



Land North of Springhead Nursery Ebbsfleet, Kent

Report on Palaeolithic Test Pits

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Summary

Five deep test pits (TPs 15-18 and 24) were dug in June 2015 as part of a wider field evaluation to inform the application for a Development Consent Order (DCO) for the proposed London Resort. The five deep test pits were carried out to provide additional information on the Palaeolithic significance and potential of the unquarried area between the southern end of the Southfleet Pit chalk quarry and the Springhead Nursery. This area includes a Scheduled Monument (List Entry 1004206, formerly Kent 268b) the basis of its designation in part relating to the presence of Late Upper Palaeolithic remains with associated palaeo-environmental evidence.

The results from the test pit evaluation were considered in conjunction with (a) heritage information from the vicinity of the site, and (b) data from previous work in the site area. The previous draft Palaeolithic Historic Environment Framework (HEF) characterisation was updated, and four new areas were defined across the site: PPs 26a, b and 31a, b.

The conclusions were that much of the Site (areas PP26a, b and the western side of PP31b) remains of uncertain Palaeolithic potential, with insufficient investigations as yet to establish the Quaternary significance of the deeper-lying deposits, and the nature/potential of any Palaeolithic remains.

Part of the site (area PP31a, which includes the Scheduled Monument) is of high potential, likely to contain a direct continuation of the same sequence as in the Scheduled Monument.

And finally, part of the site (the central part and eastern side of PP31b) is of low potential.

Further field investigation to evaluate the nature of the Quaternary sequence and its Palaeolithic potential is therefore recommended in the parts of the site that are of uncertain or high potential (areas PP26a, b; PP31a; and the western side of PP31b).



Land north of Springhead Nursery Ebbsfleet, Kent

Report on Palaeolithic Test Pits

1 INTRODUCTION

1.1 Project and planning background

- 1.1.1 A new entertainment resort is proposed for the Swanscombe Peninsula, just to the southeast of the Greater London area; henceforth “the London Resort”. Wessex Archaeology were commissioned by London Resort Company Holdings Ltd (LRCH, or “the Client”) to carry out archaeological evaluation in a small part of the wider proposed London Resort area, to the north of the A2 exit for Ebbsfleet International station, henceforth “the Site” (**Figure 1**). The Site is likely to be affected by new road access layout from the A2 to the London Resort. It also includes a Scheduled Monument (List Entry 1004206, formerly Kent 268b).
- 1.1.2 The results of the evaluation will contribute to the application for a Development Consent Order.
- 1.1.3 The evaluation was carried out in accordance with a Written Scheme of Investigation (Wessex Archaeology 2015c) approved by Kent County Council's Heritage Conservation team, acting as archaeological advisor to Dartford Borough Council. There were three aspects to the fieldwork programme: (a) trial-trenching to investigate for post-Palaeolithic features and remains below the topsoil, (b) two geo-archaeological test pits to investigate the deeper-lying Holocene sequence near the Scheduled Monument, and (c) five deeper test pits to investigate sub-surface Quaternary deposits and Palaeolithic potential across the Site.
- 1.1.4 The work was guided by the relevant professional standards and guidance: Standard and Guidance for Archaeological Field Evaluation (CIfA 2014), and the Management of Research Projects in the Historic Environment: the MoRPHE Project Managers' Guide (Historic England 2015).
- 1.1.5 The Palaeolithic test pits were excavated on 18th-19th June 2015, in conjunction with Francis Wenban-Smith (Department of Archaeology, University of Southampton) as Palaeolithic specialist.

1.2 Scope of the report

- 1.2.1 This report specifically concerns the results of the five deeper test pits dug across the Site to investigate Quaternary deposits and Palaeolithic remains (the other work has been reported separately - Wessex Archaeology 2017). The sequence encountered in each test pit is reported in detail. The results are integrated with data from previous work in the Site area (see below, Section 2.2) to produce a sub-surface deposit model across the Site. The Site is then divided into four areas of varying Palaeolithic/Quaternary deposit character and potential, building on the “PP” (“Paramount Palaeolithic”) areas previously defined for the Palaeolithic Historic Environment Framework (HEF) characterisation for the overall footprint of the proposed resort development (Wessex Archaeology 2015d).

1.3 The Site

- 1.3.1 The Site lies to the southwest of Swanscombe, in northwest Kent, directly north of the junction of the A2 for Ebbsfleet International station, on land to the northwest of Springhead Nursery, centred at c. NGR 561500 172900 (**Figure 1**). It covers an area of c. 5ha, and is formed of unquarried ground to the south of the extensive complex of Chalk quarries that were active in the Ebbsfleet valley from the late 19th century through to c. 1970. It is bounded to the south and southwest by the A2 Ebbsfleet International link roads and the Springhead Nursery buildings, to the north by scrubland in the southern part of the footprint of the old Southfleet Pit chalk quarry, and to the east by the Ebbsfleet stream and the High Speed 1 rail line.
- 1.3.2 The ground-surface of the Site slopes down to the northeast from c. 17m above Ordnance Datum (OD) at its southwest side to c. 5m OD along its eastern side, corresponding with the lower part of a substantial dry valley that enters the head of the Ebbsfleet valley from higher ground to the southwest.
- 1.3.3 The underlying pre-Quaternary geology of the Site is mapped as a thin veneer of Thanet Sand conformably overlying Upper Chalk (Seaford and Newhaven Formations) (British Geological Survey 1998, and on-line) (**Figure 2**). However, much recent work (eg. for the HS1 Ebbsfleet Elephant butchery site, 500m to the northwest - Wenban-Smith 2013; and for the Ebbsfleet Green development 300m to the west - MOLA 2011), has shown that mapping of Thanet Sand in the area is often incorrect. Pleistocene sands, variously of fluvial or colluvial origin, have often been mis-mapped as pre-Quaternary Thanet Sand. This is something that needs to be taken into consideration when considering the results of both new and previous work in the Site area.
- 1.3.4 Besides its proven potential for inaccuracy, the current geological mapping is also slightly misleading as it shows the uppermost deposits as exposed after quarrying. Thus, the area of Chalk bedrock shown adjacent to the northern side of the Site represents the deeper-lying bedrock that continues under the Site, but not the previously present overlying superficial deposits. These are, however, shown in earlier historic editions of geological mapping (**Figure 3**), here reproduced from unpublished research work (Wenban-Smith 1996, Figure 4.4). This figure shows the southern end of the Ebbsfleet valley as a colluvial sump, infilled with Coombe Deposits that have fed into the area down numerous dry valleys from all quarters of the compass (going clockwise) from southeast to north-northwest. One aspect where more-recent geological mapping is more accurate, however, concerns the dry valley coming down into the Site from the northwest. This is (correctly) shown as infilled with a more substantial spread of colluvial deposits in the 1977 edition of the Dartford sheet 271, and then also as having a wider network of dry valley heads in the 1998 edition (**Figure 2**).
- 1.3.5 The date (or dates) of this colluvial input is very uncertain. Based on recent work on similar deposits at Ebbsfleet Green to the west of the Site (MOLA 2017), for HS1 to the north of the Site (Wenban-Smith *et al.* 2020) and at the Northfleet Wastewater Treatment Plant to the northeast of the Site (Wenban-Smith & Bates 2011), there was substantial colluvial deposition in the dry valley system of the Ebbsfleet area through the middle-late Devensian, between c. 90,000 and 15,000 BP. It is therefore likely that the Site area includes substantial deposits from this period. However, it remains very uncertain in the absence of good information on the sub-surface sequence whether (and if so, where) these Devensian slopewash deposits bury earlier Pleistocene sediments, and whether any more-deeply-buried pre-Devensian sediments contain Palaeolithic remains.

2 ARCHAEOLOGICAL BACKGROUND

2.1 Palaeolithic background: the Ebbsfleet valley

2.1.1 The Ebbsfleet valley is a key area for the Palaeolithic, with many sites of national and international importance both in the valley itself, and also on higher ground around it (**Figure 2**). The Ebbsfleet is a small south-bank tributary of the Thames, entering its lower estuarine reaches c. 5km downstream from the Dartford Crossing, opposite Tilbury docks. The valley cuts northward through the Middle Pleistocene Boyn Hill terrace (current geological mapping - BGS 1998 and on-line), formerly known as the Swanscombe 100-ft terrace, but more recently attributed as the Orsett Heath Formation by Bridgland (1994). This terrace is preserved on the south side of the Lower Thames as an intermittent east–west trending series of deposits from Dartford Heath through Dartford, Stone, Greenhithe and Swanscombe to Northfleet. It is present on the high ground either side of the Ebbsfleet valley, underlying Swanscombe (on the west side of the valley) and Northfleet (on the east side) (**Figure 2**). The terrace deposits consist of a sequence of predominantly fluvial loam, sand and gravel units laid down by the ancient Thames in the Hoxnian interglacial period between 450,000 and 350,000 BP [years Before Present] (late MIS 12 to early MIS 10), which can be traced further upstream along the Thames Valley, through London and towards Reading (Gibbard 1985 & 1994; Bridgland 1994).

2.1.2 Lower Palaeolithic remains comprising flint handaxes, cores, waste flakes and faunal remains have been found *in situ* at numerous sites in the Boyn Hill/Orsett Heath Formation between Dartford and Northfleet (Wymer 1968; Wessex Archaeology 1993; Wymer 1999). The most important site is Barnfield Pit (**Figure 2**, site 2), located c. 2km northwest of the Site. Here, as well as abundant lithic artefacts and faunal remains (many from undisturbed palaeo-landsurfaces), three conjoining fragments of early human skull were recovered (the "Swanscombe skull"), classified as late *Homo heidelbergensis*, with some features presaging the transition of this early NW European hominin population into Neanderthals.

2.1.3 Other important Lower Palaeolithic sites close to the Site are Bevan's Wash-pit, Swan Valley School (now the Ebbsfleet Academy), Eastern Quarry Area B (now part of the Castle Hill development), and the HS 1 Ebbsfleet elephant site. These are reviewed below, along with some slightly younger sites attributed to Lower/Middle or Middle Palaeolithic (dating between c. 250,000 to 35,000 BP).

Bevan's Wash-pit (Figure 2, site 6)

2.1.4 This is the old (now-wooded) late 19th century clay pit that is located on the other side of Southfleet Road from the Site, to its northwest. The avid local collector Henry Stopes found more than 20 handaxes here, as well as some flakes (Wenban-Smith 2004); there is no information on their precise provenance, other than that one handaxe was found 17 ft from the ground surface. Spurrell (1890) describes the sequence in the pit as brickearth over fluvial terrace gravel, and reports recovery of mammoth/elephant teeth from the brickearth, as well as handaxes.

Swan Valley School (Figure 2, site 4)

2.1.5 This site was investigated between 1997 and 2001 (Wenban-Smith & Bridgland 2001). The important aspects of this site were not only that it provided abundant lithic evidence of Lower Palaeolithic activity from Boyn Hill terrace gravels (the Lower Middle Gravel), but also that it demonstrated that the important Boyn Hill/Orsett Heath Formation extended much more widely than was previously known.

Eastern Quarry Area B (Figure 2, site 5)

- 2.1.6 This site was investigated in various stages between 2002 and 2015. The early phases of work (Wessex Archaeology 2006 & 2009a) demonstrated that archaeologically rich parts of the Boyn Hill/Orsett Heath Formation extended even further south than the Swan Valley School, and into the eastern side of Area B, c. 1km to the northwest of the Site.

The HS1 Ebbsfleet elephant site (Figure 2, site 1)

- 2.1.7 The Ebbsfleet elephant site was discovered in late 2003 and excavated in 2004. A preliminary report was produced soon after (Wenban-Smith et al. 2006), followed by full analysis and publication (Wenban-Smith 2013). It is located c. 500m to the northwest of the Site, where Southfleet Road was diverted as part of the HS1 development. Here, undisturbed remains of an elephant skeleton were recovered along with the flint tools used to butcher its meat. The remains were contained in a sequence of fluvial, marsh and slopewash deposits within the southwest part of the Ebbsfleet valley. These deposits were not part of the Boyn Hill/Orsett Heath formation, but were of the same age, dating to c. 420,000 BP, early in the Hoxnian interglacial (MIS 11). The key point about the HS1 elephant site is that it demonstrates that unmapped and deeply-buried Hoxnian deposits of high Palaeolithic importance were present in the southern Ebbsfleet valley close to the present Site. It is possible that related deposits extend into the present Site.

Middle Palaeolithic (c. 250,000 to 35,000 BP) sites

- 2.1.8 Several nationally important Middle Palaeolithic sites have been found in post-Hoxnian deposits that infill the Ebbsfleet valley at lower elevations than the Boyn Hill/Orsett Heath terrace (Wenban-Smith 1995). The area to the east of Southfleet Road (now an undulating terrain of landfill capped by turf, and occupied by Ebbsfleet International rail station and its car park) contained a number of sites in fluvial and colluvial/solifluction deposits (between c. 5m and 15m OD) that produced abundant Levalloisian flint artefacts and associated faunal and environmental remains, particularly the site of Baker's Hole (**Figure 2**, site 13), investigated in the early 20th century by RA Smith (1911). Other important locations for Middle Palaeolithic material are the Northfleet Allotments (**Figure 2**, site 15) and Burchell's Ebbsfleet Channel site (**Figure 2**, site 14), both of which are designated as part of the Baker's Hole Palaeolithic Scheduled Monument (List Entry 1003557, formerly Kent 267a, b) and Site of Special Scientific Interest (SSSI).
- 2.1.9 Other Lower/Middle Palaeolithic sites and findspots in the area are shown (**Figure 2**) and listed below (**Table 1**).
- 2.1.10 Upper Palaeolithic (c. 35,000 to 12,000 BP) material is also known from the Ebbsfleet valley and the surrounding area. Although nationally rare, evidence of the final Upper Palaeolithic "Long Blade" industry seems to be particularly prevalent in the Thames basin and in parts of East Anglia, and has regularly been noted in the vicinity of the Site. Several distinctive Long Blade artefacts [two large blades and a core] were collected as surface finds from the general Swanscombe area by Henry Stopes in the late 19th century (Wenban-Smith 2004, Stopes Catalogue sites: #5 The Mounts; #34 Botany Bay Pit [Figure 2, site 18]; and #54 Hartley).
- 2.1.11 In addition to these residual surface finds, there are also several localities in the Ebbsfleet valley where undisturbed scatters of artefacts have been found: Burchell's Springhead Lower Floor (which is within the present Site), Springhead Nursery and at the Ebbsfleet Green housing development.

