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GREENWICH PENINSULA PLOT 19.05, EAST PARKSIDE, ROYAL BOROUGH OF GREENWICH

Geoarchaeological Deposit Model Report

NGR: TQ 3967 7950

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1. NON-TECHNICAL SUMMARY

A programme of geoarchaeological fieldwork and deposit modelling was carried out in order to: (1) map the height and thickness of the deposits; (2) assess their geoarchaeological, archaeological and palaeoenvironmental potential, and (3) provide recommendations for any further assessment. In order to address these aims, two geoarchaeological boreholes were retained from the site, and a deposit model prepared using the new geoarchaeological and existing geotechnical data for the site. The results of the deposit modelling indicate that the sediments present beneath Plot 19.05 are similar in character to those recorded elsewhere on Greenwich Peninsula; the Late Devensian Shepperton Gravel is overlain by a sequence of Holocene alluvial sediments, buried beneath modern Made Ground. The site lies in an area of generally lower Gravel topography (the surface of which lies at between -3.56 and -2.38m OD), perhaps either within or on the margins of a former Late Devensian/Early Holocene channel. The archaeological potential of the site is therefore considered to be limited. Between 1.7 and 4m of Holocene alluvium was recorded overlying the Gravel, within which peat was recorded at one location between -1.58 and -2.38m OD. On the basis that the sediments at the site are largely inorganic, and no peat was recorded within the new geoarchaeological boreholes, no further environmental archaeological assessment is recommended.

2. INTRODUCTION

2.1 Site context

This report summarises the findings arising out of the fieldwork and deposit modelling undertaken by Quaternary Scientific (University of Reading) in connection with the proposed development of land at Greenwich Peninsula Plot 19.03, East Parkside, Royal Borough of Greenwich (National Grid Reference: TQ 3967 7950; Figures 1 & 2). Quaternary Scientific were commissioned by RPS Planning & Development to undertake the geoarchaeological investigations. The site is located towards the south of Greenwich Peninsula, bounded to the west by East Parkside and to the south by Pilot Walk (Figure 1). Greenwich Peninsula itself is formed and bounded by a meander of the Thames to the west, east and north of the site, and lies opposite the confluence of the River Lea. The ground across the area originally formed part of the natural floodplain of the Thames, and is underlain by river alluvium (British Geological Survey 1:50,000 sheets 256 North London 1993, 257 Romford 1996, 270 South London 1998, 271 Dartford 1998). This alluvium consists of fine-grained mineral-rich deposits and peat, and is mapped to the south to approximately the position of the A206 where it meets higher drier ground. Beneath the alluvium, sand and gravel is present and is assigned by Gibbard (1994) to the Late Devensian Shepperton Gravel. The bedrock beneath this is mapped as the Palaeogene Lambeth Group – Clay, Silt and Sand. Ground level at the site is recorded at between *ca*. 4.9 and 5.3m OD (Ian Farmer Associates, 2016).

The results of previous geotechnical investigations at the site (Ian Farmer Associates, 2016) revealed a sequence of Shepperton Gravel overlain by alluvium, frequently described as organic and containing pockets of peat, overlain by Made Ground. In one borehole a peat horizon is recorded directly overlying the Gravel, between -1.58 and -2.38m OD (borehole 19.05.BH2). In one borehole

Made Ground directly overlies the Gravel (19.05.BH6). The Gravel surface was recorded at the site at between -3.28 and -2.38m OD, and appears to fall gently northwards from *ca.* -2.5m OD in the south to between -3.0 and -3.5m OD in the north. Elsewhere on Greenwich Peninsula (see Figure 1), relatively high Gravel surfaces (between *ca.* -0.9 and -1.7m OD) have been recorded on the Tunnel Avenue (Landscape Zone B; Batchelor, 2013), Victoria Deep Water Terminal (Landscape Zone A; Corcoran, 2002) and Plot 18.03 (Young & Batchelor, 2017) sites; elsewhere, the Gravel surface drops to below -4m OD, interpreted as either localised hollows, or part of interconnected palaeochannels (see below).

Peat has been identified elsewhere on Greenwich Peninsula, including at the Victoria Deep Water Terminal site (Corcoran, 2002), where peat accumulation was radiocarbon dated to 5280-4660 cal BP (Middle-Late Neolithic), whilst at the Cable Car South Station (*ca.* 50m to the east; Green et al., 2011), the beginning of accumulation was dated to ca. 5580-5310/5890-5610 cal BP (Middle Neolithic), continuing until at least 3380-3210 cal BP Late Bronze Age). At Greenwich Peninsula Central East (Young & Batchelor, 2015a) a complex sequence of alluvium and at least three intercalated peat horizons of between 0.1 and 1.0m thickness were recorded, dated to 6720-6500 cal BP (lower Peat; Late Mesolithic), 6190-5990 cal BP (middle Peat; Early Neolithic) and 3340 to 3080 cal BP (upper Peat; Middle Bronze Age). The peat horizons recorded across much of Greenwich Peninsula thus appear to have accumulated within the same general age range of 6700 to 3000 cal BP (late Mesolithic to late Bronze Age; broadly equivalent to Devoy's (1979) Tilbury III Peat).

2.2 Geoarchaeological, palaeoenvironmental and archaeological significance

The peat and the organic alluvium recorded at the Plot 19.05 site represents a period of semi-terrestrial conditions that may date to the Neolithic through to the Bronze Age. The palaeoenvironmental potential of the sequences at the site is therefore considered to be high. On the basis of the radiocarbon dates from sites elsewhere on the Peninsula, it is possible that the peat at the present site may have been accumulating at the same time as trackway construction occurred at the 72-88 Bellot Street (Mclean, 1993; Philp, 1993) and the Garage Site, Bellot Street (Branch *et al.*, 2005) sites (Bronze Age) approximately 600m to the southwest. In addition, the existing records from the nearby area indicate a variable sequence of Holocene alluvial deposits resting, on a highly variable Shepperton Gravel surface. The different deposits recorded represent different environmental conditions that would have existed in a given location. For example: (1) variations in the topography of the River Terrace Gravels could indicate the position of former channels and islands on the floodplain; (2) the presence of soils and peat represent former terrestrial or semi-terrestrial land-surfaces, and (3) the less organic alluvial deposits of sands/silts/clays represent periods of varying hydrological conditions on the floodplain. At present, our understanding is that the Plot 18.03 site lies at the interface between slightly raised and deeper gravel surfaces, potentially indicative of a channel-marginal setting, overlain by organic-rich deposits and peat. By studying the sub-surface stratigraphy across the site in greater detail, it will be possible to build a greater understanding of the former landscapes and environmental changes that took place over space and time at this location of Greenwich Peninsula.

Organic-rich sediments (in particular peat) also have high potential to provide a detailed reconstruction of prehistoric environments on both the wetland and dryland. In particular, there is the potential to increase knowledge and understanding of the interactions between hydrological change, human activity, vegetation succession and climate in this area of the Middle Thames Valley. Important vegetation changes include the early Holocene/early Mesolithic transition from pine-dominated to mixed-deciduous dominated woodland; the late Mesolithic/Neolithic decline of elm woodland, the Neolithic colonisation and decline of yew woodland; the late Neolithic/early decline of wetland and dryland woodland. Such investigations are carried out through the assessment/analysis of palaeoecological remains (e.g. pollen, plant macrofossils & insects) and radiocarbon dating. So called palaeoenvironmental reconstructions have been carried out on the sedimentary sequences from elsewhere in this general area, including at the Victoria Deep Water Terminal site (Corcoran, 2002), at the Cable Car South Station (Green et al., 2011), Greenwich Peninsula Central East (Young & Batchelor, 2015a), Enderby Wharf (Batchelor et al., 2015) and Alcatel-Lucent Telegraph Works (Young & Batchelor, 2015b).

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 structure) and palaeoenvironmental record (e.g. changes in vegetation composition). As stated above, such evidence was identified in the form of a Bronze Age trackway at the 72-88 Bellot Street (Mclean, 1993; Philp, 1993) and Garage Site, Bellot Street (Branch *et al.*, 2005) sites (Bronze Age) approximately 600m to the southwest.

2.3 Aims and objectives

On the basis of the geoarchaeological, palaeoenvironmental and archaeological potential of the site, further records are required to enhance our understanding of the sub-surface stratigraphy of Plot 19.05, and for any further assessment/analysis of the deposits (if necessary). Five research aims relevant to the geoarchaeological investigations were outlined within the written scheme of investigation for the site (Young, 2017), as follows:

1. To clarify the nature of the sub-surface stratigraphy across the site
2. To clarify the nature, depth, extent and date of any former land surfaces, alluvial and peat deposits;
3. To compare the results of the investigation to the other sites in the area of Greenwich Peninsula;
4. To investigate whether the sequences contain any artefact or ecofact evidence for prehistoric or historic human activity;
5. To investigate whether the sequences contain any evidence for natural and/or anthropogenic changes to the landscape (wetland and dryland);
6. To integrate the new geoarchaeological record with ongoing investigations in the area of Greenwich Peninsula (including those carried out as a response to the Historic England

Archaeological Brief and Plot Specific WSI), and other recent work in the local area, for publication in an academic journal.

