

SURREY HOUSE, 20 LAVINGTON STREET, LONDON BOROUGH OF SOUTHWARK, SE1 0NZ (SITE CODE: LVI11): GEOARCHAEOLOGICAL FIELDWORK REPORT

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INTRODUCTION

This report summarises the findings arising out of the geoarchaeological fieldwork undertaken by Quaternary Scientific (University of Reading) in connection with the proposed development at Surrey House, 20 Lavington Street, London Borough of Southwark, SE1 0NZ (National Grid Reference: TQ 32087 80160; 2.8m OD; site code: LVI11; Figure 1). The site is on the valley floor of the River Thames in its tidal reach on the south side of the river and about 0.4km from the modern waterfront. Previous investigations in this part of Southwark (Batchelor *et al*, 2011a, 2011b, 2011c; Branch *et al*, 2002; Cowan *et al*, 2009; Dicks, 2010; Dunwoodie 2006; Sidell *et al*, 2000; Thompson *et al* 1998) have led to the recognition of a substantial palaeochannel (the Bankside Channel) aligned broadly NE to SW from Bankside towards Waterloo alongside the River Thames, with at least two tributary channels joining it from the south - the Borough Channel and the Southwark Street Channel. The British Geological Survey (BGS) (1:50,000 Sheet 256 North London 1994) shows the site underlain by Alluvium overlying London Clay bedrock. Borehole records associated with the previous investigations in and around the Bankside Channel indicate the presence of Holocene sediments infilling the palaeochannel and overlying sands and gravels of Late Devensian Lateglacial age (The Shepperton Gravel). The Shepperton Gravel rises from beneath the floor of the palaeochannel both northward and southward to form gravel bars that define the margins of the channel.

To the west of the present site the form of the Bankside Channel can be made out between Union Street in the south and Southwark Street in the north. In the presumed axis of the channel, at the South Point site on the Blackfriars Road, the surface of the Shepperton Gravel is at -3.49m OD (Branch *et al* 2002) and at nearby sites in Joan Street and Union Street (Sidell *et al* 2000) the surface is between -2.00m and -3.00m OD. Towards the northern edge of the Bankside Channel at Bear Lane and Bear House (Tan, 2008; Batchelor *et al.*, 2011a), the gravel surface rises northward from -2.70m to -0.60m OD and further north again in Blackfriars Road (Batchelor *et al* 2008) the gravel rises to 2.67m OD. The form of the channel is also apparent to the east of the present site, where the surface of the Shepperton Gravel is at -3.64m OD at Anchor Terrace (Thompson *et al* 1998), probably close to the axis of the palaeochannel, but rises northward to 0.66m OD in Skinmarket Place

(Thompson *et al* 1998) and southward to 0.8m OD at 97-101 Union Street (Capon 2006). Close to the present site the gravel surface was recorded at -1.6m OD south and east of the site at 65 Southwark Street (Batchelor *et al* 2011b) and between -1.22m and -2.95m OD to the north at St Christopher's House (Howell 2003).

