Investigation Report

London Gateway: Compensation Site A Archaeological Trenching

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oxfordarchaeology

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LONDON GATEWAY

COMPENSATION SITE A

ARCHAEOLOGICAL TRENCH INVESTIGATION

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NON-TECHNICAL SUMMARY

A combination of gradiometer survey, electrical resistivity survey and evaluation trenching at Compensation Site A, to the west of the main London Gateway development, has revealed evidence for regionally significant multi-period archaeological remains, adjacent to Mucking Creek, in Stanford-le-Hope, Essex. In February 2009, OA carried out a series of trench excavations in a 41.5 Ha area which is to be transformed into an inter-tidal mudflat habitat as part of the ecological mitigation for the London Gateway development. This involves reducing the ground level across the site by 500 mm and then breaching the sea wall to allow the site to flood at high tide.

The significant archaeology discovered to date includes a concentration of prehistoric worked flint tools, including probable late Mesolithic or early Neolithic artefacts, a series of early Romano-British rectangular settlement enclosures and contemporary salt-making sites. Salt-making seems to have been an important regional industry in the centuries immediately before and after the Roman conquest of Britain, from c.150BC to c.250AD. Sites of this kind, known as 'red hills', are a characteristic feature of the Essex coastal marshes, although only a few have been systematically excavated (Fawn et al, 1990). Medieval pottery has been recovered from the same area as the Roman finds. The post-medieval site of Stanford-le-Hope Wharf, which was active into the 20th century, lay immediately adjacent, completing the impression of persistent riverside activity at this location from at least the early Neolithic until the modern period, although this need not have been continuous. A second, less complex focus of archaeological remains, at the eastern edge of Compensation Site A appears to comprise further evidence for Romano-British salt-making, in the form of a second red hill.

Extensive assessment of the geoarchaeological sequence, using a combination of techniques, has successfully characterised the depth and distribution of alluvial sediments across the site. The relationship of archaeological deposits to major palaeochannels has been partially defined, and the age of major sediment units has been estimated using stratigraphic evidence. Within this 41.5 Ha site, archaeological features appear, on present evidence, to be concentrated in areas where the gravel terrace rises to the surface in the northern half of the site, but appear sparsely distributed or absent in the southern part of the site where the alluvial deposits are deeper.

As a result of the discoveries, a programme of mitigation is proposed before construction takes place, involving detailed excavation of the most significant remains, controlled archaeological stripping throughout the northern part of Site A, and monitoring during construction in the remainder of the site.

1 INTRODUCTION

1.1 Location and scope of work

1.1.1 In February 2009, OA carried out a series of trench excavations at Stanford-le-Hope, Essex (Fig. 1). The excavations were undertaken on behalf of DP World at Compensation Site A (Fig. 2). The area is to be transformed into an inter-tidal mudflat habitat as part of the ecological mitigation for the London Gateway Port and Park development. This involves reducing the ground level across the site by 500 mm and then breaching the sea wall to allow the site to flood at high tide. Localised deeper excavations may be undertaken in the southern part of the site. The archaeological trial trenching was conducted in accordance with the London Gateway Archaeological Mitigation Framework (AMF, see 1.2 below).

1.1.2 Compensation Site A is 41.5 Ha in area and is located within the parish of Stanford-le-Hope (NGR: 569900, 181100), to the west of the main London Gateway development area. In total 34 trenches were excavated for the purpose of archaeological evaluation and characterising the potential of geoarchaeological resources across the four geomorphic zones derived from the geoarchaeological assessment of the site (below and OA April 2009). In particular ground-truthing of a previous gradiometer survey by excavation was essential in characterising the cultural resources across the site. The archaeological evaluation trenching was carried out in accordance with a project design approved by Essex County Council Historic Environment Branch, on behalf of the Planning Authority (Oxford Archaeology 2009, London Gateway: Compensation Site A Archaeological Trenching Plan).

1.2 Project planning background

1.2.1 London Gateway Port and Park received planning permission from Government on 30th May 2007. The applications were in the form of an Outline Planning Application (OPA) for the Park and a Harbour Empowerment Order (HEO) for the Port. The proposed development area is extensive, including works on the gravel terrace, historic marshland, and the inter-tidal and sub-tidal zones, which are likely to encompass a diverse archaeological resource. Desk-based studies and non-intrusive surveys undertaken to support the London Gateway Environmental Statement suggest that the development has the potential to impact on important archaeological remains.

1.2.2 In recognition of this, a condition of both permissions is the implementation of the London Gateway Archaeological Mitigation Framework (AMF). Originally included as a Technical Report to the Environmental Statement, the purpose of this document was to establish a strategic framework, applicable to the entirety of the archaeological resource, within which the London Gateway archaeological programme would operate. Following consultation with Thurrock Council, an updated version of the AMF was included as Appendix 2 of the 'Statement of Common Ground' agreed between the developer (P&O, now DP World), and Thurrock Council, in July 2003a (OA 2003).

1.3 Geology and topography

1.3.1 Compensation site A is located within the Thames estuary. The site is reclaimed land within the marine zone, and is protected by a sea wall. The BGS 1:50,000 drift geology mapping describes the site as alluvium (Fig. 2), as compared to inter-tidal deposits further to the east and across the main port development.

1.3.2 The site lies between 4m and 1m OD and slopes almost imperceptibly from north to south (Fig. 3). A programme of geoarchaeological fieldwork using gradiometer survey

was conducted on the site prior to the evaluation trenching. The gradiometer survey was conducted in order to define the sediment stratigraphies across the site and to ascertain the archaeological potential within the top 1m of the sediment profile. The results of the gradiometer survey are discussed fully in a seperate report (OA March 2009) but are summarised below (section 1.5) to give context to the results of the evaluation trenching.

1.4 Archaeological and historical background

1.4.1 The Thames estuary has been a focus for human inhabitation from the Palaeolithic through to the 20th century. Throughout this period, changes in the environment and sea levels have profoundly affected patterns of settlement, exploitation of natural resources and the use of the river for transport and trade.

1.4.2 Due to the complexity of the alluvial environment at Shell Haven and the dynamic interaction between human culture and the geomorphological evolution of the landscape, the analysis of palaeoenvironmental materials, geomorphological history and human cultural materials is being undertaken within a holistic framework. This framework is concerned with understanding the geoarchaeological resources at Shell Haven, which comprise two components:

1) The palaeoenvironmental and sedimentary remains found within alluvial environments. These can be used to reconstruct past ecologies, elucidate the formation histories of different geomorphological units and act as a guide for the preservation potential of archaeological materials.

2) The cultural archaeological record, composed of archaeological sites and artefacts. These are used to provide a narrative of human culture.

1.4.3 These two components have to be dealt with as one seamless whole. They are not disparate strands of investigation, but two dynamic components that have interacted in a multitude of ways throughout the Holocene.

1.4.4 The distribution of geoarchaeological resources at Compensation Site A had already been assessed prior to evaluation trenching using a multi-method approach. The results are summarised below.

1.4.5 The desk-based assessment identified thirteen recorded sites within Site A and a further eight located on the adjacent foreshore. These sites comprised surviving historic landscape features and archaeological finds. The existing gazetteer and survey data lists the following known components of the Historic Environment Record (HER) within the boundaries of Site A (Fig. 2; Table 1):

Table 1: Recorded archaeological and historic landscape features within or adjoining Site A.

OAU/WA Ref. No.	Description	Source
9	Roman pottery, brick, wood and animal bones found in 1967 in a flint-lined well.	SMR 5188
10	Findspot of Roman and medieval pottery found by chance in 1970. Finds were from the beach, from sea erosion outside the sea wall.	SMR 5186; SMR 5187
11	Site of Curry Marsh explosives factory listed on SMR (adjacent to Site A, to the north)	SMR 15128
43	Roman pottery sherds found in foreshore mud by chance in 1972-3 and on a separate occasion before 1987.	SMR 7223; SMR 7224; SMR 7225; SMR 7226
44	Roman pottery sherds and terra sigillata found in foreshore mud by chance in 1972-3.	SMR 7130
400	Site of a WW2 bombing decoy. A site visit in 1999 noted that nothing survives of the decoy itself, although it is possible that some remains of the night shelter and concrete storage bays for the fuel drums survive below ground.	SMR 20303
403	'Little Barn Marsh'. Field name given in the Tithe Award of 1840. The name	Historic map

OAU/WA Ref. No.	Description	Source
	suggests the possible site of a small barn within Site A.	
404	Stanford-le-Hope wharf marked on the earliest map consulted dated to 1771, on which a single building is shown (adjacent to Site A, to the west)	Historic map
405	The Vigilant. Coastguard station comprising three, possibly four, buildings, apparently located adjacent to the wharf. First marked on the OS 1st edition map of 1876 (adjacent to Site A, to the west).	Historic map
408	Line of former tramway between Stanford-le-Hope wharf and a small-scale quarry *c.* 300 m to the northwest of the wharf. Constructed between 1898 and 1924. Removed between 1938 and 1960 (adjacent to Site A, to the west).	Historic map
410	Sheepfold first shown on OS 1st edition 6" map of 1876. Not shown in 1898.	Historic map
411	Site of beacon within an island of un-reclaimed marshland. First shown on OS 1st edition 6" map of 1876. Not shown in 1898 (adjacent to Site A, to the south).	Historic map
412	Sea Wall. The original wall appears to have been constructed between 1771- 1805, but may be earlier. Chapman and Andre's map of 1771 shows what appears to be a natural scarp slope along the line of the existing wall. The OS 1" map of 1805 shows it as an artificial embankment, possibly also used as a trackway. Remains of the earlier sea defences may survive within and/or beneath the modern wall.	Historic map
Inter-tidal walkover survey finds from the foreshore adjoining Site A		
WA 7001	Section of post-medieval clay tobacco pipe with broken bowl. Identified during WA site visit in March 2002.	WA site visit
WA 7002	Romano-British pottery sherd. Identified during WA site visit in March 2002.	WA site visit
WA 7003	Two lines of piles and associated rotted rope and steel cable. Modern date. Identified during WA site visit in March 2002.	WA site visit
WA 7010	Small row of stakes or frames angled down to the east. Probable post-medieval date. Identified during WA site visit in March 2002.	WA site visit
WA 7011	Arc of vertical wooden posts - possible component of former fishtrap of probable post-medieval date. Identified during WA site visit in March 2002.	WA site visit
WA 7017	Five vertical stakes and one whale within mud. Probable post-medieval date. Identified during WA site visit in March 2002.	WA site visit
WA 7035	Former jetty of six wooden posts just visible. Identified during WA site visit in March 2002.	WA site visit
WA 7036	Victorian redeposited dump of glass bottles, ceramic building material, pottery, oyster shell and clinker along foreshore. Identified during WA site visit in March 2002.	WA site visit

1.4.6 Compensation Site A contains evidence for medieval and later sea defences, land reclamation and agricultural improvement. The site was, however, not included in the late 19th and 20th century industrial development that occurred at the main Shell Haven site. The area now forms part of a rural, agricultural buffer zone, lying between the historic settlements on the gravel terrace and the late 19th and 20th century industrial developments at Shell Haven to the east. The marshland character of the area has been substantially eroded during the last 200 years, although elements survive, particularly in the Stanford le Hope marshes to the east.

1.4.7 In the post-medieval period, the inter-tidal marshland was extensively drained and reclaimed. Until the purchase of Site A by DP World (December 2008) the land was actively farmed and was under arable crop. Ploughing will have had an impact in the upper *c.* 0.30m of the ground and this may have damaged any archaeological remains present at the very top of the alluvium. Farming practices over time, might also have involved cleaning out the existing ditches and creeks in order to improve drainage. This may have had an impact upon any later medieval or post-medieval archaeological remains contained within such features, such as boats, wharf structures or water management features. Extensive land drainage is evident on the geophysical survey plot and in trenching, being particulaly intensive in the southern part of the site.

1.5 Geomorphic zonation of the site from geoarchaeological investigations

1.5.1 In April 2008 four boreholes and ten test pits were undertaken within Site A to assess the depth of the Holocene and Pleistocene sediment sequences. The boreholes were drilled and reported on by Fugro (2008a: London Gateway Geotechnical Contract Wal080028).

1.5.2 The results of these geotechnical investigations were useful for archaeological purposes, as they provided an indication of the depth of the intersection between the Pleistocene gravels and the Holocene sediments. The results clearly show that the Holocene sequence becomes relatively shallow towards the northern extent of Compensation Site A above the Pleistocene river terrace. The sequence was recorded as 2.2m within test pit TPA-4 (NGR: 569609, 181007).

1.5.3 Following on from these geotechnical investigations, and in advance of archaeological evaluation trenching, a multi-method geoarchaeological investgation was undertaken. This comprised the following surveys::

- Two electrical resistivity lines running from north to south across the site. This was undertaken to define the depth of the Holocene/Pleistocene intersection and to model significant geomorphological features in the Holocene alluvium.
- A series of gouge core transects to log the sediment stratigraphy within the Holocene alluvium and calibrate the electrical resistivity profiles.
- A gradiometer survey across the site to spatially map archaeological deposits within the upper 1m of Holocene alluvium.

1.5.4 The results from this phase of work defined four geomorphic zones within Site A. These zones are summarised on Fig.4:

- Zone 1: An area to the north of the palaeochannel (zone 2). The depth of Holocene sediment above the Pleistocene terrace and head deposits is relatively shallow, varying between 1 - 2m BGL. The depth of Holocene deposits gradually increases to the south. The whole zone has a high potential for archaeological remains. This is reflected in the gradiometer plots, which suggest well defined archaeological features throughout.
- Zone 2: A large possible palaeochannel to the south of Zone 1. This appears to be present to c. 6m deep, considerably deeper than the Holocene sediment sequences in Zone 1. The age and periods of time when the palaeochannel was active is currently undefined.
- Zone 3: The southern extent of Site A, where sediment sequences extend to a depth of c. 7m BGL. This zone is interpreted as consisting of marine inter-tidal sediments and is deemed to have a low potential to contain archaeological deposits, at least in the upper alluvium.
- Zone 4: A topographic high point between Zones 2 and 3, with archaeological features defined by the gradiometer survey. The depth of the Holocene sediment sequences above the Pleistocene drift geologies was undefined by the geoarchaeological site investigation.

1.5.5 The gradiometer survey highlighted a series of complex archaeological features within Zone 1 (Fig. 5) and also indicated the presence of archaeology in Zone 4 (Fig. 7). The archaeological evaluation trench strategy targetted specific features identified by the gradiometer survey. Zone 2 had very few archaeological features within it (Fig. 6) and

Zone 3 had a series of anomalies of uncertain character, that were also investigated by trenching (Figs. 6-7).

1.5.6 Although the geoarchaeological invesigation provided a firm basis for investigating Compensation Site A, there were still a number of unanswered geoarchaeological questions. These can be summarised as:

- The age of the paleochannel (zone 2), which appeared to cut across the terrace and head deposits (zone 1) was unknown, although presumed to be of late Pleistocene or early Holocene date.
- The chronostratigraphic relationships between zones 1, 2 and 3 were undefined.
- The understanding of the palaeochannel (zone 2) was particularly vague. The periods when it was active and whether it had been reactivated several times were unknown.
- The relative lateral extent of Head and Terrace deposits under the Holocene sediments in zone 1 were not understood.

2 PROJECT AIMS

2.1.1 The overarching aim of the archaeological surveys at Compensation Site A was to define areas of geoarchaeological potential, understand the likely impact, if any, of the removal of sediment from the upper alluvial sequence and mitigate any impacts through archaeological investigation, monitoring and recording.

2.1.2 The investigation provides an opportunity to refine the present understanding of the archaeology of the development area. This will be accomplished by undertaking a structured investigation of the known and unknown facets of the geoarchaeological resource in Site A. Further information will also be derived on the geostratigraphy of the upper alluvial sequence at Shell Haven, which will feed into the developing model of estuarine evolution.

2.1.3 Following on from the identification of archaeological features and geomorphic zonation of the site from the geoarchaeological investigations, an evaluation trenching exercise was proposed as the next phase of site investigation. In total 34 trenches were excavated across Compensation Site A. The aim of these trenches was to:

- Charaterise the archaeological potential across the four geomorphic zones.
- Investigate a series of archaeological features identified by the gradiometer survey.
- Provide information on the chronostratigraphic relationships between the different geomorphic units.

3 METHODOLOGY

3.1 Scope of fieldwork

3.1.1 Thirty four trenches were excavated across Compensation Site A (Figs. 5-7). The dimensions and rationale of the trenches are provided in Table 2.

Table 2: Trench dimensions and reason for location

Trench	Dimensions (m) and area (m^2)	Zone or interface	Reason for trenching
1	30 * 2 (60)	Zone 1	Investigation of sub-rectangular enclosure & association with spring line?
2	40 * 2 (80)	Zone 1	Investigation of sub-rectangular enclosure
3	30 * 2 (60)	Zone 1	Investigation of potential linear features
4	30 * 2 (60)	Zone 1	Characterisation of archaeological potential in an area of relatively quiet magnetic response
5	30 * 2 (60)	Zone 1	Investigate potential structural archaeology in area of high magnetic response
6	30 * 2 (60)	Zone 1	Assessment of archaeological potential in northern area of zone 1 & characterisation of any colluviation from adjacent topographically higher terrace
7	30 * 2 (60)	Zone 1	Investigate large linear feature within apparent archaeological complex
8	30 * 2 (60)	Zone 1	Investigate linear features at interface of zones 1 and 2
9	30 * 2 (60)	Zone 1	Characterisation of archaeological potential in an area of contrasting magnetic responses
10	30 * 2 (60)	Zone 2	Characterisation of archaeological potential of upper palaeochannel stratigraphy
11	30 * 2 (60)	Zone 2	Characterisation of archaeological potential of upper palaeochannel stratigraphy
12	30 * 2 (60)	Zone 2	Characterisation of archaeological potential of upper palaeochannel stratigraphy
13	30 * 2 (60)	Zone 2	Characterisation of archaeological potential of upper palaeochannel stratigraphy
14	60 * 4	Zone 3	Characterisation of archaeological potential of zone 3 in an area of contrasting magnetic responses strongly suggestive of structural archaeology
15	30 * 2 (60)	Zone 3	Characterisation of archaeological potential in an area of quieter magnetic response with potential inter-tidal creeks
16	30 * 2 (60)	Zone 4	Investigate a linear magnetic anomaly on this raised topographic landform
17	30 * 2 (60)	Interface between zones 3 and 4	Assessment of chronostratigraphy between zones 3 and 4 encompassing a sinuous palaeochannel at the interface
18	100 * 4 (400)	Interface between zones 1 and 2	Assessment of chronostratigraphy between zones 1 and 2
19	100 * 4 (400	Interface between zones 1, 2 and 4	Assessment of chronostratigraphy between zones 1, 2 and 4, providing a complete transect across the upper stratigraphy of the constricted area of the palaeochannel (zone 2)
20	40 * 2	Interface	Assessment of chronostratigraphy between zones 3 and 4

Trench	Dimensions (m) and area (m^2)	Zone or interface	Reason for trenching
	(80)	between zones 2 and 3	
21	30 * 2 (60)	Zone 1	Characterisation of archaeological potential to the north of palaeochannel zone 2, where the gradiometer results indicate complex archaeological remains
22	30 * 2 (60)	Zone 1	Characterisation of archaeological potential to the north of palaeochannel zone 2, where the gradiometer results indicate complex archaeological remains
23	30 * 2 (60)	Zone 1	Characterisation of archaeological potential to the north of palaeochannel zone 2, where the gradiometer results indicate complex archaeological remains
24	30 * 2 (60)	Zone 1	Characterisation of archaeological potential in zone 1, in area adjacent to high magnetic response investigated by trench 5, crossing a linear feature.
25	30 * 2 (60)	Zone 1	Characterisation of archaeological potential in zone 1, investigating an area of high magnetic response and adjacent to an area of relatively quiet magnetic response.
26	30 * 2 (60)	Zone 3	Characterisation of archaeological potential of zone 3 in an area of quiet magnetic responses.
27	30 * 2 (60)	Zone 1	Assessment of archaeological potential in northern area of zone 1 & characterisation of any colluviation from adjacent topographically higher terrace.
28	30 * 2 (60)	Zone 1	Characterisation of archaeological potential in northern area of zone 1, where the gradiometer results indicate complex archaeological remains, & assessment of any colluviation from adjacent topographically higher terrace.
29	30 * 2 (60)	Zone 1	Characterisation of archaeological potential in northern area of zone 1, where the gradiometer results indicate complex archaeological remains, & assessment of any colluviation from adjacent topographically higher terrace.
30	30 * 2 (60)	Zone 1	Characterisation of the archaeological potential to the north of palaeochannel zone 2, where the gradiometer results indicate complex archaeological remains.
31	30 * 2 (60)	Zone 1	Characterisation of archaeological potential in zone 1, investigating an area of high magnetic response and adjacent to an area of relatively quiet magnetic response.
32	30 * 2 (60)	Zone 1	Characterisation of archaeological potential in zone 1, in area adjacent to high magnetic response investigated by trench 5.
33	30 * 2 (60)	In between zones 1 and 2	Characterisation of archaeological potential at the margins of the palaeochannel zone 2.
34	30 * 2 (60)	Zone 1	Characterisation of archaeological potential at the margins of the palaeochannel zone 2.

