS107 were put down to 5.0m and 4.0m bgl respectively; these passed through a similar sequence of deposits dominated by clay with occasional peat lenses. Borehole MWS103 did not penetrate past the Made Ground. None of the five boreholes reached the Late Devensian Lea Valley Gravel that marks the base of the alluvial sequence; the more recent boreholes however indicate that the Gravel surface lies at between 3.7 (MWS206) and 4.5m bgl (MBH203), and the overlying alluvial sequence is frequently recorded as peaty (MBH202-204, MWS204-210) or containing 'organic detritus' (MBH201, MWS203, MWS208); in five of the window sample boreholes (MWS 204, 206, 207, 209 and 210) a distinct horizon of peat is recorded. Between *ca*. 1.7 and 3.0m of Made Ground caps the sequence in the more recent boreholes.

During investigations in connection with the development of the Olympic Park (Barrowman & Yendell 2008) a trench (PDZ8.04/5.38(C)), 30m x 8m at base, was opened *ca*. 90m north-east of the north-east boundary of the site and close to the Bow Back River. The following sediment sequence was recorded in the trench:

Depth (m OD)	Unit	Description
4.79-1.43	5	Made Ground
1.43-1.05	4	Silty clay becoming increasingly peaty upward and cut by Post-Medieval ditch and pit
1.05-0.52	3	Silty clay
0.52-0.29	2	Sandy silt and fine sand
below 0.29	1	Gravel

Further away, at a distance of about 320m to the north of the Cooks Road site, in trench PDZ8.04/5.35(C) the gravel surface was seen to rise to 1.04m OD and retained evidence of prehistoric occupation (Late Bronze Age – Iron Age) in the form of ditches, pits and/or post holes with associated pottery and flintwork (Barrowman & Yendell 2008).

2.3 Palaeoenvironmental and archaeological significance

Significantly, the organic alluvium and peat recorded in selected boreholes across the site has the potential to provide a detailed record of spatial and temporal changes in the environment, including those associated with human activity, and offers an opportunity to examine these sediments in the context of other work in this area of the Lower Lea Valley (e.g. Corcoran *et al*., 2011; Barrowman & Yendell, 2008). The previous geotechnical investigations at the site have revealed considerable variation in the nature and thickness of the stratigraphic units across the local area. Such variations in these deposits are significant as they represent different environmental conditions that would

have existed in a given location. For example: (1) the varying surface of the Lea Valley Gravel may represent the location of former channels and bars; (2) the presence of peat represents former terrestrial or semi-terrestrial land-surfaces, and (3) the alluvium represent periods of changing hydrological conditions. Thus by studying the sub-surface stratigraphy across the site in greater detail, it will be possible to build an understanding of the former landscapes and environmental changes that took place across space and time.

Organic-rich sediments (in particular peat) also have high potential to provide a detailed reconstruction of past environments on both the wetland and dryland. In particular, they provide the potential to increase knowledge and understanding of the interactions between hydrology, human activity, vegetation succession and climate. Significant vegetation changes include the Mesolithic/Neolithic decline of elm woodland, the Neolithic colonisation and decline of yew woodland; the Late Neolithic/Early Bronze Age growth of elm on peat, and the general decline of wetland and dryland woodland during the Bronze Age. Such investigations are carried out through the assessment/analysis of palaeoecological remains (e.g. pollen, plant macrofossils & insects) and radiocarbon dating.

Finally, areas of high gravel topography, soils and peat represent potential areas that might have been utilised or even occupied by prehistoric people, evidence of which may be preserved in the archaeological (e.g. features and structures) and palaeoenvironmental record (e.g. changes in vegetation composition). This is particularly significant for the present site, given the evidence of prehistoric occupation *ca*. 320m to the north at the Olympic Park (Barrowman & Yendell, 2008).

2.4 Aims and objectives

A programme of geoarchaeological monitoring of geotechnical investigations, and a programme of deposit modelling, was therefore recommended in the Written Scheme of Investigation for the site (Young & Green, 2016), the aims of which were: (1) to clarify the nature of the sub-surface stratigraphy, in particular the presence and thickness of alluvium and peat across the site, and (2) to evaluate the potential of the sedimentary sequences for reconstructing the environmental history of the site and its environs. The alluvial deposits in this area of the Lea Valley is of interest, since relatively little is known of their age and character (see Corcoran *et al*. 2011, p51); in addition, some uncertainty regarding the age of peat deposits in this area has been highlighted in recent work at the Monier Road (Batchelor *et al*., 2016a) and Omega Works Phase III (Spurr, 2005; 2006) sites.

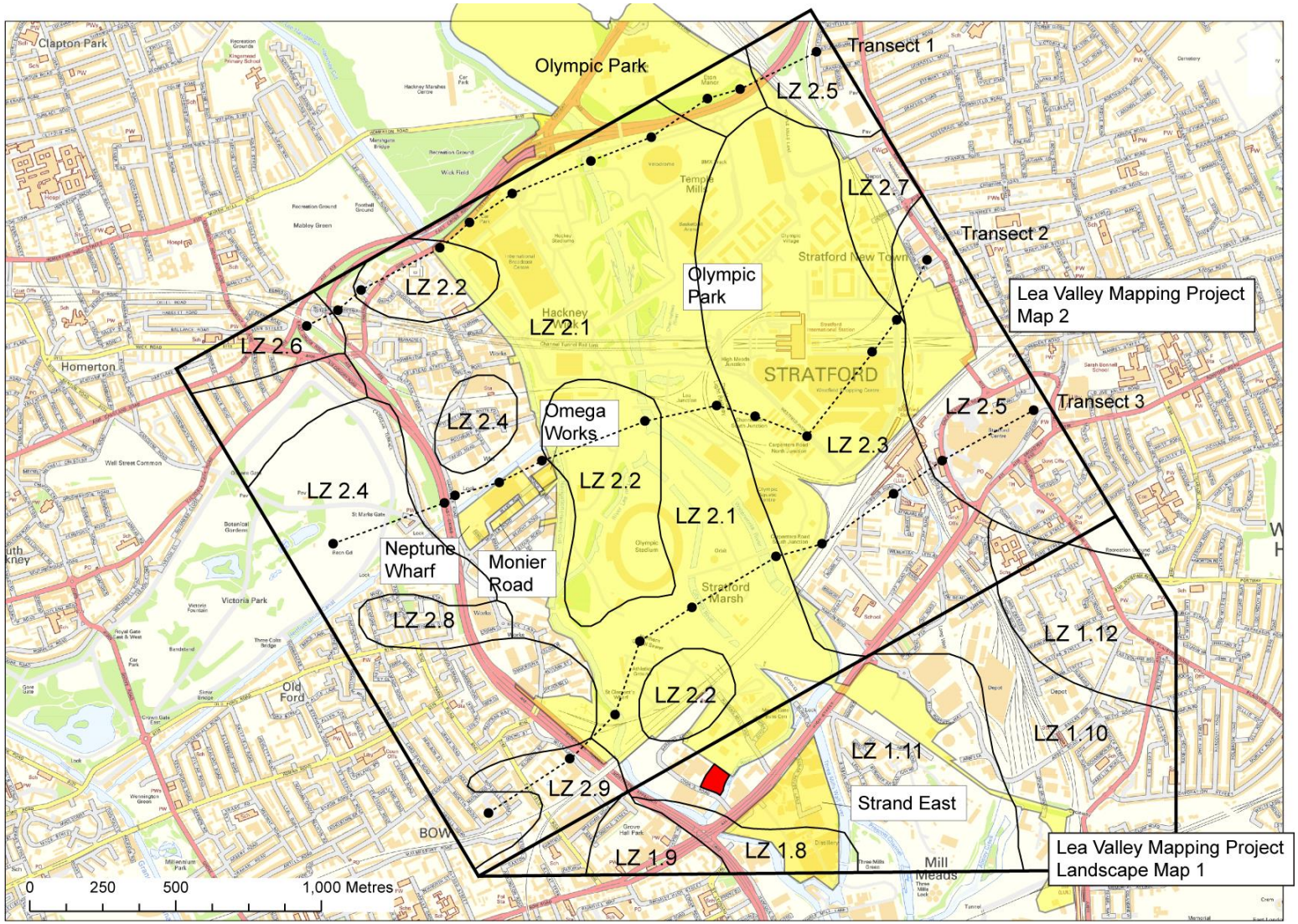

Figure 1: Location of Cooks Road Block B, London Borough of Newham (red) and other local sites including: 79-85 Monier Road (Batchelor *et al*., 2016a): Fish Island, Neptune Wharf (Batchelor *et al*., 2016b), Omega Works Phase III (Spurr, 2005, 2006), Strand East (Green & Batchelor, 2014) and the area encompassed by the Olympic Park (Powell, 2012). *Contains Ordnance Survey data © Crown copyright and database right [2016]*.