Burchell's Springhead Lower Floor (Figure 2, site 19)

- 2.1.12 A prolific Long Blade scatter (from which nearly 240 artefacts survive, held by the British Museum, including 25 cores, 25 tools of various forms, and nearly 190 pieces of distinctive large blade debitage) was recovered in the 1930s from the bottom of the deposit sequence at a site near Springhead, towards the head of the Ebbsfleet Valley (Jacobi 1982). This location also produced Neolithic artefacts and pottery, and, following further investigation in the 1960s, was designated as a Scheduled Monument (List Entry 1004206, formerly Kent 268b) in the early 1970s. The designated area is within the northern part of the present Site (**Figure 1**), and the deposit sequence was investigated as part of the fieldwork reported on here by two geoarchaeological test pits, covered in a separate report (Wessex Archaeology 2017).

Springhead Nursery (Figure 2, site 20)

- 2.1.13 Excavations undertaken in connection with HS1 in 2002 produced further evidence of Long Blade material at Springhead Nursery, c. 200m to the southeast of the site (Anderson-Whymark, Chapter 20 and Appendix I in Wenban-Smith et al. 2020). A knapping scatter of more than 170 artefacts was recovered from a small area between Springhead Nursery and the entrance to the tunnel for HS1 under Pepper Hill, where colluvial slopewash deposits spread onto the side of the alluvial floodplain of the upper Ebbsfleet. The assemblage included three cores, numerous large blades, two retouched tools and one distinctive large "bruised blade". The fresh condition of the assemblage and the discovery of several refitting artefacts indicate a minimum of disturbance since its original deposition.

Ebbsfleet Green Late Upper Palaeolithic scatter (Figure 2, site 21)

- 2.1.14 Here, trial trenching in advance of the housing development unexpectedly revealed an undisturbed knapping scatter of Long Blade material (MOLA 2017). It was situated c. 750m to the west of the Site, towards the head of a dry valley that feeds into the Site from the west. The scatter was recovered about 1m below the ground surface, from a palaeo-landsurface at the top of a thick deposit of fine-grained brickearth that had accumulated between 20,000 and 15,000 BP, sealed below about 75cm of gravelly Holocene colluvium. The scatter had >900 artefacts, including >30 cores, nearly 50 tools of various types and nearly 650 debitage (of which nearly 450 were classifiable as blades, many of them exceptionally large). Analysis of the material is in progress, but preliminary results suggest it represents the discarded remains from repeated episodes of flint tool manufacture and use at the same spot.
- 2.1.15 Several of these sites - for instance the lower horizons of the HS1 Ebbsfleet elephant site, the three Middle Palaeolithic sites mentioned above, and the two Long Blade sites found at Springhead - occurred at similar elevations to uninvestigated ground in the present Site. It is possible that equivalent deposits with similar remains are present at the Site, and could be affected by development activity.

Table 1 Background: nearby Palaeolithic sites and findspots in the Ebbsfleet valley (see Figure 2) * [Acc: A - site accurately located, E - location estimated from sources, G - general location]

Site #	Name	Acc. *	Palaeolithic finds
1	HS1 Southfleet Road elephant site	A	Undisturbed elephant butchery site (associated with Clactonian material), overlain by a fluvial gravel rich in handaxes (Wenban-Smith 2013)



2	Barnfield Pit, Swanscombe	A	Classic sequence of sand, gravel and loam deposits; Clactonian in lower deposits; handaxes ("Acheulian") in upper deposits, along with Swanscombe skull (Smith & Dewey 1913, 1914; Swanscombe Committee 1938; Wymer 1968: 334-346; Conway <i>et al.</i> 1996)
3	Rickson's Pit	A	Abundant Clactonian, handaxe and Levalloisian remains recovered, but not with good provenance (Dewey 1932; Wymer 1968: 351-353)
4	Ebbsfleet Academy (formerly Swanscombe Community School)	A	Boyn Hill/Orsett Heath terrace (Swanscombe Middle Gravels) with abundant lithic artefacts (handaxes, cores and flakes) and some faunal remains (Wenban-Smith & Bridgland 2001)
5	Castle Hill (formerly Eastern Quarry), Area B	A	Field evaluation identifying continuation of Lower Middle Gravel and archaeologically rich riverbank areas (Wenban-Smith 2002; Wessex Archaeology 2006a & 2009)
6	Bevans Wash-pit	A	22 handaxes and 4 debitage (Wenban-Smith 2004: Stopes Catalogue #14 <i>etc.</i>); also reports of elephant/mammoth teeth (Spurrell 1890)
7	Caerberlarber hole	A	Surface finds: 27 handaxes and >40 debitage (Stopes Catalogue #25; Wenban-Smith 2004)
8	Swanscombe Wood/Park	E	Surface finds: 3 handaxes and 9 debitage (Stopes Catalogue #29; Wenban-Smith 2004)
9	One-tree field, Southfleet	A	Surface finds: 8 handaxes and >10 debitage (Stopes Catalogue #28; Wenban-Smith 2004)
10	Springhead Quarter	A	Two flakes found <i>in situ</i> in remnants of terrace gravel, and also several surface finds of Palaeolithic flakes (Wessex Archaeology, 2004 & 2008a)
11	Springhead area, surface finds	A	Surface finds of three handaxes, found pre-1968 (Roe 1968: 184; Wessex Archaeology 1993: map NWK 5, site 8)
12	Ebbsfleet Green Clactonian site	A	Lower Palaeolithic (Clactonian) knapping scatter and activity area (MOLA 2014, 2017)
13	Baker's Hole Levallois site (Southfleet Pit)	A	Prolific Levalloisian industry from chalky valley-side slopewash deposits (Smith 1911; Wenban-Smith 1995)
14	Ebbsfleet Channel, Area B	A	Deep sequence of deposits with Levalloisian knapping scatters and a range of mammalian and other faunal remains (Wenban-Smith 1995)
15	Northfleet Allotments (Ebbsfleet Channel, Area A)	A	Diverse deposits with rich mammalian and other faunal remains (Wenban-Smith 1995)
16	HS1, Springhead Nursery	A	Three Palaeolithic handaxes found on surface below topsoil strip (Wessex Archaeology 2003)
17	Springhead Quarter	A	Six flint artefacts and part of a mammoth tusk, possible palaeo-landsurface deeply buried (Wessex Archaeology 2004)
18	Botany Bay Pit, Galley Hill	E	Late Upper Palaeolithic (Long Blade), one large blade, Stopes site #34 (Wenban-Smith 2004)
19	Springhead Lower Floor	A	Late Upper Palaeolithic (Long Blade), major concentration (Jacobi 1982)



20	HS1, Springhead Nursery LUP scatter	A	Late Upper Palaeolithic (Long Blade), slightly disturbed knapping scatter (Lambdin-Whymark, in Wenban-Smith <i>et al.</i> , 2020, Ch 20 and Appendix I)
21	Ebbsfleet Green LUP site	A	Late Upper Palaeolithic (Long Blade), knapping scatter (MOLA 2014, 2017)

2.2 Site history, previous work and Ground Investigations

- 2.2.1 The Site has been subject to several investigations since the early 1990s, when the HS1 corridor was routed through it. A tabulated summary of these investigations is provided (**Table 2**, below), their locations are shown (**Figure 4**), and their details are reviewed below. Numerous boreholes were undertaken in the Ebbsfleet valley as Ground Investigations in advance of HS1, two of which (SA6408 and SA6408A, in March 1996) were within the Site's footprint, at its southwest edge. Then there was a substantial archaeological evaluation of the Site for HS1 in 1997, involving the excavation of numerous trial trenches under the site-code ARC SPH95. This work focused upon post-Palaeolithic remains close below the topsoil, so produced little information of Palaeolithic relevance - although the ground surface elevations provide useful information on the natural ground surface morphology prior to HS1.
- 2.2.2 In conjunction with the construction of HS1, the surrounding Ebbsfleet valley was divided into several designated development areas, and the Site became part of the development area "Station Quarter South". Further evaluation within this area was then undertaken in 2005, involving both trial trenching and geoarchaeological monitoring of Ground Investigations (Wessex Archaeology 2005a). Two of the geoarchaeological records - from TPs 23 and 25 - were located within the present Site, and provide useful information to complement the new work covered in this report.
- 2.2.3 This was then followed in 2006 by a targeted Palaeolithic test pit investigation of the unquarried ground in the southern part of the Ebbsfleet valley, in the same area as the present Site (Wessex Archaeology 2006b). Six deep test pits were dug to get a preliminary idea of the sub-surface deposits, and in particular to investigate for a continuation of deposits related to the HS1 Ebbsfleet elephant site. No related deposits were found. The results showed a c. 3m thick sequence of silt/sand (interpreted as colluvial slopewash) overlying a gravel body with its upper surface at c. 5m OD, sloping shallowly down to the east. The bottom of the gravel wasn't reached and it wasn't clear whether it was a fluvial or solifluction deposit. A slightly-abraded flint artefact was found in the gravel in one of the test pits (TP 4).
- 2.2.4 The final piece of previous work prior to the present investigation was a second Watching Brief carried out on further Ground Investigations in May 2007 (Wessex Archaeology 2007). This work involved monitoring of six geoarchaeological test pits distributed across the southwest part of the present Site (**Figure 4**). These test pits were never more than 1.6m deep, and so did not provide very much useful information, and no information on deeper-lying deposits. However, TPs 1 and 5 (of this series - there was also a different archaeological TP 5 dug in 2006) established the presence of made ground down to at least 1.6m. The other test pits reached the upper part of the major sand/silt body encountered in the 2006 work, confirming its widespread.
- 2.2.5 The results from all this previous work are integrated in this report with the results from the new work, to provide an up-to-date assessment based on all the available information of the sub-surface deposit character and Palaeolithic potential of the Site.

Table 2 Previous archaeological work: HS1 and other investigations since 1995

Dates	Project	Investigation overview	Key interventions	Fieldwork site-code (arch.)	Report reference
March 1996	HS1	Ground Investigations	Boreholes SA6408 and SA6408A	-	BGS on-line GeoIndex, logs TQ67SW882 and TQ67SW883
May-June 1997	HS1	Evaluation (85 trial trenches)	TTs 1326, 1329, 1333, 1335, 1339-1341, 1345-1348	ARC SPH95	URL 1997 [Wessex Archaeology, report ref 43501d]
July, August 2005	Station Quarter South	GI WB 1: Watching Brief on Fugro GI (5 test pits) Evaluation (10 trial trenches)	TPs 23 and 25 TRs 01-02, 04-08	60401 60401	Wessex Archaeology 2005a [report ref 60401.02, Appendix 2] Wessex Archaeology 2005a [report ref 60401.02]
July, August 2006	Station Quarter South	Targeted Palaeolithic evaluation (6 test pits)	TPs 1-6	63543	Wessex Archaeology 2006b [report ref 63543.02]
May 2007	Station Quarter South	GI WB 2: Watching Brief on Arup GI (6 test pits)	TPs 1-5 and 25	63545	Wessex Archaeology 2007 [report ref 63545.11]
June 2015	London Resort (Paramount)	Pre-DCO evaluation (14 trial trenches and 2 geo-archaeological test pits) Pre-DCO evaluation (5 Palaeolithic test pits)	Tr 1-14; TPs 19-20 TPs 15-18 and 24	106573 106574	Wessex Archaeology 2017 [report ref 106573.03] This report

2.3 Historic Environment Frameworks (HEFs) and archaeological potential

2.3.1 Complementing the above history of previous investigation (*Section 2.2*), and broadly concurrent with it, have been a series of desk-based Historic Environment Framework (HEF) models of the Palaeolithic potential of different parts of the Ebbsfleet valley including the present Site (**Table 3**, below). Although they have been developed over roughly the same period as the previous investigations (between 1992 and 2015), they mostly haven't taken account of their results. This is because either they were developed before the fieldwork took place (HS1, Ebbsfleet DBA and DBA rev1), or because they were focused on slightly different areas adjacent to the present Site (Ebbsfleet DBA rev2 and the Southfleet Road DBA for Peter Brett).