3.1.2 The top of the alluvial sequence was removed under close archaeological supervision by a 360° mechanical excavator fitted with a toothless bucket. Excavation proceeded to a maximum depth of 1.0m. All fieldwork records were entered into the London Gateway Archaeological GIS (ArcGIS ver. 9.2). Within this GIS there are a number of data sources that facilitate contextualisation of the archaeological data.

3.1.3 An OA surveyor recorded trench locations on completion using a differential GPS. Trench sections were cleaned by hand where necessary. Alluvial sequences were recorded as geoarchaeological logs and drawn in section. Archaeological features were planned at an appropriate scale and their sections drawn at scales of 1:20 or 1:50. All trenches and features were photographed using colour digital photography and black and white print film. Recording followed procedures laid down in the *OAU Fieldwork Manual* (Ed. D Wilkinson 1992).

3.1.4 The field-based recording adopted a dual approach, whereby any cultural features were recorded using standard OA conventions as archaeological contexts (cuts, fills, etc). In addition the sedimentology of the upper alluvial sequence was also recorded, due to its relevance in understanding the evolution of the Holocene landscape and allowing inferences to be made regarding archaeological potential within Compensation Site A. Through extrapolation, these inferences can also be used,across the wider development area. Therefore, two sets of records were made, one defining archaeological contexts and a second detailing geoarchaeological units (see Appendices A and B).

3.2 Finds

3.2.1 Finds were recovered by hand during the course of the excavation and bagged by context.

3.3 Palaeoenvironmental evidence

3.3.1 A number of samples were taken for palaeoenvironmental evaluation, in order to address specific questions relating to the mechanism of formation of the upper alluvial stratigraphy and its chronology. Extensive palaeoenvironmental sampling was not conducted, as this was deemed inappropriate for an evaluation phase of work. Seven soil samples were taken from archaeological contexts to assess the character and preservation of charred plant remains, molluscs, etc. Larger scale environmental questions will be addressed through the London Gateway Site-wide Palaeoenvironmental Study (OA August 2008). Several samples of 'red hill material' were taken for characterisation and another was taken from a flint -rich deposit in trench 27 (see below).

4 RESULTS: GEOMORPHIC ZONES AND SEDIMENT STRATIGRAPHIES

4.1 Terrace and Head deposits across zone 1

4.1.1 The relative lateral extents of Head and river terrace deposits under zone 1 could only be poorly understood on the basis of the original geoarchaeological assessment. In order to address this, several trenches at the northern extent of zone 1 had slightly deeper test pits dug, to map the interface with the Pleistocene surface. In addition, a gouge core transect was undertaken to further define this boundary.

4.1.2 Trenches 2, 27, 6, 28, 22, 21 and 29 were dug across the northern edge of the Pleistocene terrace with some having slightly deeper test pits excavated to expose the interface with the underlying Pleistocene drift geologies. Trenches 2, 27 and 6 all encountered the light grey sandy silt with Fe mottling (unit G3) on top of the terrace gravel (Plate 1). However, trenches 28 and 29 both encountered unit G24 (at 1m and 1.5m BGL respectively), which is equivalent to the undifferentiated Head (Plate 2), as mapped by the BGS (Fig. 2).

4.1.3 In addition to the definition of underlying Pleistocene drift geologies in trenches 28 and 29, gouge core transect 3 revealed a relatively complex section (Fig. 8), which allowed an understanding of the intersection between the river terrace 2 deposits and undifferentiated head deposits. The Holocene sediment body above the Head deposit was appreciably thinner (c. 2m BGL) than that above the river terrace deposit (c. 3m BGL). It is not clear whether this is a localised effect or can be generalised across the whole site.

4.1.4 The depth of the Holocene sediment body above the terrace deposit is important in transect 3, as it represents a relatively deep sequence compared to other investigations above the terrace gravels, e.g. trenches 2, 6 and 27. It is possible that the western edge of transect 3 has intersected with part of a palaeochannel that has incised into the terrace gravels, so producing a localised deeper sequence. This would seem probable, given that this is the intersection between the two different drift geologies and hence an area where palaeochannels would be expected to form.

4.1.5 It is now possible to produce a higher resolution geomorphic landform model than was possible using the geoarchaeological investigation alone. The original geomorphic zone can now be split into two sub-zones, being 1a (thin Holocene sediment body over river terrace 2 gravels) and 1b (thin Holocene sediment body over Head deposits) (Fig. 9).

4.2 Sediment unit register

4.2.1 The sediment stratigraphy across Compensation Site A was relatively simple to the depths excavated (c. 1.0m BGL). In order to avoid confusion between archaeological contexts and sediment units, a dual recording system was utilised, recording sediment units and archaeological contexts. This system allowed cultural features to be placed within sediment units. The geoarchaeological descriptions of sediment sequences and their evolution, interspersed with descriptions of cultural events, forms a record of site taphonomy.

4.2.2 The sediment register for Compensation Site A is included as Table. 3. Some of these units have particluar importance in understanding the Holocene sediment sequence at Site A, and are briefly discussed below.

Table 3: The sediment unit register

Sediment Unit	Description	Associated with	Comments
G1	Brown silty clay Ap, trace of sand		Homogeneous Ap unit found over entire site
G2	Stiff brown grey silty clay	G1	Lower portion of non ploughed but active soil profile, mainly aerobic
G3	Light grey orange sandy silt, Fe mottling	River terrace 2 deposit	A sand silt dominated unit, sits on top of the terrace 2 gravels. Containing a wealth of artefactual evidence including lithics, dating from the Mesolithic and Neolithic periods.
G4	Dark grey clayey silt sand, Fe mottling		
G5	Mottled blue, grey orange stiff clay, trace of silt and sand		This appears to be a partly ripened soil profile and may represent an earlier Ap segment of the soil profile than the current G1/G2 unit. Heavy Fe mottling, partly caused by root penetration. Variable thickness.
G5a	Mottled blue, grey orange stiff clay, trace of sand, but with higher silt content		G5 sub unit
G5b	Mottled blue, grey orange stiff clay, trace of silt and sand, with a distinct linear band of Mn mottling		G5 sub unit
G5c	Mottled blue, grey orange stiff clay, trace of silt and sand, with a browner clay band with Mn mottling at top of the unit		G5 sub unit
G5d	Mottled blue, grey, brown orange stiff clay, trace of silt and sand, but more homogenised, with browner colour		G5 sub unit
G5e	Mottled blue, grey, brown orange stiff clay, trace of silt and sand, but more homogenised, with greyer colour		
G5f	Mottled blue, grey, brown orange stiff clay, trace of silt and sand, but with distinct blue band without Fe mottling		
G6	Medium - dark brown grey silt clay, with sand		Drainage ditch/palaeochannel fill
G7	Dark brown grey silt, containing Mn, organics and shell fragments		Drainage ditch/palaeochannel fill
G8	Dark grey orange silty clay with sand		Drainage ditch/palaeochannel fill
G9	Brown orange clayey silt, Mn banding, lamina structure		Potential cultural fill of feature
G10	Dark grey brown silt, with sand		Fill of palaeochannel
G11	Medium-light grey orange silty sand, orange mottled		Fill of palaeochannel
G12	Reddish clay sand		Cultural deposit
G13	Greyish yellow brown silty clay		Cultural deposit
G14	Light bluish grey clay, limited Fe mottling		Palaeochannel fill
G15	Dark blackish brown/ brown clayey silt, organic rich Ap	Associated with archaeological features in trench 5	
G16	Firm greyish orangey brown clay, redeposited G5?		Ditch fill in trenches 33 and 34.
G17	Black organic peaty silt		
G18	Mid orangey brown silty clay, with small clasts, some degraded	Weathered Head deposit - (G24)	Weathered Head
G19	Light brown grey clayey sand		
G20	Grey blue clay, with darker laminae		Palaeochannel fill in trench 9
G21	Grey blue clay, Fe mottled		Lower ditch fill, trench 19
G22	Dark greyish blue soft silty organic rich clay		

Sediment Unit	Description	Associated with	Comments
G22a	Mid blue grey soft silty organic rich clay		
G23	Light grey clay silt, with orange Fe mottling, laminar structure		
G23a	Light orangey brown grey clayey silt, Fe mottling, laminated		
G24	Mid grey brown clay with silt, firm	Head	Weathered top to the Head deposit, with degraded clasts
G24a	Mid grey brown loam (less clayey than G24)	Head	Weathered top to the Head deposit, with degraded clasts
G25	Firm mid orangey brown clay (reworked head)	Head deposit	Head deposit that has been locally reworked during the Holocene
G26	Orange coarse sand, no visible bedding structure	Zone 3, underlain by G22 ('London Clay')	Victorian/WWII/Post WWII anthropogenic deposit
G27	Dark brown black peaty clay		High preservation potential for palaeoenvironmental materials
G28	Stiff grey brown loam with organics		

4.2.3 G1: Brown silty clay with traces of sand. This represents the current humic topsoil (A horizon) that has been ploughed (Ap horizon).

4.2.4 G2: Stiff brown grey silty clay. This represents the current A horizon, but is just below the ploughzone. This unit was not always evident, and the boundary between G2 and G5 was not always clear.

4.2.5 G3: Light grey orange sandy silt, with Fe mottling. This unit lies on top of the Terrace 2 gravel deposits. The depth of this unit is now known, and its lateral extent is expected to cover the whole of the river terrace gravels. The unit contained lithic artefacts in Trenches 29, 27 and 2. It represents the top of the terrace during the early Holocene and is likely to have derived from a late Devensian/early Holocene braidplain draining off the Devensian terrace.

4.2.6 G5: Mottled blue, grey orange stiff clay, with traces of silt and sand. This unit has several sub categories. It represents an older soil profile, being a partly matured soil A horizon. The bulk of the sediments from G5 have accumulated from marine deposits, but there is also a freshwater sediment component.

4.2.7 G18: Mid orangey brown silty clay, with small clasts, some degraded. This is the top of the undifferentiated Head deposit.

4.2.8 G22: Dark greyish blue soft silty organic rich clay ('London Clay'). This is commonly known as 'London Clay', a term which covers a large number of sub-type sediment units. London Clay 'to the eye' is often homogeneous, but subtle variations are often evident within it. The vast majority of sediment input into this unit is from marine (inter tidal) sources. Across site A, where G22 is evident, it identifies the inter-tidal sediment in the upper sediment sequence.

4.3 Geoarchaeological summary, zone 1a (Archaeological Area A)

4.3.1 Within this zone there were five trenches were excavated, (1, 2, 6, 7 and 27) (Fig. 5). The sediment logs from these trenches all describe a similar sequence. It was known from the original resistivity transects that the terrace gravels sloped gently from north to south. These trenches defined the depth of the Holocene sequences above the terrace deposits: Trench 6 showed a depth to unit G3 of c. 0.4m - 0.7m. At the north end of trench 2 the depth was 0.5m. In trench 1 terrace gravels were not encountered, indicating the deepening sequence from north to south.

4.3.2 From the resisitivity transect conducted in zone 1a, the depth to gravel was known to be c. 1-2m across the terrace.The measurements from the excavations are in broad agreement with this. However, unit G3 is located above the terrace gravels and contains significant archaeological deposits dating from the early Holocene. The unit is a sand silt.

4.3.3 Across this zone the units G1 and G2 are generally evident, forming the upper part of the soil profile. This represents an aerated soil, with well defined Ap zone (ploughed humic topsoil layer).

4.3.4 Below this occurs the sediment unit G5, which represents a partly matured soil, with evidence of gleying. This unit is currently located within a fluctuating water table and straddles the redox zone. Towards the south side of zone 1a, the layer G5 has a distinct blue hue, and, making a subjective judgement on its source material, appears to be derived from marine sediments.

4.3.5 The general Holocene sequence for this zone comprises, from top to bottom, units G1, G2, G5 and G3.

4.3.6 Extensive Romano-British archaeology found in in trench 2 is clearly sealed by G5 and lies above G3 (Plate 1). Unit G3 is an early Holocene sediment body and contains lithic material dating to the Late Mesoliothic and early Neolithic periods. Medieval and post-medieval features cut unit G5 (Figs. 21-22).

4.3.7 Trench 6 revealed a very homogeneous sediment stratigraphy, comprisng units G1, G2 and G5 and no cultural features (Fig. 11).

4.4 Geoarchaeological summary, zone 1b (Archaeological Areas B, C and D)

4.4.1 The majority of the trenches in zone 1b were targetted to investigate a series of features cut into the Head deposits. Some of the trenches revealed dense, complex and well preserved archaeology. This was particularly evident in trench 5.

4.4.2 Again a very generalised sediment sequence was evident in this unit comprising, from top to bottom, G1, G2 and G5.

4.4.3 In certain trenches the depth of the interface with the underlying Pleistocene Head deposit was measured. In trench 29 the interface was identified at 1.55m BGL, at its northern edge, as unit G24, with unit G25 above it (Fig. 12). In trench 28 a deeper test pit in the NE end encountered the unit G24 at 1m BGL (Fig. 13).

4.4.4 In some trenches in zone 1b unit G19 was evident, lying on top of the Head deposit. It is interpreted as being an alluvial deposit (trenches 28 and 29). Unit G19 contained artefactual evidence such as briquetage, burnt flint and possibly struck flint. This artefactual evidence, on visual examination, appears to be derived from a reworked alluvial material, although its is unlikely to have moved far from the source area.

4.4.5 The sediment unit G3, found across zone 1a, does not appear to have an equivalent on top of the head deposit (G24) in zone 1b. No flint artefacts were recovered from any of the trenches excavated in zone 1b.

4.4.6 The gradiometer results provided a wealth of detail about geomorphological features across zone 1b, as well as some clear cultural features. The relationship between the excavation and geophysical survey provided a good correlation in some trenches, whilst in other trenches the reasons for specific magnetic anomalies was less clear.

4.5 Geoarchaeological summary, zone 2 (Archaeological Areas E, F, G, H)

4.5.1 Geomorphic zone 2 represents the palaeochannel located between geomorphic zones 1 and 2. The Holocene sediment stratigraphy of geomorphic zone 2 is radically different from zones 1a and 1b.

4.5.2 The original geoarchaeological evaluation showed the palaeochannel sediment stratigraphy to be much deeper than that of Zone 1a. This was confirmed by the evaluation trenching and also by a 5cm gouge core that recovered material from within the palaeochannel.

4.5.3 Trench 11 is representative of the evaluation trenches excavated in palaeochannel zone 2 (Fig. 14). In this trench, units G1 and G2 overlie a series of G5 sub-units, which form the top of unit G22, the 'London Clay'. The London clay (G22) was not exposed in trench 11 due to the relatively shallow excavation depth, but was located in the southern end of trench 18, at a depth of 1.65m.

4.5.4 As the Holocene sediment sequences in zone 2 are much deeper, and the upper part of the sequences younger, than the equivalent sequences in zone 1, their potential for containing archaeological materials is much lower than in zone 1. Very little cultural material was derived from the excavations in zone 2.

4.5.5 To fully understand the sediment sequences of the palaeochannel, and also to retrieve some sediment for dating, a gouge core was undertaken within the palaeochannel (Fig. 15). The gouge core revealed the following sediment stratigraphy:

0-15cm
Dark greyish brown silty clay Ap. Visible vertically bedded modern plant (grass/reed). No coarse inclusions observed (G1).

15-26cm
Dark greyish brown A horizon, firmer than above. Limited Fe and Mn mottling. No visible organics/coarse inclusions (G2).

26-100cm
Mottled - 70% brown, 30% greyish brown compact clay with trace of silt. Greyish brown becomes more frequent towards base of unit. Heavy Fe and Mn mottling. Occasional vertical blackish stains (rootlets). Towards base (around 75cm) clay seems cleaner, not so mottled. Rare clasts (~5mm) observed (G5).

100-140cm
Diffuse boundary with above. Dark grey clay with trace of silt. Occasional Fe mottling which becomes less frequent from approx. 135cm (still present, but rare). From this point rare Mn mottling appears. Gradually becoming darker grey towards base of unit, and trace of silt becomes gradually less.

140-225cm
Dark grey clay, very moist. Very smooth, polished, sticky. Rare Fe mottling and some limited organics. Gradually becomes firmer and darker towards base.

225 260cm
A slightly darker grey clay, very moist. Very smooth, polished, sticky. Rare Fe mottling and some limited organics, but slightly darker grey

260-292cm
A slightly lighter, dark grey clay, very moist. Very smooth, polished, sticky. Rare Fe mottling and some limited organics.

292-320cm
Dark grey clay, very moist. Very smooth, polished, sticky. Rare Fe mottling and some limited organics.

320-330cm
A slightly lighter, dark grey clay, very moist. Very smooth, polished, sticky. Rare Fe mottling and some limited organics.

330-435cm
A slightly lighter, dark grey clay, very moist, with rare fine sandy lenses. Very smooth, polished, sticky. Rare Fe mottling and some limited organics, with occasional black stains (15%).

435-450cm
Dark grey to black silty clay, with a trace of sand.

450-487cm
Very dark grey silty clay, with trace of sand.

487-490cm
Very dark grey silty clay, with trace of sand.

490cm
Impenetrable basal gravel.

4.5.6 The results from the gouge coring of the palaeochannel demonstrate that the depth to basal gravel is c. 5m BGL. This shows the substantially deeper Holocene sequences across zone 2, compared to zones 1a and 1b. The presence of the large palaeochannel across zone 2 means several key issues need to be addressed in order to fully understand the chronostratigraphy of Site A. In particular, the location of a palaeochannel between zones 1 and 3 is curious and has two quite different potential explanations that are reviewed here. Further work to resolve these questions is detailed below in the Further work section.

4.5.7 The gradiometer results highlight the general similarity in geomorphological features between zones 1 and 3, with zone 2 apparently bisecting these zones. The information derived from the resisitivity transect, gouge coring and excavations clearly show zone 1 to be an incised terrace edge, which must pre-date the palaeochannel at its southern edge, with the incision of the terrace presumably having been formed by the channel in zone 2 when it was active. Therefore, the similarity in morphology between zones 1 and 3 is interesting, as it presents two alternative, competing theories for site evolution. These are summarised as:

4.5.8 **a)** The palaeochannel (zone 2) did form the incision on the terrace (zone 1). However, the palaeochannel has been periodically active (holding flow), throughout the Holocene. Therefore, features such as those seen on zones 1 and 3 have either been more recently eroded across zone 2 or buried by alluvium deposited by the palaeochannel acoss zone 2. The last period of activity of this palaeochannel may be relatively recent, just before the sea wall was built. It could be that the difference in morphology between

zones 2 and 3 is superficial and that they are of the same age, with zone 2 holding flow of a large creek in the inter tidal deposits of zone 3.

4.5.9 **b)** The palaeochannel (zone 2) is actually younger than zones 1 and 3 and does represent an incision into zone 3. The incision of the terrace (zone 1) was caused by either the main Thames channel or another minor tributary palaeochannel, which has been subsequently eroded by later alluvial action.

4.5.10 Establishing the exact site formation process and the chronostratigrapic relationship of these different zones is a key issue that will be addressed by further site investigation and through an integrated dating programme (see below).

4.6 Geoarchaeological summary, zone 3 (Archaeological Areas J, K and l)

4.6.1 The excavations in zone 3 consisted of trenches 14, 16, and parts of trenches 17 and 26. Only a limited number of trenches could be excavated in this area, due to the location of possible bomb craters and the potential for unexploded ordnance being in the vicinity of a recorded WWII bomb decoy site.