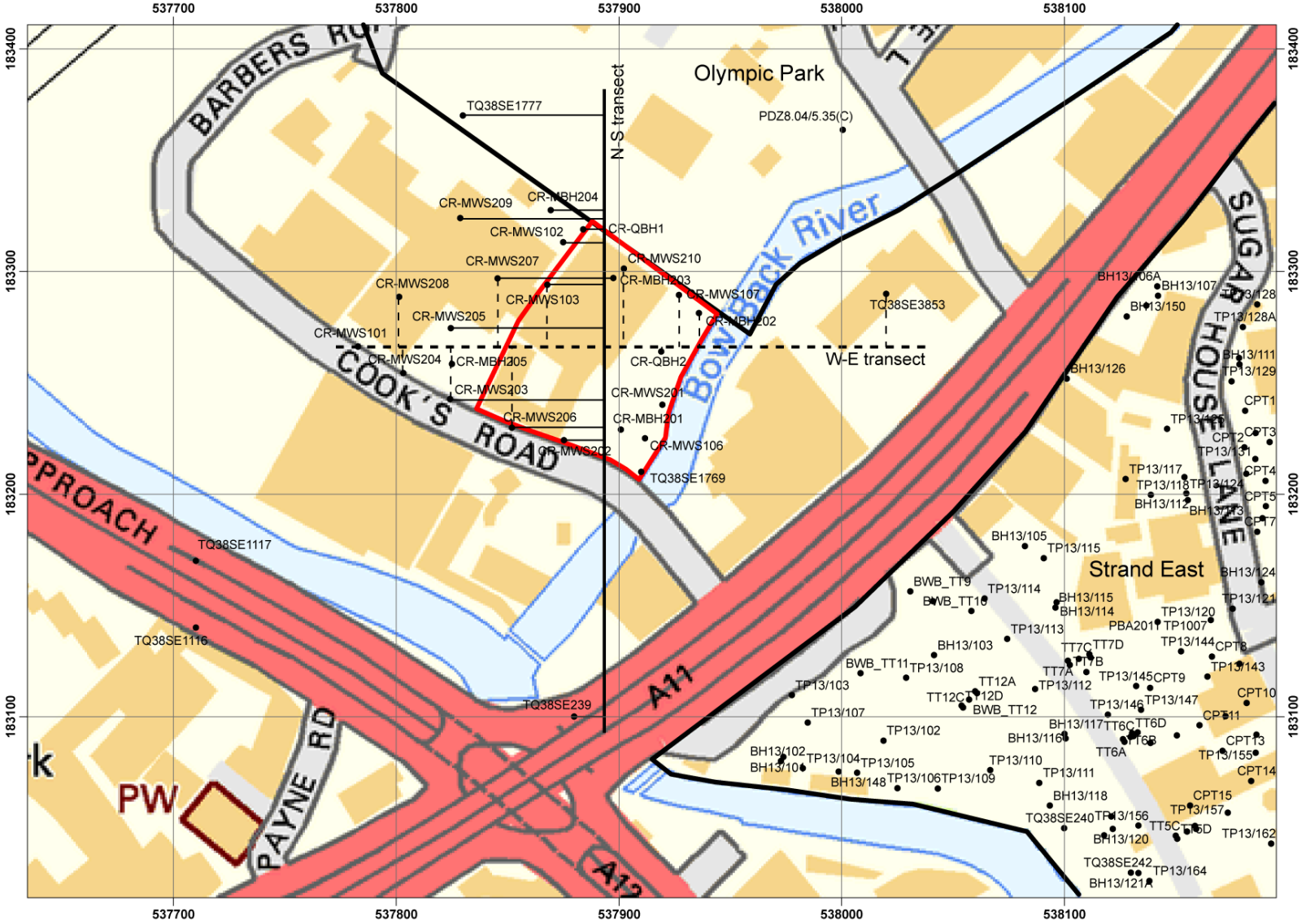

Figure 2: Location of the boreholes/test pits used in the deposit model at Cooks Road Block B, London Borough of Newham. West-East and North-South transects also shown. *Contains Ordnance Survey data © Crown Copyright and Database right 2016.*

3. METHODS

3.1 Field investigations and lithostratigraphic descriptions

Two boreholes were put down at the site by Idom Merebrook, supervised by Quaternary Scientific, in October 2016. The lithostratigraphy of the boreholes was described in the field using standard procedures for recording unconsolidated sediment and organic sediments, noting the physical properties (colour), composition (gravel, sand, clay, silt and organic matter) and inclusions (e.g. artefacts) (Tröels-Smith, 1955). The procedure involved: (1) cleaning the sample using a scalpel; (2) recording the physical properties, most notably colour using a Munsell Soil Colour Chart; (3) recording the composition; gravel (Grana glareosa; Gg), fine sand (Grana arenosa; Ga), silt (Argilla granosa; Ag) and clay (Argilla steatoides); (4) recording the degree of peat humification and (5) recording the unit boundaries e.g. sharp or diffuse. The results of the geoarchaeological descriptions of the boreholes are displayed in Tables 1 and 2. The spatial attributes of the boreholes are displayed in the Appendix and in Figure 2. The elevation data for the new borehole was calculated using a recent topographic survey, provided by CgMs Consulting.

3.2 Deposit modelling

The deposit model was based on a review of 143 borehole and test pit records for the area of the site (see Figure 2 and Appendix). These incorporated nine BGS archive boreholes (www.bgs.ac.uk/opengeoscience), 111 boreholes from the Strand East site (Green & Batchelor, 2014), one nearby archaeological trench from the Olympic Park site (PDZ8; Barrowman & Yendell, 2008) and 20 existing geotechnical records from the present site. Modelling was undertaken using RockWorks 16 geological utilities software. The term 'deposit modelling' describes any method used to depict the sub-surface arrangement of geological deposits, but particularly the use of computer software to create contoured maps or three dimensional representations of contacts between stratigraphic units. The first requirement is to classify the recorded borehole sequences into uniformly identifiable stratigraphic units. At the Cooks Road Block B site, the sedimentary units were classified into five groupings: (1) Gravel, (2) Lower Alluvium, (3) Peat, (4) Upper Alluvium and (5) Made Ground. Models of surface height were generated for the Gravel, Lower Alluvium, Peat and Upper Alluvium (Figures 3, 4, 5 and 7 respectively), with models of the thickness of the Peat (Figure 6), total alluvial sequence (incorporating the Lower Alluvium, Peat and Upper Alluvium (Figure 8) and Made Ground (Figure 9) also modelled using a nearest neighbour routine. Two-dimensional north-south and west-east stratigraphic profiles were also generated using Rockworks 16 for selected boreholes across the site (Figures 10 and 11).

How effectively Rockworks portrays the relief features of stratigraphic contacts or the thickness of sediment bodies depends on the number of data points (boreholes/test pits) per unit area, and the extent to which these points are evenly distributed across the area of interest. The portrayal is also affected by the significance assigned to these data points, in terms of the extent of the area around the point to which the data are deemed to apply. This can be predetermined for each data set, and in the present case the value chosen for each data point (borehole) is equivalent to an area of 50m radius for all models. The boreholes are relatively well distributed over the area of investigation. In general, reliability improves towards the core area of boreholes where mutually

supportive data are likely to be available from several adjacent data points. Reliability is also affected by the quality of the stratigraphic records, which in turn are affected by the nature of the sediments and/or their post-depositional disturbance during previous stages of land-use on the site. Finally, because of the 'smoothing' effect of the modelling procedure, the modelled levels of stratigraphic contacts may differ slightly from the levels recorded in borehole logs.

4. RESULTS AND INTERPRETATION OF THE LITHOSTRATIGRAPHIC DESCRIPTIONS AND DEPOSIT MODELLING

A summary of the borehole data included in the deposit model is shown in Appendix 1, with the results of the lithostratigraphic descriptions shown in Tables 1 and 2. The results of the deposit modelling are displayed in Figures 3 to 11; Figures 3 to 9 are surface elevation and thickness models for each of the main stratigraphic units, whilst Figures 10 and 11 are two-dimensional north-south and west-east transects of selected boreholes across the site. The results of the deposit modelling indicate that the number and spread of the logs is sufficient to permit modelling with a high level of certainty across the entire site (see Figure 2).

The full sequence of sediments recorded in the boreholes comprises:

Made Ground – widely present
Upper Alluvium – widely present
Peat – locally present; usually separates the Lower and Upper Alluvium
Lower Alluvium – widely present
Gravel (Lea Valley Gravel) – widely present but not reached in all boreholes

4.1 Lea Valley Gravel

The Lea Valley Gravel was present in all the boreholes that penetrated to the bottom of the Holocene sequence. It was deposited during the Late Glacial (15,000 to 10,000 years before present (BP)) and comprises the sands and gravels of a high-energy braided river system which, while it was active would have been characterised by longitudinal gravel bars and intervening low-water channels in which finer-grained sediments might have been deposited. Such a relief pattern would have been present on the valley floor at the beginning of the Holocene when a lower-energy fluvial regime was being established.

The surface of the Gravel (see Figure 3) is relatively even across the area of the site, recorded at between -0.20 (CR-MBH203) and 0.40m OD (CR-MBH204). In the two new geoarchaeological boreholes it is recorded at 0.15 (CR-QBH1) and 0.10m OD (CR-QBH2). To the east and southeast of the site in the area of Strand East (Green & Batchelor, 2014) the Gravel surface generally lies at between *ca.* 0 and -1m OD; *ca.* 200m to the west however, it rises to between 2.4 and 2.6m OD in the area of boreholes TQ38SE1116 and TQ38SE1117. The Gravel recorded to the west of the site most likely represents either the 'low terrace' remnant of the Lea Valley Gravel described in this area by Corcoran *et al.* (2011), or a remnant of the early to middle Devensian (30,000 to 80,000

years BP) Leyton Gravel. Within the area of the site and to the east, the Gravel topography is typical of that in a braided river system, with undulations in the surface of the Gravel indicative of shallow channels separating longitudinal gravel bars.

4.2 Lower Alluvium

The Lower Alluvium rests directly on the Lea Valley Gravel and was recorded in the majority of records across the site (see Figure 4). The deposits of the Lower Alluvium are described as predominantly silty or clayey, tending to become increasingly sandy downward in most sequences. The Lower Alluvium frequently contains detrital wood or plant remains, and in many cases is described as organic and with occasional Mollusca remains. The surface of the Lower Alluvium (Figure 4) is variable, but generally lies at between *ca*. 0m and 1m OD. In general, thicker occurrences of Lower Alluvium are present where the surface of the Gravel lies at a lower level.

The sediments of the Lower Alluvium are indicative of deposition during the Early to Mid-Holocene, when the main course of the Lea was probably confined to a single meandering channel. During this period, the surface of the Lea Valley Gravel was progressively buried beneath the sandy and silty flood deposits of the river. The richly-organic nature of the Lower Alluvium suggests that this was a period during which the valley floor was occupied by a network of actively shifting channels, with a drainage pattern on the floodplain that was still largely determined by the relief on the surface of the underlying Gravel.

4.3 Peat

In seven of the 22 records in the area of the site a horizon of peat separates the deposits of the Lower and Upper Alluvium, present at elevations of between *ca*. 0.4 and 1.8m OD. Its upper surface is recorded at between 0.90 (CR-MWS209) and 1.90m OD (CR-MWS202) (Figure 5), and it is present in variable thicknesses of between 0.10 and 1.30m (Figure 6). In general, the peat increases in thickness eastwards. The absence of the peat in certain areas of the site may be a result of a number of factors, including: (1) difficulties identifying peat in geotechnical logs; or (2) subsequent erosion of the peat by fluvial processes. Given the localised nature of the peat at sites in this area of the Lea Valley (see Discussion), it is also possible that the peat only formed in localised floodplain hollows, and did not form a continuous, laterally extensive horizon in this area.