In order to address the first two of these aims, the following objectives are proposed:

1. To retrieve undisturbed continuous samples from two targeted borehole locations for laboratory-based investigation;
2. To use the stratigraphic data from the new locations, and existing records to produce a deposit model of the major depositional units across the site;
3. To make recommendations for any further geoarchaeological, palaeoenvironmental and archaeological investigation at the mitigation stage.


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Figure 1: Location of (1) Greenwich Peninsula Plot 19.05, Royal Borough of Greenwich and selected other geoarchaeological and archaeological sites nearby: (2) Greenwich Peninsula Plot 18.03 (Young & Batchelor, 2017); (3) Plot MO115 (Young & Batchelor, 2013b); (4) Plot MO117 (JHW13; Young & Batchelor, 2013a); (5) Greenwich Millennium Village (Miller & Halsey, 2011); (6) Land between A102(M) & Bugsby's Way (GPN98); (7) The Leisure Site, Bugsby's Way (BW99); (8) Land between A102(M) & Bugsby's Way (GPN98); (9) Enderby Wharf, Christchurch Way (Batchelor *et al*., 2015a); (10) Alcatel-Lucent Telegraph Works (Young & Batchelor, 2015b); (11) Greenwich Wharf (Nicholls *et al*., 2017); (12) Plot MO401 (Batchelor, 2014); (13) Bellot Street (GLB05; Branch *et al*., 2005); (14) 72-88 Bellot Street (BSG93; McLean, 1993; Philp, 1993); (15) Tunnel Avenue (GPF12; Batchelor, 2013); (16) Greenwich Peninsula Central East (Young & Batchelor, 2015a); (17) The Cable Car route (CAB11; Batchelor *et al*., 2015b); (18) Victoria Deep Water Terminal (TUA02; Corcoran, 2002).

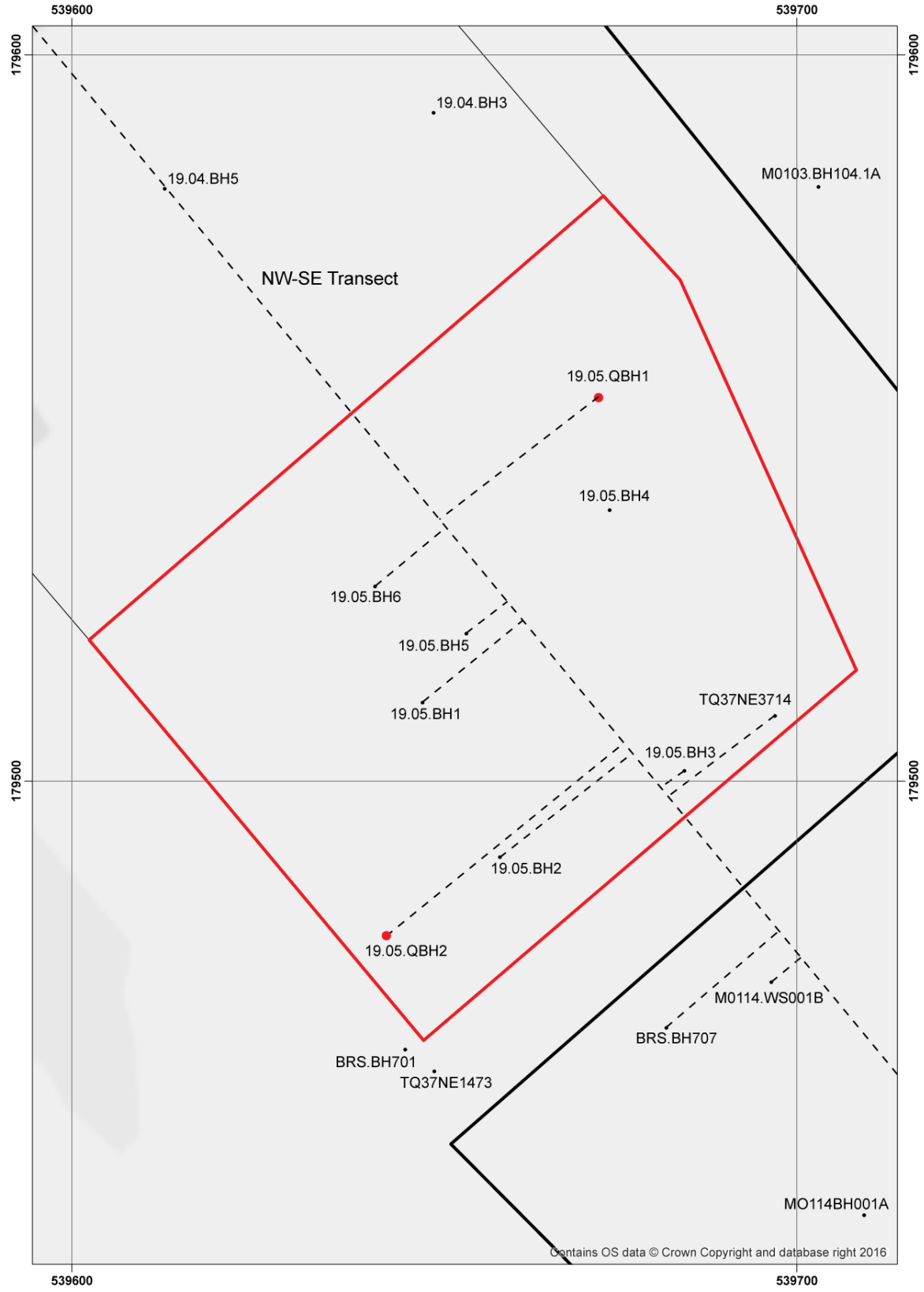

Figure 2: Location of previous geotechnical boreholes, the new geoarchaeological boreholes (19.05.QBH1 and 19.05.QBH2) and British Geological Survey (BGS) archive boreholes at Greenwich Peninsula Plot 19.05, Royal Borough of Greenwich.

3. METHODS

3.1 Field investigations

Two geoarchaeological boreholes (boreholes 19.05.QBH1 and 19.05.QBH2) were put down at the site in March 2017 by Quaternary Scientific (Figure 2). The borehole core samples were recovered using an Eijkelkamp window sampler and gouge set using an Atlas Copco TT 2-stroke percussion engine. This coring techniques provide a suitable method for the recovery of continuous, undisturbed core samples and provides sub-samples suitable for not only sedimentary and microfossil assessment and analysis, but also macrofossil analysis. Spatial co-ordinates for each borehole were obtained using a Leica Differential GPS.

3.2 Lithostratigraphic description

Laboratory-based lithostratigraphic descriptions of the new borehole samples was carried out using standard procedures for recording unconsolidated sediment and peat, noting the physical properties (colour), composition (gravel, sand, clay, silt and organic matter) and inclusions (e.g. artefacts). The procedure involved: (1) cleaning the samples with a spatula or scalpel blade and distilled water to remove surface contaminants; (2) recording the physical properties, most notably colour; (3) recording the composition e.g. gravel, fine sand, silt and clay; (4) recording the degree of peat humification, and (5) recording the unit boundaries e.g. sharp or diffuse. The results are displayed in Tables 1 and 2.

3.3 Deposit modelling

The deposit model for the Plot 19.05 site was based on a review of 8 borehole records for the site itself, including the two new geoarchaeological boreholes and six previous geotechnical records (Figure 2). This new data was incorporated in to the existing Quest data set for Greenwich Peninsula and the London Borough of Newham, incorporating over 4000 geotechnical, geoarchaeological and archaeological interventions (see Young *et al.*, in press and Figure 11). Sedimentary units from the boreholes were classified into seven groups: (1) Bedrock, (2) Gravel, (3) Sand, (4) Lower Alluvium. (5) Peat, (6) Upper Alluvium and (7) Made Ground. The classified data for groups 1-7 were then input into a database within the RockWorks 16 geological utilities software, the output from which was generated using ArcMap 10. A northeast to southwest borehole transect across the site is displayed in Figure 3. Models of surface height were generated for the Gravel, Lower Alluvium, Peat and Upper Alluvium using an Inverse Distance Weighted algorithm (Figures 4, 5, 6 and 8). Thickness of the Peat, total Holocene alluvium (incorporating the Lower Alluvium, Peat and Upper Alluvium) and Made Ground (Figures 7, 9 and 10) were also modelled (also using an Inverse Distance Weighted algorithm).