4.6.2 Zone 3 was interpreted as having an upper sediment sequence derived from inter-tidal source material in the upper alluvial sequence.

4.6.3 The interface between the Holocene and Pleistocene deposits was not witnessed in zone 3 during excavation, but is known from the resistivity profiling to be at a depth of c. 6 - 8m.

4.6.4 Trench 26 provides a good overview of the sediment sequences in zone 3 (Fig. 15), with a general sequence comprising, from top to bottom, G1, G2 and G5 sub-units. In essence, this is a very similar general stratigraphy to that in zone 2. None of the evaluation trenches excavated in zone 3 produced cultural materials or structures.

4.6.5 Trench 14 provided a curious result, whereby a very clean, medium to coarse orange sand (unit G26), was found at c. 0.5m BGL (Fig. 6). Whilst superficially this deposit may be interpreted as having been formed within an active channel (e.g. sand bar) the unit is almost certainly a dump of recent aggregate material. The sheer quantity of sand deposited, combined with there being no depositional or erosional structure within it, indicates that it was imported by mechanised transport and must therefore be a relatively recent deposit.

4.6.6 Overall the potential of the upper alluvial stratigraphy in zone 3 to contain geoarchaeological resources is low.

4.6.7 Again the chronostratigraphy of zone 3 is unclear, with its relationship to zone 2 currently undefined. This issue will be addressed in further work (see below).

4.7 Geoarchaeological summary, zone 4 (Part of Archaeological Area l)

4.7.1 Geomorphic zone 4, is the topographic island between zones 2 and 3. Very little was understood about this zone prior to evaluation trenching. The results from the gradiometer survey indicated the presence of cultural features in this zone. This, combined with its topographic expression, meant that this zone was interpreted as having a high geoarchaeological potential. Trenches 16, 17 and 19 investigated the sediment sequences and cultural potential of this zone.

4.7.2 The sediment sequences were again relatively homogeneous and similar to those witnessed in zones 2 and 3. Trench 17 provides a good illustration of these sequences: The sediment units comprise, from top to bottom, G1, G2 and a series of G5 sub units (Fig. 17). There was no difference revealed by excavation in the upper alluvial sediment sequences between geomorphic zones 2, 3 and 4.

4.7.3 No cultural features were located in the evaluation trenching in zone 4, which is curious, given the gradiometer results.

4.7.4 In order to further investigate the topography of zone 4, a gouge borehole was undertaken at the western edge of trench 16. The borehole recorded a depth to gravel of 4.3m, proving a slightly thinner Holocene sequence in zone 4 when compared to the palaeochannel (zone 2) where the depth to gravel was 4.9m. This suggests that zone 4 is an area of slightly higher topography than the adjacent zones 2 and 3.

4.7.5 As this height difference is reflected in the gravel surface it appears that zone 4 has been an area of slightly higher topography since the early Holocene, when differential erosion left an area of slightly upstanding Devensian drift geology. This difference in topography has continued to be reflected in the sediment sequences throughout the Holocene.

4.8 Chronostratigraphic relationships defined by evaluation trenching

4.8.1 While the majority of the evaluation trenches were intended to investigate apparent cultural features identified by the gradiometer survey, four trenches were excavated specifically to look at the chronostratigraphic relationships between geomorphic zones.

4.8.2 It must be borne in mind that the depths of excavation were relatively shallow, so for geomorphic zones 2, 3 and 4, the discussion of chronostratigraphy is restricted to the upper alluvial profile. However, as trenches 19 and 21 show, these three zones have a relatively homogeneous upper alluvial sequence, comprising, from top to bottom, sediment units G1, G2, and a series of G5 sub-units. The date of this upper alluvial sequence is not known and the chronological relationship between zones 2, 3 and 4 is currently undefined. Trench 18 investigated the relationship between zones 1 and 2. Again, a relatively homogeneous sequence was seen along its length, comprising, from top to bottom, G1, G2, and G5.

4.8.3 Trench 2, although firmly located within geomorphic zone 1a, concisely records the interface between the marine sediment units, which overlap with the freshwater incised terrace deposits of zone 1 (Fig. 10). In this area, the light grey sand silt deposit above the terrace gravels (G3) is seen dipping from north to south. Above this, part way along the trench, unit G5 is seen overlapping G3, and petering out to the north. This interface is important, as it represents the most northerly extent of G5, and hence the northern limit of marine incursion. As the Romano-British archaeological deposits are located to the north of G5 in trench 2, or sealed beneath it, it is clear that the marine incursion on this part of Compensation Site A post dates the Romano-British period. Trench 1 revealed a ditch with medieval material in it, which cut G5 (Fig. 20), thus providing a chronological bracket for the marine incurison and deposition of unit G5 in zone 1.

4.8.4 The upper portion of G5 can therefore be given a chronological bracket of AD43 - AD1400 in zone 1, on stratigraphic grounds. However the date for the upper alluvial sequences in zones 2, 3 and 4 is still unknown and requires clarification.

4.8.5 In order to answer these key questions about the chronology of the different geomorphic zones the following actions are recommended:

a) Radiocarbon dates on suitable material from the gouge core sample within the palaeochannel (sample COSAGE09, S01). At least three dates should be obtained from the sequence.

b) Radiocarbon date suitable material from the gouge core sample taken from trench 16.

c) If further site excavation occurs, undertake a relatively complete box section of a small strip of geomorphic zones 2 and 3, and retrieve a complete sediment sequence using monoliths. Again seek suitable material for radiocarbon dating and palaeoenviromental analysis.

d) Define a *terminus ante quem* for the date of the incision of the terrace in geomorphic zone 1, derived from the cultural artefacts retrieved during open area excavation. Undertake localised deeper excavation through the sand silt deposit above the gravels (G3) to look for the earliest possible cultural artefacts.

5 RESULTS: EVALUATION TRENCHING

5.1 Presentation of results

5.1.1 The archaeological results for the Compensation Site A evaluation have been grouped by field and geomorphic zones into 11 separate areas, labeled A to K, one of which (K) contained no evaluation trenches and is not included in the following discussion (**Fig. 19**). It is intended that these areas will be zones for future mitigation.

5.2 Cultural features Area A (Trenches 1, 2, 6, 7, 18, 27) (Figs. 20, 21, 22 & 23)

5.2.1 Area A contained five complete (1, 2, 6, 7 & 27) and one partial trench (T18 north) (Fig. 19). Two of these (1 & 2) investigated some magnetic responses, which were interpreted as defining a multi-ditched double rectangular enclosure. Trench 6 was excavated to test the archaeological potential of the sand/gravel terrace at the northern end of area A. Trench 7 was located over a broad palaeochannel and trench 27 investigated some geophysical anomalies, which possibly indicated ditches. Trench 18 had more than one purpose: Its main aim was to investigate the chronostratigraphy along the boundary between geomorphic zones 1 and 2; it also investigated some possible linear features in zone 1. In addition, it tested for the archaeological potential and preservation of organic remains within the palaeochannel.

5.2.2 Trenches 1, 2 and 27 produced significant and complex archaeological deposits, while trenches 6 and 7 were empty. Trench 18 had late post-medieval field boundaries cutting across it, which were visible on the Ordnance Survey map of 1876 (Fig.18).

5.2.3 Trench 6 revealed the light grey/yellow sands of the Pleistocene terrace (G3, 06003) overlain by darker grey clay/silt/sand, possibly representing a buried shallow topsoil (G4, 06004). At its southern end the sands gave way to the G5 mottled blue-orange stiff clays representing inundation deposits (06005). A palaeochannel (06006, 06007 & 06008) cut across trench 6 from almost the top of the sediment sequence, immediately below the topsoil (G1, 06001). This sequence, comprising a sand/silt deposit on top of terrace gravels and buried by inundation deposits, indicates high preservation potential for archaeological deposits wihin zone 1a (Fig. 11). Despite the clear magnetic responses, trench 7 revealed no corresponding archaeological or geomorphological features.

5.2.4 Early Prehistory (Figs. 21 & 23): The earliest recorded phase of human activity within Compensation Site A was represented by struck flints recovered from the sand silt deposit above the terrace gravels (G3) in trenches 2 and 27 (02003, 02014 & 27003) and occasionally as residual finds in later features. Several blades and blade-like forms were present within the assemblage and there were numerous other pieces exhibiting parallel dorsal ridges, indicative of a carefully maintained reduction sequence aimed at blade and regular flake production (Plate 7). There was heavy use of platform abrasion and many of the blades had isolated platforms. A 'horseshoe type' end scraper was recovered (Plate 7) along with an unusual obliquely truncated end scraper and a side denticulate on a blade-like flake. A core fragment was also recovered, which appeared to represent a fairly cubic dual or multi-platformed bladelet core.

5.2.5 Some pottery sherds were also recovered from trenches 2 and 27 (02003, 02014 & 27003) at a depth of around 0.3m, within the G3 deposit. This pottery may be Late Neolithic to Early Bronze Age in date. However, the sherds are in poor condition and do not contain any easily dated elements such as decorated sherds, rims, cordons or bases. The numbers of prehistoric artefacts from each trench varied considerably and there were none from trench 6, which also contained the same sand silt unit (G3).

5.2.6 Due to the limited extent of the evaluation trench program, it is difficult to reach any firm conclusions regarding Human activity on top of the terrace in zone 1 during early prehistory, at this stage of investigation. If unit G3 does represent an early Holocene braidplain, then extensive human activity during the Mesolithic and Neolithic periods can be expected. The excavated assemblage is most likely to date from the Early Neolithic, however, the possibility that it is multi-period should not be ruled out, and a range of dates spanning the Mesolithic and Neolithic should also be considered. Several test pits were dug down into unit G3 in both trenches, and a sample of the deposit was taken to provide an estimate of flint density.

5.2.7 Late Iron Age to Romano-British: The next phase of human activity in trenches 1, 2 and 27 was represented by enclosure ditches and banks associated with a series of dense layers of briquetage and red hill deposits. Roman pottery and tiles were found in association with these features.

5.2.8 In Trench 2 (Fig. 21), a series of three parallel east-west orientated ditches (02015, 02016 & 02018) were identified, separated by gaps of 2.7m between the outer and middle ditch and 2m between the middle and inner ditch. These ditches were c. 1.8m wide and had depths of 0.6m to 0.9m, becoming progressively deeper towards the enclosure interior. The two exterior ditches cut through a potential buried soil horizon G4 (02021), but there was no sign of any surviving banks The briquetage layers overlying the ditches have contributed to the excellent preservation of the site. The absence of a bank suggests that the excavated ditch material may have been transported elsewhere on site, such as for use as earthworks for channeling and controlling the flow of tidal saline water for salt production Such a bank was identified in trench 1 (Fig. 22 & Plate 3).

5.2.9 In trench 2, the three ditches were largely filled with an alternating sequence of sterile grey sand/clay fills, layers rich in briquetage, and reddened clayey material known as ‘red hill’ soil (Figs. 21-22, Plates 4 & 5). Several pottery sherds were recovered from these ditches along with residual flints. The pottery was spot dated to the Romano-British period, with the possibility of some Late Iron Age sherds (Plate 8). Overlying the ditch fills was a complex sequence of manganese rich layers, more briquetage-rich layers and ‘red hill’ soil layers. These were at their most complex where they overlay the outer two ditches.The southern interior ditch was sealed by a thick layer of ‘red hill’ material (02004), above which was a potential inundation deposit (G5, context 02044). This may have been responsible for the excellent preservation encountered here.

5.2.10 To the north of the main set of three ditches there were two more features, one of which (02007) was probably a ditch, while the interpretation of the other was less clear (02055). Both features were heavily truncated by post-medieval activity here, but 02007 ditch contained significant amounts of Roman pottery and tile in its three fills. The base of ditch 02007 indicated that it was either terminating within the trench, or that it was some form of segmented feature. The second, more ambiguous feature, 02055, contained some struck flint along with a single fragment of briquetage, which may have been intrusive. It is, therefore, possible that this feature could be of earlier date. Feature 02055 appeared to cut across the trench from SE-NW, whereas ditch 02007 followed the NE-SW orientation of the other Romano-British ditches. Another possibility is that both of these features (02007 & 02055) may have formed two sides of a quadrilateral-shaped settling tank and meet at right angles a short distance to the southwest of the trench. Such features are known from ‘red hill’ sites in Essex. The features had very similar fills in terms of colour and texture and the prehistoric worked flint recovered could easily have been residual.

5.2.11 Trench 1 had a similar sequence of features and deposits to trench 2 (Fig. 20). In trench 1 the G5 potential marine inundation deposit (01005) not only sealed the Romano-British ditches, but also formed their upper fills. Later features, dated by pottery finds to

the medieval period, cut through the G5 deposit. Here there were only two ditches (01017 & 01018) visible at the southern edge of the enclosure, although a deep drain and post-medieval ditch occupied the likely location of the third ditch and may have completely truncated it. Because these ditches were largely filled with sediments equivalent to G5, defining their edges proved to be extremely difficult. Moreover, flooding prevented clear definition of the base of these ditches.

5.2.12 Given the difficulties described above, only an estimate of the width and depth of these features could be made. This estimate was that these features were around 1.5 - 2m wide and at least 0.5m deep. The upper fills of the ditches contained no finds, but the ditches were separated by a domed band of yellow/orange sand clay (01012, 2m wide and 0.3m high) which contained some pottery (Plate 3). This layer sealed another containing briquetage material (01006), which was most likely a 'red hill' soil horizon. It is possible that band 01012 represents a surviving bank, as its composition is similar to the underlying terrace material into which the ditches are largely cut. The sealing of 'red hill' material below this bank is difficult to interpret, but may indicate that there was a sequence of enclosures here. Alternatively, given the degree of truncation by the post medieval ditch and drain, the 'red hill' soil band 01006 did not continue across the whole trench and that the layer sealed by 01012 may relate to an earlier, small-scale/less intensive period of salt production.

5.2.13 Trench 27 contained evidence for salt production dating to the Romano-British period (Fig. 23). A ditch (27013) occupied much of the northern edge of the trench and was filled with 'red hill' material (27014) containing Roman pottery and briquetage fragments (though the latter were considerably worn). This ditch was at least 0.9m wide and 0.8m deep, with a sharp-angled profile leading into a flat base. The ditch cut a small feature (27015) which contained some pottery or briquetage. However, the subsequent flooding and re-stripping of this trench resulted in their loss. Another small pit or possible ditch terminus was found (27010). This also contained a fill of 'red hill' soil (27011).

5.2.14 Late medieval-early post-medieval: There was limited evidence for late medieval-early post-medieval activity in Zone 1a. Trench 1 contained a shallow ditch (01010) which cut inundation deposits G5 (01005). This ditch contained numerous sherds of late medieval-early post-medieval pottery in very fresh condition. This pottery has been spot dated to the late 15th -early 16th century and has been identified as Essex Red Ware (J. Cotter, pers. com.). This ditch was 1.7m wide and 0.5m deep with an open 'v' shaped profile.

5.2.15 Late post-medieval - early modern: Several large ditches in Area A are believed to date to the late post-medieval or possibly the modern period, some having been filled in as recently as the inter-war years. In all instances, these features displayed heavy manganese staining from what would have been their upper bank tops and had fairly sterile stiff brown clay fills. One ditch (02011/02046) in trench 2 contained much of a German mineral water bottle dated to the mid-late 19th century (J. Cotter, pers. com.). Other ditches were identified in trenches 1 (01008) and 18 (18004). These features tended to be wide (3.5-5m) and deep (1.2m).

5.2.16 Uncertain date: One ditch from trench 27 is of uncertain date, although stratigraphically it must be Romano-British or later. Ditch 27017 ran N-S across the trench and was 1.2m wide and was excavated to 0.8m deep before the water table was reached and excavation abandoned. The three fills identified did not produce any artefactual material.

5.3 Cultural features Area B (Trenches 5, 24, 25, 31, 32, 33 north & 34) (Fig. 19 & 24)

5.3.1 Area B contained six complete and one partial trench (Fig. 19). These were chosen in order to test areas of high magnetic responses (trench 5), areas that bordered high magnetic responses (trenches 25, 31 & 32), possible linear features (trench 24) and (trenches 33 north & 34) to test the archaeological potential of the margins of the palaeochannel geomorphic zone 2. These trenches revealed fairly disparate human activity, except for trench 5 that contained a dense sequence of archaeological horizons associated with shallow ditches and possible pits.

5.3.2 Romano-British: Trenches 24 and 31 each contained a single linear feature of similar character and alignment, which are interpreted as parts of a single continuous ditched boundary, scarcely visible in the gradiometer plot. Both ditches (24004 & 31004) were of similar dimensions and profile; ditch 24004 was 1.8m wide by 0.35m deep with a single sterile light blue clay fill (24008). Ditch 31004 measured 2.1m wide by 0.35m deep and had two fills, the upper of which (31006) contained artefactual material. Both had open, flat bottomed 'U' shaped profiles. Finds from these ditches were sparse, but there were two fragments of fired clay or briquetage and a single rolled sherd of Romano-British pottery (probably Upchurch ware) from ditch fill 31006.

5.3.3 Trench 5 contained a mass of archaeology of a similar character and intensity to that identified in trenches 1 and 2 (Fig. 24). At the north end of the trench a very shallow ditch, orientated E-W and 3m wide by 0.4m deep, was identified (05004). Its fill (05005) contained briquetage/fired clay fragments. This feature was cut by a shallow pit (05006), which had a flat base with steep sides and was filled with a mixed orange/brown clayey deposit (05007) containing numerous briquetage fragments. This pit was located in the northeast corner of the trench and is of uncertain size and form. South of this was a shallow pit or ditch terminal (05010), 2m by at least 0.5m, which was 0.14m deep and filled (05011) with a dark grey/brown briquetage rich deposit.

5.3.4 Beyond this there was a complex sequence of layers, which appeared to have been banked up along the edges of the activity area (Plate 6). There is some uncertainty over whether these layers were contained in a natural channel, a ditch, or at the edge of a raised strip of land. The northern half of these deposits was interpreted as being located on a layer of very compacted redeposited clay (05013), containing Roman pottery. South of this, the underlying clays dipped down and inundation deposits were visible overlying the archaeological material.

5.3.5 The southern extent of these layers was not defined despite the excavation of two deep test sondages (c. 1.5 BGL) to ascertain whether they sloped away. Some of these layers were very rich in briquetage. Other layers were rich in mollusc shells including 05029 and another upper layer which contained a mix of shells (05017). Layer 05017 may represent a bank in a later palaeochannel that cut over this activity area. This is, however, a speculative interpretation and will require further excavation for clarification (Plate 6).

5.3.6 Pottery from this trench was identified as Roman, although possibly earlier in date than that recovered from trenches 1 and 2. Briquetage fragments from here appeared to be larger, chunkier and better preserved than elsewhere on site and included large fragments of 'kiln furniture' such as triangular wedges. Residual struck flints were absent from this area, most probably due to the fact that these features did not cut into sand/gravel terrace deposits. There was also no evidence for later activity comparable to the medieval elements from Area A.

5.3.7 19th/20th century: Trenches 33 and 34 both contained a wide modern bank and ditch which was clearly visible in the geophysical survey plots and is likely to be the same feature identified in trench 19, Area C (19008) and trench 18, Area A (18004), and

shown on the OS map of 1898 (Fig.20). Ditch (33007) was 4m wide by 1.6m deep, while ditch (34004) was 3.1m wide and at least 0.8m deep.

5.3.8 Trenches 25 and 32 did not contain any archaeological remains other than some modern mortared bricks forming sections of collapsed walling in trench 25. More bricks were found in trench 31 and may account for some of the very high magnetic responses in the northern part of Area B. It is believed that these bricks may relate to structures built here during the construction and maintenance of the sea wall, or possibly during World War II as part of the bomb decoy site. Trench 32 did expose palaeochannel deposits producing a perfect match for the geophysical anomalies identified at the same location.