Where recorded, the peat horizons are indicative of a transition towards semi-terrestrial (marshy) conditions in this area of the floodplain, supporting the growth of sedge fen and/or woodland communities. Assuming that 1m of peat represents 1000 years of peat formation (a figure typical of fen peatlands), the peat may represent over 1000 years of accumulation in some locations.

4.4 Upper Alluvium

The Upper Alluvium rests on the peat, or where this was not present, the Lower Alluvium, and more rarely directly on the Lea Valley Gravel (although at least in some of these cases, the lack of Lower Alluvium may arise from difficulties identifying this unit in geotechnical logs). The deposits of the Upper Alluvium are described as predominantly silty or clayey and very occasionally organic-rich.

The surface of the Upper Alluvium (Figure 7) is recorded at between 1.70 (CR-MBH205/CR-MWS204) and 3.10m OD (CR-MWS106) across the area of the site.

The sediments of the Alluvium are indicative of deposition within low energy fluvial and/or semi-aquatic conditions during the Holocene. The high mineral content of the sediments may reflect increased sediment loads resulting from intensification of agricultural land use from the later prehistoric period onward, combined with the effects of rising sea level. The combined thickness of the alluvial units at the site (incorporating the Lower Alluvium, the peat, and the Upper Alluvium) is shown in Figure 8. The model indicates that thicknesses of between 2 and 3m of alluvium are recorded across the area of the site.

4.5 Made Ground

Between *ca.* 1.5 and 3m of Made Ground caps the Holocene alluvial sequence across the site (Figure 9). The Made Ground is generally thickest towards the east of the site (2-3m).

Table 1: Lithostratigraphic description of borehole CR-QBH1, Cooks Road Block B, London Borough of Newham.

Depth (m OD)	Depth (m bgs)	Description	Interpretation
4.75 to 3.40	0.00 to 1.35	Made Ground	MADE GROUND
3.40 to 2.40	1.35 to 2.35	Dark grey silty clay with sand, gravel, frequent clinker, CBM, plastic and metal fragments. Sharp contact in to:	
2.40 to 1.35	2.35 to 3.40	As3 Ag1; grey silty clay. Diffuse contact in to:	UPPER ALLUVIUM
1.35 to 0.97	3.40 to 3.78	As3 Ag1 Dl+ Sh+; brown silty clay with traces of detrital wood and organic matter. Sharp contact in to:	
0.97 to 0.85	3.78 to 3.90	As3 Ag1; dark brownish grey silty clay. Vertical rooting. Diffuse contact in to:	
0.85 to 0.15	3.90 to 4.60	Ag3 Ga1; light grey sandy silt. Sharp contact in to:	LOWER ALLUVIUM
0.15 to -0.25	4.60 to 5.00	Gg2 Ga2; grey brown sand and gravel.	LEA VALLEY GRAVEL

Table 2: Lithostratigraphic description of borehole CR-QBH2, Cooks Road Block B, London Borough of Newham.

Depth (m OD)	Depth (m bgs)	Description	Interpretation
4.90 to 3.30	0.00 to 1.60	Made Ground	MADE GROUND
3.30 to 2.27	1.60 to 2.63	As4 Gg+; light brown clay with gravel clasts and brick fragments. Sharp contact in to:	
2.27 to 2.10	2.63 to 2.80	As3 Ag1; very dark grey silty clay. Possible contamination. Diffuse contact in to:	UPPER ALLUVIUM
2.10 to 1.90	2.80 to 3.00	As3 Ag1; grey silty clay with rootlets. Diffuse contact in to:	
1.90 to 1.57	3.00 to 3.33	As3 Ag1; blueish grey silty clay. Sharp contact in to:	
1.57 to 0.60	3.33 to 4.30	Sh2 Th^{2}1 As1; humo. 2; brown moderately humified herbaceous, clayey peat. Poor recovery of lower part of sequence. Sharp contact in to:	PEAT
0.60 to 0.37	4.30 to 4.53	As3 Sh1; brownish grey organic clay. Sharp contact in to:	LOWER ALLUVIUM
0.37 to 0.26	4.53 to 4.64	As2 Ag2; blue grey silt and clay. Sharp contact in to:	

Depth (m OD)	Depth (m bgs)	Description	Interpretation
0.26 to 0.10	4.64 to 4.80	Ga3 Ag1; grey blue silty sand. Sharp contact in to:	
0.10 to -0.10	4.80 to 5.00	Ga2 Gg2; black sand and gravel.	LEA VALLEY GRAVEL

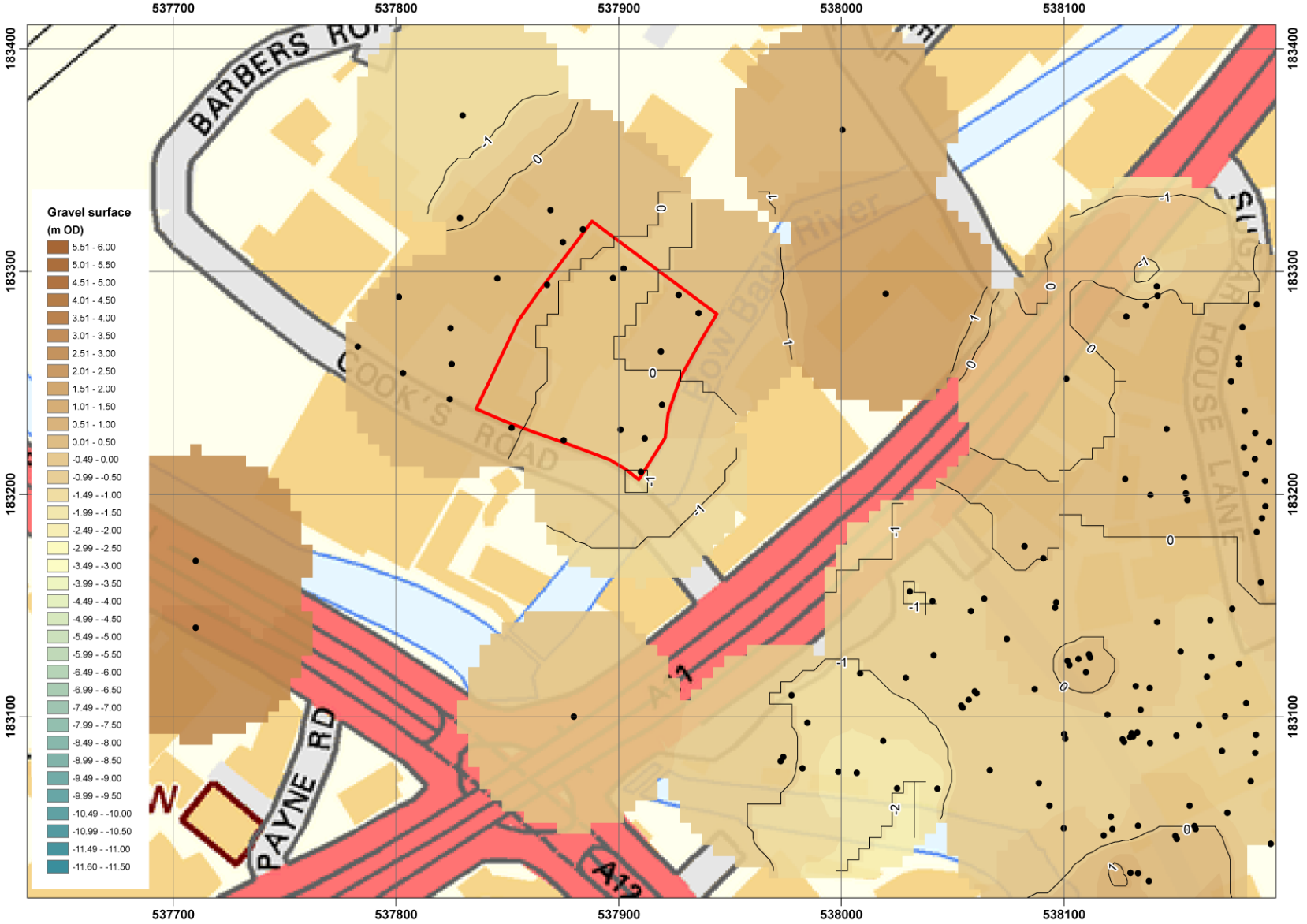

Figure 3: Lea Valley Gravel surface (contour heights in m OD). *Contains Ordnance Survey data © Crown Copyright and Database right 2016.*