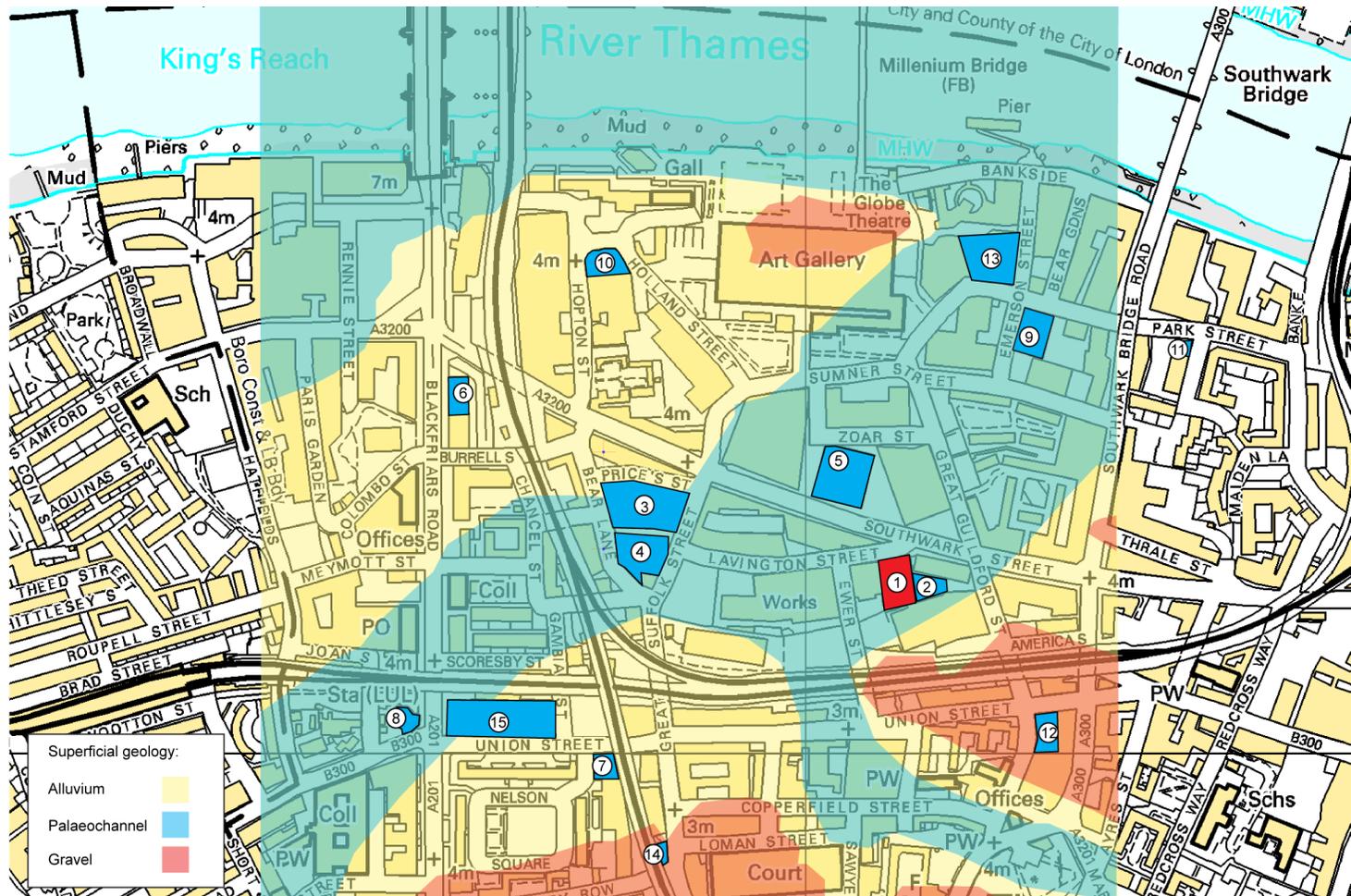
Infilling the Bankside Channel is a sequence of Holocene sediments which includes at most sites a bed of peat, either resting directly on the Shepperton Gravel or separated from it by units of organic sand or silt. Overlying the peat are alluvial silts which in general are less richly organic than the underlying sediments. These transitions from peat to alluvium represent important palaeoenvironmental transitions, with peat representing periods of semi-terrestrial conditions and frequently in the Lower Thames Valley, the growth of fen carr woodland, whilst the alluvium represents periods of inundation. At the Surrey House site itself, a previous archaeological watching brief of geotechnical boreholes and test pits revealed 3-4m of peat and alluvium overlying the Shepperton Gravel, capped by Made Ground (Turner, 2010; previous site code LVN10). Geoarchaeological investigations from the neighbouring 65 Southwark Street (Figure 1), recorded a similar alluvial sequence (Batchelor *et al.*, 2011b).