2.3.2 There has also been a Palaeolithic-focused HEF characterisation produced in relation to the London Resort proposal, covering the full footprint of the proposed resort development area, and complementing the non-Palaeolithic characterisation. This Palaeolithic HEF characterisation focused on identifying areas of surviving unquarried ground, and identifying

areas of Palaeolithic importance and areas of uncertainty where preliminary field investigations would be required to establish Palaeolithic potential. Maps were produced showing 47 different areas of varying Palaeolithic potential: PP (for “Paramount Palaeolithic”) 1-13, 14a-14f, 15-27, 28a-b, 29a-c, and 30-38. These maps were complemented by a table identifying the Palaeolithic potential of these areas, and identifying where preliminary field investigations were recommended. This work was presented to curators and discussed with them on various occasions between 2015 and 2017. The Palaeolithic HEF (and post-palaeolithic HEF) has been updated since 2015/2017 and incorporated into the most recent version of the Historic Environment Framework (Wessex Archaeology 2022).

Table 3 Previous Palaeolithic deposit models and Historic Environment Frameworks (HEFs)

<i>Date</i>	<i>Project</i>	<i>Comments</i>	<i>Relevant areas for the Site</i>	<i>Report reference</i>
1992, September	HS1	Was strongly-based on geological mapping, before new field data showed how unreliable this is	Area 11	Wenban-Smith 1992
2005, November	Ebbsfleet Development (initial)	Included development quarters on both sides of HS1; 22 zones (A1-A22) of varying deposit character and Palaeolithic potential were defined	A15, A16 and A17	Wessex Archaeology 2005b
2006, April	Ebbsfleet Development (rev1)	Revision of the initial Ebbsfleet Development deposit model, with (a) very minor alterations to some zones, and (b) deposit-modelling of sub-surface transects across the 22 areas	A15, A16 and A17	Wessex Archaeology 2006c
2008, April	Ebbsfleet Development (rev2)	The scope of this revision was - amended to exclude the southern end of the Ebbsfleet valley		Wessex Archaeology 2008b
2013, July	Southfleet Road Improvement (Peter Brett)	The corridor for the proposed new Southfleet Road crossed the southern part of the present Site	Area S12	Wessex Archaeology 2013
2015, May	London Resort (initial)	Initial site-wide scoping of more important Palaeolithic areas and areas of greatest uncertainty	PPs 26, 31	Draft submitted in 2015, final report in prep

2.3.3 It is useful to recap these previous HEFs for the Site (**Figure 4**), since they establish previous thinking around its nature and potential, prior to the new investigations reported on here.

2.3.4 For HS1, the Site was designated as Area 11, uninvestigated unquarried deposits in the southern part of the Ebbsfleet valley and north of the A2, and assessed as “Palaeolithic

Priority 4, deposits of high potential requiring field evaluation". The report (Wenban-Smith 1992) drew attention to verbal information (R Scaife, pers comm) of bedded fluvial sands/silts exposed in the southern end of the nearby quarry (in retrospect these are very reminiscent of phase 5 of the HS1 elephant site sequence "clay-laminated sands", although the HS1 elephant had not been discovered at the time of this report). The report emphasised that the area had formed a trap for the accumulation of colluvial and solifluction deposits, and that it was likely that "buried somewhere under these are Pleistocene deposits of Palaeolithic significance" (*ibid.* Section 3).

- 2.3.5 For the initial Ebbsfleet Development deposit model (Wessex Archaeology 2005b), the Ebbsfleet valley area was divided into Holocene "Ebbsfleet alluvium" and 22 surrounding areas - A1-A22 - of varying Quaternary deposit character and Palaeolithic potential. The present Site was attributed as parts of Ebbsfleet alluvium and of three of these areas: A15, A16 and A17 (**Figure 4**).

Ebbsfleet alluvium.

- 2.3.6 This area was located down the east side of the Site, with an incursion into its central north part. The potential for the presence of Late Upper Palaeolithic Long Blade material at the base of the Holocene alluvial sequence was noted, as well as the potential for the association of environmental evidence.

A15, "Southwestern dry valley".

- 2.3.7 This area was located in the northwest part of the Site, corresponding with the lower part of the present-day dry valley that crosses the north end of the Site from the southwest. It was suggested that the sediments here were most likely to be Holocene colluvial slopewash and dry valley fill, overlying Thanet Sand, and thus the area was most likely of low Palaeolithic potential. However, it was noted that no investigations had taken place, and this supposition needed to be confirmed by field investigation.

A16, "Park Corner".

- 2.3.8 This area represents higher ground on the southeast side of the above-mentioned dry valley. A small part of this area extends into the southwest side of the Site. The area is mapped as Thanet Sand, and exposures of Thanet Sand (without any apparent overlying Quaternary deposits) were informally noted c. 50-100m southwest of the Site during HS1 road-link construction works. Same as for A15, this area was categorised as most likely of low Palaeolithic potential, subject to confirmation by field investigation.

A17, "Nursery Complex".

- 2.3.9 This area represents the southern half of the present Site, up to Trench 7 and including TP 23 from the 2005 Ground Investigations. Fluvial gravels were identified in this latter test pit (Wessex Archaeology 2005a, Appendix 2), occurring at similar elevation to known MIS 7 fluvial deposits further north in the Ebbsfleet valley (**Figure 2**, sites 14 and 15; and also from fieldwork for HS1 just to the east of site 15 - Wenban-Smith *et al.* 2020, chapter 5). This area was therefore assessed as of uncertain potential, and requiring field investigation to clarify its Palaeolithic importance.

- 2.3.10 A revised version (rev 1) of the Ebbsfleet Development deposit model was then issued in April 2006 (Wessex Archaeology 2006c). However, none of the revisions affected the present Site. The same 22 areas were presented, with addition of sub-surface deposit-modelling shown as various stratigraphic cross-sections, but none of these crossed the present Site. A further-revised version (rev 2) was then issued in April 2008 (Wessex Archaeology 2008b). This second revision involved more-detailed sub-surface deposit

modelling, and substantial refinements of the 22 deposit character zones. The overall boundaries of the zones remained very similar (with a few minor revisions), but finer detail was provided on variations of deposit character and potential within several zones, and in particular a more detailed and varied assessment was provided of variations across the wide area of Holocene alluvium. However, the scope of this second revision was focused on parts of the Ebbsfleet valley to the north of the present Site, so no new assessment was provided of the Site.

- 2.3.11 In July 2013 a detailed Palaeolithic desk-based assessment and deposit-model was prepared (Wessex Archaeology 2013) along Southfleet Road on the west side of the Ebbsfleet valley, between it and Swanscombe, in conjunction with a proposal for expansion and improvements along this corridor. The study corridor crossed the southern side of the Site, which was attributed as area S12 in the report (*ibid.* Table 7, pp 18-20; and Appendix 2). This area (**Figure 4**) was characterised as colluvial/slopewash sediments interdigitating with floodplain alluvium, buried below up to 3m of made-up ground. It was attributed as of low Palaeolithic potential, although it was noted that there was potential for final Upper Palaeolithic Long Blade remains to be found at the lower eastern side of the area, nearer the course of the Ebbsfleet. It was recommended that test pits be carried out to investigate for these.
- 2.3.12 Finally, a preliminary draft of a Palaeolithic Historic Environment Framework (HEF) for the London Resort footprint was prepared in May 2015 (Wessex Archaeology 2015d), and discussed with curators on various occasions between 2015 and 2017. In this Palaeolithic HEF, the Site was attributed as parts of two areas, PPs 26 and 31 (**Table 4**, below). Both of these areas were characterised as of “Uncertain” Palaeolithic potential, with a moderately high likelihood of possibly important Palaeolithic remains being present. It was therefore recommended that preliminary field investigation be carried out to improve understanding of these areas, to inform the application for the DCO.

Table 4 London Resort Palaeolithic Historic Environment Framework (HEF) and fieldwork recommendations for the Site (Wessex Archaeology 2015d)

PP area #	Palaeolithic potential	Likelihood of presence	Importance, if present	Likely Palaeolithic remains	Preliminary field investigation recommended
PP26	UNCERTAIN	Moderate	High?	Artefacts in fluvial terrace sands/gravels	Yes
PP31	UNCERTAIN	Moderate	Maybe high	Artefacts in fluvial terrace sands/gravels; late Upper Palaeolithic (Long Blade) in colluvium/alluvium interdigitation zone	Yes

3 AIMS AND OBJECTIVES

3.1 General aims

- 3.1.1 The general aims of the evaluation were defined in the Written Scheme of Investigation (Wessex Archaeology 2015c). In accordance with *Standard and Guidance: Archaeological Field Evaluation* (ClfA 2014), these were to provide information about the archaeological resource within the site, including its presence/absence, character, extent, date, integrity, state of preservation and quality. The evaluation was also designed to be minimally intrusive and minimally destructive to archaeological remains.



3.1.2 This information will enable the identification and assessment of the significance of any archaeological heritage assets within the site, consider the impact of the proposed development upon that significance and, if appropriate, develop strategies to avoid or minimise conflict between heritage asset conservation and the development proposal, in line with the *National Planning Policy Framework* (Ministry of Housing, Communities and Local Government, 2012).

3.2 Specific objectives

3.2.1 As specified in the Written Scheme of Investigation (Wessex Archaeology 2015c, Section 3.2), the specific objectives of the evaluation were to record the location, extent, date, nature, character, and significance of archaeological remains as may exist on the Site and to report on the results of the evaluation so that an informed decision on their subsequent treatment can be made, in light of the impact of the proposed development. From a Palaeolithic perspective, the specific objectives included:

- to determine the nature and depth of Pleistocene deposits below the Site's ground surface;
- to recover/record any Palaeolithic artefactual remains in the Pleistocene deposits below the Site;
- to determine the potential of the site to provide palaeo-environmental and economic evidence, and the forms in which such evidence may be present;
- to relate the sequence under the Site to the sequences known previous work nearby and in the Ebbsfleet valley, specifically (a) previous test pit evaluation within the Site in 2006, (b) work at the nearby HS1 Ebbsfleet elephant site, (c) alluvial and colluvial sequences flanking the Ebbsfleet that have previously produced Late Upper Palaeolithic remains, and (d) other work for HS1 further north in the Ebbsfleet valley;
- to establish the date and formation processes associated with Quaternary deposits recognised at the Site;
- to assess the depositional and post-depositional process undergone by any artefactual or faunal remains recovered, and to assess the importance of any such remains in terms of their relevance to local, regional and national research priorities;
- to revise (if necessary) the current Palaeolithic HEF in light of the new results; and
- to consider the impact of the development proposal on any deposits or remains found, and to make recommendations for further work that might be needed to understand them sufficiently for well-informed curatorial decision-making.

4 METHODS

4.1.1 As specified in the Written Scheme of Investigation, the Palaeolithic Evaluation consisted of five test pits (TPs 15, 16, 17, 18 and 24). These were initially located so as to (a) match the proposed new road layout through the Site, and (b) to match areas previously identified (on the basis of topography) as most likely to provide good information on sub-surface deposits and their Palaeolithic potential. However, due to various on-site constraints (such as ecology and lack of access to certain areas), these test pits were substantially relocated (**Figure 5**).



- 4.1.2 In the end, two test pits (TPs 15 and 16) were dug in the northern part of the Site, forming a short broadly WSW-ENE transect across the flank of the Ebbsfleet valley, where the ground surface sloped down from c. 11m to 7m OD. The other three test pits (TPs 17, 18 and 24) were dug in the southern part of the Site, forming a broadly SW-NE transect across the flank of the Ebbsfleet valley to the south of the dry valley crossing the Site from the southwest, where the ground surface sloped down from c. 11.5m to 8m OD. Test pits 16 and 24 were dug on their own, away from trial trenches; the other three test pits (TPs 15, 17 and 18) were dug in the footprints of trial trenches (trenches 3, 10 and 9 respectively).
- 4.1.3 All the test pits were approximately 4m long and 2m wide. Their depths varied from 2m to 3.6m bgl (below ground level). Pre-Quaternary deposits were reached in one of them - in TP 16 where degraded Chalk bedrock was found at 1.8m bgl - but otherwise the base of the Quaternary sequence wasn't reached, and excavation was halted due to limitations of machine reach.
- 4.1.4 Full details of the test pit excavation methods are given in the Written Scheme of Investigation (Wessex Archaeology 2015c). In summary, the test pits were set out on OS National Grid (NGR) co-ordinates using Leica GPS following the locations in the WSI, although some needed to be relocated as explained above. The locations were scanned for live services before excavation by trained Wessex Archaeology staff using a Cable Avoidance Tool (CAT). The final 'as dug' test pit plan was recorded with GPS.
- 4.1.5 Each test pit was excavated by a tracked 360° excavator equipped with a 2m-wide toothless bucket. Excavation took place under direction of the Palaeolithic/Pleistocene geoarchaeological specialist (Francis Wenban-Smith) and the WA Field Supervisor. Each test pit was then taken down in horizontal spits of 5-10cm, respecting the interface between sedimentary units when unit changes were encountered, and monitoring for Palaeolithic remains and sediments with palaeoenvironmental potential. The Palaeolithic/geoarchaeological specialist recorded and numbered the sequence of sedimentary units as excavation progressed further down, following standard descriptive practices. Test pits were entered at c. 1.20m depth to record the upper stratigraphy. Then they were excavated below that following the same method, with all recording being done by measuring down from the ground surface without entering the test pit.
- 4.1.6 For each test pit, a representative section was recorded at a scale of 1:20, and the section was photographed and surveyed, with supplementary photos/notes/drawings as thought suitable. All recording was undertaken with reference to a GPS-surveyed spot-height, and the final 'as dug' test pit outline was recorded with GPS. All test pits were backfilled shortly after excavation and recording were completed, and no test pits were left open untended or overnight.
- 4.1.7 No natural sand/gravel beds suitable for artefact-sieving were encountered. Excavation progressed in shallow spits of 2-5cm through the major sand/silt beds that were most-commonly encountered, with close attention paid during excavation for any lithic artefacts or fossil bone remains, both in the trench floor and in the freshly excavated spoil. However, no artefacts or faunal remains were found, nor any sediments meriting palaeoenvironmental sampling.
- 4.1.8 Fieldwork took place from 18th-19th June 2015 and was carried out by Wessex Archaeology with assistance of Francis Wenban-Smith (Department of Archaeology, University of Southampton) as Palaeolithic and Pleistocene geoarchaeological specialist. Fieldwork was carried out under the Wessex Archaeology project code 106573.