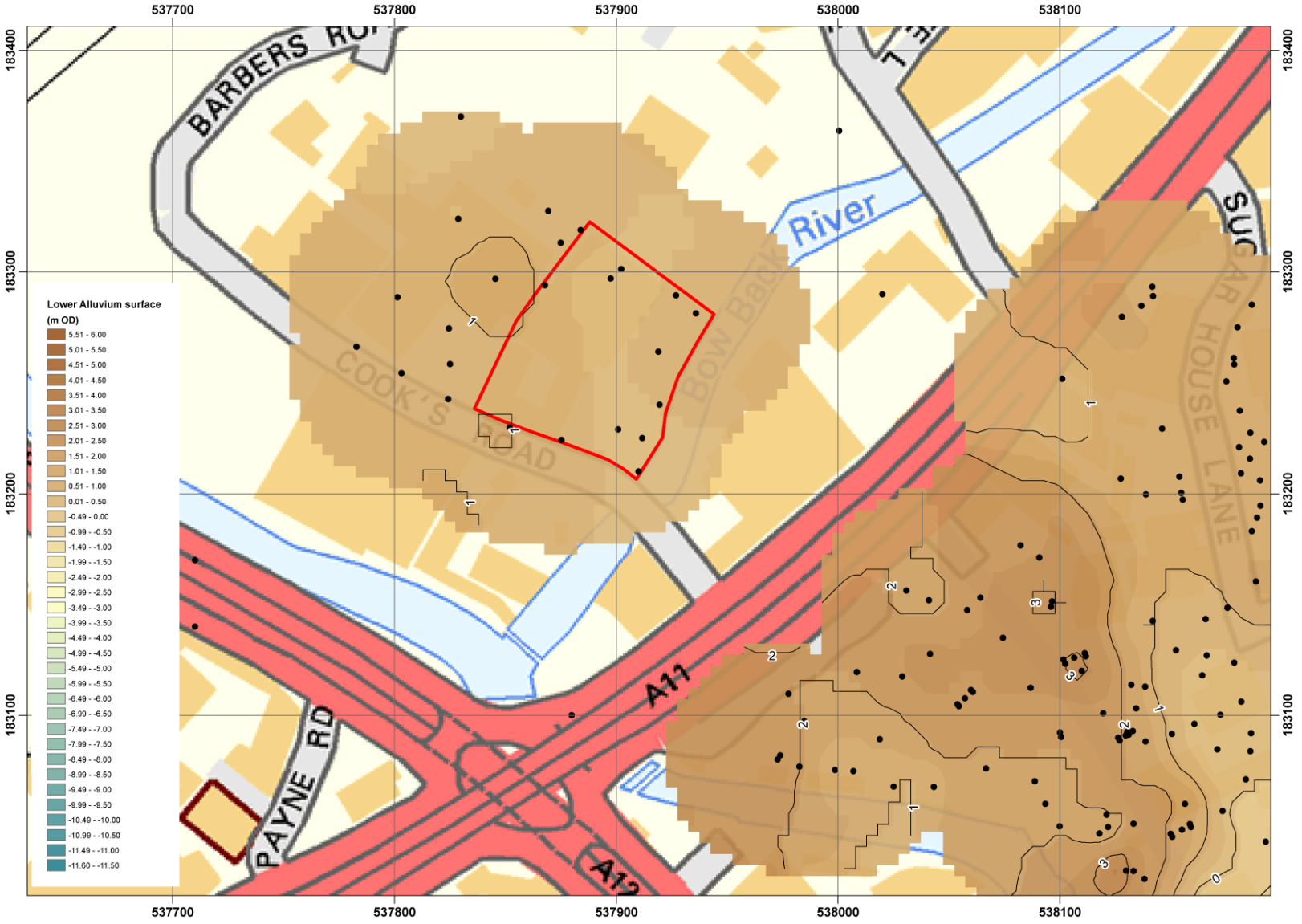

Figure 4: Lower Alluvium surface (contour heights in m OD). *Contains Ordnance Survey data © Crown Copyright and Database right 2016.*

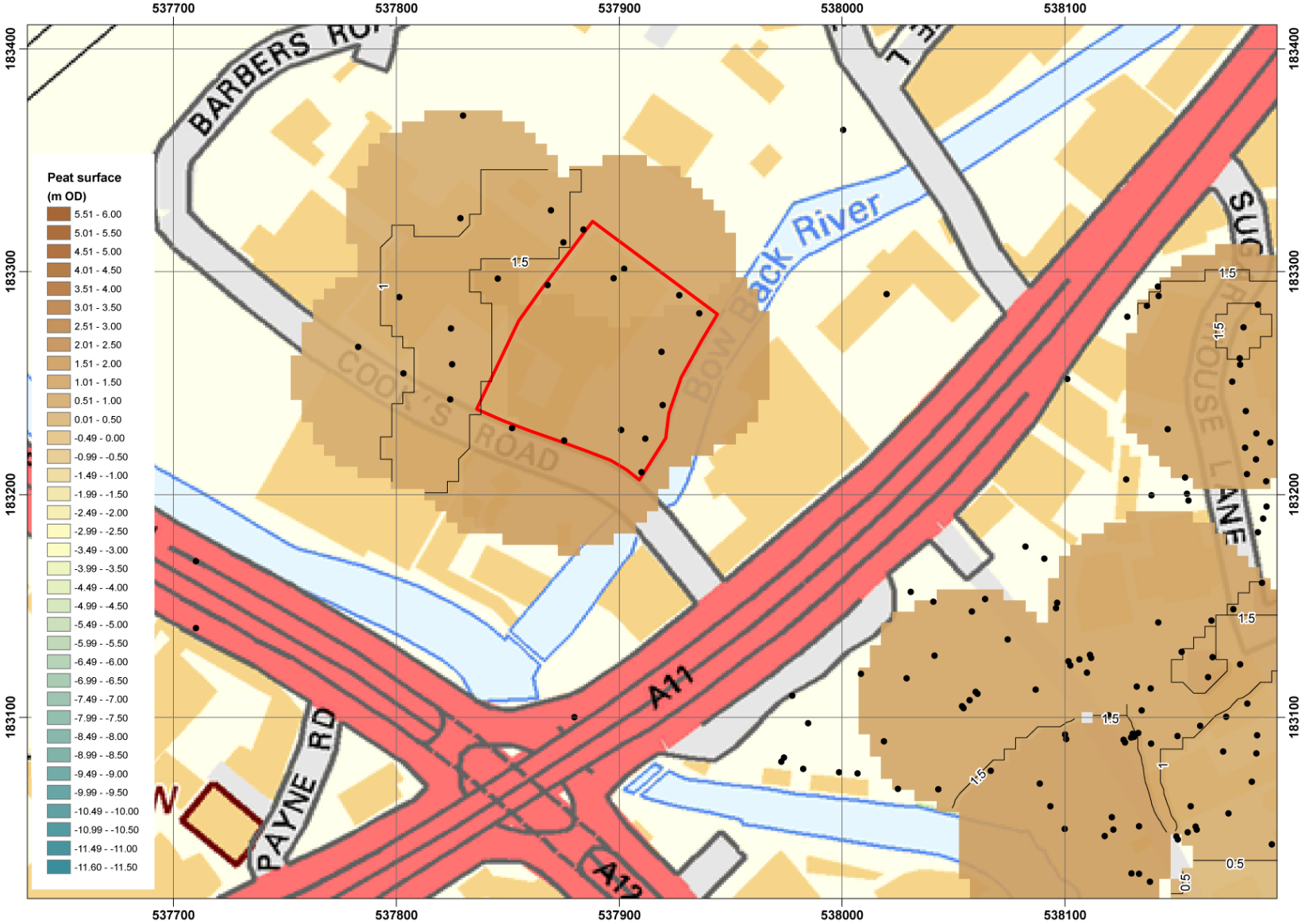

Figure 5: Peat surface (contour heights in m OD). *Contains Ordnance Survey data © Crown Copyright and Database right 2016.*

Figure 6: Peat thickness (contour heights in m). *Contains Ordnance Survey data © Crown Copyright and Database right 2016.*

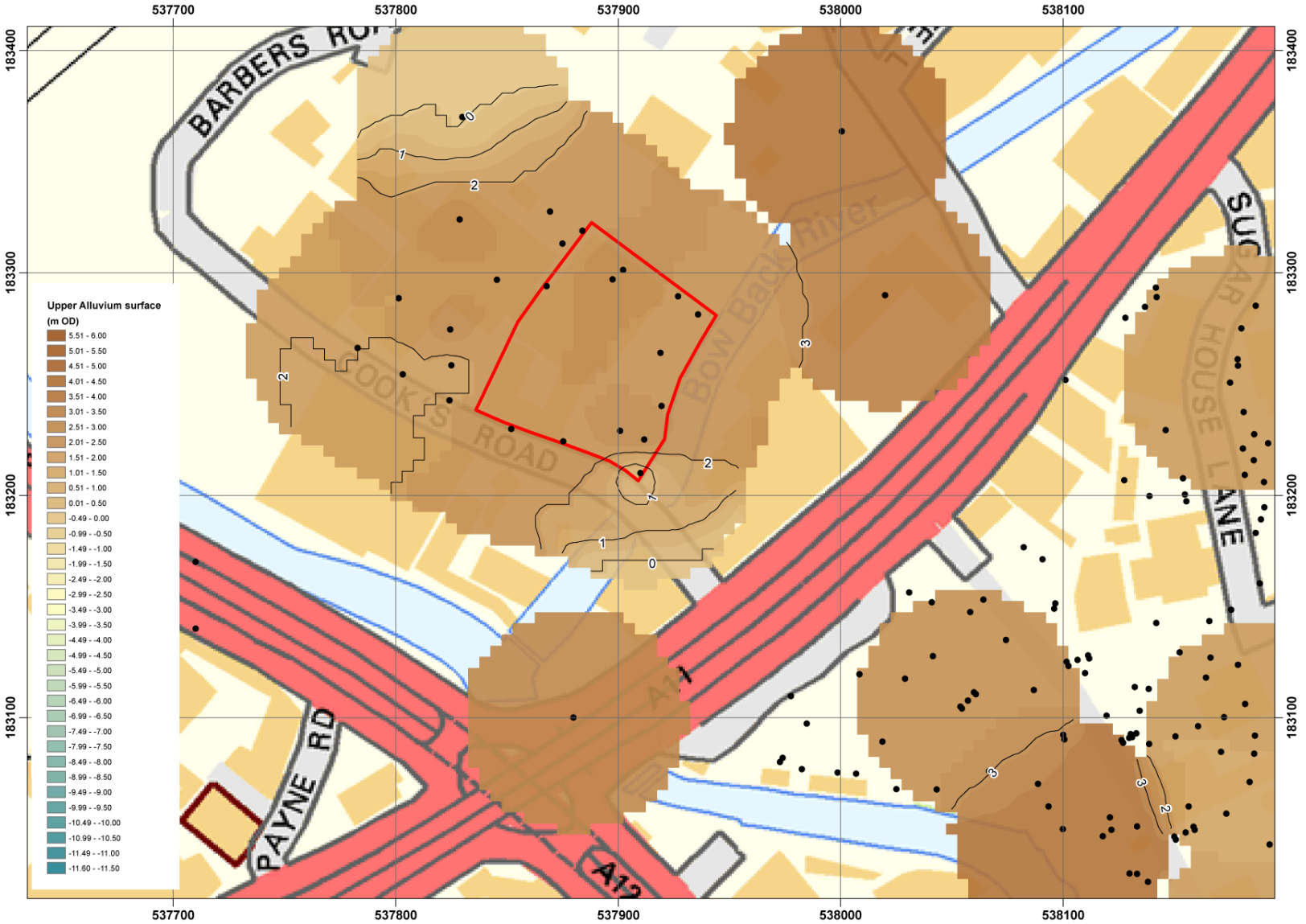

Figure 7: Upper Alluvium surface (contour heights in m OD). *Contains Ordnance Survey data © Crown Copyright and Database right 2016.*