Because the boreholes are not uniformly distributed over the area of investigation, the reliability of the models generated using RockWorks is variable. In general, reliability improves from outlying areas where the models are largely supported by scattered archival records towards the core area of commissioned boreholes. 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 and section drawings. As a consequence of this the modelling procedure has been manually

adjusted so that only those areas for which sufficient stratigraphic data is present will be modelled. In order to achieve this, a maximum distance cut-off filter equivalent to a 50m radius around each record is applied to all deposit models from site; for the model of the wider area (Figure 11), a 100m radius is used in order to more easily place the site in its wider topographical context. In addition, it is important to recognise that multiple sets of boreholes are represented, put down at different times and recorded using different descriptive terms and subject to differing technical constraints in terms of recorded detail including the exact levels of the stratigraphic boundaries.

4. RESULTS, INTERPRETATION & DISCUSSION OF THE LITHOSTRATIGRAPHIC DESCRIPTIONS AND DEPOSIT MODELLING

The results of the deposit modelling are displayed in Figures 3 to 11. Figure 3 is a two-dimensional northeast-southwest transect of selected boreholes across the area of the site, whilst Figures 4 to 10 are surface elevation and thickness models for each of the main stratigraphic units at the site. Figure 11 is a surface elevation model for the Gravel across the wider area of Greenwich Peninsula. 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 site.

The full sequence of sediments recorded in the boreholes comprises:

Made Ground
Upper Alluvium – widely present
Peat – present in one borehole
Lower Alluvium – locally present
Gravel – widely present

4.1 Gravel

The Shepperton Gravel was present in all the boreholes that penetrated to the bottom of the Holocene sequence (eight of the nine records). It was deposited during the Late Glacial (15,000 to 10,000 years before present) 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.

Within the area of the site, the surface of the Gravel is relatively low, lying at between -3.56 (19.05.QBH1) and -2.38m OD (19.05.BH2) (Figures 3 and 4). In general, the Gravel surface is slightly higher toward the east of the site (-2.38 to -2.47m OD) than it is towards the west (-2.93 to -3.53m OD). The wider model (Figure 4) indicates that the Gravel surface falls further both towards the northwest and west, to *ca.* -3.5m OD, falling from the higher Gravel surfaces of *ca.* -1.5 to -2m OD to the southeast of the site. The models thus indicate that the site lies within or on the margins of a depression in the Gravel topography, perhaps forming part of the interconnected palaeochannels

that have been identified in the Late Devensian/Early Holocene topography of Greenwich Peninsula (see Figure 11 and Young *et al.*, in press).

Perhaps one of the most substantial of these channels is that aligned broadly west-east and underlying the Alcatel-Lucent (Batchelor *et al.*, 2015), Enderby Wharf (Batchelor & Young, 2015) and 20 Horn Lane (Batchelor & Young, 2017) sites, *ca.* 800m to the south. This channel reaches slightly deeper depths of around -4m OD, although towards its eastern end at 20 Horn Lane and Greenwich Millennium Village (Miller & Halsey, 2011), the Shepperton Gravel is lower, ranging between -4 and -8m OD. Further onto the main area of Greenwich Peninsula, the Shepperton Gravel surface is recorded in various places down to -4m OD representing the presence of further smaller, but important channels. For example, towards the north-east of the Tunnel Avenue site the Gravel surface drops to below -4m OD. It does the same towards the far south-eastern corner of the Greenwich Millennium Village site (Miller & Halsey, 2011), across much of Greenwich Peninsula Central East (Young & Batchelor, 2015a), *ca.*500m to the northwest, and to the west of Plot 18.03 (Young & Batchelor. 2017). In addition, smaller 'patches' of lower gravel surface >-4m OD were recorded towards the centre and south-western areas of the Millennium Festival Site (Landscape Zone D; Bowsher & Corcoran, unknown). These areas of lower Gravel surface have been interpreted as either localised hollows, or part of interconnected palaeochannels.

To the southeast of the present site the Gravel surface rises to between *ca.* -2 and -1.5m OD. Similar, relatively high Gravel surfaces (between *ca.* -1 and -1.7m OD) were recorded towards the north of the Peninsula on the Tunnel Avenue (Landscape Zone B; Batchelor, 2013) and Victoria Deep Water Terminal sites (Landscape Zone A; Corcoran, 2002). These topographic features represent small, but important former islands. Wherever the Gravel surface reaches such elevations, it is more likely to represent the former River Terrace of the Kempton Park Gravel, deposited during the middle-late Pleistocene. Such terraces have negligible potential for Palaeolithic remains since the Kempton Park Gravel was deposited during a period when hominid remains have not previous been recorded in the British Isles. They do however, represent areas of greater archaeological potential as they would have been raised above the surrounding floodplain. This is demonstrated by prehistoric trackway remains found within the overlying Peat at Bellot Street (e.g. Branch *et al.*, 2005). The archaeological potential of the present site is considered to be limited however, since the Gravel surface is no higher than -2.38m OD across the area of the site.

4.2 Lower Alluvium

In two of the eight records from within the area of the site, a unit of sandy silt is recorded either directly overlying the Shepperton Gravel (19.05.QBH1) or forming the basal unit of the sequence (19.05.QBH2). It should be noted that its absence in the geotechnical borehole logs may be a result of difficulties differentiating this unit from the overlying Upper Alluvium in such logs, since it is only recorded within the geoarchaeological boreholes.

The deposits of the Lower Alluvium are described as a 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 sediments of the Lower Alluvium are indicative of deposition during the Early to Mid-Holocene, when the main course of the Thames was probably confined to a single meandering channel. During this period, the surface of the Shepperton 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 Shepperton Gravel.

The surface of the Lower Alluvium is relatively even, recorded in the two sequences at -2.29 (19.05.QBH1) and –2.19m OD (19.05.QBH2); beyond the margins of the site, the surface of the Lower Alluvium is generally recorded at between *ca*. -3 and -1m OD (Figure 5).

4.3 Peat

A horizon of peat was recorded in one of the geotechnical borehole logs (19.05.BH2), but was not encountered in either of the new geoarchaeological boreholes. In 19.05.BH2 it lay directly on the Shepperton Gravel, between -1.58 and -2.38m OD (see Figure 3). Although limited to a very small area of the site, it is indicative of a transition towards semi-terrestrial (marshy) conditions at this location, supporting the growth of sedge fen/reed swamp and/or woodland communities. Beyond the area of the site, the surface of the Peat in this area is generally recorded at between *ca*. 0 and -1m OD, although it falls to *ca*. -2m OD towards the modern course of the Thames (Figure 6). Where present, the Peat is generally recorded in thicknesses of between *ca*. 0.5 and 2m in this general area (Figure 7).

Across Greenwich Peninsula more generally, peat is frequently recorded in thicknesses of up to 3m, with greater thicknesses often recorded in areas where the Shepperton Gravel topography is lower. Thick peat horizons have been recorded just to the south, at the Alcatel-Lucent (Batchelor *et al*., 2015) and Enderby Wharf (Batchelor & Young, 2015) sites for example. At these sites, the Peat has been dated to from the early to late Neolithic period, and middle Neolithic to Bronze Age periods respectively. Peat has been identified elsewhere on Greenwich Peninsula, including at the Victoria Deep Water Terminal site (Corcoran, 2002), where peat accumulation was radiocarbon dated to 5280-4660 cal BP (Middle-Late Neolithic), whilst at the Cable Car South Station (*ca*. 50m to the east; Green et al., 2011), the beginning of accumulation was dated to ca. 5580-5310/5890-5610 cal BP (Middle Neolithic), continuing until at least 3380-3210 cal BP Late Bronze Age). At Greenwich Peninsula Central East (Young & Batchelor, 2015a) a complex sequence of alluvium and at least three intercalated peat horizons of between 0.1 and 1.0m thickness were recorded, dated to 6720-6500 cal BP (lower Peat; Late Mesolithic), 6190-5990 cal BP (middle Peat; Early Neolithic) and 3340 to 3080 cal BP (upper Peat; Middle Bronze Age). The peat horizons recorded across much of Greenwich Peninsula thus appear to have accumulated within the same general age range of 6700 to 3000 cal BP (late Mesolithic to late Bronze Age; broadly equivalent to Devoy's (1979) Tilbury III Peat).