5.4 Cultural features Area C (Trenches 4, 8, 9 & 19 north) (Figs. 19 & 25)

5.4.1 Area C contained three whole (4, 8 & 9) and one partial trench (19 north). Trench 4 was placed in order to characterise the archaeological potential in an area of magnetic responses. This trench contained no archaeological features, nor was any artefactual material recovered. Trench 8 was placed to test a series of putative short linear features but was on excavation found to be entirely sterile. Trench 9 was placed to test a series of contrasting magnetic responses and revealed a palaeochannel (09003) with numerous rolled briquetage fragments within its fill (09006). This palaeochannel cut through the ubiquitous G5 stiff blue yellow clays (09005). At the north end of the trench another smaller channel, or possibly a ditch (09008), was identified in a test pit, which was excavated in order to find the 'head' deposits (G18, 09004). This feature did not contain any artefactual material and was filled with blue clays (09008) similar to other palaeochannel deposits. This feature cut a thin layer (G19, 09009), which elsewhere in Area D contained flint, burnt flint, pottery and some briquetage fragments. No finds were, however, found within this layer at this location.

5.4.2 The northern third of trench 19 revealed a sequence of potentially interesting deposits including two shallow ditches/channels (19004 & 19006), a much later double bank and ditch (19008) and a possible structure defined by wooden stakes (19011) (Fig. 25).

5.4.3 Both the shallow ditch/channels (19004 & 19006) were discovered cutting into the G5 layers and sealed beneath the G2 horizon. These features measured c. 1m wide and 0.1-0.15m deep and could as well be shallow channels as genuine archaeological features. The fills (19005 & 19007) of these features were very similar blue/grey clays without finds. The identification of these features as either ditches, natural channels or managed channels was again difficult to establish, within the narrow confines of evaluation trenches.

5.4.4 The possible stake-built structure (19011) is of uncertain age, although radiocarbon dating some of the samples obtained from the stake tops may be possible. Three stakes were observed in a rough right-angled triangle measuring 0.8m along its base and 1m along its perpendicular side. The area that the stakes were in was under water and excavating them was, therefore, impossible. One stake was traced downwards for around 0.4m and proved to be roughly circular, stake c. 0.15m in diameter. This stake was inserted into the G5 clays at an angle of around 20 degrees from vertical and inclined down towards the southwest. The stake was still very securely embedded at that depth. The other two stakes were tested to see how secure they were at the level they were discovered at and were found to be firmly in place. Some of the material recovered as wood samples appeared to have been worked, but will require specialist examination to verify this.

5.4.5 19th/20th century: Ditch (19008) most likely represents a very late field boundary (late 19th century) which has been filled in quite recently, possibly during the inter-war years.

Its fill (19009) contained a whole brick and numerous other brick fragments indicating a recent date. This feature was around 6.2m wide and at least 1.2m deep.

5.5 Cultural features Area D (Trenches 3, 21, 22, 23, 28, 29 & 30)

5.5.1 Area D contained seven trenches which were located here for a variety of reasons (Fig. 19). Trenches 28 and 29 were placed in order to test gradiometer results, which indicated complex archaeological remains and to test the potential of the sand/gravel terrace. Trenches 3 and 30 were placed in order to investigate the possibility of linear features, while trenches 21, 22 and 23 were located in areas that either represented palaeochannels or areas of possibly complex archaeology. Area D suffered the most from the inclement conditions experienced during the project and all of the trenches became flooded. In addition, much of the field was under water for some time during the course of the work. As a result of this, the trenches in Area D had to be bailed, re-stripped and battered along their edges. This would have had a detrimental effect on any subtle archaeological features that may have been present, although none were seen during the initial strip.

5.5.2 Trenches 21, 22 and 23 did not contain any visible archaeological remains and failed to reveal any correlation between their underlying deposits and the geophysical survey, despite being stripped to depths of around 0.8-1m. There is some possibility that the remains were slightly deeper, as two deeper test pits in trenches 28 and 29 to the north did reveal possible archaeological features at depths of around 1.2m.

5.5.3 Trenches 3 and 30 were placed across the same linear feature at their southern ends. Upon excavation, trench 30 was shown to contain a broad modern field boundary ditch (30003), similar to those encountered elsewhere. Trench 3, however, revealed a sequence of laminar G5 variants as they dipped downwards to the south, with no sign of the ditch. Trench 3 also contained a shallow ephemeral linear (03005) at its northern end. This feature measured 0.85m wide by 0.15m deep, was filled by a light blue/grey clay (03006) and contained no finds. The modern ditch in trench 30 measured 4m in width, by at least 0.55m in depth but was not bottomed due to flooding

5.5.4 Trenches 28 and 29 initially appeared to be archaeologically sterile and also failed to reveal any deposits corresponding to the geophysical survey plots, within the top 0.5m. What was also unusual about these trenches was that the expected sand/gravel terrace was not identified at the depth to which the trenches were initially excavated. Because of this, each trench had a deeper test pit cut at its northern end. In both cases this revealed a thin (0.1-0.15m) layer of material (G19, 28003, 29004) at a depth of around 1.2m, which contained briquetage fragments, burnt flint, possibly some struck flint and a single sherd of pot or well-made briquetage. Most of this artefactual material appeared fresh. This material lay over the 'head' deposits (G24, 28005). In both of these deep test pits possible features, perhaps ditches or palaeochannels, were discovered. In trench 29 a narrow channel similar in profile to many of the fairly sterile ditches identified in Areas B, C and D was located. It measured 1.2m in width by 0.2m in depth and was filled with a blue/grey clay. In trench 28 the feature was at least 1m wide by at least 0.5m deep.

5.6 Cultural features Area E (Trenches 10 & 18 south)

5.6.1 Two trenches were excavated within Area E (Fig. 19). Trench 10 was placed to test the archaeological potential of the wide palaeochannel identified as geomorphic zone 2. Trench 18 south was placed in order to assess the chronostratigraphy between geomorphic zones 1 and 2. Neither of the trenches contained archaeological features, and no artefactual material was recovered.

5.7 Cultural features Area F (Trench 12 & 33 south)

5.7.1 Two trenches were positioned within Area F (Fig. 19). Trench 12 was placed to test the archaeological potential of the wide palaeochannel identified as geomorphic zone 2. Trench 34 south was placed to test the archaeological potential of the margins of the palaeochannel geomorphic zone 2. Neither trench contained archaeological features nor was any artefactual material recovered.

5.8 Cultural features Area G (Trench 19 centre)

5.8.1 Area G was represented solely by a 50m long central portion of trench 19. This section of trench 19 was cut into the palaeochannel (geomorphic zone 2). No archaeological features or artefactual material was identified in this portion of trench 19.

5.9 Cultural features Area H (Trenches 11, 13 & 20)

5.9.1 Area H contained three trenches (11, 13 & 20), two of which (11 & 13) were placed in order to test the archaeological potential of the wide palaeochannel identified as geomorphic zone 2. The third trench (20) was placed in order to assess the chronostratigraphy between geomorphic zones 3 and 4 (Fig. 19). No archaeological features were identified in any of these trenches nor was any artefactual material recovered. This was not unexpected as these areas did not show any geophysical anomalies.

5.10 Cultural features Area I (Trenches 15, 16, 17, 19 south & 26)

5.10.1 Area I contained four complete and one partial trench (Fig. 19). Three trenches (16, 17 & 19 south) were placed in order to test linear features apparent on the geophysical survey plot in an area of slightly raised ground believed to represent a relict island feature (geomorphic zone 4). Two other trenches (15 & 26) were placed in the adjacent geomorphic zone 3. No archaeological features were identified in any of these trenches nor was any artefactual material recovered. The geophysical results are, therefore, believed to represent ripened palaeochannel features in the upper portions of the sediment sequence, which have become so homogenised as to be practically invisible.

5.11 Cultural features Area J (Trench 14)

5.11.1 Trench 14 was the sole intervention carried out in area J and measured 60m in length (Fig. 19). This trench was placed in order to test a series of contrasting magnetic responses, strongly suggestive of structural archaeology. However, excavation revealed a clean light reddish yellow coarse sand with occasional small flint pebble inclusions (G26, 14002) lying immediately below the topsoil (G1,14001) at a depth of around 0.3-0.5m. At the western end of the trench, the sand dipped down to a depth of 0.8m and was sealed by a possible inundation deposit, or possibly a cut feature backfilled with gray clays/muds (G2?, 14003). Four deep test pits were cut into the sand along the length of trench 14 and all revealed clean sand to a depth of 1.6m at which depth, blue/grey clays were encountered (G22a, 14004). There was no indication of what had caused the geophysical survey results. The sand most likely originated from a nearby quarry and appeared to be graded. The overall cleanness of the sand suggested that it had been brought in bulk/large containers, most probably during World War II as part of the construction program for the decoy site or perhaps infilling palaeochannels for the purpose of agricultural improvement.

6 FINDS AND ENVIRONMENTAL SAMPLES

6.1 Pottery (E. Biddulph and J. Cotter)

6.1.1 A total of 117 sherds, weighing 2.5 kg, was recovered from the evaluation (Table 4). A small amount of flint-tempered pottery recovered from contexts 02029, 02053 and 27003 is prehistoric in date, most likely belonging to the late Bronze Age or early Iron Age. Pottery possibly dating to the middle Iron Age was recorded in context 05033; the sherd was small and so identification is uncertain. Groups containing glauconite, distinctive black greensand grains, were of more certain Iron Age date. The use of glauconite is infrequent in Essex – the tradition is better known in Kent, for example, especially in the Medway valley (Pollard 1988, 31) – but glauconite is found in the Thanet Sand, which outcrops in the Mucking-Chadwell area, and it was used in later Iron Age pottery (fabric A) found at Waltham (Drury 1978, 128). No forms in glauconitic fabrics were recorded at the evaluation site, but the bases and body sherds recovered are consistent with the Waltham forms.

6.1.2 Kentish products were detected in pottery dated to the Roman period. North Kent fine fabrics were recorded in contexts 05013 and 31006, while a grey ware sherd in context 05023 was identical to standard (Kentish) Thameside grey ware products (cf. Monaghan 1987). These fabrics are likely to share a 1st or 2nd century date. A gritty oxidised ware with burnished surfaces in context 02013 also resembles north Kent wares, but arrived in the 2nd or 3rd century. Most vessels were, however, undoubtedly made locally along the north bank of the Thames. Production of shell-tempered ledge-rimmed jars, like that in context 05013, is attested at Mucking (Jones and Rodwell 1973). Other local products include a sandy grey ware ledge-rimmed jar (Going 1987, type G5), a jar with a bifid rim (Going 1987, type G28), and a bead-and-flanged dish (Going 1987, type B6). The jars date to the 2nd and 3rd centuries, while the dish was a late Roman form.

Table 4: Summary of pottery by context group

Context	Count	Weight	Comments	Spot-date
01006	5	27	Red ware jar rim; oxidised body sherds	Roman
01011	29	726	Essex Red Ware jug	Late 15th-early 16th cent
01012	3	22	Early shell-tempered ware; fine grey ware cup or beaker	Mid 1st-early 2nd cent
02004	1	12	Handmade sand and organic-tempered grey ware, burnished surface	?Early-mid 1st cent AD
02008	1	17	Black-burnished ware ?dish	Mid 2nd-mid 3rd cent
02010	4	26	Bifid-rimmed jar Going G28 (sandy grey ware)	2nd-3rd cent AD
02012	6	647	German mineral water bottle	Mid 19th cent
02013	12	240	Ledge-rimmed jar Going G5 (black-surfaced ware); storage jar base sherd; white ware; jar rim and body sherds in ?Thameside gritty oxidised ware with burnished surfaces	Mid 2nd-late 3rd cent AD
02024	12	71	Glauconitic reduced ware jar rim, and body and base sherds	Middle/late Iron Age
02026	2	66	Handmade mixed tempered (organics, sand, flint) sherds	?Iron Age
02029	4	7	Medium-coarse flint-tempered pottery	Late Bronze Age/Early Iron Age
02050	10	82	Bead-and-flanged dish Going B6 (black-surfaced ware); fine grey ware; Glauconitic reduced ware jar base	Late 3rd-4th cent AD
02052	1	6	Jar in black-surfaced ware	Roman
02053	2	20	Flint-tempered pottery; glauconitic reduced ware	Middle/late Iron Age
05013	3	116	Ledge-rimmed jar Going G5.1 (early shell-tempered ware); North Kent white-slipped oxidised ware flagon base; black-surfaced ware	Mid-late 1st cent AD

Context	Count	Weight	Comments	Spot-date
05014	4	53	Early shell-tempered ware; fine grey ware, burnished	Mid 1st-mid 2nd cent.
05021	2	36	Sandy grey ware	Roman
05023	1	7	Sandy grey ware (cf. Thameside grey ware)	Mid 1st-2nd cent AD
05033	1	6	Micaceous sandy tempered sherd, burnished handmade-looking exterior surface	?Middle Iron Age
12001	1	21	Land drain	Modern
18011	1	2	Sandy grey ware	Roman
27001	1	20	Glauconitic reduced ware jar base	Middle/late Iron Age
27003	2	24	Coarse flint-tempered fabric	Late Bronze Age/early Iron Age
27014	1	30	Glauconitic ware	Middle/late Iron Age
31006	1	2	?North Kent grey ware	Mid 1st-mid 3rd cent
33005	4	47	White ware; early shell-tempered ware	Medieval (residual early Roman)
34001	3	150	Land drain	Modern
TOTAL	**117**	**2483**		

6.1.3 The medieval period is represented by white ware in context 33005, while pottery dating probably to the 15th/16th century (that is, the boundary between the medieval and post-medieval periods) was recovered from contexts 01011 and 19th century material was found in ditch fill 02012.

6.1.4 Overall, the assemblage indicates activity in the prehistoric, Roman, medieval and post-medieval periods. Further material for all these periods will almost certainly be recovered with more extensive fieldwork.

6.2 Ceramic burnt material (CBM) (D. Stansbie)

6.2.1 A total of 11 fragments of ceramic building material, weighing 2895 g was recovered during the course of the evaluation (Table 5). The material was rapidly scanned and assigned to fabric groups. A note was made of identifiable objects. The majority of the material was Roman and comprised mainly roof tile.

6.2.2 Five main fabric types are present and these are described below. Fabrics A and B are post-medieval in date, while fabrics C to E are Roman. All of the fabrics are likely to derive from locally available clay sources.

> Fabric A is brownish yellow in colour and has a sandy matrix. Inclusions comprise frequent shell (<2 mm), frequent fragments of an iron rich compound (<5 mm) and occasional flint (<2 m).
>
> Fabric B is reddish brown in colour with frequent inclusions of shell (<2 mm) and frequent flecks of silver mica.
>
> Fabric C is reddish orange in colour and has a sandy matrix with frequent inclusions of sub-rounded quartz sand (< 2mm) and occasional flint (<2 mm).
>
> Fabric D is reddish brown in colour and has a sandy matrix. Inclusions comprise occasional quartz sand (<2 mm), moderate to frequent shell (< 2 mm) and occasional flecks of silver mica.
>
> Fabric E is pale orange in colour and has a sandy matrix. It contains occasional inclusions of quartz sand and occasional shell.

6.2.3 Fabric D is dominant among the Roman material and includes several fragments of tegula, although fragments of tegula are also present in fabrics C and E. A single fragment of tile and a possible brick fragment are also present in fabric D Among the

post-medieval material there are four fragments from a land drain in fabric B and part of an early to mid 19th century brick in fabric A

6.2.4 The assemblage is small and has no potential for further study. This material should be incorporated into any publication catalogue resulting from further excavation work.

Table 5: Ceramic building material

Context	Count	Weight (g)	Comments
01005			Fabric D (brick or teg fragment) Roman
02010	2	861	Fabric C (tegula fragment), fabric E (teg fragment) Roman
02047	1	241	Fabric D (tegula frag) Roman
05025	1	62	fabric D (prob teg fragment) Roman
12001	1	21	Fabric B (frag of modern land drain)
19009	1	1528	Fabric A (Victorian brick Early-Mid 19th C)
33002	2	32	Fabric D (tile frag), misc, Roman
34001	3	150	Fabric B (fragments of modern land drain)

6.3 Briquetage (E.Biddulph)

6.3.1 Almost 900 fragments (9 kg) of briquetage were recovered from the evaluation (Table 6). Two principal fabrics were recognised: a fine sandy or silty fabric and a shell-tempered fabric with occasional organic inclusions. A sand- and flint-tempered fabric was also recorded. Body, base and rim sherds from salt containers or pans were present in both the sandy and shelly fabrics. The rims were flat along the top. There was no hint of neck or shoulder, which is consistent with the typically conical shape of salt containers. Bases were flat, sometimes with a sharp junction with the vessel wall or, more usually, a lumpy base angle. A number of vessel fragments were 'bleached' and had internal salt residues. Context 5012 contained pieces that were severely heat-affected, probably deriving from a hearth, which provided heat to salt pans placed above it. The fragments suggest that salt evaporation was carried out close the site. Salt was probably exported in containers like those recovered here.

Table 6: Summary of briquetage by context group

Context	Count	Weight (g)	Comments
1006	44	292	Sandy and shelly fabrics
2010	1	11	Sandy fabric
2013	219	829	Rim, body and base fragments in sandy fabric; shell fabric; large base sherd in sand and shell fabric
2014	24	45	Shell tempered fabric
2024	12	122	Fragments mainly in sandy fabric; shell-tempered pieces; flint and sand-tempered pieces
2027	1	11	Shell tempered fabric
2050	2	20	Sandy fabric; rim and body sherds
2051	6	43	Sandy fabric
2053	27	247	Sandy fabric
2056	1	2	Sandy fabric
5003	5	34	Shell tempered fabric

Context	Count	Weight (g)	Comments
5005	16	163	Shell tempered fabric
5007	9	79	Shell tempered fabric
5009	118	911	Shell tempered fabric
5011	12	103	Shell tempered fabric
5012	42	294	Shell tempered fabric; some pieces have become very light and porous through firing/heat - ?salt hearths
5013	7	9	Shell tempered fabric
5014	4	67	Base and body sherds in shell fabric
5017	19	13	Shell tempered fabric
5018	17	118	Shell tempered fabric
5021	29	516	Shell tempered fabric
5022	151	3362	Body and base sherds in shelly fabric; rim sherd with salt mark
5023	60	442	Body and base sherds in shelly fabric
5024	28	561	Rim and body sherds in shell fabric
5025	7	388	Shell tempered fabric
5026	4	33	Shell tempered fabric
5033	12	51	Shell tempered fabric
18011	1	3	Sandy fabric
27001	1	15	Sandy fabric
27014	7	40	Sandy fabric
31006	2	6	Sandy/shelly fabric
33002	1	13	Shell-tempered fragment
TOTAL	**889**	**8843**	

6.4 Struck flint (M. Donnelly)

6.4.1 Struck flint was recovered from eight separate contexts in three trenches (Table 7). The vast bulk of the struck flint originated from a single context, 27003, from trench 27. This context comprises part of a sand layer (slightly gravelly) which forms the surface of the Pleistocene terrace (Geoarchaeological layer G3). Within trench 27 the distribution of struck flints was far from uniform. Three test pits investigated along the length of trench 27 yielded 18, 17 and zero flints respectively (from west to east at 2m, 6m and 11m), unfortunately the remaining half of trench 27 was under water and could not be investigated. However, flints recovered from sand dumps along the spoilheap (the trench had to be re-stripped after flooding which resulted in truncation of layer 27003) showed that flints were present all the way along to the east end of trench 27. A sample taken from 27003, midway between test pits 1 and 2 was rapidly scanned for flint down to 4mm and revealed 27 pieces (from 36 litres). This assemblage included many pieces of knapping debris (some burnt), one core fragment and a blade segment. The retent less than 4mm also contained flint which has not been examined in detail at this stage. The same G3 deposit yielded some flints in trench 2, c 75m to the west. However, trench 6, 85m east of trench 27 did not contain any struck flint. Some burnt unworked flint was observed on the spoilheap of trench 6 but it probably relates to salt working as many of the 'red hill' layers in trench 2 also contained burnt flint.