Investigations at 65 Southwark Street indicated that the peat accumulated between 5610-5480 and 4290-4090 cal yr BP equating to the Middle to Late Neolithic cultural period. Elsewhere at Bear House (Batchelor *et al.*, 2011a) and Bear Lane (Tan, 2008), radiocarbon dating indicates that towards the northern edge of the Bankside Channel the peat deposits accumulated from at least 4820-4570 to 3140-2870 cal yr BP (Late Neolithic to Late Bronze Age). At sites towards the middle of the projected course of the Bankside Channel such as St Christopher House (*ca.* 100m northeast of the site; Maloney, 2003, 2004) radiocarbon dating indicate that the channel dated from at least 10,650-10,250 cal yr BP and included both peat and alluvial deposits (Maloney, 2004), whilst historic records indicate it had infilled by the Late 17th Century (Turner, 2009). The close location of Surrey House to 65 Southwark Street suggests that the new sequence is most likely to be of similar date, but if differing OD heights are recorded for peat formation between the two sites, this may infer a different chronology. Furthermore, the radiocarbon determinations listed above demonstrate the large temporal variations in the onset and cessation of peat formation along the course of the Bankside Channel.

The potential for tracking prehistoric cultural activity is also demonstrated from sites along the Bankside Channel. At St Christopher's House for example, three timber structures dated

to 3450-3240 cal yr BP (2 structures) and 2750-2350 cal yr BP (1 structure) were recorded within the channel's sedimentary sequence (Maloney, 2004). Whilst at two sites located on a gravel eyot further to the north of the site (44-47 Hopton Street, Maloney, 2001; 245 Blackfriars Road, Thompson *et al.*, 2008), various artefacts reflective of occupation dating from the Neolithic cultural period onwards have been recorded. The sedimentary sequence at Surrey House therefore also has good potential to provide evidence of prehistoric and historic human activity both on the wetland and on dryland surfaces adjacent to the site, which should be compared with existing evidence.

The aim of the geoarchaeological fieldwork at Surrey House, was therefore: (1) to collect and record two new borehole sequences from specifically selected areas of the site; (2) to integrate these new records with the results of both the archaeological watching brief and of the investigations at 65 Southwark Street; (3) to create a site-based model of the sub-surface stratigraphy, (4) to make recommendations for further assessment and analysis (if necessary). In addition, the archaeological watching brief recorded frequent twigs/brushwood and wood fragments within the peat which was subsequently highlighted as potentially significant; this report will also comment on these findings.



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|---|--|---|--|
| ① Surrey House (LV111) | ⑤ St. Christopher's House (SCH03; London Archaeologist, 2004) | ⑨ 135 Park St (PKP09; Batchelor and Young, 2009) | ⑬ Skinmarket Place (Thompson <i>et al.</i> , 1998) |
| ② 65 Southwark Street (SOU11; Batchelor <i>et al.</i> , 2011) | ⑥ 231-241 Blackfriars Rd (BFX08; Batchelor <i>et al.</i> , 2008) | ⑩ 44-47 Hopton St (HNT94; London Archaeologist, 2001) | ⑭ Great Suffolk Street (GUF10; Batchelor <i>et al.</i> , 2011) |
| ③ Bear House (BJH10; Batchelor <i>et al.</i> , 2011) | ⑦ Jubilee Line, Union St (UNL08; Sidell <i>et al.</i> , 2000) | ⑪ Anchor Terrace (Thompson <i>et al.</i> , 1998) | ⑮ South Point (BKA02; Branch <i>et al.</i> , 2002) |
| ④ Bear Lane (BLZ07; Tan <i>et al.</i> 2008) | ⑧ Joan St (JOA91; Sidell <i>et al.</i> , 2000) | ⑫ 97-101 & 103 Union Street (Capon, 2006) | |

Figure 1: Location of Surrey House and nearby sites. The projected course of the Bankside Channel, as indicated by Dunwoodie *et al.* (2006) and adapted after Young *et al.* (2010), is also shown.



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Figure 2: Location of the archaeological and geoarchaeological boreholes at Surrey House, London Borough of Southwark (site code: LV111)

METHODS

Field investigations

Two boreholes (Boreholes 4 and 5) were put down at the site in June 2011 (Figure 2). The boreholes were recovered using an Eijkelkamp window sampler and gouge set driven by an Atlas Copco TT 2-stroke percussion engine. Each borehole was put down until coarse grained unconsolidated sediments had been recorded. The spatial attributes of each proposed borehole location were recorded by Bowmer and Kirkland Ltd (Table 1). The spatial attributes for the original archaeological watching brief boreholes are also shown (boreholes 1 to 3), and the spatial attributes of recent geoarchaeological boreholes from 65 Surrey House are presented in Table 1 only. During the course of the Surrey House watching brief, surface heights relative to ordnance datum were not recorded. These have instead been interpolated here from a pre-demolition survey.