4.4 Upper Alluvium

The Upper Alluvium was recorded in eight of the nine boreholes within the area of the site, resting either on the Peat, Lower Alluvium (where present) or Shepperton Gravel. Only in one borehole (19.05.BH6) was the Upper Alluvium absent; here, the overlying Made Ground lay directly on the surface of the Gravel, indicative of truncation of the alluvial sequence at this location. The sediments of the Upper 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 deposits of the Upper Alluvium are described as predominantly silty or clayey which are very occasionally organic-rich. The surface of this unit at Plot 19.05 (Figure 8) is variable (perhaps as a result of truncation by the overlying Made Ground), recorded at between 0.53 (19.05.BH3) and -1.59m OD (19.05.BH1); in the wider area, the surface of the Upper Alluvium is generally recorded at between *ca*. 0 and 2m OD (see Figure 8).

The thickness of the Holocene alluvial sequence (incorporating the Lower Alluvium, Peat and Upper Alluvium) is displayed in Figure 9. This thickness tends to reflect the model of the Gravel surface, with greater thicknesses recorded in areas of lower Gravel topography and vice versa, as might be expected; within the area of the present site between 1.7 (19.05.BH1) and 4m (19.05.BH5) is recorded, with greater thicknesses towards the northwest.

4.5 Made Ground

Between 2.8 and 6.8m of Made Ground is recorded across the site (Figure 10). At one location, 19.05.BH6, the Made Ground lies directly on the Shepperton Gravel, indicative of truncation of the alluvial sequence in this area.

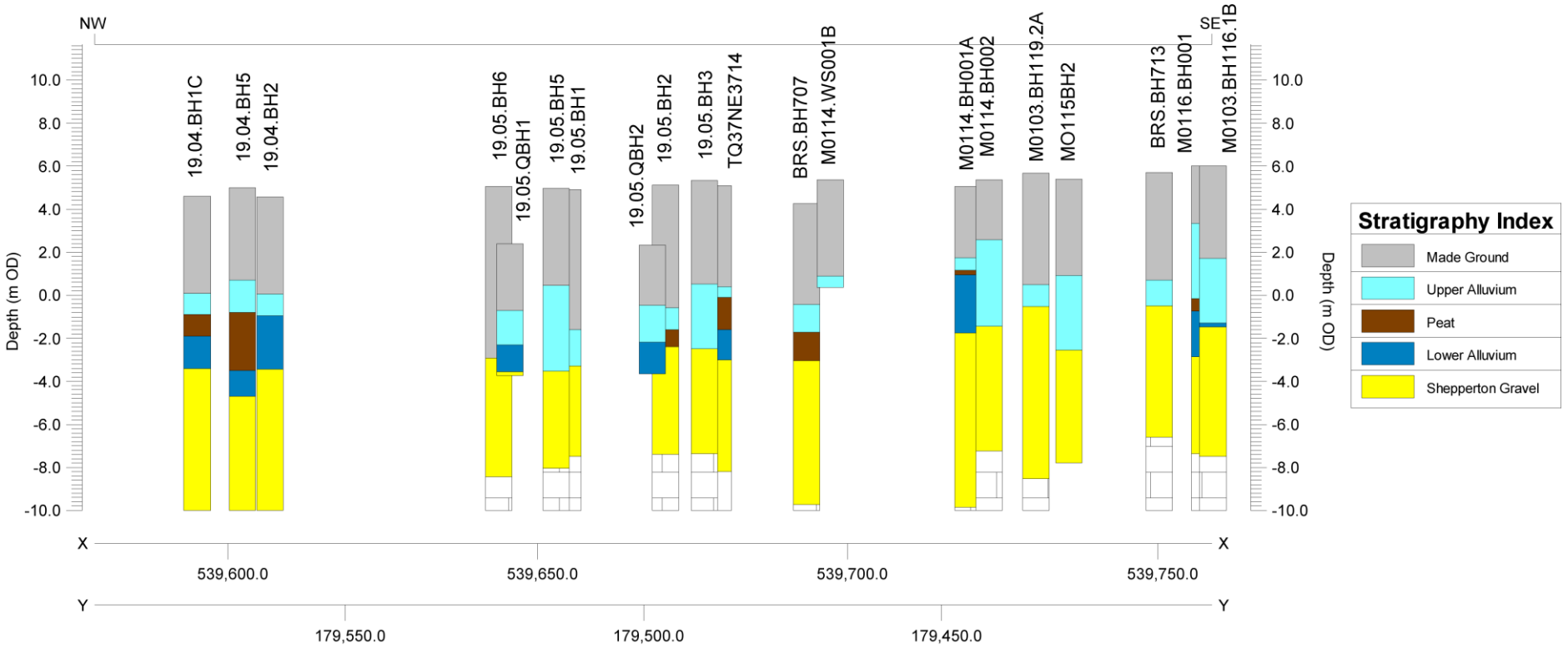

Figure 3: Northwest-southeast transect of selected boreholes across Greenwich Peninsula Plot 19.05 site.

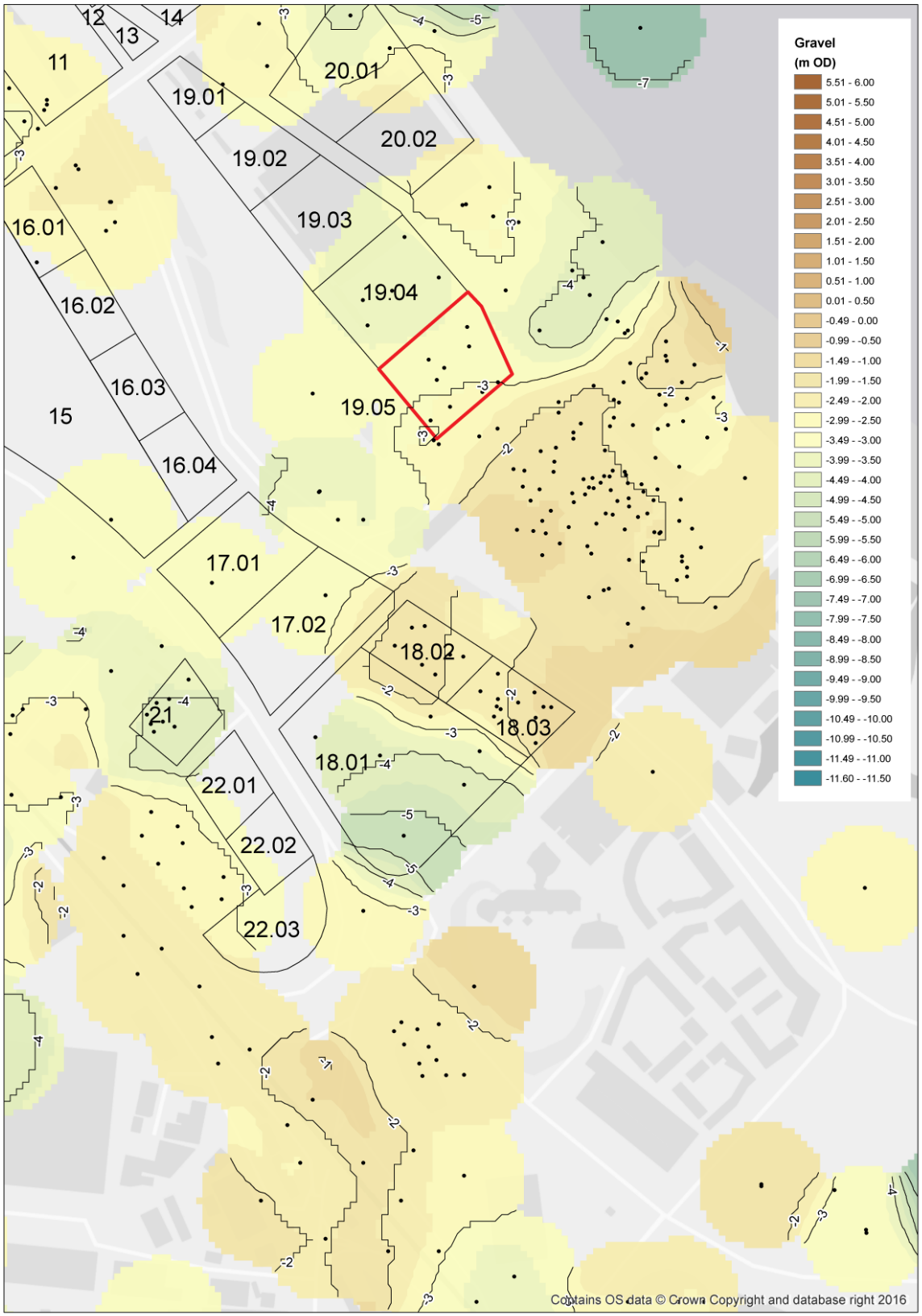

Figure 4: Top of the Gravel (m OD)