Table 7: Quantity of struck flint by context

Trench	Context	Flakes	Blades	Cores	Tools	Shatter	Total
2	02003	1					**1**
	02013	3					**3**
	02014	1					**1**
	02056	1					**1**
Tr.2 total							**6**
27	27001	1		1			**2**
	27003	16	2		3	3	**24**
	27003 TP 1	12	1			5	**18**
	27003 TP 3	11				6	**17**
	27003 sample <4>	10	1	1		15	**27**
	27014		1				**1**
Tr.27 total							**89**
29	29004	1					**1**
Total		**47**	**4**	**1**	**3**	**14**	**96**

6.4.2 The flint was generally very fresh, even though some of the pieces were found up to 0.25m deep in the sand layer 27003. Several blades and blade-like forms were present within the assemblage and there were numerous other pieces exhibiting parallel dorsal ridges indicative of a carefully maintained reduction sequence aimed at blade and regular flake production (Plate 7). The blades were quite long (48mm average) and there were no bladelets present in the assemblage. There was heavy use of platform abrasion with some isolated platforms. The only formal tools recovered were a 'horseshoe type' end scraper, another possible scraper (obliquely truncated, possibly some large microburin) and a denticulate on a blade-like flake. Two blades had fine edge serrations along one entire side and other regular flakes exhibited miscellaneous edge trimming and/or utilisation (4). No cores were present, but two core fragments were recovered; one of which appeared to represent a fairly cubic dual or multiplatformed bladelet core. This, along with some decortical and preparatory flakes and the numerous pieces of fine shatter from sample 4/27003 and other pieces recovered by hand indicated that knapping had occurred here.

6.4.3 The flints displayed characteristics of both Mesolithic and Neolithic assemblages and there is some possibility that they may be from more than one period. However, all the flints could easily be accommodated in an Early Neolithic assemblage and this would seem the most likely period represented.

6.5 Bulk samples

6.5.1 Seven bulk environmental samples were collected during evaluation trenching at London Gateway, Site A. Samples were collected from securely sealed contexts, specifically for the recovery of charred plant remains (CPR), and accompanying ecofacts and artefacts. Sample <3> (10005) is from a ditch fill, whilst the other samples are from features associated with phases of occupation from the Roman period or earlier.

6.5.2 Samples were taken in order to:

- Describe the soils and sediments.
- Determine whether ecofacts and environmental evidence (such as plant remains, animal bone, human bone and molluscs) are present.
- Determine the quality, range, state and method of preservation of any ecofactual evidence.
- Recover and preliminarily identify any small artefacts.
- Make further recommendations about sampling for future excavations at the site.

6.5.3 The bulk samples were processed by water flotation using a modified Siraf style flotation machine, with the flot (the material which floats) collected on a 250µm mesh and the heavy residue (the material which does not float) sieved to 500µm. All flots and heavy residues were dried in a heated room at approximately 30℃, after which the residues were sorted by eye for artefacts and ecofactual remains. Sample volumes and a brief description of the sediments sampled were recorded (Table 8).

6.5.4 The flots were scanned for charred plant remains (CPR) using a low-power binocular microscope at magnifications between x12.5 and x20. Flots were rapidly scanned and therefore both the identifications and the relative quantities of plant remains, and other ecofacts, should be viewed as provisional. Nomenclature for the plant remains follows Stace (1997) for indigenous taxa and Zohary and Hopf (2000) for economic plants. The traditional binomial system for the cereals has been used here, following Zohary and Hopf (2000: p. 28, table 3 and p. 65, table 5).

Table 8: Summary of bulk samples

Sample	Context Number	Context Description	Provisional Phasing	Sample Vol.	Sediment Description	Any other observations
1	02013	Potential “red hill” deposit, likely to extend to trench 1, same as [02004]	Roman	34 L	Mixture of reddish brown sandy loam (60%) and a soft, sticky light brownish grey silty clay (40%)	Approximately 20% of flot is CBM/?Briquetage fragments up to large pebble size. ? industrial debris
2	02014	Sand/gravel terrace	Mesolithic-Neolithic	32 L	A clay sand, a mixture of greyish brown (70%), light brownish grey (20%) and red (10%), containing approximately 10% rounded flint pebbles	Vitreous objects and small fragments of CBM/ pottery noted in flot - ?industrial debris/ fuel ash/?briquetage.
3	10005	Fill of ditch or minor palaeochannel, taken to test organic survival	Medieval	10 L	A well compacted light brownish grey silty clay	No inclusions of ecofacts/ artefacts noted
4	27003	Sand/gravel terrace rich in flints	Mesolithic-Neolithic	31 L	A clayey sand, a mixture of light olive grey (70%)	

Sample	Context Number	Context Description	Provisional Phasing	Sample Vol.	Sediment Description	Any other observations
					and yellowish brown clayey sand (30%), with approximately 10% angular to rounded flint pebbles and occasional flint cobbles	
5	05026	Part of 'red hill' sequence	Roman	3L	A black, highly organic silty loam	Small (ca. 1-2mm) rounded white, ashy nodules frequently noted in flot. ?fuel ash.
6	05023	Heavily organic layer, part of 'red hill' sequence	Roman	13L	A dark brown clayey silt	Abundant small-sized (1-2 mm) white, ashy nodules frequently observed. ?Fuel ash.
7	05017	Possible retaining bank or maybe part of recent palaeochannel	Roman	32L	A yellowish brown clay loam with abundant marine shell	Occasional fragments of CBM/ pottery noted in flot. ?Briquetage. No other inclusions noted.

6.6 Carbonised plant remains and charcoal

6.6.1 Moderate to abundant quantities of modern plant material, including roots and seeds, were present in most samples (Table 9). No charred plant macrofossils were recovered from the heavy residues.

6.6.2 Samples <1>, <3>, <4> and <7> were all assessed to have poor potential for CPR, and were predominately composed of modern plant material (e.g. modern root and weed seeds). Sample <1> contained a few fragments of unidentified cereal chaff, which is too low a number to be of any interpretable value (following the arguments of van der Veen and Fieller 1982), and only contained charcoal measuring less than 2mm (which is generally viewed as unlikely to be securely identifiable). Sample <3> contained a single fragmented, possibly ancient cereal grain. Sample <4> contained some fragments of charcoal greater than 4mm which may be identifiable; however, since the assemblage was clearly significantly less than 100 individual fragments (the typical quantity of charcoal analysed, pers. comm. D. Challinor), the sample is unlikely to be of much interpretable value. Sample <7> contained one possibly ancient weed/ wild seed and two fragments of cereal chaff.

6.6.3 Samples <2>, <5> and <6> offer greater potential for CPR. Sample <2> includes several indeterminate wheat (*Triticum* sp.) glume bases/ spikelet forks and one possible emmer (*Triticum* cf. *dicoccum* Schübl.) glume base. Indeterminate wild/ cultivated oat (*Avena* spp.) and/or brome grass (*Bromus* spp.) were also frequently noted. This sample was not particularly rich (ca. <50 identifiable plant remains); however, if the sample is of early prehistoric date (e.g. Bronze Age or earlier) it should be fully analysed.

6.6.4 Samples <5> and <6> produced relatively similar and fairly unusual assemblages of plant remains. Both samples contained well preserved seed capsules of possible ribwort plantain (*Plantago* cf. *lanceolata* L.), with seeds still within the lower portion of the distinctive transversely dehiscent, two-seeded capsules (Stace 1997, 584). Both samples also appeared to contain rye grass (*Lolium* sp.) caryopses and sample <6> also contained charred sedge (*Carex* spp.) flowers, still containing the seed (urticle). Other unidentified weed/wild seeds/ flower parts were also noted in rapid scanning of these flots. These remains are all typical of turf, which was a common fuel in the recent past and is likely to have been used in antiquity as well (e.g. Dickson 1998; Hall 2003).

If these deposits are associated with the use of turves as fuel, possibly related to salt production already identified on site, these flots will be of national importance since evidence for the use of turves as fuel in lowland Britain is virtually non-existent (e.g. Hall 2003, 5).

6.6.5 Finds from the samples are detailed for flots and residues (Tables 9, 10 and 11). A plentiful, but limited range of finds, were recovered from the heavy residues associated with these seven samples. Small fragments of what appears to be CBM or pottery, which may be linked to briquetage/ salt working, were particularly common in both the flots and heavy residues. Burnt flints were also frequently noted and some examples of possible worked flint and flint debitage were also noted. Sample <7> (05017) produced abundant marine shell fragments in the heavy residue fraction, including larger bivalves, such as oyster, cockle and mussels, as well as smaller marine/ estuarine molluscs.

6.6.6 The presence of charred plant remains, including charcoal, in the evaluation samples establishes that CPR are likely to be recovered in any future excavations of this site. Although the potential for other proxy environmental indicators (e.g. waterlogged plant remains, insects, pollen and molluscs) appears to be low, the possibility of waterlogging at this site should be considered during any subsequent excavation. Future excavations should target a range of securely dated features across the site, and should be in accordance with the most recent Oxford Archaeology Sampling Guidelines (OA 2005) and English Heritage Sampling Guidelines (EH 2002).

6.6.7 It is recommended that if otherwise undated, some of the glume wheat (Triticum dicoccum Schübl./ spelta L.) chaff is submitted for AMS radiocarbon determination. It is recommended that plant remains from samples <5> and <6> should be submitted for radiocarbon determination to establish that these remains are securely ancient and not a remnant of a modern bonfire/ campfire on site. Should the charred plant remains prove to be securely ancient it is recommended that these are included in any analysis of CPR in future excavations at the site, since this rapid evaluation of their content suggests that they are likely to be derived from burnt turf, and if associated with salt working, the secure identification of the use of turf-fuel in lowland Britain means these assemblages are of national importance.

Table 9: Evaluation of charred plant remain flots

Sample No	Context No	Feature Type	SampleVolume (L.)	Date/ Phase	Flot vol (ml)	Grain	chaff	weeds	other CPR	Animal Bone	Charcoal	Molluscs	Comments on CPR	CPR Potential	Full Analysis
1	02013	Potential "red hill" deposit	34	Roman	30		+				+		100% of flot scanned. Abundant modern root present. Occasional modern seeds noted. Small quantity of indeterminate cereal chaff present. Small quantity of <2mm flecks of charcoal. CPR potential assessed as POOR.	C	N
2	02014	Sand/gravel terrace	32	Mesolithic-Neolithic	30		++	++			++		100% of flot scanned. Several indeterminate wheat (*Triticum* sp.) glume bases and spikelet forks noted. One possible emmer (*Triticum* cf. *dicoccum* Schübl.) noted. Small quantities of weed/ wild taxa noted, include brome (*Bromus* spp.) grass, indet. oat/ brome (*Avena* spp./ *Bromus* spp.) and a few small grass (POACEAE) caryopses. Occasional modern seed and abundant modern root present. Charcoal present in low to moderate quantity, mostly as flecks <2mm with occasional fragments >4mm. Vitreous objects and small fragments of CBM/ pottery noted in flot - ?industrial debris/ fuel ash/?briquetage. CPR potential assessed as POOR to GOOD.	B/C	N
3	10005	Ditch fill/ minor palaeochannel	10	Medieval	22	+					+		c. 50% of flot scanned. Occasional modern seed noted. One fragmented charred cereal grain noted. Some modern root present. Small quantity of charcoal present; most fragments <2mm. CPR potential assessed as POOR.	C	N
4	27003	Sand/gravel terrace rich in flints	31	Mesolithc-Neolithic	20						++		100% of flot scanned. Abundant modern root present, occasional modern seed noted. No charred seeds observed. Charcoal present in moderate quantity, including a low number of fragments >4mm. CPR potential assessed as POOR.	C	N
5	05026	part of 'red hill' sequence	3	Roman	30			+++ +					c.10% of flot scanned. Rich in fragmented indeterminate plant stalk - likely to be either grass family (POACEAE) or plantain family (PLANTAGINACEAE). Capsules of plantain (most likely ribwort plantain (Plantago lanceolata L.) Poorly preserved and highly warped seeds observed are likely to be puffed out possible ribwort plantain (Plantago cf. lanceolata L.). Small grass seeds also noted, a few clearly rye grass (Lolium	A/B	?Y may need to riffle (?1/2 or 1/4).

Key: + = <10 items, ++ = 10 -50 items, +++ = 50-100 items, ++++ = > 100 items
Potential: A = rich assemblage, >300 identifiable items; B = good assemblage, between 100-300 items; C = poor assemblage, <100 identifiable items

Sample No	Context No	Feature Type	SampleVolume (L.)	Date/ Phase	Flot vol (ml)	Grain	chaff	weeds	other CPR	Animal Bone	Charcoal	Molluscs	Comments on CPR	CPR Potential	Full Analysis
													sp.). Small (ca. 1-2mm) rounded white, ashy nodules frequently noted in flot.. No charcoal observed. CPR potential assessed as GOOD to RICH. N.B. WS has never encountered charred plantain capsules before - it's not impossible, but is unusual. May be advisable to submit some material for AMS radiocarbon determination.		

Table 10: Evaluation of charred plant remains flots

Sample No	Context No	Feature Type	SampleVolume (L.)	Date/ Phase	Flot vol (ml)	Grain	chaff	weeds	other CPR	Animal Bone	Charcoal	Molluscs	Comments on CPR	CPR Potential	Full Analysis
6	05023	heavily organic layer, part of 'red hill' sequence	13	Roman	20	+	++++	++					c. 25% of flot scanned. Abundant small-sized (1-2 mm) white, ashy nodules frequently observed. Rich in fragments of grass (POACEAE) and/or plantain (PLANTAGINACEAE) stalks. Some sedge (Carex spp.) seed heads also noted. Loose possible plantain (Plantago sp. - most likely ribwort plantain - *Plantago* cf. *lanceolata* L.) were noted, but these are highly warped. Rye grass type (Lolium sp. type) caryopses and sedge (*Carex* spp.) seeds also noted. One charred indeterminate cereal grain also noted. No charcoal observed. It is unusual to recover charred remains of the more fragile plant parts (stems, calyxes, etc...) of either sedge (*Carex* spp.) or plantain (*Plantago* spp.) - therefore it is recommended that some of this material is submitted for AMS radiocarbon determination.	B	?Y
7	05017	possible	32	Roma	5		+					+	100% of flot scanned. Composed almost entirely of	C	N

Key: + = <10 items, ++ = 10 -50 items, +++ = 50-100 items, ++++ = > 100 items
Potential: A = rich assemblage, >300 identifiable items; B = good assemblage, between 100-300 items; C = poor assemblage, <100 identifiable items

Sample No	Context No	Feature Type	SampleVolume (L.)	Date/ Phase	Flot vol (ml)	Grain	chaff	weeds	other CPR	Animal Bone	Charcoal	Molluscs	Comments on CPR	CPR Potential	Full Analysis
		retaining bank or maybe part of recent palaeochannel		n									modern root. Small quantity of modern seed noted. Two fragments of possible charred cereal chaff observed. One possibly ancient charred weed/wild seed noted. One snail shell was observed in the flot. The heavy residue produced abundant marine molluscs including oyster, cockle, mussels and a number of smaller marine/ estuarine molluscs. CPR potential assessed as POOR. GOOD potential for marine mollsucs.		

Key: + = <10 items, ++ = 10 -50 items, +++ = 50-100 items, ++++ = > 100 items
Potential: A = rich assemblage, >300 identifiable items; B = good assemblage, between 100-300 items; C = poor assemblage, <100 identifiable items

Table 11: Estimated finds quantities from sieved samples

Sample Number	Context Number	CBM	Pottery	Burnt Flint	Worked Flint	Flint Debitage	Mortar	Burnt Clay	Marine Shell
1	02013	++++							
2	02014	+++	++	++					
3	10005								
4	27003				+	+++			
5	05026	+++							
6	05023	+++					+++	+++	
7	05017	+++	++						++++

Key: + = <10 items, ++ = 10 -50 items, +++ = 50-100 items, ++++ = > 100 items
Potential: A = rich assemblage, >300 identifiable items; B = good assemblage, between 100-300 items; C = poor assemblage, <100 identifiable items

7 DISCUSSION AND INTERPRETATION

7.1 Reliability of field investigation

7.1.1 The trench investigation assessed the archaeological potential at 34 locations across the site. The principal purpose was to investigate how far archaeological features matched the geophysical survey results, as well as to characterise the features and alluvial sediments and provide dating evidence. The trench sample was relatively small and biassed towards areas of predicted higher archaeological potential. Nevertheless the extensive use of geophysical survey, and the integrated assessment of the alluvial stratigraphy, means that the results provide a sound basis for assessing archaeological potential within the top 1m of the deposit sequence at Site A. The results are subject to the limitations of trenching and geophysical survey methods in identifying ephemeral or widely dispersed archaeological features.

7.1.2 Weather conditions were poor, with heavy snow, freezing conditions, waterlogged soils and frequent trench collapse. Many of the trenches had to be battered at an angle to maintain safe working conditions. While flooding impeded hand excavation and recording in some trenches, overall the adverse conditions did not compromise the reliablity of the investigation. Visibility was good during the initial excavation of trenches in all cases.

7.2 Summary of geomorphic zones, sediments and archaeological potential

7.2.1 ***Zone 1a*** contains a series of sediment units (G3, G5, G2 and G1) which lie above the terrace gravels. G3 is seen across the whole of zone 1a and is obviously an early Holocene deposit, possibly deposited in a braidplain environment. This unit contains apparently localised concentrations of unabraded flint debitage and artefacts within a silt/sand matrix. This unit also has a low potential for the preservation of organic remains. Unit G5 is a presumed marine sediment body, dominated by clay, which is visible in the southern part of Zone 1a. This unit seals Romano-British and earlier archaeology, with medieval and post-medieval features cutting into the top of it. Overall zone 1a represents a landsurface formed in the early Holocene, next to a large palaeochannel/intertidal zone. It has a high potential for archaeological remains containing aspects of settlement archaeology from the early Mesolithic through to the post-medieval periods, within the top 1m of the sediment sequence.

7.2.2 ***Zone 1b*** is also an area of raised topography and forms part of the incised Devensian terrace. The basal unit is a sterile undifferentiated Head deposit, a brown silty clay, with small clasts (G24, G24a). Above this are a series of sediment units, G5 being dominant, with an A horizon of G1 and G2. There was no equivalent unit to G3 detected by trenching above the Head deposit, although occasional sand and silt deposits were recorded above the head (such as G19). Above this, the usual sediment units of G1, G2 and G5 were recorded. A series of Romano-British and medieval features were found cutting into G5 and G2 across zone 1b. Overall, zone 1b represents a land surface, with an erosional surface formed in the early Holocene. The zone has the potential to contain archaeology from the early Holocene to the post-medieval periods. Apparently, more palaeochannels or inter-tidal creeks are located in the Head deposit area (zone 1b) when compared to the terrace deposit of zone1a.

7.2.3 ***Zone 2*** represents a palaeochannel, with a much deeper sediment sequence than zones 1a and 1b, bottoming at 5.02m in the palaeochannel gouge core. The upper part of the sediment sequence appears relatively simple, comprising the usual G1, G2 and G5 (with a number of G5 sub units identified). The relationhsip of G5 in zone 2, to G5 in zones 1a and 1b, is unclear at present. Given its depth of 1.0m BGL, the G5 unit in zone 2 is liable to be much younger than the equivalent G5 unit in zones 1a and 1b at the same depth. Overall this unit proved to have a low archaelogical potential in the upper alluvium. It is possible that significant archaeology could be found at lower depths in the palaeochannel, although this would be below the depth of impact from construction. The chronology of the palaeochannel remains unclear, and its relationship to zones 1a and 1b is still undefined. Until this is resolved the potential of the entire palaeochannel sediment sequence remains somewhat unclear.

7.2.4 ***Zone 3*** represents presumed inter-tidal deposits derived from a channel with much deeper sediment sequences than is present in zones 1a and 1b, and also zone 2. The deposits in zone 3 reach a depth of c. 6-7m BGL at the interface with the Pleistocene lithology. The sediment sequence is a standard G1, G2 and G5, with a number of G5 sub units identified. The relationhsip of G5 in zone 3, to G5 in zones 2, 1a and 1b is unclear, but at the depth of 1.0m BGL, the G5 unit in zone 3 is liable to be much younger than the equivilant G5 unit of zones 1a and 1b at the same depth. Overall this unit proved to have a low archaeological potential in the upper alluvium, although potential WWII features have been identified from the gradiometer survey. The chronostratigraphic relationship of zone 3 to zone 2 is currently undefined.

7.2.5 ***Zone 4*** was shown in the geoarchaeological assessment to be an area of raised topography within the floodplain. Apparent linear magnetic anomalies identified in the upper alluvium were thought to be archaeological features, which resulted in zone 4 being initially categorised as having very high archaeological potential. Evaluation trenching, however, has shown zone 4 to have low archaeological potential, certainly in the upper alluvium.