Table 1: Borehole attributes, Surrey House, London Borough of Southwark (site code: LVI11)

Borehole number	Easting	Northing	Elevation (m OD)
<i>Surrey House geoarchaeological boreholes</i>			
Borehole 4	532082.057	180176.900	1.40
Borehole 5	532089.102	180151.952	2.80
<i>Surrey House archaeological watching brief boreholes</i>			
Borehole 1	532072	180162	3.00
Borehole 2	532056	180199	3.08
Borehole 3	532087	180140	3.00
<i>65 Southwark Street geoarchaeological boreholes</i>			
Borehole <1a>	532108.773	180148.300	2.86
Borehole <2>	532118.593	180158.858	2.88

Lithostratigraphic descriptions

Borehole core samples were retained and described in the laboratory 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 2 and 3, and Figures 3 and 4. The archaeological watching brief descriptions are provided in Tables 4 to 6 and displayed in Figures 3 and 4, adjusted to the interpolated ordnance datum height.

RESULTS, INTERPRETATION AND DISCUSSION OF THE LITHOSTRATIGRAPHIC DESCRIPTIONS

The sediment sequences in the two new geoarchaeological boreholes (Boreholes 4 and 5; Tables 2 and 3) are broadly similar to each other; to those recorded during the course of the archaeological watching brief (Boreholes 1, 2 and 3; Tables 4 to 6) and to sequences recorded elsewhere in the Bankside Channel.

In Borehole 4 (Table 2), gravel (Unit 1) is recorded at -4.55m OD beneath a thin (0.37m) sequence of fine-grained organic sediments (Units 2 and 3), and thick (1.85m) of peat between -4.18 and -2.13m OD (Unit 4). The peat is overlain by a sequence of 1.73m of moderately organic silt (Unit 5) to -0.60m OD. In Borehole BH5 (Table 3), a total thickness of 2.65m of peat is separated into two sub-units (Units 2 and 4) by a thin (0.14m) bed of organic silt (Unit 3). The lower peat sub-unit rests on inorganic gravelly sand at -3.64m OD (Unit 1) and the upper peat sub-unit is overlain by 1.29m of silt with common detrital plant remains from -0.99m OD (Unit 5). In both boreholes the upper silty beds are probably truncated by historic ground modification. The peat units recorded in archaeological Boreholes 1, 2 and 3 (Tables 4 to 6) were similarly thick (around 2m) either directly lying on the gravel surface, or separated by a thin layer of alluvium. The gravel surface was recorded at -3.95m OD in Borehole 1 and -2.95m OD in Borehole 3. Frequent wood fragments were recognised within the new geoarchaeological boreholes, a find analogous to the vast majority of peat sequences in the Lower Thames Valley, and also highlighted during the archaeological watching brief. These remains suggest that the peat surface was colonised by fen carr woodland.

The combined results of the geoarchaeological fieldwork and archaeological watching brief indicate a dipping Shepperton Gravel surface from south (-2.95m OD; Borehole 3) to north (-4.55m OD; Borehole 4) across the Surrey House site (Figure 3). Significantly, the depths towards the northern edge of the site are the lower than recorded elsewhere in the Bankside Channel, at -3.49m OD at the South Point site (Branch *et al.*, 2002); and -3.64m OD at Anchor Terrace (Thompson *et al.*, 1998); and substantially below the levels recorded in two sites immediately to the north and south of the Surrey House site, respectively at -2.95m OD at St Christopher House (Howell 2003) and at -1.60m OD at 65 Southwark Street to the east (Batchelor *et al.*, 2011b; Figure 4). The low level of the base of the Holocene sediment sequence at the Surrey House site may indicate the presence of a continuous deep narrow channel occupying the axis of the Bankside depression or, and perhaps more likely, a localised scour hollow in the surface of the Shepperton Gravel.