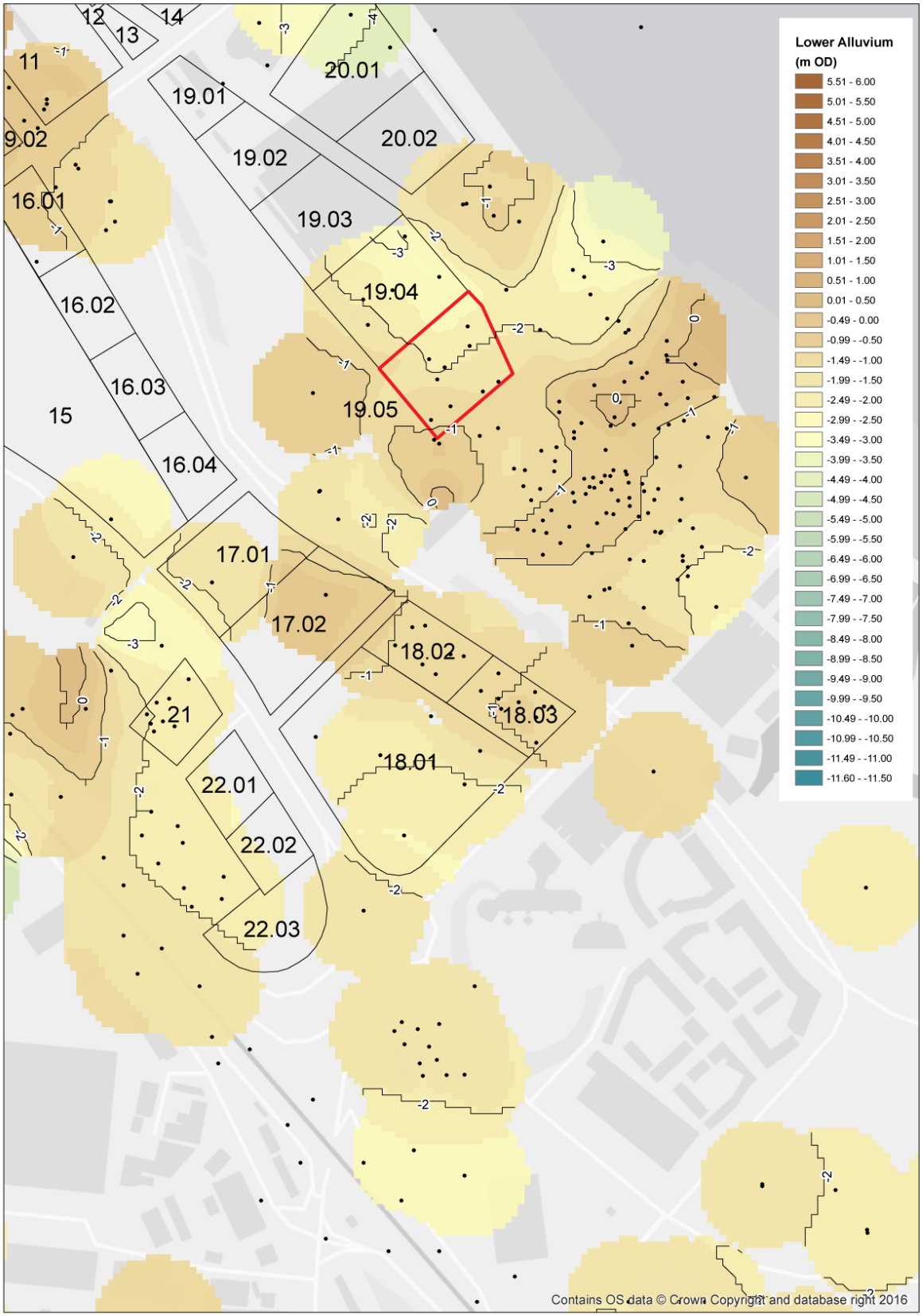

Figure 5: Top of the Lower Alluvium (m OD)

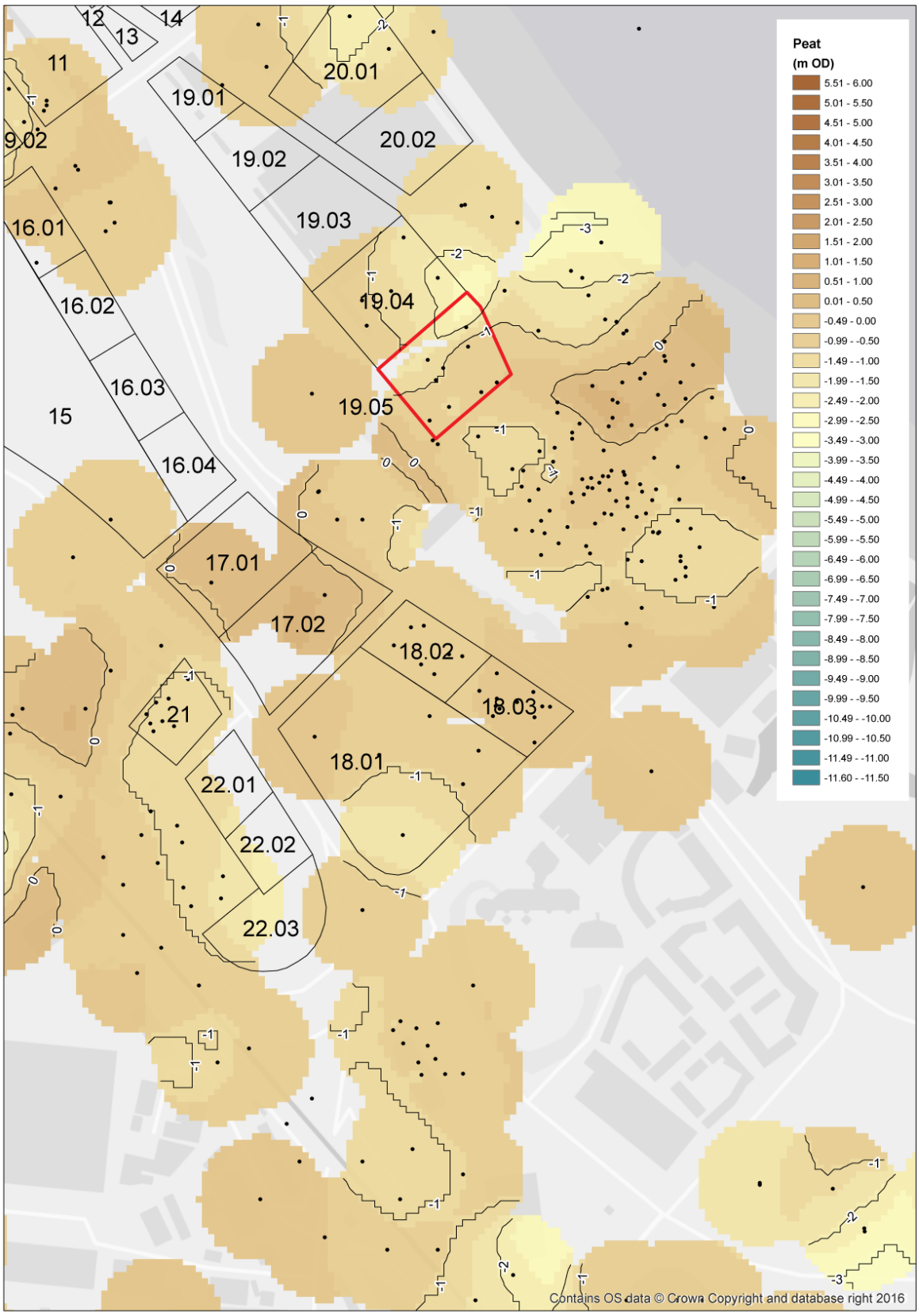
Peat
(m OD)
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Figure 6: Top of the Peat (m OD)