7.3 Interaction between geoarchaeological assessment and trench excavation results

7.3.1 The geoarchaeological evaluation of the site, based on Lidar and aerial photographic data, gradiometer survey, electrical resistivity survey and hand-augering, resulted in a geomorphic model with four zones. These included discrete areas of high archaeological potential, as well as areas of uncertain archaeological potential. The model of site development has now been extensively tested and revised by trenching, which allows a more robust interpretation of the baseline data. Considerable confidence can now be placed on the combined results, in defining the archaeological potential of different areas of Site A.

7.3.2 In agreement with the geoarchaeological model, the terrace surface was found to be relatively shallow across zone 1 of the site at its northern end, in particular in the north-west and northeast corners of Site A. Site A has now been sub-divided into zones 1a and 1b to reflect geomorophological differences in the northern part of the site. Within zone 1a, a series of anomalies identified by the gradiometer survey have been confirmed as archaeological in nature, including Romano-British enclosures and associated briquetage debris (trenches 1 and 2). Trench 5, at the eastern edge of zone 1b, also confirmed the archaeological character of geophysical survey anomalies .

7.3.3 Some areas of the site had magnetic anomalies that were ambiguous in form, and potentially represented creeks, palaeochannels or field boundaries. The full analysis of these features has now been completed in the gradiometer report. Analysis has also

been undertaken to correlate features in the evaluation trenches with magnetic anomalies (Figs.5, 6 and 7).

7.3.4 During the geoarchaeological evaluation, zones 2 and 3 were identified as having a much lower archaeological potential than zone 1, although the exact nature of this potential was uncertain. The resistivity showed the Holocene sediment sequences to be much deeper in these zones, with fewer magnetic anomalies of certain archaeological potential. This pattern was borne out by the results of the evaluation trenching, which shows a low potential for archaeological materials to be found in the upper alluvium across zones 2 and 3.

7.3.5 Zone 4 was shown in the geoarchaeological assessment to be an area of raised topography within the floodplain. Apparent linear magnetic anomalies identified in the upper alluvium were thought to be archaeological features, which resulted in zone 4 being initially categorised as having very high archaeological potential. Evaluation trenching, however, has shown zone 4 to have low archaeological potential, certainly in the upper alluvium.

7.4 Discussion of archaeological potential

7.4.1 A combination of gradiometer survey and evaluation trenching at Compensation Site A, has served to reinforce the existing predictive model for the London Gateway development.

7.4.2 The existing model predicts that submerged Mesolithic landscapes are likely to be preserved at the base of the Holocene alluvial sediment sequence, where preservation conditions are suitable. The model suggests that these once-dry landscapes were submerged beneath inter-tidal salt-marsh deposits before c. 4000 calBC, as a result of marine inundation. The presence of such landscapes at Compensation Site A is currently unproven, as no substantial excavations have been made to sufficient depth. The extreme difficulty of investigating at such depths, coupled with very shallow construction impacts, means that extensive submerged Mesolithic landscapes are not expected to be found during construction of Compensation Site A, except possibly in very shallow deposit sequences close to the gravel terrace.

7.4.3 The model predicts that multi-period settlement archaeology, dating from the early Neolithic onwards, is most likely to be focussed at, or slightly above, the wetland/ terrestrial interface, particularly in the vicinity of the major navigable creeks. The main navigable channels are also most likely to produce evidence for marine finds (such as boats, fish-traps etc). Floodplain areas are likely to produce evidence for seasonal marshland activities, such as salt-making sites, livestock enclosures and trackways, as well as land reclamation features (sea walls, man-made drainage channels and managed creeks). The model would suggest that much of this activity should also be focussed close to the terrace edge, particularly in the vicinity of the major creeks.

7.4.4 At Compensation Site A, multi-period archaeological remains have indeed been found at the very edge of the gravel terrace, adjacent to Mucking Creek. Within this 41.5 Ha site, archaeological features appear, on present evidence, to be concentrated in areas where the gravel terrace rises to the surface in the northern half of the site, but appear sparsely distributed or absent in the southern part of the site where the alluvial deposits are deeper. Furthermore the main concentrations of archaeology identified to date occur immediately adjacent to large creeks. The results are discussed by site area below. The most significant archaeology is concentrated in Areas A and B, which were

noticeably better drained than other areas of the site during trenching, which probably made them more attractive for a variety of riverside activities.

7.4.5 **Area A (Geoarchaeology Zone 1a):** The archaeology encountered adjacent to Mucking Creek (Fig.19) is multi-period in character, including a concentration of prehistoric worked flint tools (probably late Mesolithic or early Neolithic date), a series of Romano-British enclosures and a contemporary salt-making site (red hill). It is particularly interesting to find evidence for Romano-British salt-making activity, very characteristic of a saltmarsh environment, in direct association with what appear to be typical rural settlement enclosures of the same date (although permanent settlement has yet to be demonstrated). Medieval pottery has been recovered from the same trenches as the Roman finds, although the character and extent of medieval activity is not yet clear; It is not uncommon to find evidence for medieval activity in association with Roman salterns, perhaps representing the deliberate re-use of suitable sites (Fawn et al 1990). The post-medieval site of Stanford-le-Hope Wharf, which was active into the 20th century, lay immediately adjacent, completing the impression of persistent riverside activity at this location from at least the early Neolithic until the modern period, although this need not have been continuous.

7.4.6 **Area B (Geoarchaeology Zone 1b):** The second main concentration of archaeological features (at the north-eastern edge of Compensation Site A) is interpreted as another red hill site. In this case all of the artefacts recovered to date, including pottery, briquetage and ceramic building material, appear consistent with a Roman date. The archaeology includes ditches and extensive 'Red Hill' deposits, and appears generally similiar in character to the Roman archaeology in Area A, although there is no sign of comparable rectilinear enclosures on the geophysical survey plot. On present evidence this location is interpreted as a specialist salt manufacturing site, probably occupied during a comparatively narrow chronological range, predominantly within the Roman period, but perhaps starting in the late Iron Age. Area B may have been more remote than Area A from Mucking Creek and the main historic centres of settlement on the gravel terrace, and thus not attracted the same level of multi-period activity.

7.4.7 **Areas C and D (Geoarchaeology Zone 1b):** The remainder of the terrace edge in the northern half of the site has moderate archaeological potential. The geophysical survey shows numerous magnetic anomalies in these areas, but trenches dug through a selection of these anomalies have shown the deposit sequence in this area to consist of sterile silty clays with very few recognisable archaeological features. The majority of the magnetic anomalies in this area are assumed to reflect ephemeral ripened palaeochannels, with fills that are indistinguishable from the surrounding sediments. Nevertheless there is some residual potential for discovery of prehistoric artefact concentrations, and potentially patches of later archaeology, given the terrace edge location. Fragments of fired clay were found in re-worked alluvial deposits at a depth of c.1.2m in trenches 28 and 29, in a sequence which suggests the presence of an infilled palaeochannel in the northern part of Area D.

7.4.8 Otherwise, a series of linear anomalies on the geophysical survey plots were tested by trenching and proved to be simple bank and ditch boundaries. Historic map evidence indicates that these were levelled during the 20th century. A major boundary is apparent at the interface between the terrace edge (zone 1) and palaeochannel (zone 2). It is shown on late 19th century Ordnance Survey maps and appears to reflect a substantial boundary in the drainage characteristics of Site A: 20th century land drains to the south of the boundary appear on the geophysical survey at double the density of land-drains to the north (Fig.19).

7.4.9 **Areas E, H, G and F (Geoarchaeology Zone 2):** No archaeological finds or features were found within these areas, which correspond to geoarchaeological zone 2 (the palaeochannel). This reflects the low archaeological potential of the upper fills of the palaeochannel, which are dominated by yellowish-brown silty clays, in which organic preservation is not expected. The possibility of significant archaeology being preserved at depth within the palaeochannel sequence cannot be discounted, and is particularly likely adjacent to Area 1a. However any such remains would be well below the depth of construction impact, which is limited to c.0.5m BGL. The depth of the channel to gravel has been proved at c. 5m BGL by hand-augering and resistivity survey.

7.4.10 Areas J, I and K (Geoarchaeology Zones 3 and 4):

7.4.11 Archaeological features in the southern part of the site were limited to features of modern date.These include an extensive sand deposit found throughout Trench 14, which appears to be imported material infilling a former creek, possibly associated with construction of the WWII bomb decoy site. Large discreet magnetic anomalies in Areas I and J were not tested by trenching as they are most likely to be associated with the bomb decoy site. The geophysical survey in these areas shows a complex of magnetic anomalies, which are similiar in character to features in Area C and D. Where tested by trenching these proved to have no obvious exprssion as geoarchaeological features. They are interpreted as ephemeral ripened palaeochannels, with fills that are indistinguishable from the surrounding inter-tidal mudflat sediments. This was particularly surprising in the case of geoarchaeological zone 4 (the northern part of Area I). This slight topographic rise, identified from the Lidar survey, appeared on the geophysical survey plot to be associated with linear magnetic anomalies characteristic of archaeological enclosures or buildings. However no trace of archaeological finds or features was recorded in Trenches 16, 17 or 19, which investigated this 'island'.

7.5 Archaeological impact assessment

7.5.1 The creation of new mud-flats at Compensation Site A involve the reduction of the ground level by 0.5m across the site, and the construction of a new sea wall in the northern part of the site. The topsoil will be removed prior to construction of the sea wall, also to a depth of c. 0.5m. The existing sea wall will then be breached, allowing the site to be flooded at high tide. There may be a requirement for localised deeper excavations in the vicinity of the sea wall breach.

7.5.2 Predictions made in the original Environmental Impact Assessment stressed the likelihood of important archaeological discoveries being found at the edge of the terrace gravels, close to major navigable creeks, and this has proved to be the case at Compensation Site A. However, our initial desk-based assessment of the geology of the site led us to expect that any archaeology would be covered by layers of alluvium. In fact, trenching has shown that the terrace gravels and archaeological features lie very close to the present ground surface in the northern half of the site, and will be removed or disturbed by construction of the mudflats and new sea wall.

7.5.3 The depth of the alluvial sediments in each geoarchaeological zone, and at key interfaces between them, has been assessed using a combination of electrical resistivity survey and lines of gouge auger holes. A magnetometer survey was also carried over the whole site in December 2008 and January 2009, to map buried archaeological features, which has now been tested by trenching. Taken together, these surveys have successfully assessed the archaeological potential of the site as a whole, and identified at least two significant archaeological sites, located at the western and eastern ends of Site A.

7.5.4 Trench excavations have shown that the two main sites, which are c.500m apart, are covered by layers of reddish brown burnt clay, a characteristic by-product of late Iron Age and early Roman salt-making. Salt-making seems to have been an important regional industry in the centuries immediately before and after the Roman conquest of Britain, from c.150BC to c.250AD. Sites of this kind, known as 'red hills', being extensive and highly visible, are a characteristic feature of the Essex coastal marshes (c. 300 or so are known or suspected), although only a few have been systematically excavated (Fawn et al, 1990). The archaeology discovered at Site A is assessed as of moderate regional importance. It is not so important that it will prevent construction of the new mudflats. However the Archaeological Mitigation Framework, and discussions with the local authority archaeological advisor, require that the most significant remains (in Areas A and B) be excavated and recorded before construction at Compensation Site A can proceed (Figure 19).

7.5.5 The remainder of the northern part of the site (Areas C and D) has moderate potential for discovery of further significant archaeology. Given the shallow depth of the alluvial sediments in these areas, the proposed construction will impact upon any features discovered.

7.5.6 The southern part of the site (Areas J, I and K) appears to have low potential for discovery of significant archaeology, at least within the upper alluvial deposits which will be affect by construction of the mudflats.

8 PROPOSED ARCHAEOLOGICAL MITIGATION

8.1.1 On the basis of the evaluation results the site has been been divided into archaeological areas, which are sub-divisions of the geoarchaeological zones (Areas A - L, Fig.19). The east-west area boundaries are defined on the basis of geoarchaeological zones 1 - 4. The zone boundaries are not precisely defined in all areas, and will be reviewed and refined in the course of extensive soil stripping. The north-south area boundaries follow modern field boundaries, for pragmatic reasons. Nevertheless the areas shown on Figure 19 provide a useful framework for assessing archaeological potential and planning further mitigation.

8.1.2 In light of the archaeological predictions outlined above, planned large-scale trenching and open area excavation work is focussed predominantly at the edge of the gravel terrace, at the north-western edge of Compensation Site A. The most intensive investigations are reserved for the vicinity of Mucking Creek, in Area A, although detailed excavation is also proposed in Area B.

8.1.3 The total area identified for detailed excavation is 7.35 Ha (Areas A and B). A further 8.4 Ha will be subject to 'strip, map and sample excavation', and 13 Ha will be subject to 'monitoring during construction'. Existing boundaries and drainage ditches throughout the site, including the existing sea wall, are currently constrained by ecological factors as they are suitable newt habitats. Excavation plans initially exclude these areas, but this will be reviewed in light of archaeological results from topsoil stripping in Areas A - K. The existing field boundaries will be subject to strip, map and sample excavation, If necessary, once ecological mitigation is complete. Apart from the planned breach in the sea wall, the existing sea wall will be left in situ.

Table 12: Proposed archaeological mitigation zones

Area	Geo-morph-ological zone	Area	Archaeological potential	Proposed mitigation
Area A	Zone 1a	4.85 Ha	Contains regionally important prehistoric, Roman and medieval archaeology, with a strong concentration of features and finds in the vicinity of trenches 1 and 2.	Detailed excavation
Area B	Zone 1b	2.50 Ha	Contains regionally important Roman archaeology, with a strong concentration of features and finds in the vicinity of trench 5.	Detailed excavation
Area C	Zone 1b	3.17 Ha	High archaeological potential was predicted on the basis of geophysics, but not realised during trenching. Anomalies shown on geophysics plots have no visible expression in most cases, and are likely to be geomorphological features. Some linear features were identified as predicted, but are identifiable as post-medieval boundaries.	Strip, map and sample
Area D	Zone 1b	5.23 Ha	Ditto	Strip, map and sample

Area	Geo-morph-ological zone	Area	Archaeological potential	Proposed mitigation
Area E	Zone 2	1.35 Ha	Trenching through the palaeochannel did not encounter significant archaeology. The upper part of the sediment sequence has low archaeological potential.	Monitoring during construction
Area F	Zone 2	0.87 Ha	Ditto	Monitoring during construction
Area G	Zone 2	0.72 ha	Ditto	Monitoring during construction
Area H	Zone 2	2.36 Ha	Ditto	Monitoring during construction
Area I	Zones 3 & 4	3.64 Ha	Reclaimed inter-tidal mudflats. This area has deepening alluvial deposits, up to c. 6m thick. Archaeological potential is low. There is a topographic high point in the underlying gravel at this location (georchaeological zone 4). This was predicted to have high archaeological potential, but trenching indicates that magnetic anomalies here are not archaeological features.	Monitoring during construction
Area J	Zone 4	3.53 Ha	Reclaimed inter-tidal mudflats. This area has deepening alluvial deposits, up to c. 6m thick. Archaeological potential is low.	Monitoring during construction
Area K	Zone 4	0.53 Ha	Ditto	Monitoring during construction
Area L	Zone 4		Sea wall breach. Generally low archaeological potential, but monitoring during construction is proposed, to allow investigation of the sea wall structure.	Monitoring during construction
Total		**28.75 Ha**		

APPENDIX A ARCHAEOLOGICAL CONTEXT INVENTORY

Notes

*Contexts are arranged in context (not stratigraphic) order.

**Depth below ground level (bgl) refers to the first level at which the context is recorded (in plan or section). The actual depth of trench excavation and feature depths are given in the comments column or report text where relevant.

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
1	01001	Layer	0	Topsoil	G1		
	01002	Layer	0.25	A1 Poorly developed gleyed soil	G2		
	01003	Fill	0.25	fill of ditch [01016]			19th/20th century
	01004	voided					
	01005	Layer	0.3	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	01006	Layer	0.85	'Red hill' material	G12	pottery, metal briquetage	Potential 'red hill' deposit , likely to extend to trench 2, Roman pottery and nail recovered
	01007	Layer	1.25	Sand/gravel/clay terrace	G3		Dipping Pleistocene terrace
	01008	Cut	0.25	cut of palaeochannel			Recent event, cuts through poorly formed A1 soil G2
	01009	Deposit	0.55	fill of palaeochannel [01008]	G9		
	01010	Cut	0.55	cut of ditch			
	01011	Fill	0.55	fill of ditch [01010]		pottery	Contains 26 sherds of a late 15th-early16th cent jar
	01012	Deposit	0.55	mixed sand/clays		pottery	Bank deposit, 3 sherds of Roman pottery (m1st-e2nd cent AD), overlies 'red hill' layer 01006
	01013	Layer	1.2	black trampled layer below 'red hill' [01006]			Similar layers identified in trench 2

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
	01014	Cut	0.25	cut of drainage ditch			19th/20th century, 'recut' of existing palaeochannel
	01015	Fill	0.25	fill of ditch [01014]			
	01016	Cut	0.25	cut of drainage ditch			19th/20th century, recut of drainage ditch [01014]
	01017	Cut	0.95	cut of ditch			Roman enclosure ditches filled by inundation layer G5, cut through 'red hill' layer 01006, not bottomed due to flooding
	01018	Cut	0.9	cut of ditch			Roman enclosure ditches filled by inundation layer G5, cut through 'red hill' layer 01006, not bottomed due to flooding
2	02001	Layer	0	Topsoil	G1	briquetage	
	02002	Layer	0.25	A1 Poorly developed gleyed soil	G2		
	02003	Layer	0.8	Sand/gravel/clay terrace	G3		
	02004	Layer	0.45	'Red hill' material	G12	briquetage, burnt flint	Potential 'red hill' deposit , likely to extend to trench 1
	02005	Deposit	0.4	redeposited clay			Possibly relates to organic mixing along edge of open ditch
	02006	Deposit	0.45	redeposited clay			Possibly relates to organic mixing along edge of open ditch
	02007	Cut	0.25	cut of ditch			Roman ditch cut truncated by 19th/20th century ditch
	02008	Fill	0.25	fill of ditch [02007]		pottery	4 sherds of Roman pottery, 2nd-3rd cent AD
	02009	Fill	0.75	fill of ditch [02007]			
	02010	Fill	0.95	fill of ditch [02007]		pottery, roof tile	6 sherds of Roman pottery, 2nd-3rd cent AD, 2 Tegulae
	02011	Cut	0.25	cut of ditch			19th/20th century field boundary ditch
	02012	Fill	0.25	fill of ditch [02011]			19th/20th century field boundary ditch, Mid 19th cent German glazed jug
	02013	Layer	0.45	'Red hill' material	G12	pottery, flint, briquetage, burnt flint	Potential 'red hill' deposit , likely to extend to trench 1, same as [02004], 12 sherds Roman pottery, m2nd-e3rd cent AD, 3 flint flakes
	02014	Layer	0.8	Sand/gravel/clay terrace	G3	flint	same as [02003], single flake

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
	02015	Cut	0.7	cut of ditch			outer ditch in triple ditched Roman enclosure
	02016	Cut	0.8	cut of ditch			middle ditch in triple ditched Roman enclosure
	02017	Cut	0.7	cut of hollow			possible working hollow or natural feature
	02018	Cut	0.75	cut of ditch			inner ditch in triple ditched Roman enclosure
	02019	Layer	0.35	gravel layer			possible working surface
	02020	Layer	0.7	buried soil	G4		sealed by 'red hill' layers, also occurs in trench 27 as 27021
	02021	Layer	0.55	buried soil	G4		sealed by 'red hill' layers, also occurs in trench 27 as 27021
	02022	Fill	0.85	fill of ditch [02015]			basal fill in late Iron Age/ Roman ditch
	02023	Fill	0.8	fill of ditch [02015]		briquetage, bone, burnt flint	2nd fill in late Iron Age/Roman ditch
	02024	Fill	0.7	fill of ditch [02015]		pottery, burnt flint, briquetage	upper fill in late Iron Age/Roman ditch, 12 sherd middle-late Iron Age pottery
	02025	Layer	0.45	silt-clay layer			part of 'red hill' sequence
	02026	fill	0.85	fill of ditch [02016]		pottery	basal fill in late Iron Age/Roman ditch, 2 sherds of uncertain date
	02027	fill	0.9	fill of ditch [02016]		burnt flint	middle fill in late Iron Age/Roman ditch
	02028	fill	1.05	fill of ditch [02016]			localised middle fill in late Iron Age/Roman ditch
	02029	fill	0.55	fill of ditch [02016]		pottery	upper fill in late Iron Age/Roman ditch, 4 tiny sherd of residual later Prehistoric pottery
	02030	Layer	0.55	silt-clay layer			part of 'red hill' sequence
	02031	Layer	0.45	clay layer			part of 'red hill' sequence
	02032	Layer	0.5	silt-clay layer			part of 'red hill' sequence
	02033	Layer	0.45	silt-sand layer			part of 'red hill' sequence
	02034	Layer	0. 5	silt-clay layer		briquetage	part of 'red hill' sequence
	02035	Layer	0.55	silt layer			rich in manganese, part of 'red hill' sequence