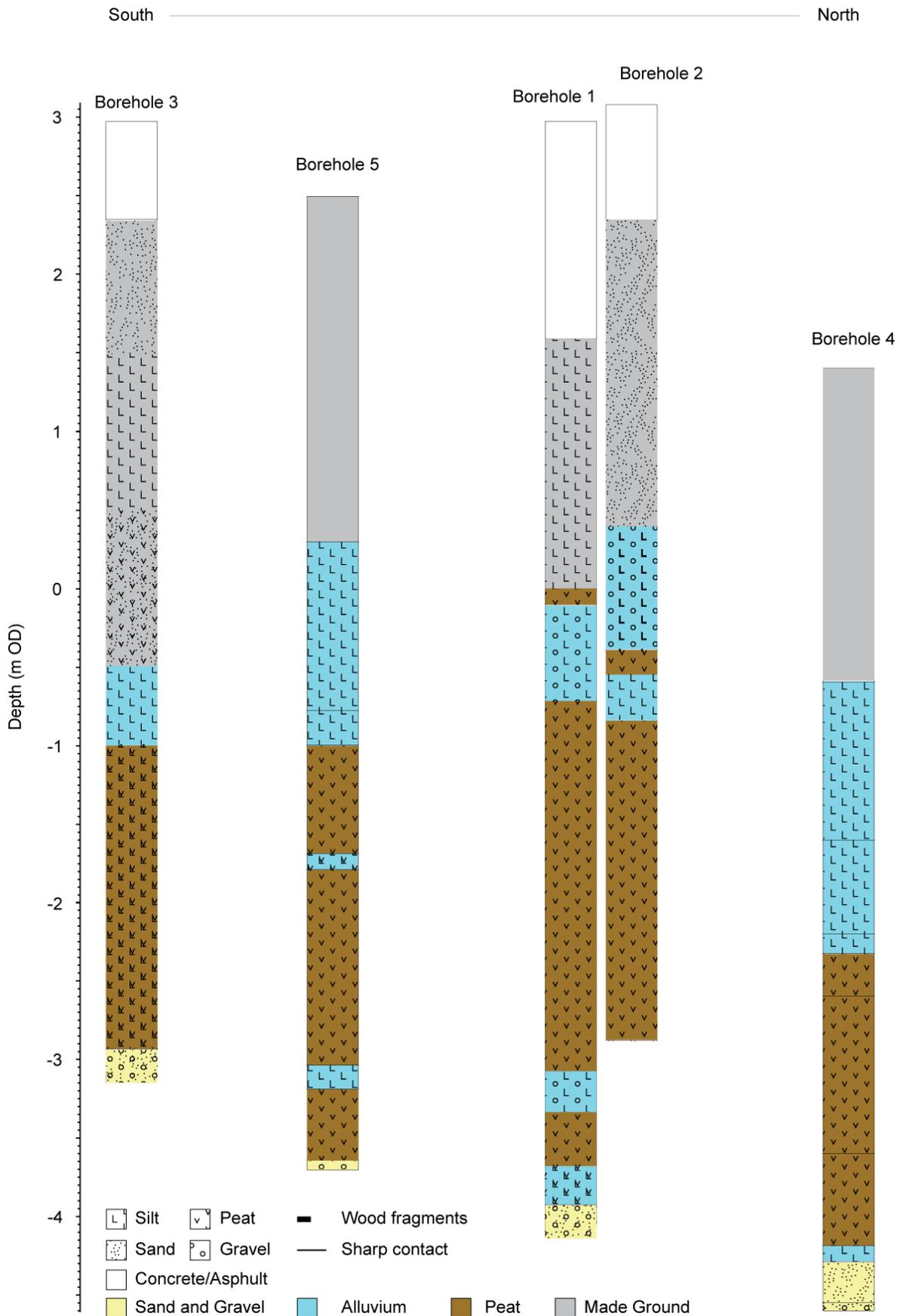


Figure 3: North-south transect of boreholes across Surrey House, London Borough of Southwark (site code: LVI11)