5 RESULTS

5.1 Stratigraphy, distribution of sediments and depositional environments

- 5.1.1 The results from the new work were integrated with those from the previous Palaeolithic test pits (**Table 5**, below). As well as Topsoil (To) and modern made ground (M), three Quaternary deposit groups were previously recognised (I, II and III). Group III (a substantial spread of silt/sand across much of the Site) was encountered in the new work, but not groups I and II. However, three new deposit groups were defined (IV, V and VI). The former of these (IV) represents the upper part of deposit III as attributed in 2006. However, the latter two (V and VI) represent newly-recognised slopewash deposits encountered in the northern part of the Site. Chalk bedrock (Ck) was only occasionally encountered: in TP 2 of the 2006 work, and in TP 16 of the new work.
- 5.1.2 A detailed report of the stratigraphic sequence in each test pit is provided as an appendix (**Appendix A**). This appendix also identifies the attribution of different stratigraphic contexts in each test pit to deposit groups recognised across the Site, and provides photos of the full sequence. The new sequence data from the test pits were drawn up in conjunction with data from previous work into a sub-surface deposit model, shown here as Transects A, B and C (**Figures 6, 7**). Transects A and C include the new test pit data; and Transect B represents data from the previous 2006 work (Wessex Archaeology 2006b, Figure 4). All three transects are oriented broadly SW-NE across the west flank of the Ebbsfleet valley, moving progressively southward down the Site.
- 5.1.3 The test pit evaluation confirmed previous indications that the southern part of the Site is covered by a wide and thick spread of sandy/silty slopewash deposits (III). As they dip westward and approach the west side of the Ebbsfleet, their upper part is increasingly distinct as a darker brown and more clayey bed (IV). This latter bed is probably not a distinct deposit, but rather is most likely the decalcified upper part of the same bed. These deposits probably formed through the generally cold period of the Devensian glacial (MIS 5d-2, between c. 110,000 and 12,000 BP). However, it is also possible that they could date earlier, to MIS 6 (c. 180,000-130,000 BP), or even to an earlier cold period (MIS 8, c. 300,000-250,000 or MIS 10, c. 370,000-340,000).
- 5.1.4 These Group III deposits are underlain by shelly flint gravel (variously attributed as deposit II in the southwest part of the Site, and deposit I in the central east part of the Site, slightly downslope to the northeast. The date and formation process of this deposit (or perhaps these deposits if they are not lateral equivalents of each other) is very uncertain. These gravel deposits were not encountered in the new work, so there is no new information to help improve their interpretation. Their base has not been reached in any test pit. It remains very uncertain as to whether the gravel in the southwest part of the Site (II) is, or isn't a different deposit to that further northeast (I). Both deposits I and II could be either of fluvial origin, or formed by slopewash/solifluction processes. Based on their landscape situation in the "colluvial sump" at the head of the Ebbsfleet valley (see above, *Section 1.3*), it is most likely they are of colluvial/solifluction origin. However, their elevation is similar to confirmed fluvial gravel deposits found further north in the Ebbsfleet valley, which have been reliably dated to MIS 7 and which (in some places) have been proven to contain artefactual and faunal remains.
- 5.1.5 The newly attributed deposits V and VI were only present in the northern part of the Site. These were clearly recognisable as slopewash/solifluction deposits, with clear beds of gravelly silt/sand dipping downslope (VI), overlying chalk-rich solifluction deposits (V), which was seen to grade down into degraded Chalk bedrock in TP 16. Same as for deposit III, they most-likely date to the last (Devensian) glacial, but could be older.

5.1.6 There is one slight anomaly in the sub-surface deposit sequence in the northwest part of the Site, which doesn't easily tie in with the other deposits seen. This is a thicker body of sand/silt identified higher up the slope, seen in TP 5 during the second GI watching brief and shown as the west end of Transect A (**Figure 7a**). Here, there is a body of silt/sand of similar nature to deposit III, but at a substantially higher elevation (between c. 12m and 13m OD, without its base being reached). This could be an upslope correlate of deposit III, or it could be a different sediment body. Also, it is uncertain how it relates to deposit VI. Its different sedimentary character makes it unlikely that it is a direct correlate; it is most likely an older deposit, that has been truncated downslope by deposit VI.

Table 5 Stratigraphy: integration of new results (2015 work, this report) with framework from previous work (2006 work, Wessex Archaeology 2006b)

Sediment Group	Deposit, description	Period, interpretive notes	Test pits present, by work-phase	
			2006	2015
To	TOPSOIL. Dark brown, friable, variably pebble-rich clayey silt/sand, capped with grass and shrubs.	Varied period. Mostly well-developed historic topsoil on natural deposits, although recently laid down above made-up ground in some test pits.	All	All
M	MADE GROUND. Mod. consolidated clay-silty sand, yellowish/greyish-brown, with chalk and flint pebbles, flint nodules, wooden stakes and modern CBM	Recent, mid-20th C. This is probably of mid-late 20 th century origin, relating to the southern end of the New Barn Pit that was close to the west, prior to its backfilling	1-3	24
VI	GRAVELLY SAND, WITH FLINT NODULES. Parallel beds of clayey/silty sand with some lenses of chalk and flint pebbles, progressively richer in larger clasts downwards (including substantial flint nodules deeper down), dipping downslope to the east [overlying deposit V]	Mid/Late Pleistocene. These are slopewash/solifluction deposits. Their age is very uncertain; they are most-likely mid-late Devensian, but could be substantially older.	-	15-16
V	CHALK DIAMICT. Densely-packed chalk pebbles and cobbles, and occ. flint nodules in a very pale brown (sometimes reddish/yellow-stained) chalk silt matrix [underlying deposit VI]	Mid/Late Pleistocene. These are basal slopewash/solifluction deposits. Their age is very uncertain; they are most-likely mid-late Devensian, but could be substantially older.	-	15-16
IV	SANDY CLAY-SILT, SILTY SAND. Brown silty sand, firmer and more clayey in TP 17, and with occ. fine chalk pebbles in TP 17	Mid/Late Pleistocene. These are probably decalcified slopewash deposits, equivalent to the upper decalcified part of deposit III in the 2006 test pits 4-6. They could either date to MIS 6, or to the Devensian (MIS 5d through to 2).	-	17-18
III	SILTY SAND. Yellowish-brown structureless silty sand, less silty and softer downward; contains occ. thin bands of chalk/flint clasts and flint nodules; upper part darker and decalcified, lower parts paler, with patches of re-precipitated carbonate infilling networks of fine rootlet tubules	Mid/Late Pleistocene. Slopewash deposits; they could either date to MIS 6, or to the Devensian (MIS 5d through to 2).	All	17-18, 24



II	SANDY/SHELLY FLINT/CHALK GRAVEL. Mod. soft and poorly-sorted, coarsely-bedded chalk and flint gravel with flint nodules, matrix rich in reworked Tertiary shell fragments	Mid./Late Pleistocene. Probably slopewash/solifluction deposits, laid down in episode of cold climate - although may be a fluvial terrace, representing an up-slope continuation of I (see below).	1-4	-
I	SANDY/SHELLY FLINT GRAVEL. Mod. soft and poorly-sorted, sandy chalk and flint gravel with coarse sub-horizontal bedding, including undulating sand beds, in silty sand matrix rich in reworked Tertiary shell fragments	Mid./Late Pleistocene. Probably fluvial terrace deposit - although may be slopewash/solifluction deposits, representing a down-slope continuation of II (see above)	6	-
Ck	CHALK. Dry white crumbly chalk rubble, with occ. fresh flint nodules	Cretaceous Chalk. Degraded surface of Chalk bedrock, uncomfortably truncated by Pleistocene deposits.	2	16

5.2 Lithic artefacts

5.2.1 No lithic artefacts were found in this test pit evaluation. However, two pieces of flint debitage were found in 200L of deposit II, sieved during the 2006 work. This is a moderately high rate of recovery, so indicative that this gravel body has Palaeolithic archaeological interest. Assessing the level of potential depends upon establishing the formation process, whether fluvial or colluvial/solifluction.

5.3 Faunal and other palaeo-environmental remains

5.3.1 No mammalian remains (or other faunal remains such as molluscs) were encountered during the test pit excavation, and nor were any sediments encountered with potential for palaeoenvironmental sampling.

6 CONCLUSIONS

6.1 Overview

- 6.1.1 This investigation work (2015) has reinforced the previous understanding of the sequence in the southern part of the Site, and provided new information that has enhanced understanding of the sequence in the northwest part of the Site. In the southern part of the Site, there is a thick sequence of colluvial sand/silt (deposits III, IV) that seems to be lacking in any artefactual or faunal remains. It probably represents slopewash during a period of cold climate, when southern Britain would most likely have been unoccupied. Therefore, the deposit itself can be regarded as of low potential on present knowledge. However, it may cover deposits of higher potential, comprising (a) deposits I and II, and/or (b) as-yet-undiscovered deposits.
- 6.1.2 As summarised above (*Section 5.1*), the interpretation of deposits I and II remains uncertain, although deposit II has been shown to contain flint artefacts. The key uncertainties are: (a) are these two deposits direct correlates of each other (ie, does one merge laterally into the other?), and (b) how were they (or, how was it) formed? The base and lower levels of these deposits have also not been investigated, so it remains uncertain whether they contain additional evidence that could help in their interpretation and add to their importance. Therefore, it is necessary to carry out further investigations of the deeper-lying Quaternary sequence to understand the southern part of the Site better.
- 6.1.3 In the northwest part of the Site, the investigation has demonstrated (in TPs 15 and 16) the presence of shallower and more-gravelly slopewash sediments (deposit VI) than in the southern part of the Site, becoming chalk-rich at their base (deposit V), and then grading down into Chalk bedrock (Ck). No artefacts or faunal remains were found in these deposits, and they can be regarded as of low potential, as any remains that might later be recovered would be very poorly constrained chronologically. However, monitoring of ground investigations at the northwest edge of the Site (in TP 5(2), **Figure 7a**) revealed fine-grained deposits of uncertain age and origin, without reaching the base of the Quaternary sequence. Therefore, there remains uncertainty in this area about the nature of the Quaternary sequence, and its Palaeolithic potential.
- 6.1.4 This investigation work allows some refinement of the current draft Palaeolithic HEF for the Site area, when considered together with previous data. Details of these revisions are presented below (*Section 6.3*).

6.2 Stratigraphic framework: correlation and dating

- 6.2.1 It isn't yet possible to piece together a coherent stratigraphic framework across the Site, due to the low number of deeper interventions and their wide separation. In the southern part of the Site (**Figure 7b, c**), the base of the Quaternary sequence was not reached. The lowest deposits seen were the upper parts of sandy/shelly flint gravel (deposits I and II). These were overlain by a thick and widespread body of sand/silt (deposit III). Deposit III is overlain in places by a darker brown and more clayey/silty bed (deposit IV). This is considered to be the decalcified upper part of deposit III, rather than a stratigraphically distinct bed.
- 6.2.2 As discussed above (*Section 5.1*), it isn't possible to know (a) whether deposits I and II are lateral equivalents or different deposits, or (b) whether they are fluvial or colluvial/solifluction deposits. If they are fluvial deposits, then they may be an upstream correlate of the MIS 7 (c. 240,000 - 190,000 BP) fluvial gravels seen further north in the Ebbsfleet valley, in the Baker's Hole Palaeolithic Scheduled Monument and Site of Special Scientific Interest on



the west side of HS1 (**Figure 2**, sites 14, 15). If colluvial/solifluction deposits, then they could be of almost any age, most likely from the last (Devensian) glacial, from MIS5d-2 (c. 110,000 - 12,000 BP). The overlying sand/silt is a colluvial solifluction deposit that very likely does date to the last (Devensian) glacial, although it could date to an earlier cold period such as MIS 6 (c. 180,000-130,000 BP), or even earlier.

6.2.3 There is no clear stratigraphic relationship between the deposits in the southern and northern parts of the Site. The northern part of the Site was dominated by gravelly silt/sand deposits in parallel downslope-dipping beds (deposit VI) of clear colluvial/solifluction origin (**Figure 7a**). These were quite thin (<1m thick) upslope towards the western side of the Site (in TP 16), but thickened downslope to the east (TP 15). Here, they overlie chalk diamict (deposit V), also of colluvial/solifluction origin, and this was bottomed out down to degraded Chalk bedrock.

6.2.4 A slightly anomalous sequence was noted at the northwestern edge of the Site, in TP 5 of the second ground investigation. Here, a pale yellowish-brown sandy silt was seen, similar in character to deposit III, but at a much higher elevation (between 12m and 13m OD, with the base not reached) than other deposit III exposures in the southern part of the Site. The correlation and date of this deposit is very uncertain. It could be an upslope continuation of deposit III, or it could be an entirely different (and older) body of similar character.

6.3 Significance and potential

6.3.1 The results of the new work have been integrated with previous data to provide an updated assessment of Palaeolithic significance and potential in the Site area. The draft Palaeolithic HEF has been updated. The parts of the previous areas PP26 and PP31 that crossed the Site have been refined and redrawn as PP26a, b and PP31a, b (**Figure 6**). Details of these new areas are presented in an appendix (**Appendix B**), and summarised here below (**Table 6**).