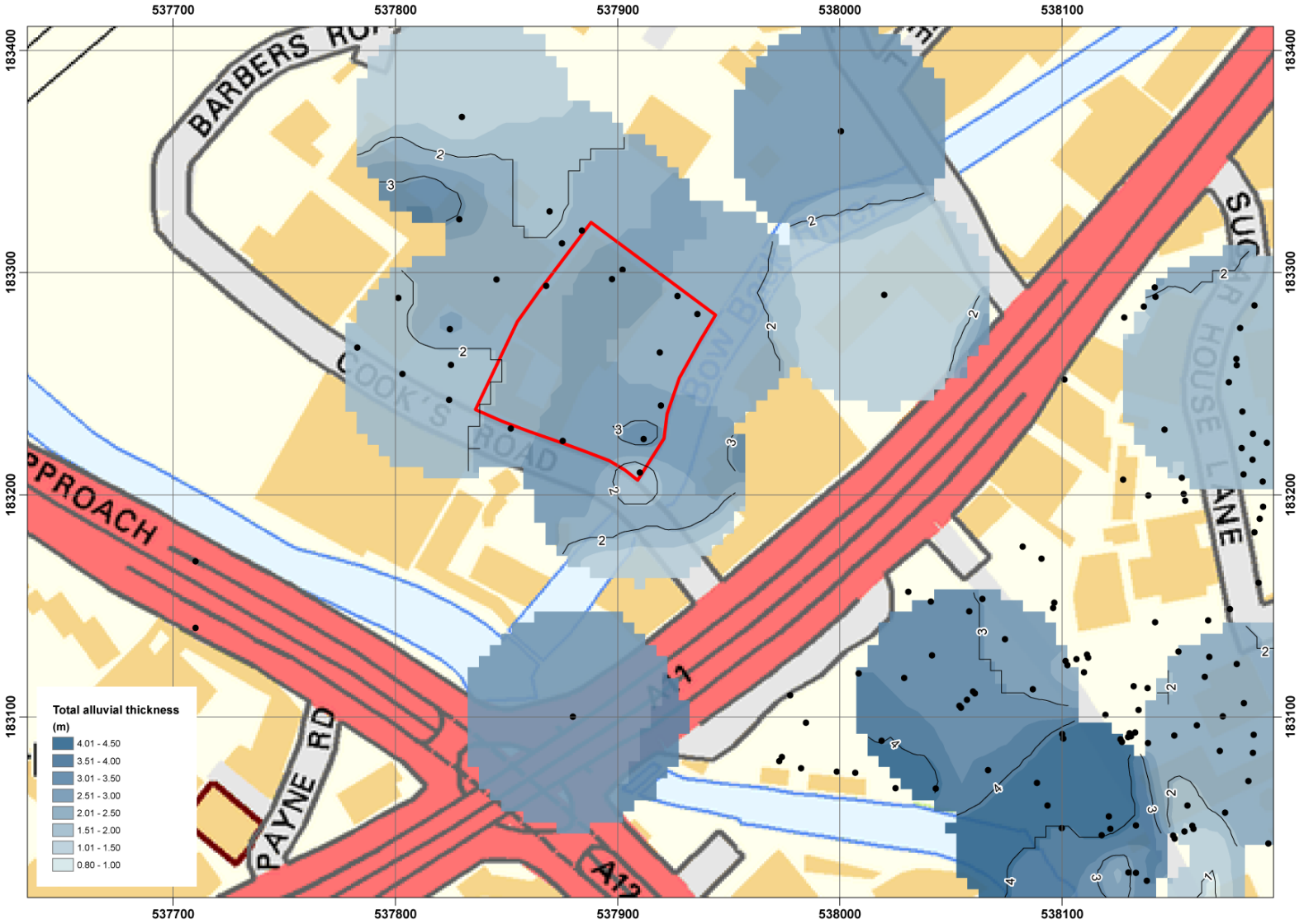

Figure 8: Total alluvial thickness (incorporating the Lower Alluvium, Peat and Upper Alluvium; contour heights in m). *Contains Ordnance Survey data © Crown Copyright and Database right 2016.*

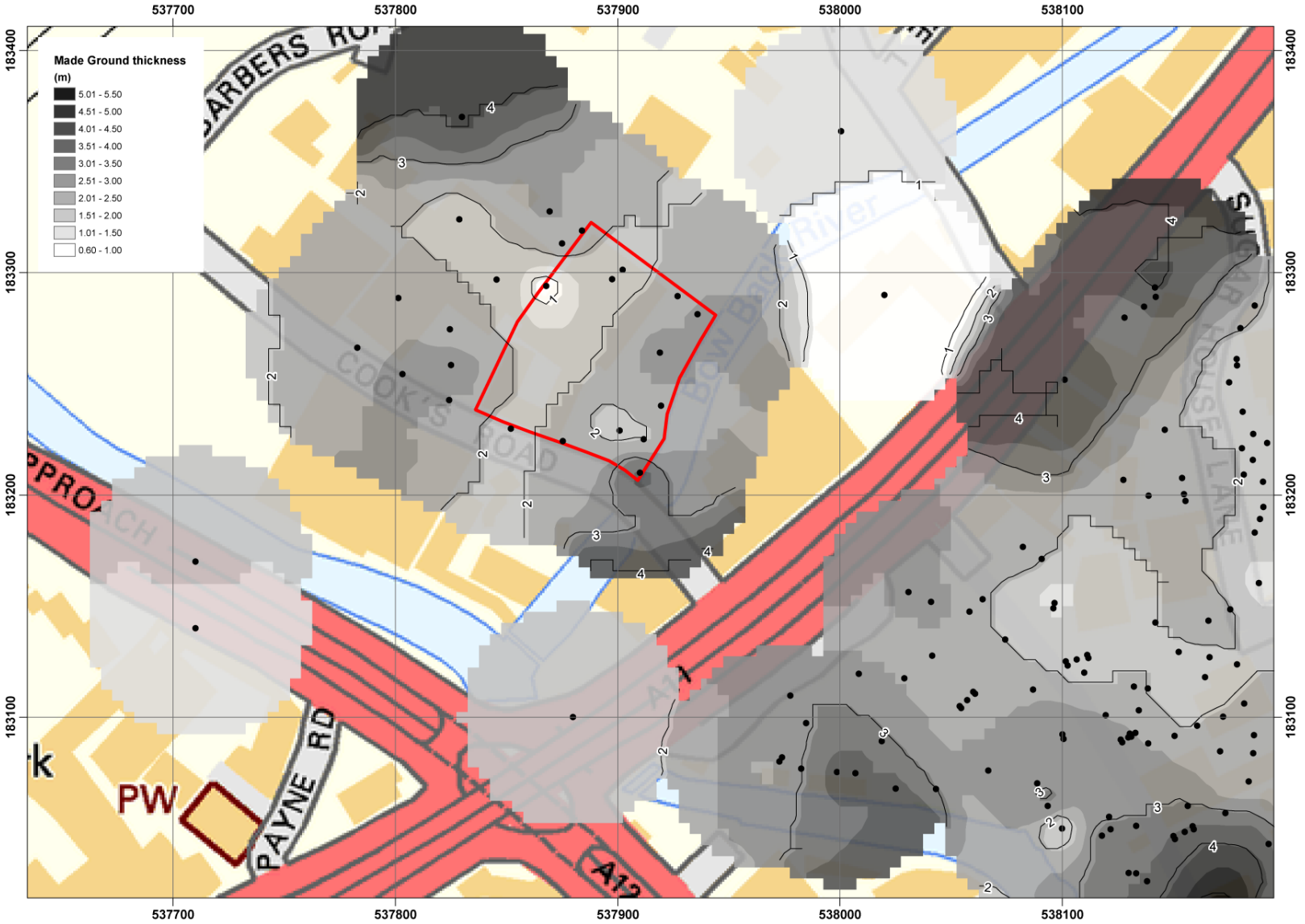

Figure 9: Made Ground thickness (contour heights in m). *Contains Ordnance Survey data © Crown Copyright and Database right 2016.*

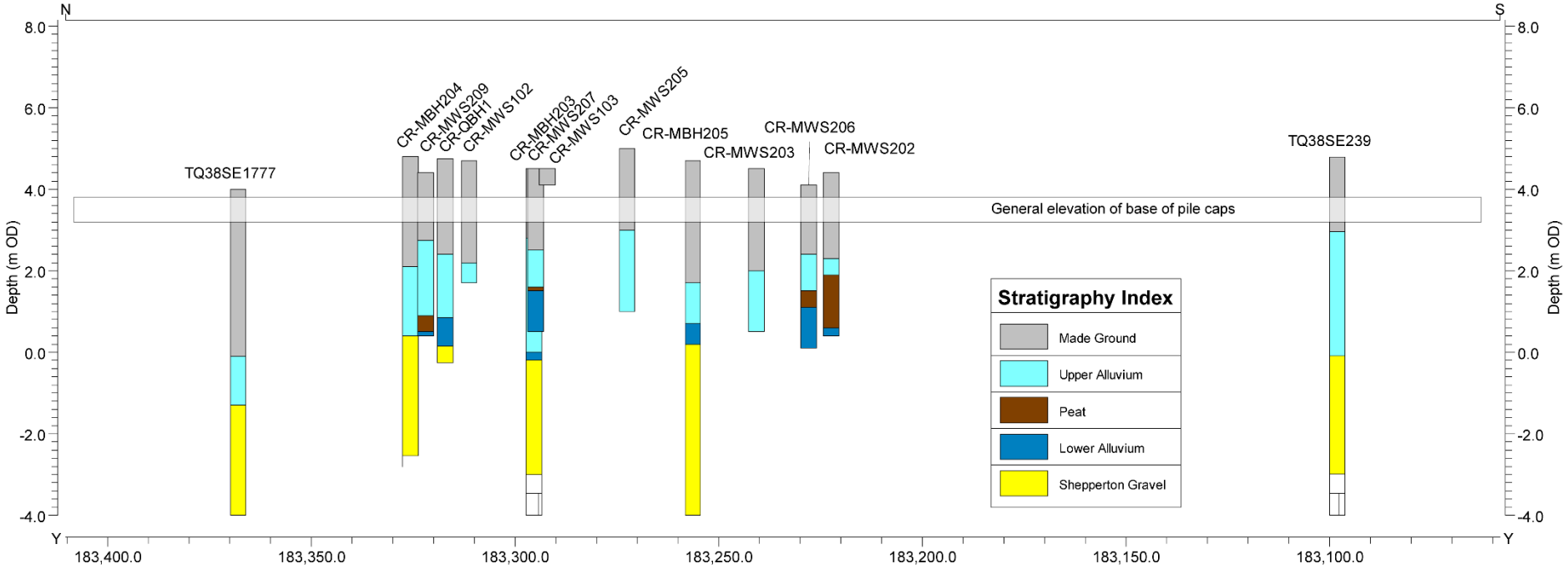

Figure 10: South-north transect of boreholes across the Cooks Road Block B site (see Figure 2 for orientation).