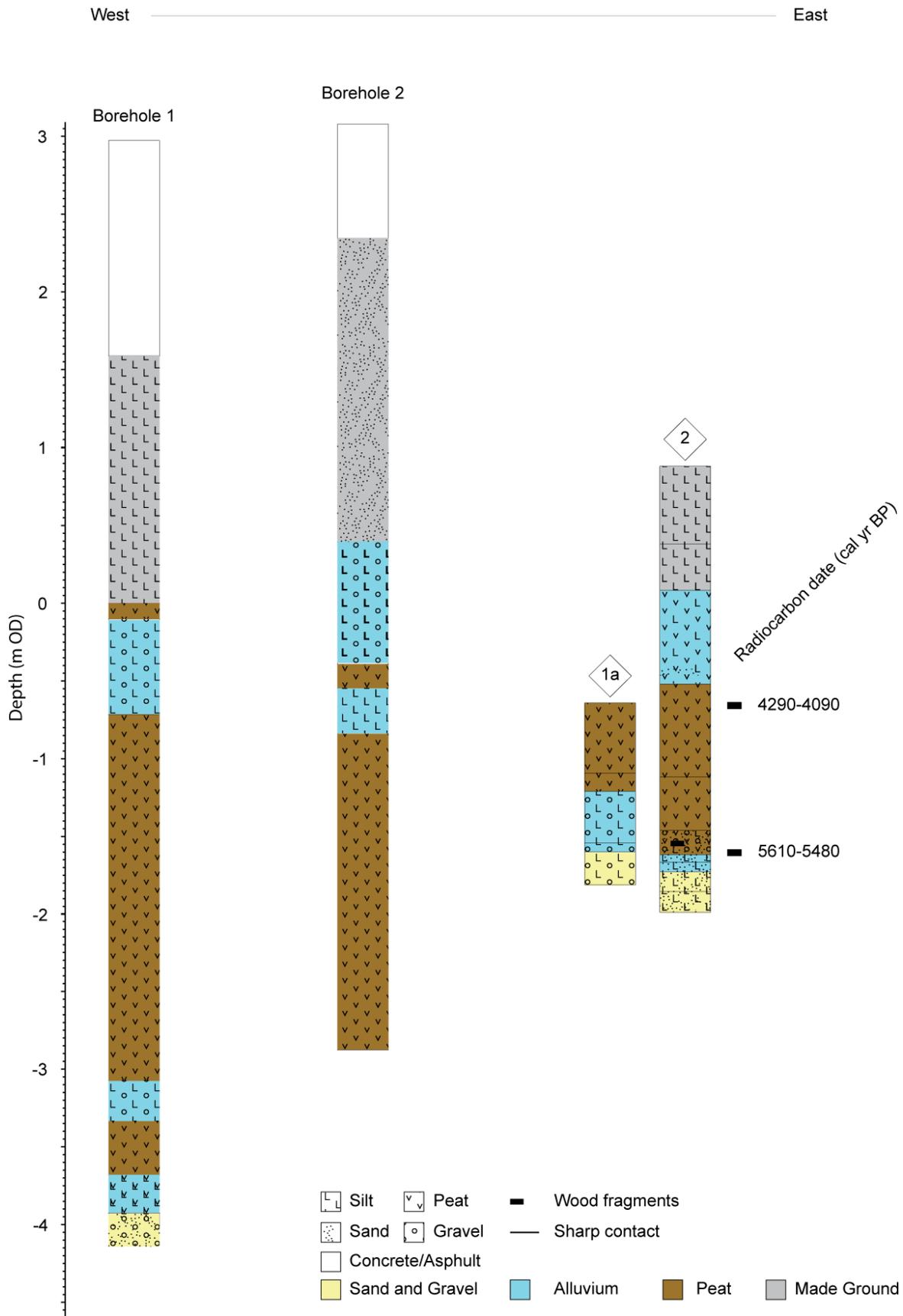


Figure 4: West-East transect of boreholes across Surrey House and 65 Southwark Street (site codes: LVI11 and SOU11)

Table 2: Lithostratigraphic description of Borehole 4, Surrey House, London Borough of Southwark (site code: LVI11)