Table 6 London Resort, updated Palaeolithic Historic Environment Framework (HEF) in the Site area, following from 2015 fieldwork

<i>PP area #</i>	<i>Palaeolithic potential</i>	<i>Likelihood of presence</i>	<i>Importance, if present</i>	<i>Likely Palaeolithic remains</i>	<i>Further field investigation recommended</i>
PP26a	UNCERTAIN	Low - deposit III Moderate - deposit II	Uncertain	Artefacts and faunal remains in fluvial terrace silts, sands and gravels	Yes
PP26b	UNCERTAIN	Low - deposit III Uncertain - any deeper deposits	Uncertain	Artefacts and faunal remains in fluvial terrace silts, sands and gravels (if present)	Yes
PP31a	HIGH	Moderate/high	High	Late Upper Palaeolithic (Long Blade) and palaeo-environmental remains towards base of alluvium, and in colluvium/alluvium interdigitation zone	Yes
PP31b	LOW	Moderate	Low - on present understanding	Occasional reworked lithic artefacts	Yes, in western part of area

6.4 Recommendations and priorities for future work

- 6.4.1 As summarised above (**Table 6**), much of the Site - areas PP26a, b and the western part of area PP31b (**Figure 6**) - is currently insufficiently well-understood for a confident assessment of the nature and potential of any Palaeolithic remains. Therefore, further fieldwork is recommended to remedy this, targeted at gaps between existing records and in less-investigated areas, and using methods that will reach the base of the Quaternary sequence (such as boreholes).
- 6.4.2 Another part of the Site (area PP31a) is assessed as of high potential, due to the likelihood of there being a direct continuation of the same sequence as in the Scheduled Monument in part of the area, with the likely presence of Late Upper Palaeolithic and associated palaeo-environmental remains towards the base of the alluvium. Furthermore, work for HS1 at Springhead Nursery (Anderson-Whymark, Chapter 20 and Appendix I in Wenban-Smith *et al.* 2020) recovered Late Upper Palaeolithic remains in colluvial deposits interdigitating with the edge of the alluvium higher up the sequence. This area also requires further investigation, since the only investigation so far comprises two test pits (TPs 19 and 20, reported on separately - Wessex Archaeology 2017) dug immediately beside the Scheduled Monument. It is necessary to investigate the full Quaternary sequence down to its base at regular intervals between the Scheduled Monument and Springhead Nursery, and making sure to include transects that extend upslope to the west so as to investigate both deeper alluvium and its thinning/disappearance interdigitating with the colluvium upslope to the west.
- 6.4.3 Finally, most of the northern part of the Site (the central and eastern part of area PP31b) was assessed as of low potential. No further work is recommended in this area, apart from at its higher western edge, where (as explained above) the deposits are poorly understood and their nature and Palaeolithic potential is uncertain.

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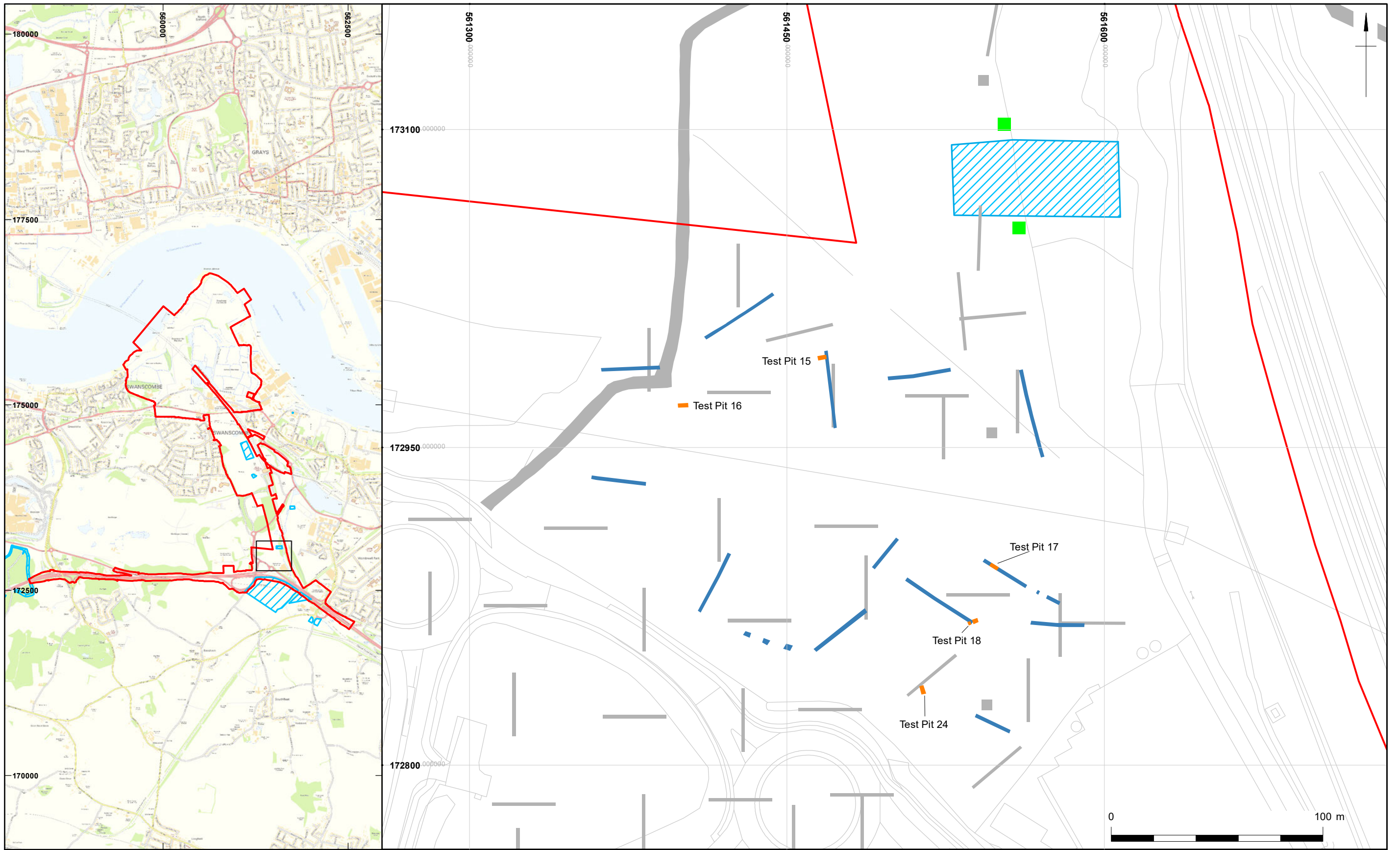


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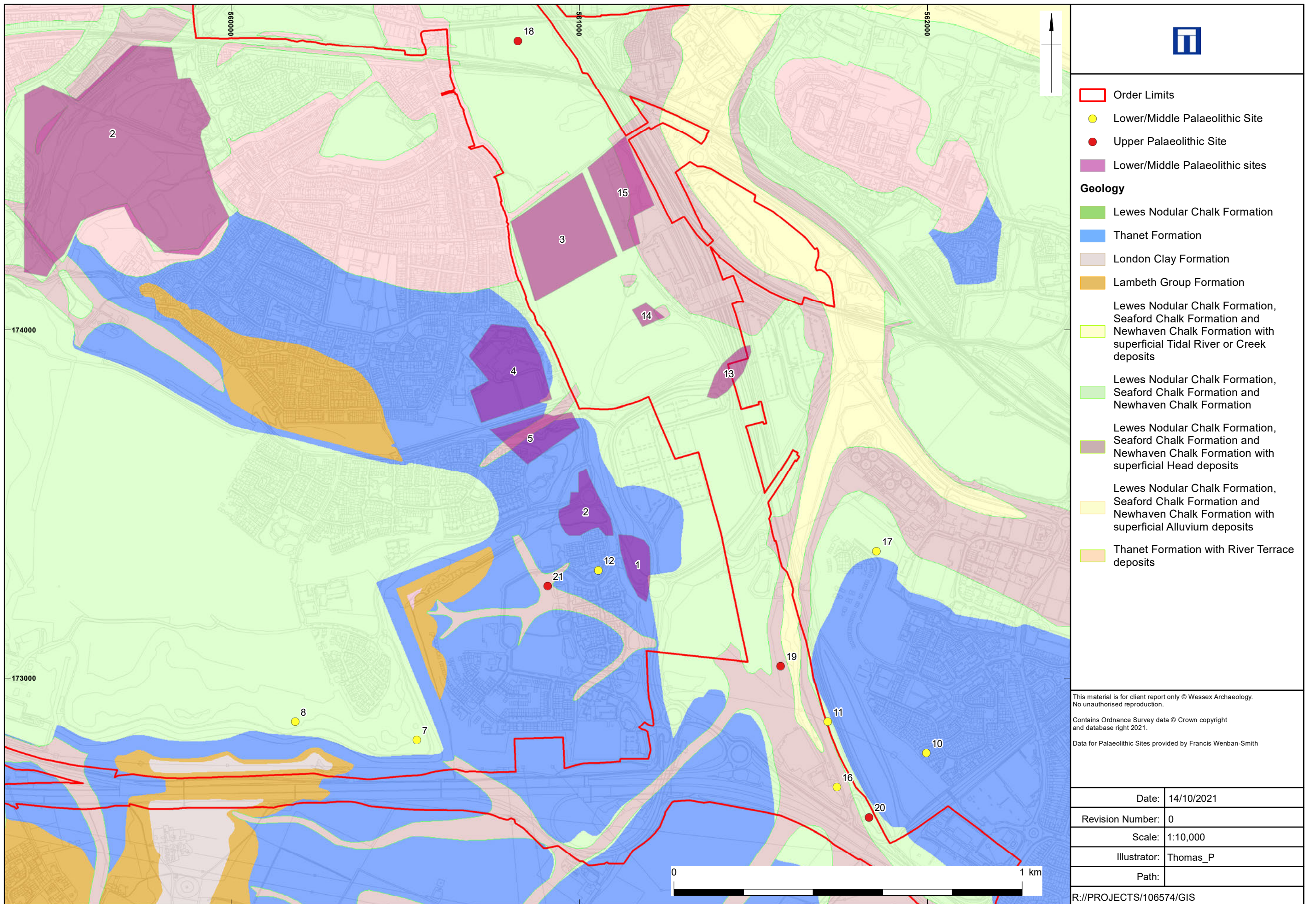
- Order Limits
- Previous Archaeological Works
- Scheduled Monument
- Palaeolithic Test Pit
- 2015 Evaluation Trench
- 2015 Geoarchaeological Test Pit

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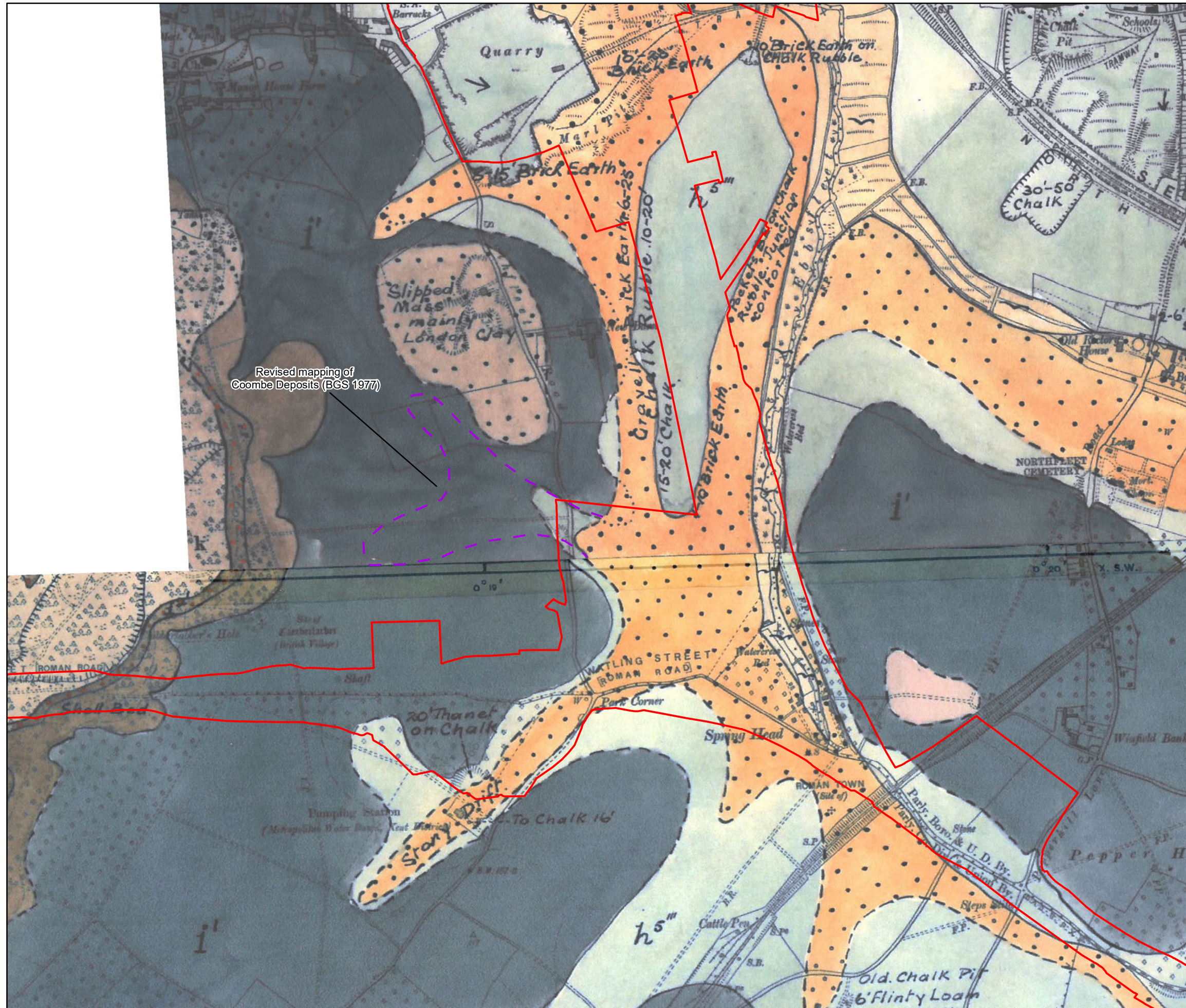
Site location with trench and test pit plan