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
	02036	Layer	0.5	silt layer		briquetage	briquetage rich dump, part of 'red hill' sequence
	02037	Layer	0.6	silt-briquetage layer			part of 'red hill' sequence
	02038	Layer	0.6	silt-burnt fuel			black layer, possibly representing burnt peat/other fuel, part of 'red hill' sequence
	02039	Fill	0.75	fill of ditch [02016]			uppermost fill in late Iron Age/Roman ditch, grey sand rich, probable surface wash
	02040	Layer	0.55	clay layer			part of 'red hill' sequence
	02041	Layer	0.5	silt-burnt fuel			black layer, possibly representing burnt peat/other fuel, part of 'red hill' sequence
	02042	Layer	0.65	silt-clay-briquetage		briquetage	briquetage rich dump, part of 'red hill' sequence
	02043	Layer	0.4	clay bank?			possible bank formation or related to 19th/20th century cut [02011]
	02044	Layer	0.55	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	02045	Layer	0.65	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	02046	Cut	0.25	cut of ditch			re-cut of 19th/20th century field boundary ditch [02011]
	02047	Layer	0.25	clay-silt-sand		tile	part of 'red hill' sequence, beyond area truncated by earl modern ditches [02011] & [02046], contained Tegulae
	02048	Fill	0.25	fill of ditch [02046]			
	02049	Fill	0.65	fill of hollow [02017]		burnt flint	'red hill' fill of working or natural hollow
	02050	Fill	0.85	fill of ditch [02018]		pottery, slag	basal fill in Roman ditch. 10 sherds, m3rd-l4th cent AD
	02051	Fill	0.9	fill of ditch [02018]		briquetage, burnt flint	middle fill in Roman ditch
	02052	Fill	1.05	fill of ditch [02018]		pottery, bone, burnt flint	upper fill in Roman ditch, Roman pottery, 1 sherd
	02053	Layer	0.45	'Red hill' material	G12	pottery, briquetage	Potential 'red hill' deposit , likely to extend to trench 1, contains 2 sherds residual late Iron Age pottery
	02054	Layer	0.45	'Red hill' material	G12		Potential 'red hill' deposit , likely to extend to trench 1,

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
	02055	Cut	0.7	possible ditch or tank cut			cut with similar fill to Roman ditch [02007], possibility that they form two sides or rectangular cut
	02056	Fill	0.7	fill of ditch or tank		flint, briquetage	single flint flake and briquetage fragment
	02057	Layer	0.25	clay layer			part of 'red hill' sequence
3	03001	Layer	0	Topsoil	G1		
	03002	Layer	0.25	A1 Poorly developed gleyed soil	G2		
	03003	Layer	0.3	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	03004	Layer	0.3	Inundation deposit	G5		Part of the flood/mud flat deposits sealing much of site
	03005	Cut	0.70	cut of ditch			cut of shallow sterile ditch or water channel
	03006	Fill	0.65	fill of ditch [03005]			fill of sterile ditch or waterchannel
	03007	Layer	0.25	Inundation deposit	G5		Thin linear band of blue clay, part of the flood/mud flat deposits sealing much of site
4	04001	Layer	0	Topsoil	G1		
	04002	Layer	0.3	A1 Poorly developed gleyed soil	G2		
	04003	Layer	0.35	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
5	05001	Layer	0	Topsoil	G1/G15		Odd topsoil probably caused by mixing with close to the surface briquetage waste layers
	05002	Layer	0.3	A1 Poorly developed gleyed soil	G2		
	05003	Layer	0.35	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	05004	Cut	0.25	cut of ditch			cut of roman? ditch
	05005	Fill	0.25	fill of ditch [05004]		briquetage	fill of shallow ditch

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
	05006	Cut	0.3	cut of pit			cut maybe quite large, only exists in corner of trench
	05007	Fill	0.3	fill of pit [05006]		briquetage	very mixed briquetage rich deposit
	05008	Cut?	0.4	voided cut			initially believed to be a ditch cut, but later excavation should the fill to be a layer
	05009	Layer	0.4			briquetage	trampled surface deposit
	05010	Cut	0.3	cut of pit			cut maybe quite large, only exists in side of trench
	05011	Fill	0.3	fill of pit [05010]		briquetage	very dark briquetage rich deposit
	05012	Layer	0.6	silt-clay		briquetage	redeposited natural, used as working surface?
	05013	Layer	0.5	silt-clay		pottery	redeposited natural, used as working surface, 3 sherds of mid-late 1st cent AD Roman pottery
	05014	Layer	0.45	sand-clay		pottery, briquetage	trampled surface deposit, 4 sherds of mid 1st - mid 2nd cent AD Roman pottery and briquetage
	05015	Layer	0.5	clay-silt		briquetage	trampled surface deposit
	05016	Layer	0.25	clay-silt			part of 'red hill' sequence
	05017	Layer	0.25	clay		marine shell	possible retaining bank or maybe part of recent palaeochannel, contains significant amounts of marine shell
	05018	Layer	0.15	clay-silt		briquetage	probable burnt fuel deposit from 'red hill' sequence
	05019	Layer	0.4	clay-silt			cess-like layer/dump beyond retaining 'bank' 05017
	05020	Cut	0.15	cut of modern ditch			very modern ditch filled with topsoil
	05021	Layer	0.45	silt		pottery	part of 'red hill' sequence, 2 sherds of Roman pottery
	05022	Layer	0.5	clay-briquetage		briquetage	nearly 80% briquetage, part of 'red hill' sequence
	05023	Layer	0.35	silt		pottery	heavily organic layer, part of 'red hill' sequence, 1 sherd of Roman pottery
	05024	Layer	0.35	clay		briquetage	part of 'red hill' sequence
	05025	Layer	0.25	clay-briquetage		briquetage	nearly 40% briquetage, part of 'red hill' sequence
	05026	Layer	0.35	peaty layer			part of 'red hill' sequence

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
	05027	Layer	0.35	clay			probable inundation deposit
	05028	Layer	0.35	clay			probable inundation deposit
	05029	Layer	0.45	coarse sand		marine shell	probable channel deposit contains oysters
	05030	Layer	0.35	silt		briquetage	part of 'red hill' sequence
	05031	Layer	0.35	Silt/ash			probable burnt fuel deposit from 'red hill' sequence
	05032	Cut	0.35	cut of palaeochannel			may simply be edge of terrace
	05033	Layer	0.55	clay-silt		Pottery	trampled surface deposit, 1 sherd of Middle Iron Age pottery?
	05034	Layer	0.75	clay			redeposited natural, used as working surface?
	05035	Layer	0.65	clay		briquetage	part of 'red hill' sequence
	05036	Layer	0.7	clay			inundation deposit
	05037	Fill	0.35	fill of ditch [05038]			fill of 19th/20th century field boundary ditch
	05038	Cut	0.35	cut of ditch			19th/20th century field boundary ditch,
6	06001	Layer	0	Topsoil	G1		
	06002	Layer	0.25	A1 Poorly developed gleyed soil	G2		
	06003	Layer	0.45	Sand/gravel/clay terrace	G3		same layer as 27003 and 02014 but does not contain flints, burnt flint observed in spoil heap
	06004	Layer	0.3	buried soil	G4		probable buried soil, also occurs in trench 2 as 02020-02021
	06005	Layer	0.45	Inundation deposit	G5		Only exists at south end of trench, flood/mud flat deposits sealing much of site
	06006	Fill	0.25	palaeochannel fill	G6		Upper fill of palaeochannel
	06007	Fill	0.25	palaeochannel fill	G7		Middle fill of palaeochannel
	06008	Fill	0.35	palaeochannel fill	G8		Lower fill of palaeochannel

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
7	07001	Layer	0	Topsoil	G1		
	07002	Layer	0.2	A1 Poorly developed gleyed soil	G2		
	07005	Layer	0.3	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
8	08001	Layer	0	Topsoil	G1		
	08002	Layer	0.35	A1 Poorly developed gleyed soil	G2		
	08003	Layer	0.4	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
9	09001	Layer	0	Topsoil	G1		
	09002	Layer	0.25	A1 Poorly developed gleyed soil	G2		
	09003	Cut	0.4	cut of palaeochannel			'Cut' of palaeochannel
	09004	Layer	0.85	brown sand-clay	G18		'Head' deposits
	09005	Layer	0.45	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	09006	Fill	0.4	fill of [09003]	G5		Palaeochannel fill with rolled briquetage and charcoal
	09007	Fill	0.7	fill of ditch/channel [09008]			fill of sterile ditch or minor palaeochannel
	09008	Cut	0.7	cut of ditch/channel			Cut of possible sterile ditch or minor palaeochannel
	09009	Layer	0.85	brown clay-sand	G19	briquetage, burnt flint	possible lower terrace top clear signs of human activity, site over head deposit
10	10001	Layer	0	Topsoil	G1		
	10002	Layer	0.2	A1 Poorly developed gleyed soil	G2		
	10003	Cut	0.4	cut of ditch/palaeochannel			'Cut of possible sterile ditch or minor palaeochannel
	10004	Layer	0.75	fill of ditch/channel [10003]			fill of sterile ditch or minor palaeochannel

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
	10005	Layer	0.6	fill of ditch/channel [10003]		bone	fill of sterile ditch or minor palaeochannel
	10006	Layer	0.4	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	10007	Layer	0.75	Inundation deposit	G22a		Purer grey flood/mud flat deposits below G5
11	11001	Layer	0	Topsoil	G1		
	11002	Layer	0.55	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	11003	Layer	0.3	A1 Poorly developed gleyed soil	G2		
12	12001	Layer	0	Topsoil	G1		
	12002	Layer	0.2	A1 Poorly developed gleyed soil	G2		
	12003	Layer	0.35	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
13	13001	Layer	0	Topsoil	G1		
	13002	Layer	0.6	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	13003	Layer	0.35	A1 Poorly developed gleyed soil	G2		
14	14001	Layer	0	Topsoil	G1		
	14002	Layer	0.4	Pure yellow coarse sand	G26		brought in yellow coarse sand with small flint pebble fragments, graded? Part of WWII decoy site
	14003	Layer	0.4	Inundation deposit or fill?			Possible very recent palaeochannel or WWII fill
	14004	Layer	0.75	Inundation deposit	G22a		Purer grey flood/mud flat deposits below G5
15	15001	Layer	0	Topsoil	G1		

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
	15002	Layer	0.3	A1 Poorly developed gleyed soil	G2		
	15003	Layer	0.7	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
16	16001	Layer	0	Topsoil	G1		
	16002	Layer	0.4	Inundation deposit	G5		Variant of G5, flood/mud flat deposits sealing much of site
	16003	Layer	0.4	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	16004	Layer	0.45	Inundation deposit	G5		Variant of G5, flood/mud flat deposits sealing much of site
	16005	Layer	0.3	A1 Poorly developed gleyed soil	G2		
	16006	Layer	0.9	Inundation deposit	G22a		Purer grey flood/mud flat deposits below G5
17	17001	Layer	0	Topsoil	G1		
	17002	Layer	0.3	A1 Poorly developed gleyed soil	G2		
	17003	Layer	0.5	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
18	18001	Layer	0	Topsoil	G1		
	18002	Layer	0.3	A1 Poorly developed gleyed soil	G2		
	18003	Layer	0.7	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	18004	Cut	0.2	cut of drainage ditch			19th/20th century field boundary
	18005	Fill	0.25	fill of ditch [18004]			basal fill of field boundary
	18006	Fill	0.2	fill of ditch [18004]			middle fill of field boundary
	18007	Fill	0.2	fill of ditch [18004]			upper fill of field boundary
	18008	Cut	0.3	cut of drainage ditch			19th/20th century field boundary

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
	18009	Fill	0.3	fill of ditch [18008]			lower fill of field boundary
	18010	Fill	0.3	fill of ditch [18008]			upper fill of field boundary
	18011	Layer	0.55	Inundation deposit	G5		Variant of G5, flood/mud flat deposits sealing much of site
19	19001	Layer	0	Topsoil	G1		
	19002	Layer	0.4	Inundation deposit	G5d		Variant of G5, flood/mud flat deposits sealing much of site
	19003	Layer	0.4	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	19004	Cut	0.8	cut of ditch			cut of sterile ditch
	19005	Fill	0.75	fill of ditch [19004]			inundation-like sterile fill of ditch
	19006	Cut	0.75	cut of ditch			cut of sterile ditch
	19007	Fill	0.75	fill of ditch [19006]			inundation-like sterile fill of ditch
	19008	Cut	0.3	cut of drainage ditch			19th/20th century field boundary
	19009	Fill	0.3	fill of ditch [19008]			lower fill of field boundary
	19010	Fill	0.3	fill of ditch [19008]			upper fill of field boundary
	19011	Structure	0.7	wooden stake structure			three stakes in right angled triangle arrangement diving deep into G5-G22
	19012	Layer	0.75	laminar clay-silt	G23		iron mottled
	19013	Layer	1.3	Inundation deposit	G22		Blue-grey flood/mud flat deposits below G5
20	20001	Layer	0	Topsoil	G1		
	20002	Layer	0.3	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	20003	Layer	1.2	Inundation deposit	G22a		Purer grey flood/mud flat deposits below G5
	20004	Layer	0.2	A1 Poorly developed gleyed soil	G2		
	20005	Layer	1	silt-clay	G24		weathered top of head deposit

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
21	21001	Layer	0	Topsoil	G1		
	21002	Layer	0.2	A1 Poorly developed gleyed soil	G2		
	21003	Layer	0.5	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
22	22001	Layer	0	Topsoil	G1		
	22002	Layer	0.3	Black organic peat-like			
	22003	Layer	0.4	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	22004	Layer	1.5	Inundation deposit	G22		Blue-grey flood/mud flat deposits below G5
23	23001	Layer	0	Topsoil	G1		
	23002	Layer	0.2	A1 Poorly developed gleyed soil	G2		
	23003	Layer	0.3	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
24	24001	Layer	0	Topsoil	G1		
	24002	Layer	0.2	A1 Poorly developed gleyed soil	G2		
	24003	Layer	0.3	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	24004	Cut	0.4	cut of ditch			cut of sterile ditch
	24005	Fill	0.4	fill of ditch [24004]			inundation-like sterile fill of ditch
25	25001	Layer	0	Topsoil	G1		
	25002	Layer	0.15	A1 Poorly developed gleyed soil	G2		

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
	25003	Layer	0.25	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	25004	Layer	0	Topsoil	G15		More organic-rich topsoil
26	26001	Layer	0	Topsoil	G1		
	26002	Layer	0.2	A1 Poorly developed gleyed soil	G2		
	26003	Layer	0.25	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
27	27001	Layer	0	Topsoil	G1		
	27002	Layer	0.2	A1 Poorly developed gleyed soil	G2		
	27003	Layer	0.55	Sand/gravel/clay terrace	G3	flint, pottery	contains significant numbers of Mesolithic-Neolithic flints and early prehistoric pottery sherds
	27004	Fill	0.3	organic -rich channel fill			Palaeochannel fill
	27005	Fill	0.3	silt-sand channel fill	G11		Palaeochannel fill
	27006	Layer	0.25	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	27007	voided					
	27008	voided					
	27009	voided					
	27010	Cut	0.3	cut of pit or ditch terminal			either a pit or ditch terminal runs out southern baulk
	27011	Fill	0.55	fill of pit/ditch [27010]			
	27012	Fill	0.3	fill of pit/ditch [27010]			
	27013	Cut	0.6	cut of ditch			cut of 'red hill' filled ditch, only partially in trench, north side not found
	27014	Fill	0.6	fill of ditch [27017]			'red hill' fill of ditch, contains residual flint and mid-late Iron Age pottery
	27015	Cut	0.55	cut of possible pit			heavily truncated during restripping

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
	27016	Fill	0.55	fill of pit [27015]			heavily truncated during re-stripping
	27017	Cut	0.45	cut of ditch			cut of unbottomed ditch
	27018	Fill	0.9	fill of ditch [27017]			earliest visible fill of unbottomed ditch
	27019	Fill	0.9	fill of ditch [27017]			middle fill of unbottomed ditch
	27020	Fill	0.45	fill of ditch [27017]			upper fill of unbottomed ditch
	27021	Layer	0.5	buried soil	G4		probable buried soil, also occurs in trench 2 as 02020-02021
28	28001	Layer	0	Topsoil	G1		
	28002	Layer	0.25	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	28003	Layer	1.1	brown clay-sand	G19	briquetage, burnt flint	possible lower terrace top clear signs of human activity, site over head deposit
	28004	Layer	1.1	fill of [28006]	G20		possibly a feature fill but looks like G22 pure lower inundation deposits
	28005	Layer	1.25	silt-clay	G24		weathered top of head deposit
	28006	Cut?	1.1	terrace/channel/ditch cut			not fully revealed in trench, either a terrace edge, channel or feature cut, sterile fill
29	29001	Layer	0	Topsoil	G1		
	29002	Layer	0.2	A1 Poorly developed gleyed soil	G2		
	29003	Layer	0.4	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	29004	Layer	1.55	silt-clay	G24		weathered top of head deposit
	29005	Layer	0.9	brown clay-sand	G19		possible lower terrace top clear signs of human activity, site over head deposit
	29006	Cut	1.05	cut of palaeochannel or ditch			cut only visible in deep test slot
	29007	Fill	1.05	fill of [29006]			fill not recorded
	29008	Layer	1.05		G25		

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
	29009	Layer	1.05		G20		equals 29007 recorded by geoarchaeologist
30	30001	Layer	0	Topsoil	G1		
	30002	Layer	0.3	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	30003	Cut	0.25	cut of drainage ditch			19th/20th century field boundary
	30004	Fill	0.25	fill of ditch [30003]			basal fill of field boundary
	30005	Fill	0.25	fill of ditch [30003]			middle fill of field boundary
	30006	Fill	0.25	fill of ditch [30003]			upper fill of field boundary
	30007	Layer	0.25	A1 Poorly developed gleyed soil	G2		
31	31001	Layer	0	Topsoil	G1		
	31002	Layer	0.15	A1 Poorly developed gleyed soil	G2		
	31003	Layer	0.25	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	31004	Cut	0.5	cut of ditch			
	31005	Fill	0.65	fill of ditch [31004]			basal fill of ditch
	31006	Fill	0.5	fill of ditch [31004]		Pottery	upper fill of ditch, 1 sherd of Roman pottery
	31007	Layer	0	Topsoil	G15		More organic-rich topsoil
32	32001	Layer	0	Topsoil	G1		
	32002	Layer	0.15	A1 Poorly developed gleyed soil	G2		
	32003	Layer	0.25	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
33	33001	Layer	0	Topsoil	G1		

Trench*	Context No.	Type of deposit	Depth bgl/ (m) **	Description	GeoArch number	Finds	Context/ finds comments
	33002	Layer	0.15	A1 Poorly developed gleyed soil	G2		
	33003	Layer	0.25	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	33004	Layer	0.65	Inundation deposit	G16		Uncertainty if ditch fill or staining/modification at base of ditch
	33005	Cut	0.5	cut of ditch			
	33006	Fill	0.65	fill of ditch [33005]		Pottery	Medieval and residual early Roman
	33007	Cut	0.3	cut of drainage ditch			19th/20th century field boundary
	33008	Fill	0.3	fill of ditch [33007]	G17		basal fill of field boundary
34	34001	Layer	0	Topsoil	G1		
	34002	Layer	0.15	A1 Poorly developed gleyed soil	G2		
	34003	Layer	0.25	Inundation deposit	G5		Flood/mud flat deposits sealing much of site
	34004	Cut	0.25	cut of drainage ditch			19th/20th century field boundary
	34005	Fill	0.25	fill of ditch [30003]	G17		basal fill of field boundary
	34006	Fill	0.25	fill of ditch [30003]	G16		upper fill of field boundary