Depth (m BGL)	Depth (m OD)	Unit	Description
0 to 2.00	1.40 to -0.60	-	Made Ground
2.00 to 3.00	-0.60 to -1.60	5	5Y3/1 very dark grey; very well sorted silt; horizontally bedded alternations of plant-rich and mineral-rich sediment; common to very common detrital plant remains; wood debris including round wood to 10mm Ø; moderate acid reaction.
3.00 to 3.61	-1.60 to -2.21	5	2.5Y5/1 grey to 2.5Y3/1 very dark grey; well sorted organic silt; horizontally bedded alternations of plant-rich and mineral-rich sediment; common to very common detrital plant remains; vivianite; moderate acid reaction; well-marked transition to:
3.61 to 3.73	-2.21 to -2.33	5	2.5Y3/1 very dark grey to black; well sorted organic silt with irregular peaty inclusions; massive; very common detrital plant remains; common broken mollusc shell with concentration at base of unit (-2.29 to -2.33m OD); moderate acid reaction; gradual transition to:
3.73 to 4.00	-2.33 to -2.60	4	Black; peat, slight visible mineral content decreasing downward; scattered broken mollusc shell.
4.00 to 5.00	-2.60 to -3.60	4	Black; woody peat including roundwood to 10mm Ø, with large piece of wood at 3.89-4.02m OD, no acid reaction.
5.00 to 5.58	-3.60 to -4.18	4	Black; peat with slight visible mineral content below -4.80m OD; massive; no acid reaction; sharp contact with:
5.58 to 5.69	-4.18 to -4.29	3	2.5Y4/1 dark grey and 2.5Y5/4 olive brown; very well sorted marly silt; weakly developed horizontal bedding; strong acid reaction; sharp contact with:
5.69 to 5.95	-4.29 to -4.55	2	Black, dark grey and olive brown, moderately sorted very slightly silty sand with scattered flint granules; horizontally bedded; scattered detrital plant remains; no acid reaction; sharp contact with:
5.95 to 6.00	-4.55 to -4.60	1	Dark brown, moderately well sorted clast-supported gravel of well-rounded and sub-angular flint (with very sparse sand matrix); no acid reaction.

Table 3: Lithostratigraphic description of Borehole 5, Surrey House, London Borough of Southwark (site code: LVI11)

Depth (m BGL)	Depth (m OD)	Unit	Description
0 to 2.50	2.80 to 0.30		Made Ground
2.50 to 3.50	0.30 to -0.70	5	10YR4/1 dark grey with black specks; very well sorted silt with inclusion of 10YR3/2 very dark greyish brown peaty silt at -0.03 to -0.11m OD; massive; common Fe-stained root channels becoming less common downward; scattered root remains; common detrital plant remains (black specks); very scattered broken mollusc shell.
3.50 to 3.79	-0.70 to -0.99	5	2.5Y3/1 very dark grey; very well sorted organic silt; massive becoming laminated towards base of unit

			(below -0.90m OD); very common detrital plant remains increasing downward especially below -0.90m OD; no acid reaction; sharp contact with:
3.79 to 4.48	-0.99 to -1.68	4	Black; peat with scattered twigs.
4.48 to 4.50	-1.68 to -1.70	4a	10YR3/1 very dark grey; very well sorted silt enclosing piece of wood.
4.50 to 5.84	-1.70 to -3.04	4	Black; peat with scattered twigs; sharp contact with:
5.84 to 5.98	-3.04 to -3.18	3	10YR3/1 very dark grey; very well sorted silt; massive, common detrital plant remains; common detrital wood fragments; sharp contact with:
5.98 to 6.44	-3.18 to -3.64	2	Black; woody peat; sharp contact with:
6.44 to 6.50	-3.64 to -3.70	1	Dark grey passing down to olive brown; poorly sorted gravelly sand with clasts of sub-angular flint (up to 30mm).