Figure 1



Background: geological mapping and key nearby Palaeolithic sites (see Table 1)

Figure 2



- Order Limits
- Chalk
- Thanet Sand
- Coombe Deposits

Revised mapping of
Coombe Deposits (BGS 1977)

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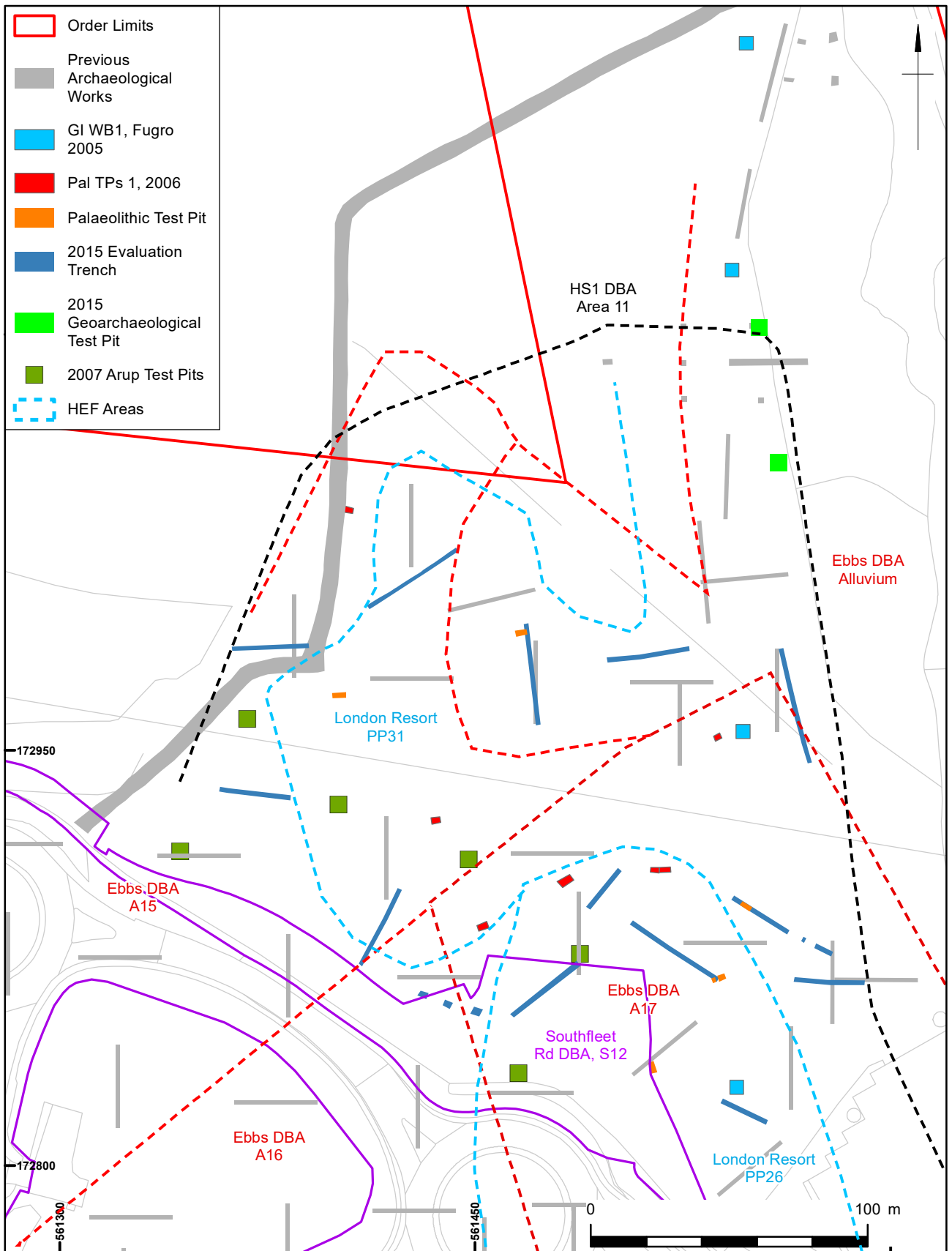
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Historic geological mapping, as surveyed by CN Bromehead in 1920 (Based on Wenban Smith 1996, Figure 4.4)

Figure 3



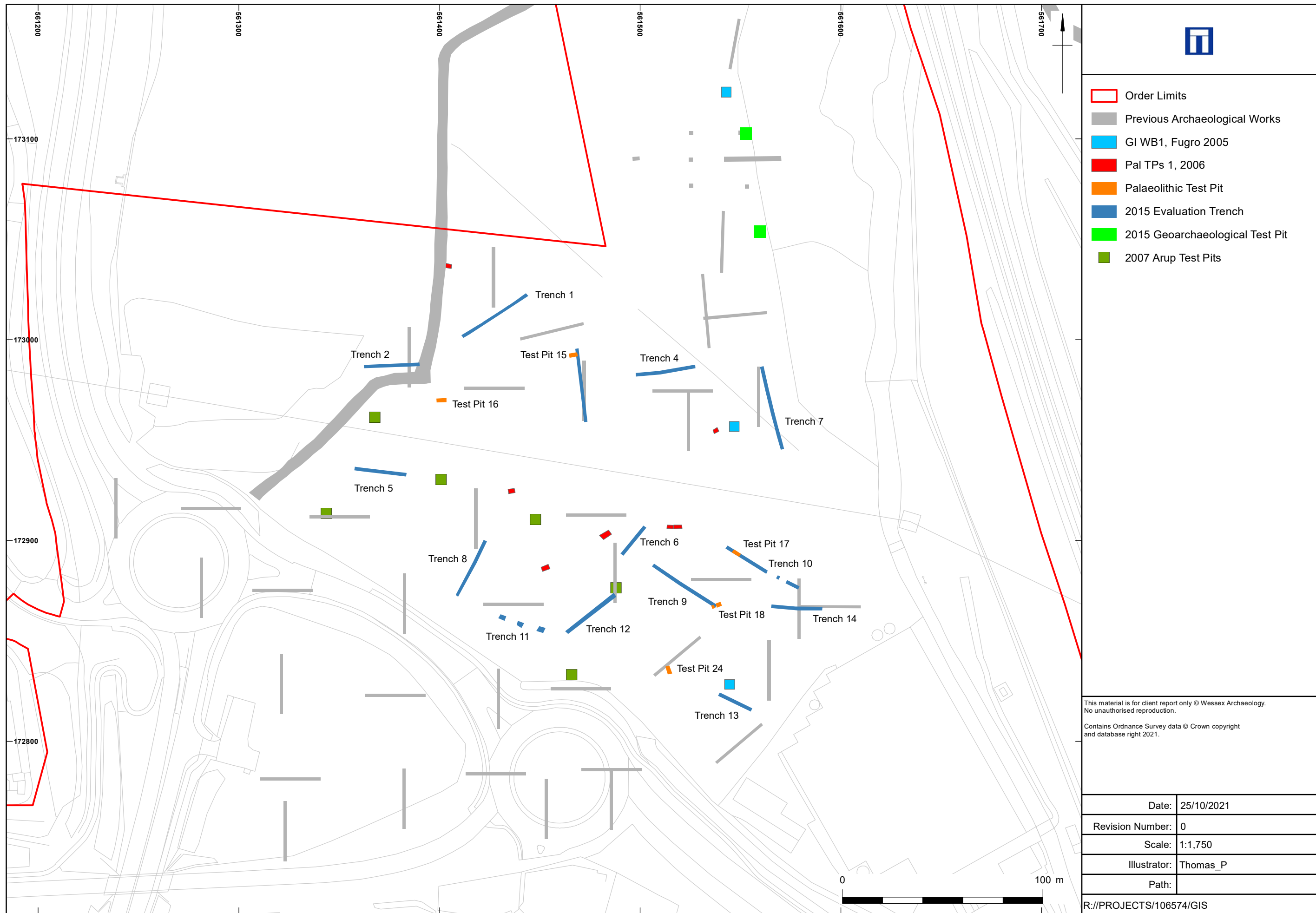
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Background: Previous work and Palaeolithic Historic Environment (HEF) areas