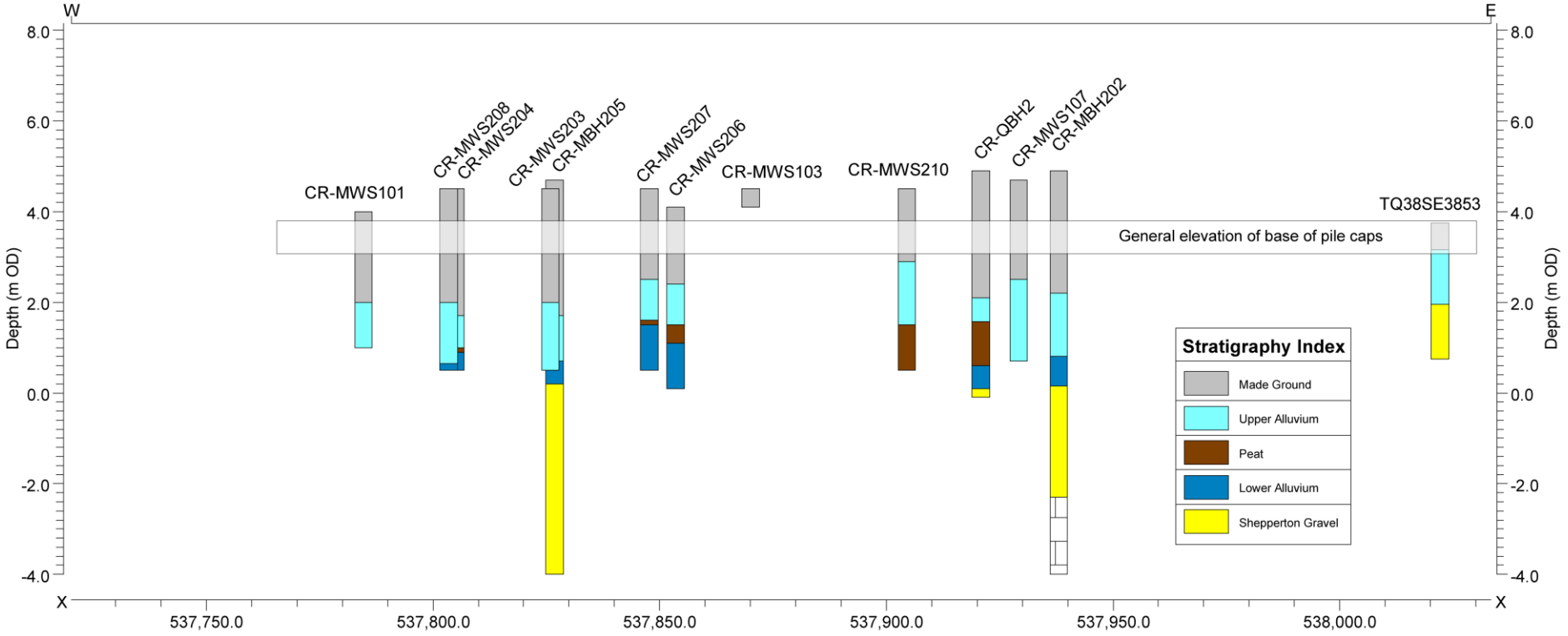

Figure 11: West-east transect of boreholes across the Cooks Road Block B site (see Figure 2 for orientation).

5. DISCUSSION AND CONCLUSIONS

The aims of the geoarchaeological investigations at the Cooks Road Block B site were: (1) to clarify the nature of the sub-surface stratigraphy, in particular the possible presence and thickness of alluvium and peat across the site, and (2) to evaluate the potential of the sedimentary sequences for reconstructing the environmental history of the site and its environs. In order to achieve this aim, a programme of geoarchaeological fieldwork and deposit modelling of the surface elevation and thickness of the major stratigraphic units at the site was carried out, incorporating data from the new geoarchaeological boreholes and existing geotechnical data from the site and the wider area.

The results of the deposit modelling have revealed a sequence of Late Devensian Lea Valley Gravel, overlain by Holocene alluvium (in places containing peat) and modern Made Ground. The deposit models indicate that the Gravel surface at the site is relatively even, lying at between -0.20 and 0.40m OD. Such elevations are consistent with those described during investigations in this area by Corcoran *et al.* (2011). The site lies within the area that has been investigated in the Lea Valley Mapping Project (Corcoran *et al.,* 2011), where the Lea Valley was divided into Landscape Zones characterised by their Holocene landscape history based largely on sedimentary evidence derived from borehole records. The site lies at the boundary between Landscape Zones 1.11 and 2.1, where the Lea Valley Gravel surface is described as lying at *ca*. 0.0-0.4m OD, although the gravels are incised to significant depths in places, indicating the main course of the channel and scour associated with tributary channels (Corcoran *et al.,* 2011). To the east of the site at Strand East (see Figure 1) the Gravel surface was generally recorded at between *ca*. 0 and -1m OD (Green & Batchelor, 2014), whilst *ca*. 200m to the west it rises sharply to between 2.4 and 2.6m OD, perhaps representing the 'low terrace' remnant of the Lea Valley Gravel described in this area by Corcoran *et al*. (2011). During investigations in connection with the development of the Olympic Park (Barrowman & Yendell, 2008) a trench (PDZ8.04/5.38(C)), 30m x 8m at base, was opened *ca*. 90m north-east of the north-east boundary of the site and close to the Bow Back River. The sediment sequence in this trench recorded the Lea Valley Gravel at 0.29m OD, whilst at a distance of about 320m to the north of the site, in trench PDZ8.04/5.35(C) the Gravel surface was seen to rise to 1.04m OD and retained evidence of prehistoric occupation (Late Bronze Age – Iron Age) in the form of ditches, pits and/or post holes with associated pottery and flintwork (Barrowman & Yendell, 2008).

Corcoran *et al*. (2011) describe the (Holocene) sediments overlying the Gravel in Landscape Zone 2.1 as predominantly silty clays with occasional organic silts and peat, up to 3m in thickness and representing a range of different depositional environments. Such a description is again consistent with the results of the deposit modelling at the present site: here, a locally-present horizon of peat is recorded within the alluvium in selected boreholes, generally lying at elevations of between *ca*. 0.4 and 1.8m OD and present in thicknesses of between 0.10 and 1.30m. At the Strand East site to the east (Green & Batchelor, 2014) peat was also patchily present (recorded in only 16 of the 67 sediment logs examined), and where the full thickness of the peat unit was recorded, the peat beds were thin, between 0.3m and 1.1m (Green & Batchelor, 2014).

Around 1km to the northwest, occasional peat units were recorded at similar elevations within the alluvium at the Fish Island, Neptune Wharf site (Batchelor *et al*., 2016; see Figure 1), whilst a thick peat horizon dating to the middle to late Mesolithic was recorded on the neighbouring Omega Works Phase III site (MoLAS, 2006). At the 79-85 Monier Road site meanwhile (Batchelor *et al*., 2016) two radiocarbon dates were obtained from peat directly overlying the Lea Valley Gravel. The lower sample yielded a date of 6180-5920 cal BP (early Neolithic), and the upper sample a date of 1290-1080 cal BP (Medieval). These dates are significantly different from dates obtained from organic material directly overlying gravel at a closely similar level recovered from borehole OM-WS02 at the Omega Works Phase III site; here the lower sample yielded a date of 9220-8750 cal BP and the upper sample 7270-7000 cal BP.

6. RECOMMENDATIONS

Peat horizons broadly equivalent in depth to those recorded at other nearby sites have been identified within the Holocene alluvial sequence at the Cooks Road Block B, overlying a relatively even Lea Valley Gravel surface. Peat deposits represent potential areas that might have been utilised or even occupied by prehistoric and historic people, evidence of which may be preserved in the archaeological record (e.g. features and structures). Even in the absence of the archaeological remains, the sediments have the potential to contain a wealth of further information on the past landscape, through the assessment/analysis of palaeoenvironmental remains (e.g. pollen, plant macrofossils and insects) and radiocarbon dating, as demonstrated at other sites in this area of the Lea Valley. Corcoran *et al*. (2011) state that the peat in this area should be 'dated and compared to the dates and characteristics of the peat with Landscape Zone 1.3' (p. 51), in order to establish whether or not it belongs to the more widespread Neolithic/Bronze Age peat of the east London Thames floodplain. If it does, Corcoran *et al*. (2011) acknowledge that its survival in this area of the Lea Valley would suggest that 'this locality did not lie within an active Neolithic or Bronze Age river channel, and that it has not been subsequently eroded by later prehistoric and historic river channels' (p. 51); such a conclusion would suggest that evidence for prehistoric activity may be preserved within peat horizons at the site, and both its archaeological and palaeoenvironmental potential are therefore considered to be significant.