Table 4: Archaeological watching brief description of Borehole 1, Surrey House, London Borough of Southwark (site code: LVI11)

Depth (m BGL)	Depth (m OD)	Description	Archaeological interpretation
0 to 1.70	3.00 to -1.30	Concrete and asphalt	
1.70 to 3.00	-1.30 to 0	Grey gravelly clay with ash and brick fragments	Made Ground
3.00 to 3.10	0 to -0.10	Fibrous peat	Peat
3.10 to 3.72	-0.10 to -0.72	Silty clay with black organic rootlets	Alluvium
3.72 to 3.75	-0.72 to -0.75	Burnt gravels, <5mm sub-angular with black charcoal/silt matrix	Possible Fire
3.75 to 6.09	-0.75 to -3.09	Silty clay fibrous peat with frequent twigs and wood fragments	Peat
6.09 to 6.35	-3.09 to -3.35	Silty clay, light brownish grey	Alluvium
6.35 to 6.70	-3.35 to -3.70	Fibrous peat	Peat
6.70 to 6.95	-3.70 to -3.95	Silty clay, light brownish grey, silty clay	Alluvium
6.95 to 9.00	-3.95 to -6.00	Medium density grey gravel	Sand and Gravel

Table 5: Archaeological watching brief description of Borehole 2, Surrey House, London Borough of Southwark (site code: LVI11)

Depth (m BGL)	Depth (m OD)	Description	Archaeological interpretation
0 to 0.74	3.08 to 2.34	Concrete and asphalt	
0.74 to 2.70	2.34 to 0.38	Dark brown silty sand with brick, concrete and occasional shell fragments	Made Ground
2.70 to 3.50	0.38 to -0.42	Firm, greyish brown clay with occasional fine to medium gravel	Alluvium
3.50 to 3.65	-0.42 to -0.57	Fibrous peat with frequent twigs/brushwood and wood fragments	Peat
3.65 to 3.95	-0.57 to -0.87	Silty clay, light grey	Alluvium
3.95 to 6.00	-0.87 to -2.92	Dark brown fibrous peat with occasional twigs	Peat

Table 6: Archaeological watching brief description of Borehole 3, Surrey House, London Borough of Southwark (site code: LVI11)

Depth (m BGL)	Depth (m OD)	Description	Archaeological interpretation
0 to 0.60	3.00 to 2.40	Concrete and asphalt	
0.60 to 1.50	2.40 to 1.50	Brown clayey sand with gravel, concrete and brick fragments	Made Ground
1.50 to 2.50	1.50 to 0.50	Firm, dark grey clay	Alluvium
2.50 to 3.50	0.50 to -0.50	Dark brown silty sand, slightly peaty with modern brick fragments	Made Ground
3.50 to 4.00	-0.50 to -1.00	Silty clay, light grey	Alluvium
4.00 to 4.70	-1.00 to -1.70	Fibrous peat with occasional twigs	Peat
4.70 to 4.90	-1.70 to -1.90	Silty clay fibrous peat, greyish brown with occasional twigs	Peat
4.90 to 5.70	-1.90 to -2.70	Silty clay, mid grey and slightly peaty	Peat
5.70 to 5.95	-2.70 to -2.95	Fibrous peat with occasional twigs	Peat
5.95+	-2.95+	Medium density grey gravel	Sand and Gravel

CONCLUSIONS AND RECOMMENDATIONS

There is a strong case for recommending further investigation of the Holocene sequences at the Surrey House site. Within the introduction, it was highlighted that the close location of Surrey House to 65 Southwark Street may suggest that the dates of the sedimentary sequence would be similar, particularly if the stratigraphy was analogous. This is not the case, with a substantially deeper gravel surface, and much thicker peat sequence suggesting a different chronology and environmental history for the two sites. An environmental archaeological assessment of both boreholes is therefore recommended to elucidate this and to evaluate the potential for reconstructing the past environmental conditions of the site and its environs, incorporating: (1) rangefinder radiocarbon dating, to provide an age for the onset and cessation of peat formation in both boreholes; (2) organic matter determinations to aid identification of the sedimentary units; (3) assessment of the archaeobotanical remains (pollen, waterlogged wood and seeds) to provide a provisional reconstruction of the vegetation history; (4) assessment of the diatoms to provide an indication of the palaeohydrology (e.g. marine, brackish or freshwater), and (5) assessment of the zooarchaeological remains (insects and Mollusca) to provide information on the general environmental conditions, climatic change and hydrology of the site. The environmental assessment will also highlight any indications of nearby human activity, and provide recommendations for further analysis (if necessary).

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