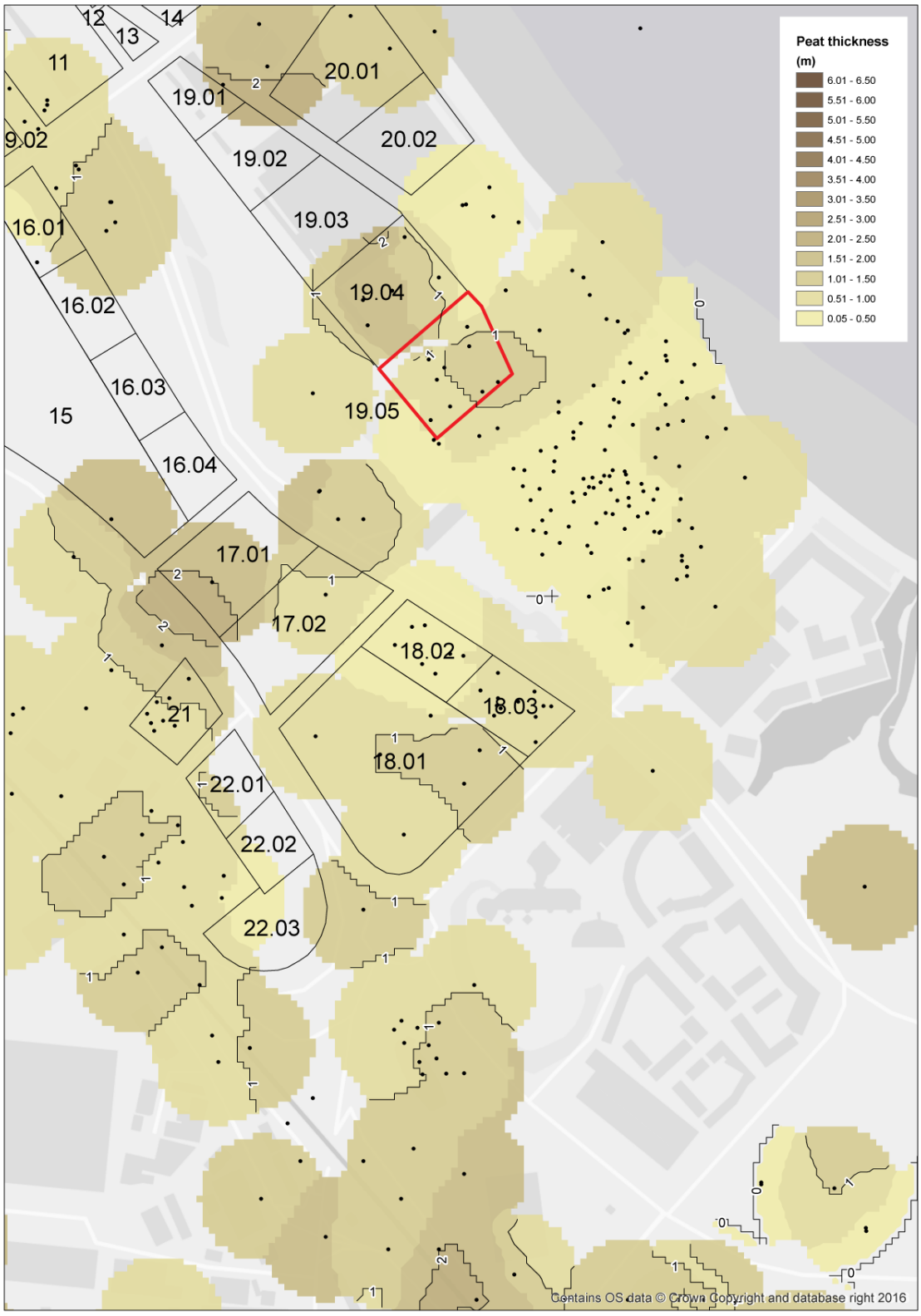

Figure 7: Thickness of the Peat (m)

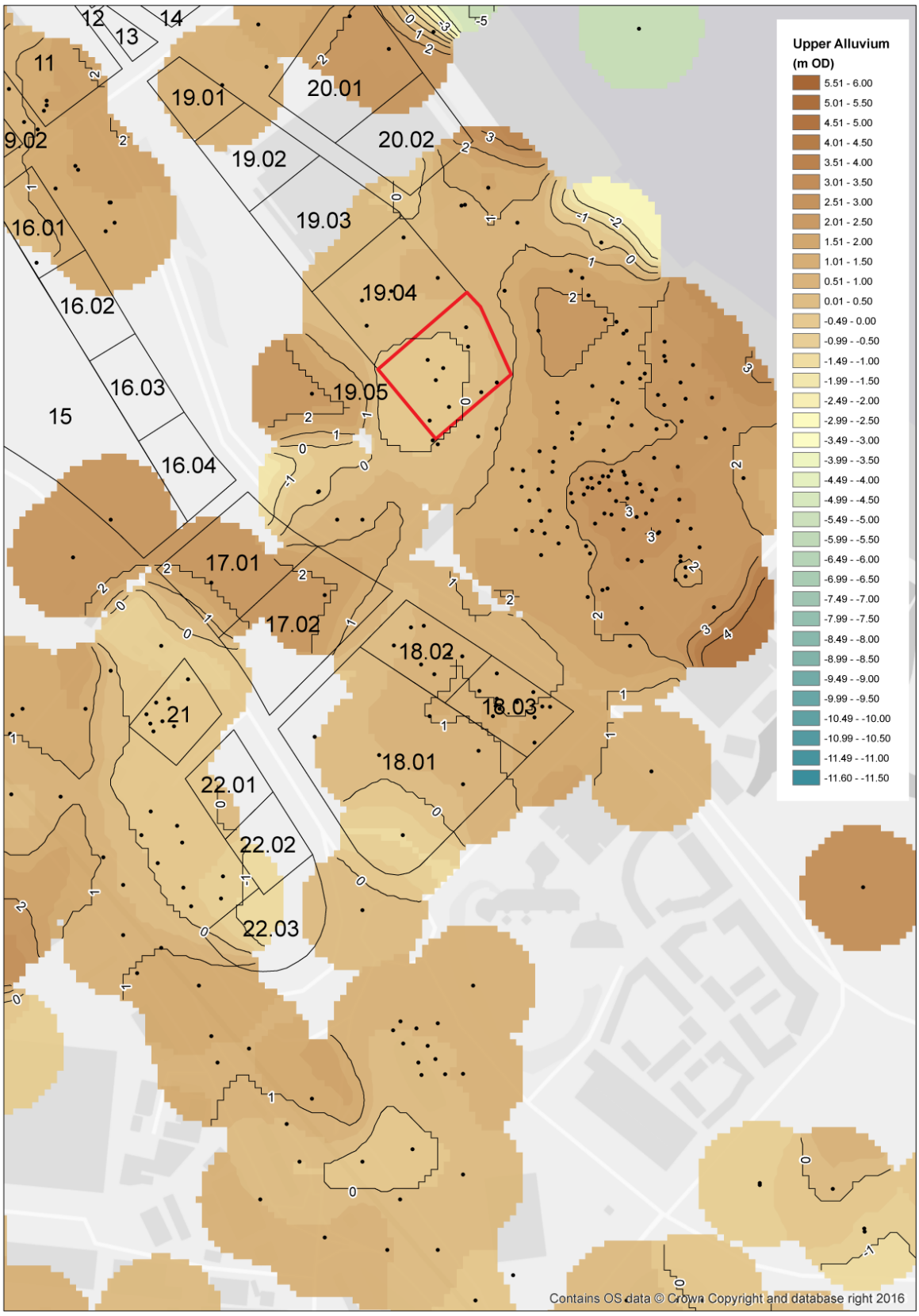

Figure 8: Top of the Upper Alluvium (m OD)