Figure 4

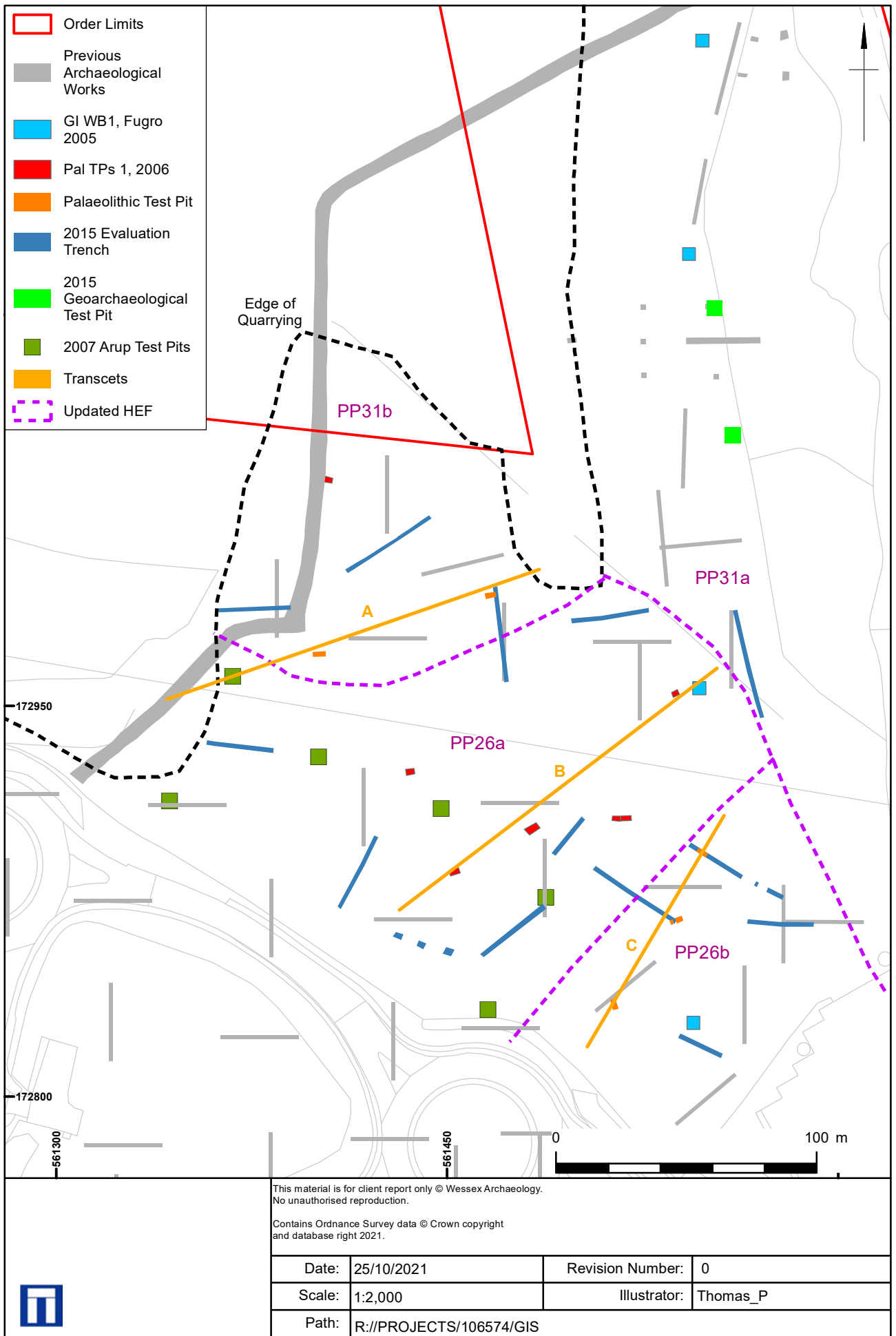


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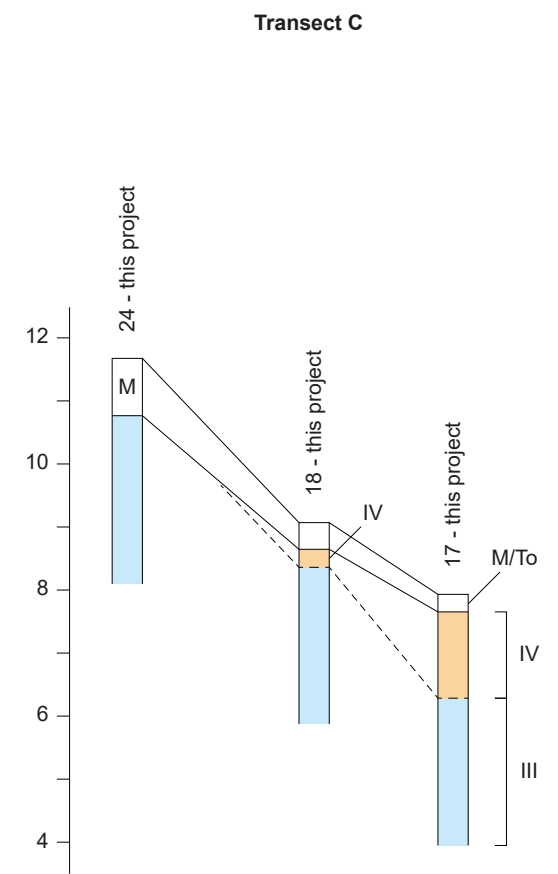
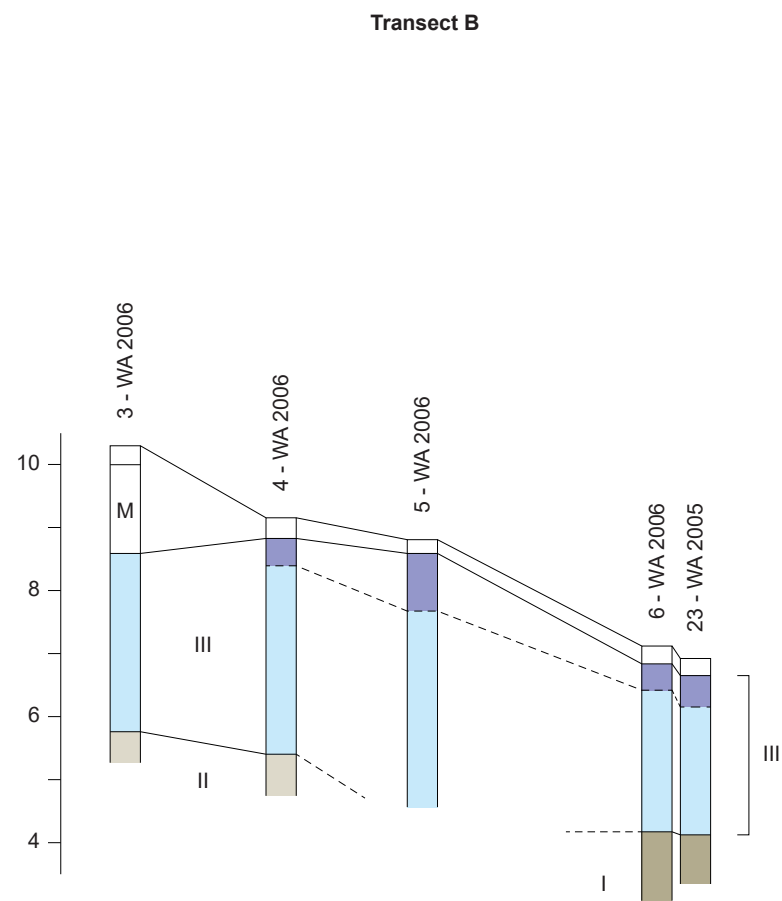
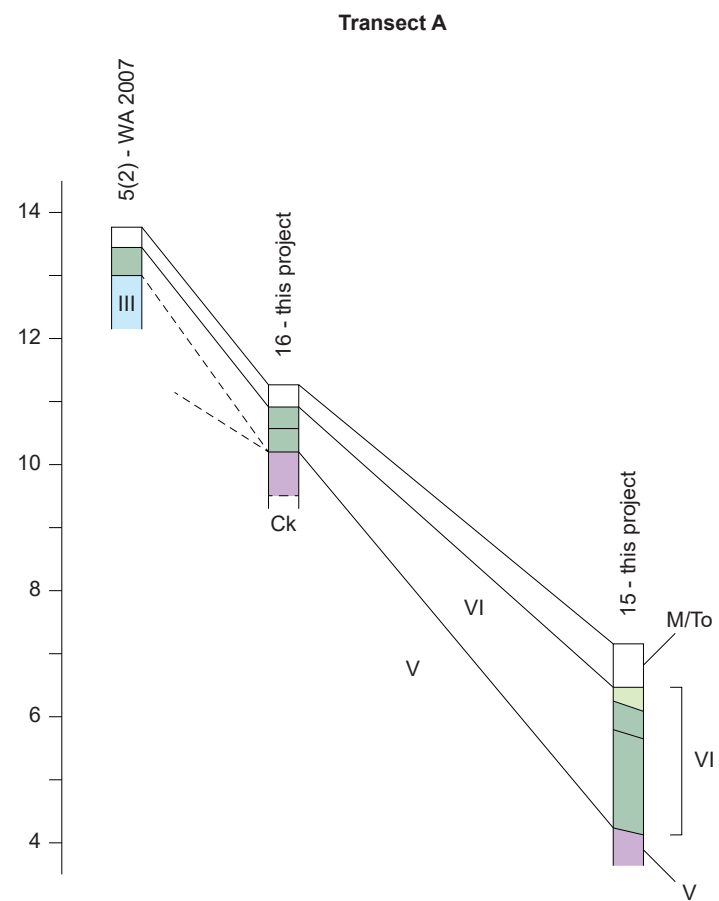
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Site layout: New Palaeolithic test pits (TP15-18 and 24, dug in 2015) in relation to previous work



Site Plan: Revised Historic Environment Framework (HEF) areas, and positions of stratigraphic transects A, B and C

Figure 6



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Transects A, B, and C

Figure 7



APPENDICES

Appendix A: Test pit summaries and context descriptions

APPENDIX A. Test pit summaries and context descriptions

Glossary for sediment description terms and abbreviations

Some common terms

- Clast - Coarser pebbles/cobbles or other larger items in an otherwise fine-grained sediment
- Cobbles - Clasts from 6.4cm to 25.6cm
- Diamict - A densely-packed mixture of clasts (usually chalk) of widely-varying sizes, in a matrix of clay/sand/silt
- Diapir - Wedge of sediment that is generally sub-vertically oriented and intrusive from lower horizons into upper ones, formed by ground heaving and pressure of overburden leading to upward-squeezing/distortion of a soft/plastic water-saturated sediment; can finish in a pointed taper or a mushroom-shaped cap
- Gravel - Sediment, typically matrix-supported with combination of pebbles, cobbles and finer-grained matrix (sand/clay/silt), can be "clast-supported" and lacking in finer matrix
- Pebble - Clasts from 2mm up to 6.4cm
- Matrix - The finer-grained part of a sediment that contains clasts
- Sand - Sediment grains from 0.0625mm up to 2mm, uncohesive unless in combination with finer clay/silt particles

Sand/gravel/cobble particle-size grades

<i>Sediment</i>	<i>Size</i>	<i>Abbreviation</i>	<i>Size-grade (Wentworth)</i>
SAND	Very fine	VF	0.0625 - 0.125 mm
	Fine	F	0.125 - 0.25 mm
	Medium	M	0.25 - 0.50 mm
	Coarse	C	0.5 - 1.0 mm
	Very coarse	VC	1 - 2 mm
GRAVEL	Very fine	VF	2 - 4 mm
	Fine	F	4 - 8 mm
	Medium	M	8 - 16 mm
	Coarse	C	16 - 32 mm
	Very coarse	VC	32 - 64 mm
COBBLES	Small	Sm	6.4 - 12.8 cm
	Large	Lg	12.8 - 25.6 cm

Some other common abbreviations

- mod. - moderately
- sl. - slightly
- occ. - occasional
- CBM - ceramic building material
- VWRDTP - very-well-rounded derived Tertiary pebble

Site:	London Resort (Pre-DCO)			Test-pit:	15
Site-code (WA):	106573	CAHO-C code:	-086		
Site sub-div:	Areas PP 26 and 31, Palaeolithic deep test pits			Date:	18 th June 2015
Dimensions:	Length (m)	4.00	Co-ords (NGR)	East:	561467
	Width (m)	2.00		North:	172991
	Depth (m)	2.95			
				Ground level, m OD:	7.15

<i>Sed group</i>	<i>Context</i>	<i>Description</i>	<i>Depth - top</i>	<i>Depth - base</i>	<i><Samp> - vol L</i>	<i>Lithic finds</i>	<i>Enviro remains</i>
To	1501	TOPSOIL/TURF. Dark greyish-brown, firm clay-silty sand with mod. common flint and chalk pebbles [?made ground below turf?] <i>Sharp sub-horizontal base</i>	0.0	0.64	-	-	-
	1502	CLAYEY/SILTY SAND. Moderately firm, sl. cohesive, sl. clayey/silty yellowish-brown VF-F sand. <i>Sharp basal junction dipping quite steeply to east</i>	0.64	0.83	-	-	-
VI	1503	SAND. Uncohesive, pale yellowish-/greyish-brown VF-F sand. <i>Sharp, wavy basal junction, dipping slightly to east</i>	0.83	1.03	-	-	-
	1504a	CHALKY/FLINTY SAND (upper). Sub-parallel and undulating bands of sand (VF-F, pale greyish-brown) with beds of VF-F chalk/flint pebbles in matrix of densely-packed derived Tertiary shell fragments, all gen. dipping east/east-south-east <i>Sharp basal junction dipping to ESE</i>	1.03	1.45	-	-	-
	1504b	CHALKY/FLINTY SAND (lower). Similar to above, but generally coarsening downward, with gravelly bands thickening to 10-20cm, and becoming more-gravelly and with coarser (M-VC) flint pebbles (mostly VWRDTPs), and also increasingly frequent nodular flint cobbles (25-35cm) deeper down, abraded and with internal frost-fracturing. <i>Sharp basal junction dipping to ESE</i>	1.45	2.95	-	-	-
V	1505	CHALK DIAMICT. Firm, very pale brown (nearly white) chalk silt with common mod.-/well-rounded F-M chalk pebbles. <i>Base not reached</i>	2.95	3.05*	-	-	-

* nominal base for unbottomed 1505, based on extrapolation of dip from thickness seen at W end of section

Test pit 15, at 1.15m (looking SW)



Test pit 15, at 2.95m (looking WSW)



Site:	London Resort (Pre-DCO)		Test-pit:	16
Site-code (WA):	106573	CAHO-C code:	-086	
Site sub-div:	Areas PP 26 and 31, Palaeolithic deep test pits		Date:	18 th June 2015
Dimensions:	Length (m)	4.00	Co-ords (NGR)	East: 561401
	Width (m)	2.00		North: 172971
	Depth (m)	2.00		
			Ground level, m OD:	11.31

<i>Sed group</i>	<i>Context</i>	<i>Description</i>	<i>Depth - top</i>	<i>Depth - base</i>	<i><Samp> - vol L</i>	<i>Lithic finds</i>	<i>Enviro remains</i>
To	1601	TOPSOIL/TURF. Dark brown, friable clay/silt/sand with common M-VC flint pebbles, capped with grass and light scrub. <i>Sharp base, dipping sl. east</i>	0.0	0.34	-	-	-
VI	1602	PEBBLY SILT/SAND. Firm, un-cohesive pale yellowish-brown silt/sand (VF) with occ. flint pebbles (becoming more common downwards), with basal layer 2-5cm thick of M-VC flint pebbles in mixed clay/silt/sand matrix with very common derived Tertiary shell fragments; flint pebbles mostly VWRDTPs, but also angular to sub-angular, mod.- to well-abraded. <i>Sharp base, dipping sl. east</i>	0.34	0.70	-	-	-
	1603	CLAY. Stiff brown clay with occ. M-VC flint pebbles (mostly dark grey VWRDTPs). <i>Sharp base, dipping sl. east</i>	0.70	0.82	-	-	-
	1604	PEBBLY/SHELLY SAND/SILT/CLAY. Firm/cohesive brownish-grey clay/sand/silt, sandier at base, with moderately common F-C flint pebbles and lenses of derived Tertiary shell fragments. <i>Sharp undulating base, dipping sl. east</i>	0.82	0.94	-	-	-
	1605	BAND OF GRAVEL WITH FLINT NODULES. Band of well-sorted C-VC flint pebbles (mostly VWRDTPs) with common frost-fractured flint nodules up to 25cm long. <i>Sharp base, dipping sl. east</i>	0.94	1.07	-	-	-
V	1606	CHALK DIAMICT. Dry/friable, white (sl. yellowish-/reddish-stained) chalk silt, with occ. abraded flint nodules, with larger nodules up to 35cm long concentrated at base. <i>Diffuse basal junction, grading down into degraded Chalk bedrock</i>	1.07	1.80	-	-	-
Ck	1607	CHALK. White (yellowish-stained) dry/friable chalk rubble with chalk silt and occasional fresh flint nodules. [degraded bedrock surface] <i>Base not reached</i>	1.80	2.00	-	-	-

Test pit 16, at 1m (looking NNW)



Test pit 16, at 2m (looking NW)



Site:	London Resort (Pre-DCO)		Test-pit:	17
Site-code (WA):	106573	CAHO-C code:	-086	
Site sub-div:	Areas PP 26 and 31, Palaeolithic deep test pits		Date:	19 th June 2015
Dimensions:	Length (m)	4.00	Co-ords (NGR)	East: 561550
	Width (m)	2.00		North: 172894
	Depth (m)	3.96		
			Ground level, m OD:	7.93