So called environmental archaeological or palaeoenvironmental investigations (such as those carried out at the 79-85 Monier Road and Omega Works Phase III sites) can identify the nature and timing of changes in the landscape, and the interaction of different processes (e.g. vegetation change, human activity, climate change, hydrological change) thereby increasing our knowledge and understanding of the site and nearby area. In the case of human activity, palaeoenvironmental evidence can include: (1) decreases in tree and shrub pollen suggestive of woodland clearance; (2) the presence of herbs indicative of disturbed ground, pastoral and/or arable agriculture; (3) charcoal/microcharcoal suggestive of anthropogenic or natural burning, and (4) insect taxa indicative of domesticated animals. In addition, there is some uncertainty as to the age of the peat deposits at the present site, given the variable age of the deposits at the sites to the northeast (see above). A programme of environmental archaeological assessment of borehole CR-QBH2 is therefore recommended, incorporating: (1) Organic matter determinations to aid identification of

the sedimentary units; (2) radiocarbon dating of the peat horizon recorded within the alluvium; and (3) assessment of the palaeobotanical remains (pollen, waterlogged wood and seeds) to provide a provisional reconstruction of the vegetation history.

With regards to the archaeological potential of the present site, the Gravel surfaces recorded (up to 0.4m OD) are not significantly lower than those at the Olympic Park, and may have represented an area of higher, drier ground at times during the prehistoric period, not far from the more deeply incised channels of the Lea Valley. In addition, although only locally present, the peat horizons recorded would have represented semi-terrestrial land surfaces which might have been utilised by prehistoric people (as described above). Further archaeological investigations at the site are therefore considered appropriate.

7. IMPACT OF THE DEVELOPMENT

As part of the construction at the site, a series of piles and pile caps are to be emplaced at various locations across much of the area of investigation (see Figure 12). In general, the top of the foundations lie at between 3.91 and 4.1m OD in the east, south and northeast, and between 4.675 and 4.775m OD towards the centre and northwest. Across these areas the piling caps are generally 0.9m deep, with some exceptions of up to 1.8m (see below). In general, the pile caps will therefore result in disturbance of the sequence to a level of between 3.01 and 3.2m OD in the east, south and northeast, and between 3.775 and 3.875m OD towards the centre and northwest. The piles in the area of the two Pile Caps labelled Pile Cap TC will result in disturbance of the sequence to a level of 1.15m OD, in the area of Pile Caps Core B1, B2, B5 to a level of 2.95m OD, and at B4 to 2.65m OD.

The base of the pile caps therefore (with the exception of in the two locations of Pile Cap TC) lie above the general range of the peat (0.4 to 1.8m OD) and the Gravel (-0.20 and 0.40m OD) at the site), and only occasionally exceed the depth of the base of the Made Ground. However, the depth of the piles (to bedrock or deeper) being put down is likely to exceed the depth of the entire Holocene sequence, and their number, density and distribution across the site means that the peat horizon, where present, is likely to be impacted and altered by the piling procedure. In addition, the likely negative impact on the peat at the site supports the case for further environmental archaeological assessment of the samples collected from the site, as outlined in section 6.

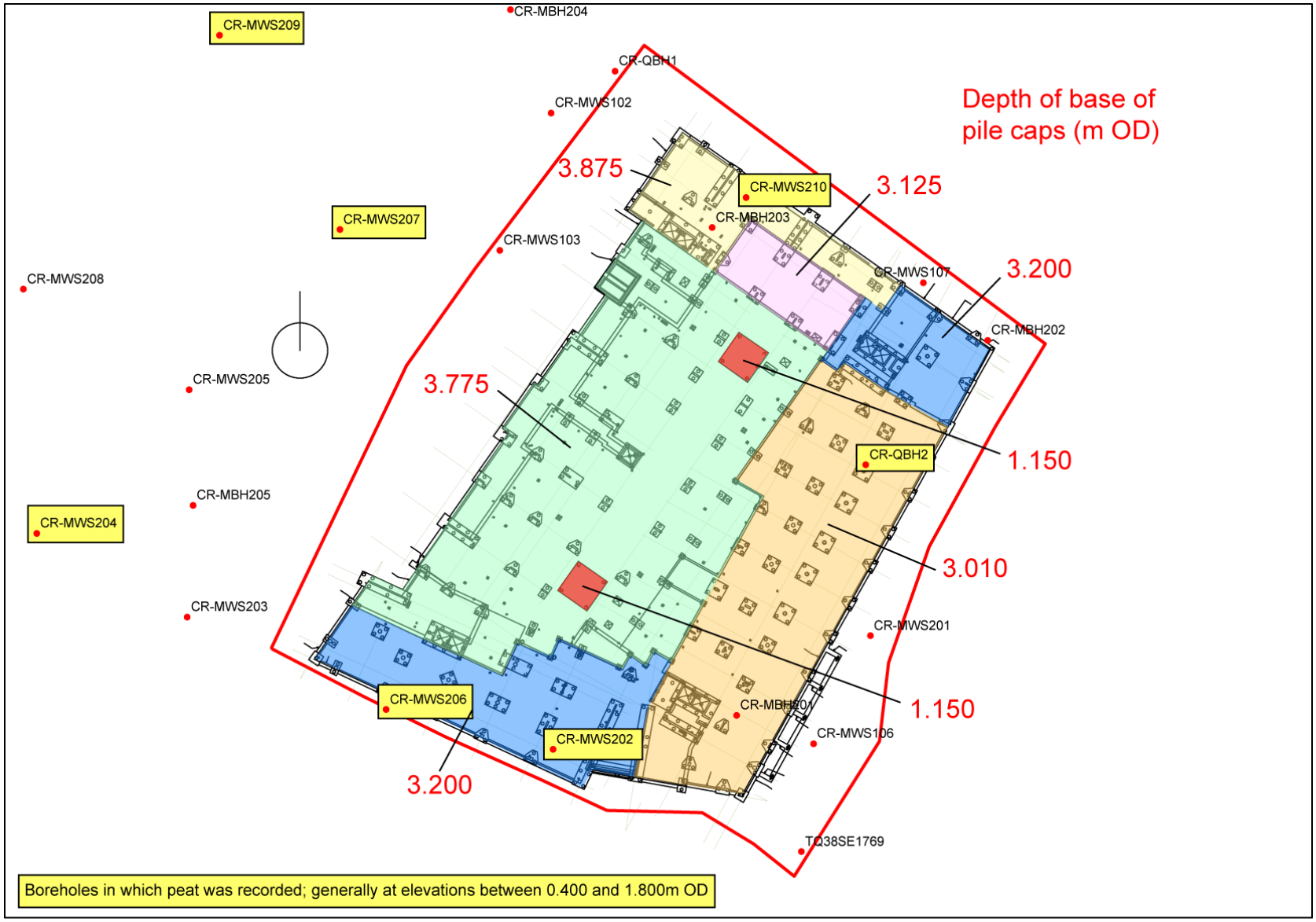

Figure 12: Impact of the pile caps at the Cooks Road Block B site.

8. REFERENCES

Batchelor, C.R., Green, C.P., Young, D.S. and Hill, T. (2016a) 79-85 Monier Road, London Borough of Tower Hamlets Geoarchaeological Assessment Report. *Quaternary Scientific (QUEST) Unpublished Report June 2016; Project Number 032/16.*

Batchelor, C.R., Green, C.P. and Young, D.S. (2016b) Fish Island, Neptune Wharf, London Borough of Tower Hamlets Geoarchaeological Assessment Report. *Quaternary Scientific (QUEST) Unpublished Report April 2016; Project Number 088/15.*

Corcoran, J., Halsey, C., Spurr, G., Burton, E. and Jamieson, D. (2011) *Mapping past landscapes in the Lower Lea Valley: A geoarchaeological study of the Quaternary sequence*. Museum of London Archaeology, MOLA Monograph 55.

CgMs Consulting (2014) Land at Cooks Road Stratford London E15 Archaeological Desk Based Assessment. *CgMs Consulting Unpublished Report, May 2014.*

Gibbard, P. (1994) *The Pleistocene history of the Lower Thames Valley*. Cambridge: Cambridge University Press.

Green, C.P. & Batchelor, C.R. (2014) *A report on the geoarchaeological deposit modelling on land at Strand East, London Borough of Newham*. Quaternary Scientific (QUEST) Unpublished Report November 2014; Project Number 221/14.

MoLAS, (2006) Omega Works Phase III, Crown Wharf, Roach Road, London E3, London Borough of Tower Hamlets: A Geoarchaeological Report

Powell, A.B (2012) *By River, Fields and Factories: the making of the lower Lea valley*. Wessex Archaeology Report No.29.

Tröels-Smith, J. (1955) Karakterisering af løse jordater (Characterisation of unconsolidated sediments), *Danm. Geol. Unders.*, *Ser IV* 3, 73.

Young, D.S. and Green, C.P. (2016) Cooks Road Block B, Pudding Mill Lane, London Borough of Newham. Written Scheme of Investigation. *Quaternary Scientific (QUEST) Unpublished Report, October 2016; Project Number 109/15.*

9. APPENDIX

Table A1: Boreholes and test pits used in the deposit model, Cooks Road Block B, London Borough of Newham.