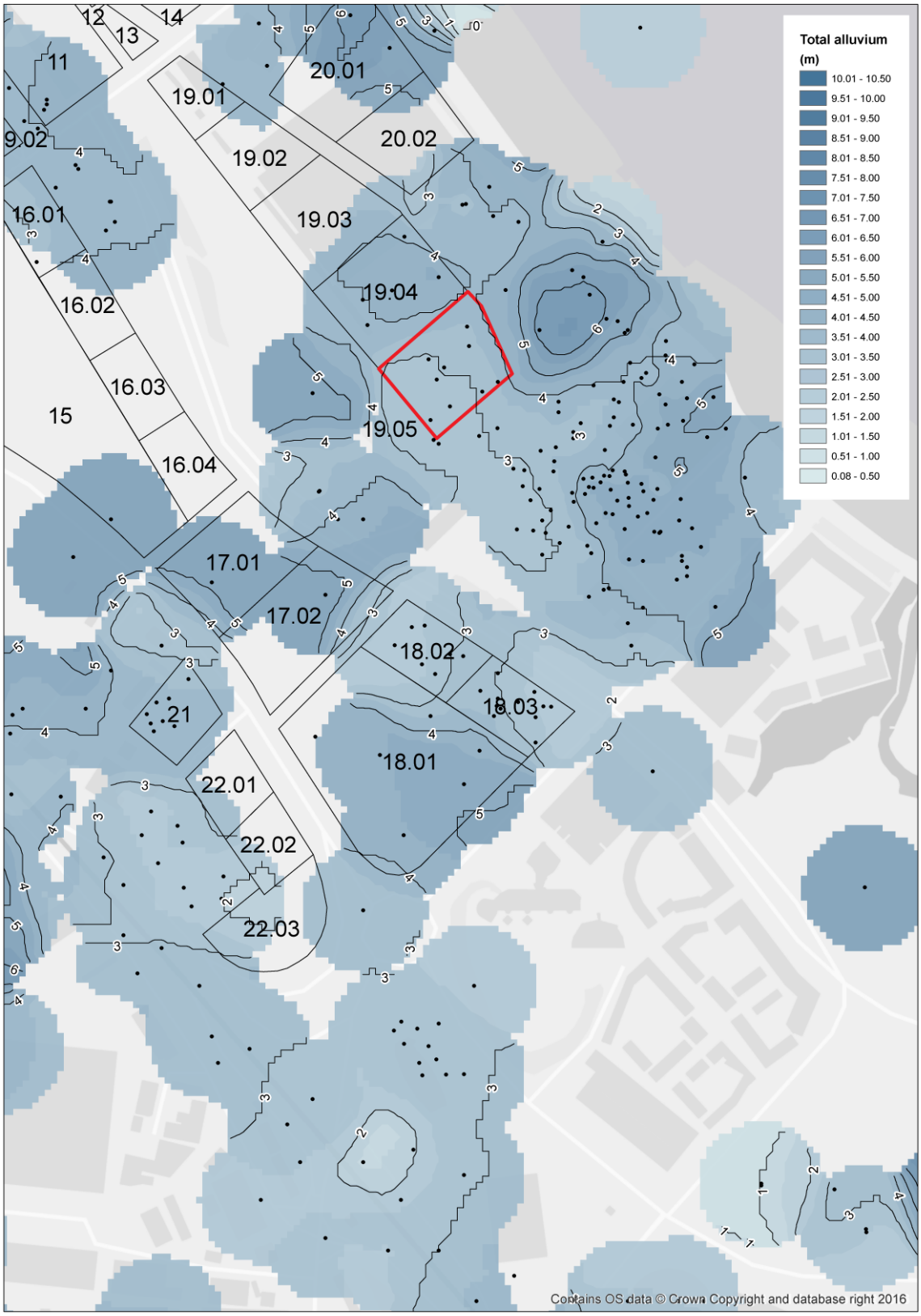

Figure 9: Thickness of the Total Alluvium (Lower Alluvium, Peat and Upper Alluvium) (m)

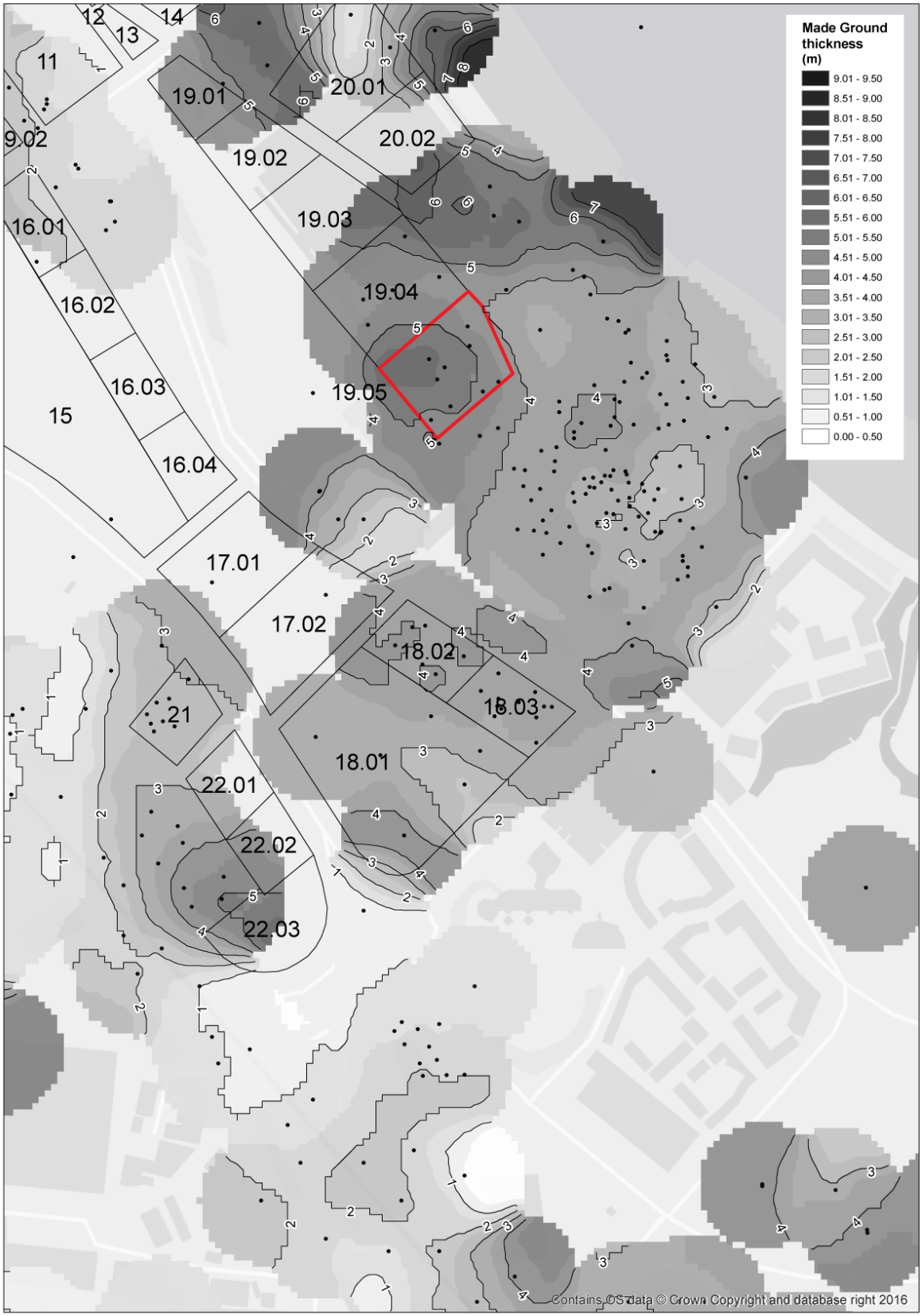

Figure 10: Thickness of Made Ground (m)

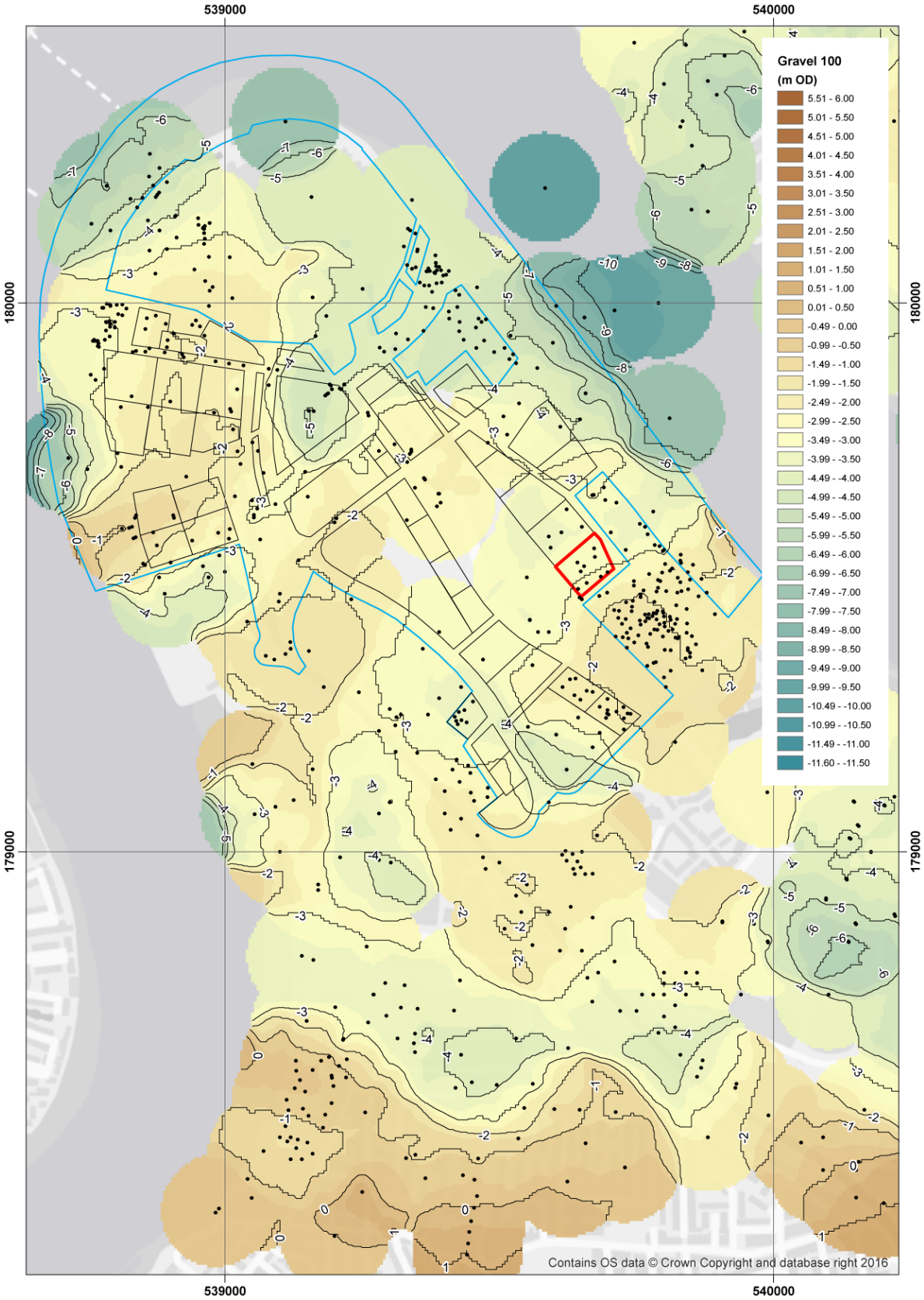

Figure 11: Top of the Gravel across the wider area of Greenwich Peninsula (m OD)

Table 1: Lithostratigraphic description of borehole 19.05.QBH1, Plot 19.05, Greenwich Peninsula, Royal Borough of Greenwich.