<i>Sed group</i>	<i>Context</i>	<i>Description</i>	<i>Depth - top</i>	<i>Depth - base</i>	<i><Samp> - vol L</i>	<i>Lithic finds</i>	<i>Enviro remains</i>
To	1701	TOPSOIL/TURF. Dark greyish-brown sand/silt/clay with mod. common VF-F chalk pebbles and F-VC flint pebbles. <i>Sharp sub-horizontal base</i>	0.56	0.28	-	-	-
IV	1702	SANDY CLAY-SILT. Mod. firm, strong brown sandy (VF-F) clay-silt, becoming sandier downwards, forming mod. soft and sl. cohesive strong brown (sl. reddish) silt/sand (VF) in bottom part of bed. <i>Sharp, undulating sub-horizontal base</i>	0.28	1.70	-	-	-
III	1703	SAND. Mod. soft, pale yellowish-brown sl. silty, VF sand with pale patches of very fine (c. 0.5-1mm diameter) tubular dendritic networks infilled with carbonate precipitate; becomes sl. gravelly in bottom part, with some VF flint pebbles and derived Tertiary shell fragments. [undecalcified lower part of 1702; =1804] <i>Base not reached</i>	1.70	3.96	-	-	-

Test pit 17, at 1.5m (looking SW)



Test pit 17, at 3.4m (looking NNW)



Site:	London Resort (Pre-DCO)			Test-pit:	18
Site-code (WA):	106573	CAHO-C code:	-086		
Site sub-div:	Areas PP 26 and 31, Palaeolithic deep test pits			Date:	19 th June 2015
Dimensions:	Length (m)	4.00	Co-ords (NGR)	East:	561538
	Width (m)	2.00		North:	172869
	Depth (m)	3.15			
				Ground level, m OD:	9.03

<i>Sed group</i>	<i>Context</i>	<i>Description</i>	<i>Depth - top</i>	<i>Depth - base</i>	<i><Samp> - vol L</i>	<i>Lithic finds</i>	<i>Enviro remains</i>
To	1801	TOPSOIL/TURF. Dark greyish-brown sand/clay-silt with mod. common VF-F chalk pebbles and M-VC flint pebbles. <i>Sharp sub-horizontal base</i>	0.0	0.32	-	-	-
IV	1802	SILT/SAND. Uncohesive mid-brown, silt/sand (VF), mod. firm with occ. VF-F chalk pebbles. <i>Sl. uneven sub-horizontal base</i>	0.32	0.65	-	-	-
III	1803	SILT/SAND. Firm, very-sl. cohesive, sl. clayey silt/ very fine sand, strong/reddish- brown; has sub-vertical wormholes infilled with topsoil down to 1.5m bgs (photo at 1.20m). <i>Diffuse sub-horizontal base</i>	0.65	1.83	-	-	-
	1804	SILT/SAND. Moderately-firm, uncohesive, pale yellowish-brown silt/ VF sand, with widely-spaced dendritic networks of fine (1.5-1.5mm) tubules infilled with pale calcareous carbonate precipitate. [undecalcified lower part of 1803; =1703] <i>Base not reached</i>	1.83	3.15	-	-	-

Test pit 18, at 1.2m (looking NW)



Test pit 18, at 3.15m (looking WNW)



Site:	London Resort (Pre-DCO)			Test-pit:	24
Site-code (WA):	106573	CAHO-C code:	-086		
Site sub-div:	Areas PP 26 and 31, Palaeolithic deep test pits			Date:	19 th June 2015
Dimensions:	Length (m)	4.00	Co-ords (NGR)	East:	561513
	Width (m)	2.00		North:	172855
	Depth (m)	3.60			
				Ground level, m OD:	11.66

<i>Sed group</i>	<i>Context</i>	<i>Description</i>	<i>Depth - top</i>	<i>Depth - base</i>	<i><Samp> - vol L</i>	<i>Lithic finds</i>	<i>Enviro remains</i>
To	2401	TOPSOIL/TURF. <i>Sharp base, dipping sl. north</i>	0.0	0.15	-	-	-
M	2402	MADE-UP GROUND. Well-consolidated, dark grey/brown clay-silt with concrete blocks, common chalk pebbles/cobbles and flint nodules. <i>Sharp sub-horizontal base</i>	0.15	0.92	-	-	-
III	2403	SANDY CLAY-SILT, "BRICKEARTH". Mod.-well-consolidated strong brown sl. sandy (VF-F) clay-silt. [upper more-clayey/weathered part of 2404] <i>Diffuse sub-horizontal base</i>	0.92	1.10	-	-	-
	2404	SANDY/CLAYEY SILT, "BRICKEARTH". Mod. firm, sl cohesive in upper part and then becoming uncohesive downward, pale yellowish-brown, silty VF-F sand; becomes less silty and more sandy (VF-F) downward, with a sl.-gravelly band 2.5-2.7m bgs, clasts mostly being dark grey VWRDTPs. <i>Base not reached</i>	1.10	3.60	-	-	-

Test pit 24, at 1.1m (looking W)



Test pit 24, at 3.6m (looking S)





Appendix B: Palaeolithic Historic Environment Framework (HEF): grading criteria and updated Site areas

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Assessment table structure, and field entry explanations

Attribute	Field entry
HEF area (rev) #	Unique ID for revised Palaeolithic Historic Environment Framework areas (PPs 26a, b and 31a, b)
Summary description	Short summary text of geomorphological and topographic situation
Sediment sequence *	Description of the Quaternary deposits that may be, or are likely to be, present
Palaeolithic artefacts	Description of Palaeolithic artefactual remains that may be, or are likely to be, present
Palaeo-environmental remains	Description of faunal (and other palaeo-environmental) remains that may be, or are likely to be, present
Palaeolithic potential **	Attribution based on matrix of likelihood and importance, and supported by brief explanatory text
Likelihood of Palaeolithic remains **	Attribution based on likely type/s of deposit present and previous artefact and palaeo-environmental find records, supported by brief explanatory text
Likely importance of Palaeolithic remains **	Attribution based on likely type/s of deposit present, and supported by brief explanatory text
Priorities for evaluation	Key questions that need answering, to allow fully informed consideration of the Palaeolithic importance of the HEF area
Approaches to evaluation	Suitable methods and approaches that could be applied to address the evaluation priority questions specified above
Any other comments	Any particular points not covered by other fields

* See the main report (**Table 5**) for further description and interpretation of the sub-surface deposit sequence

** See page 3 of this Appendix for criteria for different categories of likelihood and importance, and how these are combined in a matrix to arrive at an overall assessment of potential



Attribute grades for Likelihood and Importance of Palaeolithic remains

<i>Attribution</i>	<i>Likelihood</i>	<i>Importance</i>
VERY HIGH	Certain knowledge of Pleistocene deposits with lithic or palaeo-environmental remains	Nationally important remains: undisturbed occupation surfaces or minimally disturbed artefact concentrations; abundant faunal /palaeo-environmental remains, deposits with key sequences and lithostratigraphic relationships
HIGH	High likelihood of Pleistocene deposits with lithic or palaeo-environmental remains	Undisturbed occupation surfaces or minimally disturbed concentrations; abundant remains from deposits of good stratigraphic and chronological integrity, biological associations; deposits with important lithostratigraphic sequences and relationships
MODERATE	Reasonable likelihood of deposits with remains	Less abundant disturbed artefactual and/or faunal remains from units of reasonable stratigraphic and chronological integrity; deposits with moderate lithostratigraphic sequences and relationship
LOW	Remains are known to occur, but rare	Disturbed remains from deposits of low stratigraphic and chronological integrity; deposits with minimal lithostratigraphic sequences and relationships
VERY LOW	Remains very unlikely to occur	Thought extremely unlikely for there to be any Pleistocene deposits containing remains, any remains found will be residual and reworked
UNCERTAIN	Insufficient information on which to assess likelihood	Insufficient information on which to assess importance

Attribute grades for assessment of Palaeolithic potential

<i>Palaeolithic potential</i>	<i>Likelihood</i>	<i>Likely importance</i>
VERY HIGH	Very high	High
	High	Very high
HIGH	High	High, Moderate
	Moderate	High
MODERATE	High	Low
	Moderate	Moderate
	Low	Very high, High
LOW	Moderate	Low
	Low	Moderate
	Very low	Very high, High, Moderate,
VERY LOW	Moderate	Very low
	Low, Very low	Low, Very low
UNCERTAIN	Uncertain	High, moderate, low or very low
	High, moderate, low or very low	Uncertain



Assessment tables for Palaeolithic Character Areas

Attribute	Field entry
HEF area (rev) #	PP26a
Summary description	Central part of Site, to west of Ebbsfleet alluvial floodplain and to northeast of link road between roundabouts
Sediment sequence *	c. 3m thickness of colluvial sand/silt (deposit III), overlying sandy/shelly flint gravel of uncertain origin (deposits I and II)
Palaeolithic artefacts	Two technologically undiagnostic flint flakes from the upper part of gravel deposit II
Palaeo-environmental remains	None known
Palaeolithic potential **	UNCERTAIN
Likelihood of Palaeolithic remains **	Low - deposit III Moderate - deposit II
Likely importance of Palaeolithic remains **	Uncertain
Priorities for evaluation	- to establish the deeper sequence below deposit III, get better records through to the base of deposits I and II - establish the presence/prevalence of lithic and palaeo-environmental remains through deposits I and II - establish the relationship between deposits I and II
Approaches to evaluation	- machine-dug test pits to fill in gaps between existing records - cable/percussion boreholes to reach base of deposits I and II
Any other comments	-

* See the main report (**Table 5**) for further description and interpretation of the sub-surface deposit sequence

** See page 3 of this Appendix for criteria for different categories of likelihood and importance, and how these are combined in a matrix to arrive at an overall assessment of potential



Attribute	Field entry
HEF area (rev) #	PP26b
Summary description	Southern part of Site, to west of Ebbsfleet alluvial floodplain and abutting Springhead Nurseries
Sediment sequence *	1-2m thickness of modern made ground at the southwest edge of this area, and at least 2-3m thickness of colluvial sand/silt (deposit III) across the area, base not reached so deeper sequence unknown
Palaeolithic artefacts	None known
Palaeo-environmental remains	None known
Palaeolithic potential **	UNCERTAIN
Likelihood of Palaeolithic remains **	Low - deposit III Uncertain - any deeper deposits
Likely importance of Palaeolithic remains **	Uncertain
Priorities for evaluation	- to establish the deeper sequence below deposit III
Approaches to evaluation	- machine-dug test pits to fill in gaps between existing records - cable/percussion boreholes to reach (and bottom out) deeper deposits
Any other comments	-

* See the main report (**Table 5**) for further description and interpretation of the sub-surface deposit sequence

** See page 3 of this Appendix for criteria for different categories of likelihood and importance, and how these are combined in a matrix to arrive at an overall assessment of potential



Attribute	Field entry
HEF area (rev) #	PP31a
Summary description	East side of Site and to the east of the former Southfleet Pit, dry ground grading into marshy alluvium on west side of Ebbsfleet stream, including Scheduled Monument (List Entry 1004206, formerly Kent 268b)
Sediment sequence *	Ebbsfleet alluvium with peaty horizons, probably interdigitating with fine-grained colluvial slopewash sediments along the west side of the area, overlying fine-grained calcareous silt at the bottom of the sequence
Palaeolithic artefacts	Previous records from the Scheduled Monument area of rich Late Upper Palaeolithic knapping floor below the calcareous silt at the base of the alluvial sequence
Palaeo-environmental remains	Mollusc remains in the calcareous silt at the base of the sequence
Palaeolithic potential **	HIGH
Likelihood of Palaeolithic remains **	Moderate/high
Likely importance of Palaeolithic remains **	High
Priorities for evaluation	<ul style="list-style-type: none">- Establish the deposit sequence across this area- Establish how the alluvial sequence inter-relates with the better-known sequences higher up the valley side to the west
Approaches to evaluation	Test pits, shored and with water-pumping, if necessary, to investigate for Palaeolithic and palaeo-environmental remains deep in the alluvial sequence
Any other comments	<ul style="list-style-type: none">- Late Upper Palaeolithic remains could be present higher up the sequence, as well as in basal calcareous silt- Two test pits (TPs 19 and 20) were dug very close to the Scheduled Monument as part of this new work (separately reported - Wessex Archaeology 2017), but most of this area remains uninvestigated

* See the main report (**Table 5**) for further description and interpretation of the sub-surface deposit sequence

** See page 3 of this Appendix for criteria for different categories of likelihood and importance, and how these are combined in a matrix to arrive at an overall assessment of potential



Attribute	Field entry
HEF area (rev) #	PP31b
Summary description	Northwest part of Site, unquarried ground to south of previously quarried areas
Sediment sequence *	Parallel beds of gravelly sand/silt (deposit VI) dipping downslope to the east with common flint nodules in deeper horizons, overlying chalky solifluction deposits (V), with degraded Chalk bedrock at the base of the sequence
Palaeolithic artefacts	None known
Palaeo-environmental remains	None known
Palaeolithic potential **	LOW
Likelihood of Palaeolithic remains **	Moderate
Likely importance of Palaeolithic remains **	Low (based on present understanding)
Priorities for evaluation	Better understanding of the sequence in the western part of this area
Approaches to evaluation	-
Any other comments	There is uncertainty over the sequence in the higher western part of this area, so this requires further investigation

* See the main report (**Table 5**) for further description and interpretation of the sub-surface deposit sequence

** See page 3 of this Appendix for criteria for different categories of likelihood and importance, and how these are combined in a matrix to arrive at an overall assessment of potential



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