Name	Easting	Northing	Elevation (m OD)	Total Depth (m)
Geoarchaeological boreholes (present investigation)				
CR-QBH1	537884.00	183319.00	4.75	5.00
CR-QBH2	537919.00	183264.00	4.90	5.00
Geotechnical boreholes (Idom Merebrook, 2015)				
CR-MBH201	537900.97	183229.04	4.70	20.45
CR-MBH202	537936.03	183281.39	4.90	25.00
CR-MBH203	537897.53	183297.13	4.50	25.00
CR-MBH204	537869.38	183327.56	4.80	25.00
CR-MBH205	537825.03	183258.37	4.70	25.00
Geotechnical boreholes (CgMs Consulting, 2014)				
CR-MWS101	537782.83	183266.31	4.00	3.00
CR-MWS102	537875.04	183313.14	4.70	3.00
CR-MWS103	537867.90	183293.96	4.50	0.40
CR-MWS106	537911.69	183225.07	4.80	5.00
CR-MWS107	537927.03	183289.46	4.70	4.00
CR-MWS201	537919.62	183240.15	5.00	4.00
CR-MWS202	537875.31	183224.28	4.40	4.00
CR-MWS203	537824.24	183242.76	4.50	4.00
CR-MWS204	537803.21	183254.44	4.50	4.00
CR-MWS205	537824.51	183274.51	5.00	4.00
CR-MWS206	537852.02	183229.83	4.10	4.00
CR-MWS207	537845.54	183296.87	4.50	4.00
CR-MWS208	537801.35	183288.53	4.50	4.00
CR-MWS209	537828.74	183323.99	4.40	4.00
CR-MWS210	537902.29	183301.36	4.50	4.00
Olympic Park (Barrowman & Yendell, 2008)				
PDZ8.04/5.35(C)	538000.49	183363.56	4.80	5.00
Boreholes/test pits from Strand East (Green & Batchelor, 2014)				
BH13/101	537973.88	183081.95	4.91	10.00
BH13/102	537972.76	183080.03	4.96	10.00
BH13/103	538041.55	183127.62	5.07	10.00
BH13/104	538040.96	183151.92	4.39	10.00
BH13/105	538082.37	183176.68	4.80	10.30
BH13/106A	538141.80	183293.37	4.97	10.00
BH13/107	538142.12	183289.17	4.98	10.00
BH13/110	538178.58	183261.14	3.60	10.00
BH13/111	538178.76	183258.27	3.62	10.00
BH13/112	538154.82	183200.27	3.45	10.00
BH13/113	538155.45	183197.33	3.48	10.00
BH13/114	538096.51	183151.41	4.48	5.00
BH13/115	538096.00	183149.10	4.43	10.00
BH13/116	538100.66	183090.23	4.95	12.00
BH13/117	538100.20	183092.21	4.96	20.00

Name	Easting	Northing	Elevation (m OD)	Total Depth (m)
BH13/118	538093.44	183060.08	5.06	20.00
BH13/120	538121.74	183049.67	4.86	20.00
BH13/121A	538133.26	183029.82	4.86	12.00
BH13/123	538186.34	183092.02	4.03	20.00
BH13/124	538188.54	183160.44	2.95	3.00
BH13/126	538101.22	183251.89	4.76	10.00
BH13/134	538195.88	183004.37	4.36	6.00
BH13/135	538193.64	183003.89	4.36	20.00
BH13/136	538173.53	183009.48	4.89	20.00
BH13/137	538175.78	183009.59	4.80	12.00
BH13/148	537998.64	183075.29	4.85	7.00
BH13/149	538136.96	183284.72	4.89	5.00
BH13/150	538128.09	183279.85	4.79	5.00
BH13/161	538121.13	183055.22	4.75	6.00
BWB_TT10	538058.33	183147.45	4.28	0.00
BWB_TT11	538008.43	183119.52	4.52	0.00
BWB_TT12	538057.36	183107.76	4.76	3.65
BWB_TT5	538155.17	183048.41	4.72	0.00
BWB_TT6	538129.75	183090.88	4.17	0.00
BWB_TT7	538106.63	183125.96	4.24	0.00
BWB_TT9	538030.87	183156.30	4.26	0.00
CPT1	538181.23	183237.44	3.32	0.00
CPT10	538181.89	183106.17	3.12	0.00
CPT11	538160.73	183096.11	3.14	0.00
CPT12	538138.78	183088.24	3.50	0.00
CPT13	538171.13	183084.67	4.33	0.00
CPT14	538184.06	183071.19	4.14	0.00
CPT15	538156.50	183060.13	4.92	0.00
CPT2	538180.88	183220.94	3.34	0.00
CPT3	538192.34	183223.42	3.47	0.00
CPT4	538190.47	183205.95	3.35	0.00
CPT5	538190.62	183194.54	3.00	0.00
CPT7	538186.76	183183.15	3.11	0.00
CPT8	538166.32	183127.08	3.04	0.00
CPT9	538138.52	183112.98	3.46	0.00
PBA 2011 TP1008	538154.06	183207.70	3.33	3.80
PBA2011 TP1007	538165.84	183143.43	3.04	4.00
TP13/102	538018.76	183089.29	4.44	0.00
TP13/103	537977.74	183109.71	4.47	0.00
TP13/104	537982.56	183076.84	4.70	0.00
TP13/105	538007.04	183074.75	4.75	0.00
TP13/106	538025.09	183067.94	5.18	0.00
TP13/107	537984.79	183097.28	4.41	0.00

Name	Easting	Northing	Elevation (m OD)	Total Depth (m)
TP13/108	538029.01	183117.45	4.99	0.00
TP13/109	538043.27	183067.79	4.49	0.00
TP13/110	538066.84	183076.00	4.78	0.00
TP13/111	538088.86	183070.32	4.97	0.00
TP13/112	538086.99	183112.46	4.93	0.00
TP13/113	538074.40	183134.88	4.98	0.00
TP13/114	538064.21	183153.01	4.39	0.00
TP13/115	538090.89	183171.24	4.76	0.00
TP13/117	538127.65	183206.76	3.41	0.00
TP13/118	538138.84	183199.65	3.58	0.00
TP13/120	538142.02	183142.64	3.24	3.10
TP13/121	538175.62	183148.54	3.06	0.00
TP13/121AS	538117.98	183046.77	4.83	0.00
TP13/122	538189.12	183189.12	3.01	0.00
TP13/123	538186.35	183091.96	4.00	0.00
TP13/124	538181.77	183209.21	3.34	0.00
TP13/125	538146.16	183229.30	3.36	0.00
TP13/128	538186.66	183285.23	3.88	0.00
TP13/128A	538180.31	183275.05	3.69	0.00
TP13/129	538175.12	183250.68	3.50	2.40
TP13/130	538186.07	183227.41	3.36	0.00
TP13/131	538185.78	183215.72	3.29	0.00
TP13/142	538178.73	183123.74	3.16	0.00
TP13/143	538164.32	183117.99	3.06	3.00
TP13/144	538152.40	183129.29	3.10	0.00
TP13/145	538132.34	183113.72	3.43	0.00
TP13/146	538119.60	183100.98	3.99	0.00
TP13/147	538134.50	183103.08	3.48	0.00
TP13/148	538150.53	183091.64	3.52	0.00
TP13/149	538172.48	183100.22	3.28	0.00
TP13/155	538186.09	183083.81	3.86	5.00
TP13/156	538133.40	183051.04	4.76	0.00
TP13/157	538173.41	183056.88	4.20	0.00
TP13/162	538192.88	183043.07	3.89	0.00
TP13/163	538127.82	183015.42	4.69	0.00
TP13/164	538138.29	183026.23	4.78	0.00
TT12A	538059.97	183111.37	4.72	0.00
TT12B	538060.85	183110.60	4.73	0.00
TT12C	538054.63	183104.21	4.74	0.00
TT12D	538053.91	183104.91	4.78	0.00
TT5A	538159.22	183049.67	4.68	0.00
TT5B	538158.73	183050.99	4.71	0.00
TT5C	538150.07	183046.48	4.83	0.00

Name	Easting	Northing	Elevation (m OD)	Total Depth (m)
TT5D	538150.72	183045.14	4.86	0.00
TT6A	538127.09	183088.77	4.39	0.00
TT6B	538126.35	183089.84	4.41	0.00
TT6C	538131.12	183091.29	4.01	0.00
TT6D	538130.39	183092.63	3.99	0.00
TT6GL	538132.99	183093.01	3.52	0.00
TT7A	538101.73	183125.06	4.34	0.00
TT7B	538102.51	183123.29	4.34	0.00
TT7C	538111.74	183126.64	3.79	0.00
TT7D	538111.25	183128.01	3.85	0.00
BGS archive boreholes (www.bgs.ac.uk/opengeoscience)				
TQ38SE1116	537710.00	183140.00	4.00	3.60
TQ38SE1117	537710.00	183170.00	4.00	3.80
TQ38SE1769	537910.00	183210.00	4.00	15.00
TQ38SE1777	537830.00	183370.00	4.00	15.00
TQ38SE239	537880.00	183100.00	4.79	13.72
TQ38SE240	538100.00	183050.00	4.60	10.67
TQ38SE242	538130.00	183030.00	8.56	10.00
TQ38SE266	538110.00	183120.00	5.06	20.00
TQ38SE3853	538020.00	183290.00	3.75	3.00

10. OASIS FORM

OASIS ID: quaterna1-267534

Project details

Project name	Cooks Road Block B
Short description of the project	A programme of geoarchaeological fieldwork and deposit modelling was carried out at the site in order to (1) clarify the nature of the sub-surface stratigraphy, in particular the possible presence and thickness of alluvium and peat across the site, and (2) to evaluate the potential of the sedimentary sequences for reconstructing the environmental history of the site and its environs. The results of the deposit modelling have revealed a sequence of Late Devensian Lea Valley Gravel, overlain by Holocene alluvium (in places containing peat) and modern Made Ground. The deposit models indicate that the Gravel surface at the site is relatively even, lying at between -0.20 and 0.40m OD, consistent with previous investigations in this area by Corcoran et al. (2011; the Lea Valley Mapping Project). A locally-present horizon of peat is recorded within the alluvium in selected boreholes, lying at elevations of between ca. 0.4 and 1.8m OD

	and present in thicknesses of between 0.10 and 1.30m; the patchy, generally thin nature of the peat is consistent with other investigations in this area of the Lea Valley: peat horizons broadly equivalent in depth, but of variable age (including Mesolithic through to Medieval), have been recorded at other nearby sites. A programme of environmental archaeological assessment was therefore recommended on one borehole (CR-QBH2) recovered from the site.
Project dates	Start: 01-10-2016 End: 03-11-2016
Previous/future work	No / Not known
Any associated project reference codes	CBB16 - Sitecode
Type of project	Environmental assessment
Survey techniques	Landscape

Project location

Country	England
Site location	GREATER LONDON NEWHAM STRATFORD Cooks Road Block B
Postcode	E15 2PN
Site coordinates	TQ 3787 8330 51.531253422728 -0.01212337621 51 31 52 N 000 00 43 W Point

Project creators

Name of Organisation	Quaternary Scientific (QUEST)
Project brief originator	CgMs Consulting
Project design originator	D.S. Young
Project director/manager	C.R. Batchelor
Project supervisor	D.S. Young
Type of sponsor/funding body	Developer

Project archives

Physical Archive Exists?	No
Digital Archive Exists?	No
Paper Archive recipient	LAARC
Paper Contents	"Environmental"
Paper Media available	"Report"

Entered by	Daniel Young (d.s.young@reading.ac.uk)
Entered on	3 November 2016