Depth (m OD)	Depth (m bgl)	Description	Stratigraphic group
2.39 to -0.71	0.00 to 3.10	Made Ground	MADE GROUND
-0.71 to -1.21	3.10 to 3.60	10YR 4/1; As3 Ag1; dark grey silty clay with dark blue mottling. Diffuse contact in to:	UPPER ALLUVIUM
-1.21 to -2.29	3.60 to 4.68	2.5Y 5/3; Ag2 As2; light olive brown silt and clay. Sharp contact in to:	
-2.29 to -2.71	4.68 to 5.10	Ga3 Gg1; gravelly sand. Sharp contact in to:	LOWER ALLUVIUM
-2.71 to -2.91	5.10 to 5.30	2.5Y 5/3; Ag2 As2; light olive brown silt and clay. Sharp contact in to:	
-2.91 to -3.09	5.30 to 5.48	2.5Y 5/3; Ag2 As1 Dh1 Dl+ Sh+; light olive brown clayey silt with detrital herbaceous material and traces of detrital wood and organic matter, Diffuse contact in to:	
-3.09 to -3.41	5.48 to 5.80	2.5Y 5/3; Ag2 As1 Dh1 Dl+ Sh+ Ga+; light olive brown clayey silt with detrital herbaceous material and traces of detrital wood, organic matter and sand, Diffuse contact in to:	
-3.41 to -3.56	5.80 to 5.95	2.5Y 5/3; Ga2 Ag2 Gg+; light olive brown silt and sand with occasional gravel clasts. Sharp contact in to:	
-3.56 to -3.61	5.95 to 6.00	Ga3 Gg1; gravelly sand. Clasts are flint, up to 30mm in diameter, well-rounded to sub-angular.	SHEPPERTON GRAVEL

Table 2: Lithostratigraphic description of borehole 19.05.QBH2, Plot 19.05, Greenwich Peninsula, Royal Borough of Greenwich.

Depth (m OD)	Depth (m bgl)	Description	Stratigraphic group
2.34 to -0.46	0.00 to 2.80	Made Ground	MADE GROUND
-0.46 to -0.66	2.80 to 3.00	10YR 4/1; Ag2 As2; dark grey silt and clay. Diffuse contact in to:	UPPER ALLUVIUM
-0.66 to -1.66	3.00 to 4.00	10YR 4/1; As3 Ag1; dark grey silty clay. Diffuse contact in to:	
-1.66 to -2.19	4.00 to 4.53	10YR 4/1; As3 Ag1 Sh+; dark grey silt and clay with occasional small (<20mm) organic lenses (Sh3 Ag1), Sharp contact in to:	
-2.19 to -2.32	4.53 to 4.66	2.5Y 5/3; Ga4/Ag3 As1; light olive brown interbedded sand and clayey silt. Beds 30-50mm thick. Sharp contact in to:	LOWER ALLUVIUM
-2.32 to -2.62	4.66 to 4.96	10YR 3/1; As3 Ag1; very dark grey silty clay. Sharp contact in to:	
-2.62 to -2.66	4.96 to 5.00	Gley 1 4/10Y; Ga3 Ag1 Dl+; dark greenish grey silty sand with a trace of detrital wood.	

5. CONCLUSIONS & RECOMMENDATIONS

Geoarchaeological fieldwork and deposit modelling was carried out at the Plot 19.05 site in order to: (1) map the height and thickness of the deposits; (2) assess their geoarchaeological, archaeological and palaeoenvironmental significance and potential, and (3) prepare recommendations for geoarchaeological assessment. In order to address these aims, two geoarchaeological boreholes were retained from the site. These were described under laboratory-based conditions and integrated with stratigraphic data from existing records to produce a deposit model of the major depositional units across the site.

The results of the deposit modelling indicate that the sediments present beneath Plot 19.05 are similar in character to those recorded elsewhere on Greenwich Peninsula, and in the Lower Thames Valley more generally. The Late Devensian Shepperton Gravel is overlain by a sequence of Holocene alluvial sediments, buried beneath modern Made Ground. The deposit model for the Late Devensian/Early Holocene topography indicates that the site lies within or on the margins of a depression in the Gravel topography, one which perhaps formed part of the interconnected palaeochannels that have been identified in this area of Greenwich Peninsula (see Figure 11). The Gravel surfaces across the site are therefore relatively low, lying at between -3.56 and -2.38m OD, and the archaeological potential of the site is therefore considered to be limited.

Between 1.7 and 4m of Holocene alluvium was recorded overlying the Shepperton Gravel, the surface of which lay at between 0.53 and -1.59m OD. A horizon of peat was recorded within the alluvium in one of the previous geotechnical boreholes, at a level of between -1.58 and -2.38m OD. Where organic sediments are recorded, the sequences have the potential to contain a wealth of further information on the past landscape, through the assessment/analysis of palaeoecological remains (e.g. pollen, plant macrofossils and insects) and radiocarbon dating. So called environmental archaeological or palaeoenvironmental investigations 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. Such investigations are routinely carried out where required as part of planning conditions across the Lower Thames Valley and its tributaries, instructed by the LPA Archaeological Advisor.

However, at the present site the organic sediments were limited to one location, and were not recorded in either of the new geoarchaeological boreholes. The localised nature of this horizon may be a result of subsequent erosion of the peat by fluvial activity, or alternatively, it is possible that peat only formed within a small floodplain hollow in this area of the site. On this basis, no further environmental archaeological investigations are recommended on the samples from Plot 19.05.

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7. APPENDIX 1: OASIS

OASIS ID: quaterna1-284343

Project details

Project name	Plot 19.05, Greenwich Peninsula
Short description of the project	A programme of geoarchaeological fieldwork and deposit modelling was carried out in order to: (1) map the height and thickness of the deposits; (2) assess their geoarchaeological, archaeological and palaeoenvironmental potential, and (3) provide recommendations for any further assessment. In order to address these aims, two geoarchaeological boreholes were retained from the site, and a deposit model prepared using the new geoarchaeological and existing geotechnical data for the site. The results of the deposit modelling indicate that the sediments present beneath Plot 19.05 are similar in character to those recorded elsewhere on Greenwich Peninsula; the Late Devensian Shepperton Gravel is overlain by a sequence of Holocene alluvial sediments, buried beneath modern Made Ground. The site lies in an area of generally lower Gravel topography (the surface of which

	lies at between -3.56 and -2.38m OD), perhaps either within or on the margins of a former Late Devensian/Early Holocene channel. The archaeological potential of the site is therefore considered to be limited. Between 1.7 and 4m of Holocene alluvium was recorded overlying the Gravel, within which peat was recorded at one location between -1.58 and -2.38m OD. On the basis that the sediments at the site are largely inorganic, and no peat was recorded within the new geoarchaeological boreholes, no further environmental archaeological assessment is recommended.
Project dates	Start: 01-01-2017 End: 05-05-2017
Previous/future work	No / Not known
Type of project	Environmental assessment
Survey techniques	Landscape

Project location

Country	England
Site location	GREATER LONDON GREENWICH GREENWICH Plot 19.05
Postcode	SE10 0FR
Site coordinates	TQ 3967 7950 51.496659694509 0.012306901799 51 29 47 N 000 00 44 E Point

Project creators

Name of Organisation	Quaternary Scientific (QUEST)
Project brief originator	RPS
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","Stratigraphic"
Paper Media available	"Report"
Entered by	Daniel Young (d.s.young@reading.ac.uk)
Entered on	5 May 2017