APPENDIX B GEOARCHAEOLOGICAL INVENTORY

Trench	Top	Base	Keyword	Sediment unit	Notes
1	0.00	0.15	Silty clay	**G1** - Brown silty clay AP. Context number (01001)	Lateral stratigraphic sequence. G9 fill of a palaeochannel, only occurs between 13.5m and 15m from the north end of the trench, below G2. Archaeological material logged as G12.
	0.15	0.35	Silty clay	**G2** - Stiff brown grey silty clay. Context number (01002)	
	0.35	0.85	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (01005)	
			Clay silt	**G9** - Brown orange clayey silt, Mn banding, laminar structure. Palaeochannel fill? Context number (01009)	
	0.85	1.25	Cultural	**G12** Reddish clay sand cultural material. Context number (01006)	
	1.25	1.30+	Sandy silt	**G3** - Light grey orange sandy silt, Fe mottling. Context number (01007)	
2	0.00	0.25	Silty clay	**G1** - Brown silty clay AP. Context number (02001)	G1 overlying G27 (possible equivalent of G2) across entire trench. G27 of varying thickness, overlying G12 cultural material between 10m and 22m from northern end of trench. G12 also partially overlies G3, the weathered top of the terrace, which dips down out of the base of the trench c.14m from the northern end. In the southernmost 5m of the trench, G5 is seen in the base of the trench, overlain by G27.
	0.25	0.70+	Clay	**G27** - Brown grey clay. Context number (02002)	
			Cultural	**G12** Reddish clay sand cultural material. Context number (02004)	
			Sandy silt	**G3** - Light grey orange sandy silt, Fe mottling. Context number (02003)	
			Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (02045)	
3	0.00	0.20	Silty clay	**G1** - Brown silty clay AP. Context number (03001)	Lateral stratigraphy, showing A horizons G1 and G2 overlying G5 unit, with banding of sub-units of G5 occurring towards the se end of the trench.
	0.20	0.30	Silty clay	**G2** - Stiff brown grey silty clay. Context number (03002)	
	0.30	0.75+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (03003)	
			Clay	**G5d** - Homogenised brown stiff clay. Upper part of G5 unit from c. 24m to c. 27m from nw end of trench, approx 20cm thick	
			Clay	**G5c** - Brown stiff clay with frequent Mn mottling. Grades into G5d, top part of G5 unit from c. 27m to 30m from nw end of trench, approx 20cm thick.	
			Clay	**G5b** - band of heavy Mn mottling within G5 between 18m and 22m from nw end of trench, at a depth of 0.7m, approx 10cm thick.	
4	0.00	0.20	Silty clay	**G1** - Brown silty clay AP. Context number (04001)	Lateral stratigraphic sequence, with discontinous bands within G5 unit of various sub-categories.
	0.20	0.25	Silty clay	**G2** - Stiff brown grey silty clay. Context number (04002)	
	0.25	0.40	Clay	**G5c** - Brown stiff clay with frequent Mn mottling.	
	0.40	0.50	Clay	**G5d** - Homogenised brown stiff clay.	
	0.50	0.55	Clay	**G5b** - band of heavy Mn mottling within G5.	
	0.55	0.70+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (04003)	
5	0.00	0.25	Clay silt	**G15** - Dark blackish brown clayey silt, organic rich AP. Context number (05001)	Trench five has a markedly different topsoil to the majority of the site (G15) although this reverts to the more usual G1 towards the south. Beneath G2, there is archaeological material both above and below G5, including G13 which is a clay bank with a dump of marine shell.
			Silty clay	**G1** - Brown silty clay AP. G1 only occurs at the southern end of the trench, change between G15 and G1 is very diffuse due to ploughing and/or bioturbation, but occurs at around 24m from n end of trench. Context number (05001).	

Trench	Top	Base	Keyword	Sediment unit	Notes
	0.25	0.40	Silty clay	**G2** - Stiff brown grey silty clay. Context number (05002)	
	0.40	0.50	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (05003).	
	0.50	0.70+	Silty clay	**G13** - Greyish yellow brown silty clay, with dumps of marine shell. Context number (05017).	
6	0.00	0.25	Silty clay	**G1** - Brown silty clay AP. Context number (06001)	Lateral stratigraphy sequence with G1 and G2 overlying a very thin layer of G5 above buried palaeosol G4 which itself overlies the weathered top of the river terrace (G3). Between 15m and 22m from the northern end of the trench a palaeochannel was visible in section below G1, with three fills (G6-8).
	0.25	0.30	Silty clay	**G2** - Stiff brown grey silty clay. Context number (06002)	
	0.30	0.60	Silt sand	**G4** - Dark grey clayey silt sand, Fe mottling - buried soil? Context number (06004)	
	0.60	0.75+	Sandy silt	**G3** - Light grey orange sandy silt, Fe mottling. Context number (06003)	
			Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Overlies part of G4 in this trench. Context number (06005)	
			Silt clay	**G6** - Med-dark grey brown silt clay with sand. Top fill of palaeochannel, Context number (06006)	
			Silt	**G7** - Dark brown grey silt. Middle fill of palaeochannel. Context number (06007)	
			Silty clay	**G8** - Dark grey orange silty clay with sand. Context number (06008)	
7	0.00	0.10	Silty clay	**G1** - Brown silty clay AP. Context number (07001)	Dominant lateral stratigraphy, G1, G2, G5 sequence.
	0.10	0.25	Silty clay	**G2** - Stiff brown grey silty clay. Context number (07002)	
	0.25	0.75+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (07005)	
8	0.00	0.25	Silty clay	**G1** - Brown silty clay AP. Context number (0801)	Lateral stratigraphy, with G5 showing evidence of soil formation at top (G5d).
	0.25	0.35	Silty clay	**G2** - Stiff brown grey silty clay. Context number (0802)	
	0.35	0.60	Clay	**G5d** - Homogenised brown stiff clay. Upper part of G5 unit	
	0.60	0.80+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (08003)	
9	0.00	0.20	Silty clay	**G1** - Brown silty clay AP. Context number (09001)	Lateral stratigraphy showing typical G1, G2, G5 sequence. Deep test pit at the northern end of the trench showed head (G18), overlain by a thin layer of trample/reworked material (G19) underneath G5, and a palaeochannel cutting into and depositing on top of the head, overlain by the inter-tidal G5 deposits.
	0.20	0.35	Silty clay	**G2** - Stiff brown grey silty clay. Context number (09002)	
	0.35	0.55	Clay	**G5d** - Homogenised brown stiff clay. Upper part of G5 unit	
	0.55	0.65	Clay	**G5b** - band of heavy Mn mottling within G5.	
	0.65	0.85	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (09005)	
	0.85	1.60+	Silty clay	**G18** - Mid orangey brown silty clay with some clast inclusions. Head. Context number (09004)	
			Clay sand	**G19** - Light brown grey clayey sand, thin trample? Overlying head. Context number (09009)	
			Clay	**G20** - Grey blue clay, laminar structure. Fill of palaeochannel. Context number (09007)	
10	0.00	0.25	Silty clay	**G1** - Brown silty clay AP. Context number (10001)	Lateral stratigraphy, G2 and G5 both slightly siltier in this trench.
	0.25	0.40	Clay silt	**G2a** - Brown grey clay silt. Context number (10002)	
	0.40	0.70	Silt clay	**G5a** - Mottled blue grey and orange silty clay. Context number (10006)	

Trench	Top	Base	Keyword	Sediment unit	Notes
11	0.00	0.25	Silty clay	**G1** - Brown silty clay AP. Context number (11001)	Lateral stratigraphy, G5d generally at top of G5 unit and G5e at base. Discontinuous Mn band within G5 (G5b) and also one patch of brown G5 with Mn (G5c).
	0.25	0.30	Silty clay	**G2** - Stiff brown grey silty clay. Context number (11003)	
	0.30	0.40	Clay	**G5d** - Homogenised brown stiff clay. Upper part of G5 unit	
	0.40	0.55	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (11002)	
	0.55	0.80+	Clay	**G5e** - Homogenous grey stiff clay with a trace of silt sand.	
			Clay	**G5b** - band of heavy Mn mottling within G5.	
			Clay	**G5c** - Brown stiff clay with frequent Mn mottling.	
12	0.00	0.20	Silty clay	**G1** - Brown silty clay AP. Context number (12001)	Lateral G1, G2, G5 sequence.
	0.20	0.35	Silty clay	**G2** - Stiff brown grey silty clay. Context number (12002)	
	0.35	0.75+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (12003)	
13	0.00	0.25	Silty clay	**G1** - Brown silty clay AP. Context number (13001)	G1, G2, G5 sequence with G5d at top of G5 unit.
	0.25	0.30	Silty clay	**G2** - Stiff brown grey silty clay. Context number (12003)	
	0.30	0.50	Clay	**G5d** - Homogenised brown stiff clay. Upper part of G5 unit	
	0.50	0.80+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (13002)	
14	0.00	0.40	Silty clay	**G1** - Brown silty clay AP. Context number (14001)	Beneath topsoil G1 is a large deposit of sand which is likely to be modern and may be associated with either the sea wall or perhaps WW2 activity at the site, overlies blue grey clays. Possible modern arch feature at sw end.
	0.40	1.60	Sand	**G26** - Orange coarse sand with some gravel, no visible bedding. WW2 levelling?? Context number (14002)	
	1.60	1.80+	Clay	**G22a** - Mid blue grey soft silty organic rich clay. Context number (14004)	
			Clay	Dark brown grey clay, beneath G1 to depth of 0.8m at sw end of trench, fill of modern feature?	
15	0.00	0.15	Silty clay	**G1** - Brown silty clay AP. Context number (15001)	Typical G1, G2, G5 sequence, with browner, more homogenous band at top of G5 showing evidence for soil development.
	0.15	0.25	Silty clay	**G2** - Stiff brown grey silty clay. Context number (15002)	
	0.25	0.65	Clay	**G5d** - Homogenised brown stiff clay. Upper part of G5 unit	
	0.65	0.80+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (15003)	
16	0.00	0.15	Silty clay	**G1** - Brown silty clay AP. Context number (16001)	Lateral strat, with thin, discontinuous lenses of Mn mottling, at c. 0.5m below surface.
	0.15	0.25	Silty clay	**G2** - Stiff brown grey silty clay. Context number (16002)	
	0.25	0.85+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (16003)	
			Clay	**G5b** - band of heavy Mn mottling within G5.	
			Clay	**G5c** - Brown stiff clay with frequent Mn mottling.	
17	0.00	0.20	Silty clay	**G1** - Brown silty clay AP. Context number (17001)	Typical G1, G2, G5 sequence, with browner, more homogenous band at top of G5 showing evidence for soil development.
	0.20	0.30	Silty clay	**G2** - Stiff brown grey silty clay. Context number (17002)	
	0.30	0.65	Clay	**G5d** - Homogenised brown stiff clay. Upper part of G5 unit	
	0.65	0.75	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (17003)	

Trench	Top	Base	Keyword	Sediment unit	Notes
18	0.00	0.20	Silty clay	**G1** - Brown silty clay AP. Context number (18001)	Lateral G1 G2 G5 sequence, with ditch cut from below G2 at 45 - 50m from north end of trench.
	0.20	0.35	Silty clay	**G2** - Stiff brown grey silty clay. Context number (18002)	
	0.35	1.00	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (18003)	
19	0.00	0.30	Silty clay	**G1** - Brown silty clay AP. Context number (19001)	Trench showing lateral G1, G2, G5 stratigraphy directly overlying blue clay G22 at northern end of trench, but with silty unit G23 in between G5 and G22 further south - possible evidence for former patch of raised ground next to palaeochannel? Also large modern ditch cut across trench filled by G16, G17 and G21, cut from below G1.
	0.30	0.70	Clay	**G5d** - Homogenised brown stiff clay. Upper part of G5 unit. Context number (19002)	
	0.70	1.70	Clay	**G5e** - Homogenous grey stiff clay with a trace of silt sand. Context number (19003)	
	1.70	1.80+	Clay	**G22** - Dark greyish blue soft, silty, organic rich clay. Context number (19013)	
			Clay silt	**G23** - Light grey clay silt with orange Fe mottling, laminar structure. Occurs below G5e at a depth of 0.65m from 64m from north end of the trench southwards. Context number (19012)	
			Peaty silt	**G17** - Black organic peaty silt, at edges of modern ditch. Context number (19010)	
			Clay	**G16** - Firm greyish orangey brown clay - redeposited G5 fill of ditch. Context number (19009)	
			Clay	**G21** - Blue grey Fe mottled clay lower fill of ditch.	
20	0.00	0.20	Silty clay	**G1** - Brown silty clay AP. Context number (20001)	G1, G2, G5 sequence, overlying weathered top to head deposit to the northern end, but overlying silty material (edge of palaeochannel???) towards the south.
	0.20	0.30	Silty clay	**G2** - Stiff brown grey silty clay. Context number (20004)	
	0.30	0.50	Clay	**G5c** - Brown stiff clay with frequent Mn mottling.	
	0.50	0.70	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (20002)	
	0.70	1.05	Clay	**G5e** - Homogenous grey stiff clay with a trace of silt sand.	
	1.05	1.20+	Silty clay	**G24** - Firm mid grey brown clay with silt - weathered top of head deposit. Context number (20003)	
			Clay silt	**G23a** - Light orangey brown clay silt, Fe mottling, Laminar structure. Occurs beneath G5e at a depth of 0.9m from c.14m from north end of trench. Context number (20005)	
21	0.00	0.20	Silty clay	**G1** - Brown silty clay AP. Context number (21001)	Lateral stratigraphy. All of G5 unit given one context number.
	0.20	0.35	Silty clay	**G2** - Stiff brown grey silty clay. Context number (21002)	
	0.35	0.50	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (21003)	
	0.50	0.70+	Clay	**G5e** - Homogenous grey stiff clay with a trace of silt sand. Context number (21003)	
			Clay	**G5b** - band of heavy Mn mottling within G5. Only in southern end of trench, occurs between 0.55 and 0.70m below surface.	
22	0.00	0.30	Silty clay	**G1** - Brown silty clay AP. Context number (22001)	G1, G2, G5 sequence overlying soft blue organic rich clays (G22).
	0.30	0.40	Silty clay	**G2** - Stiff brown grey silty clay.	
	0.40	0.70	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (22003)	
	0.70	1.50	Clay	**G5e** - Homogenous grey stiff clay with a trace of silt sand. Context number (22003)	
	1.50	1.65+	Clay	**G22** - Dark greyish blue soft, silty, organic rich clay.	

Trench	Top	Base	Keyword	Sediment unit	Notes
			Clay	**G5d** - Homogenised brown stiff clay. Upper part of G5 unit, between 17 and 22m from northern end of trench, c.0.15m thick.	
23	0.00	0.20	Silty clay	**G1** - Brown silty clay AP. Context number (23001)	Typical G1, G2, G5 sequence.
	0.20	0.30	Silty clay	**G2** - Stiff brown grey silty clay. Context number (23003)	
	0.30	0.50	Clay	**G5d** - Homogenised brown stiff clay. Upper part of G5 unit.	
	0.50	0.80+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (23002)	
24	0.00	0.15	Silty clay	**G1** - Brown silty clay AP. Context number (24001)	Typical G1, G2, G5 sequence.
	0.15	0.30	Silty clay	**G2** - Stiff brown grey silty clay. Context number (24002)	
	0.30	0.80	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (24003)	
	0.80	1.20+	Clay	**G5e** - Homogenous grey stiff clay with a trace of silt sand. Context number (24003)	
25	0.00	0.15	Silty clay	**G1** - Brown silty clay AP. Context number (25001)	Typical G1, G2, G5 sequence, with change in topsoil (G1/G15) towards eastern end of trench.
			Clay silt	**G15** - Dark blackish brown clayey silt, organic rich AP. Is the topsoil in the eastern part of the trench, grades into G1. Context number (25004)	
	0.15	0.25	Silty clay	**G2** - Stiff brown grey silty clay. Context number (25002)	
	0.25	0.65+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (25003)	
26	0.00	0.20	Silty clay	**G1** - Brown silty clay AP. Context number (26001)	Typical G1, G2, G5 sequence, with browner Mn mottled top of G5 unit.
	0.20	0.25	Silty clay	**G2** - Stiff brown grey silty clay. Context number (26002)	
	0.25	0.55	Clay	**G5c** - Brown stiff clay with frequent Mn mottling.	
	0.55	0.75+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (26003)	
27	0.00	0.20	Silty clay	**G1** - Brown silty clay AP. Context number (27001)	In this trench A horizon (G1 and G2) overlies inter-tidal deposit G5 which here, in the northern part of the site is drastically thinner as the terrace rises up and is more shallowly buried. G5 overlies both G4, which probably represents a palaeosol which formed on the weathered top of the terrace, and G12 a reddish layer of cultural material. Although no relationship was visible in section in this trench, analogous layers in trench 2 suggest that it was deposited after G4. G4 overlies G3 which is the weathered top of the terrace deposits and contains cultural material (primarily worked flint), and this probably directly overlies true terrace sands and gravels. In the NE part of the trench a palaeochannel with two fills (higher energy, then lower energy) is seen in section beneath G2.
	0.20	0.32	Silty clay	**G2** - Stiff brown grey silty clay. Context number (27002)	
	0.32	0.47	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (27006)	
	0.47	0.52	Silt sand	**G4** - Dark grey clayey silt sand, Fe mottling - buried soil? Context number (27021)	
	0.52	0.70+	Sandy silt	**G3** - Light grey orange sandy silt, Fe mottling. Context number (27003)	
			Cultural	**G12** Reddish clay sand cultural material. Between G5 and G3 towards SW end of trench, no visible relationship with G4 in this trench. Context number (27012)	
			Silt	**G10** - Dark grey brown silt with some sand. Upper fill of palaeochannel. Context number (27004)	
			Silty sand	**G11** - Medium grey orange silty sand, with rare Fe mottling. Context number (27005)	
28	0.00	0.25	Silty clay	**G1** - Brown silty clay AP. Context number (28001)	Sequence showing G1 overlying G5 which in turn overlies G19 and then G24 which both represent reworked head deposit material. G24 was demonstrated to be overlying true head deposits in an auger transect carried out near to this trench. Beneath G5 a palaeochannel was seen in the NE end of the trench. Absence of G2, simply be due to ploughing.
	0.25	1.00	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (28002)	

Trench	Top	Base	Keyword	Sediment unit	Notes
	1.10	1.05	Clay sand	**G19** - Light brown grey clayey sand, thin trample? Overlying head. Context (28003)	
	1.25	1.60+	Silty clay	**G24** - Firm mid grey brown clay with silt - weathered top of head deposit. Context number (28005)	
			Clay	**G20** - Grey blue clay, laminar structure. Fill of palaeochannel. Context number (28004)	
29	0.00	0.20	Silty clay	**G1** - Brown silty clay AP. Context number (29001)	Standard sequence of G1, G2, G5 overlying deposits derived from the underlying head (G19, G25 and G24). Palaeochannel visible in section beneath G5 at N end of trench. Some laminae of subcategories of G5 visible in section near S end of trench.
	0.20	0.37	Silty clay	**G2** - Stiff brown grey silty clay. Context number (29002)	
	0.37	0.90	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (29003)	
	0.90	1.05	Clay sand	**G19** - Light brown grey clayey sand, thin trample? Overlying head. Context (29005)	
	1.05	1.55	Clay	**G25** - Firm mid orangey brown clay - reworked head. Context number (29008)	
	1.55	1.67+	Silty clay	**G24** - Firm mid grey brown clay with silt - weathered top of head deposit. Context number (29004)	
			Clay	**G20** - Grey blue clay, laminar structure. Fill of palaeochannel. Context number (29009)	
30	0.00	0.25	Silty clay	**G1** - Brown silty clay AP. Context number (30001)	Lateral G1, G2, G5 sequence.
	0.25	0.30	Silty clay	**G2** - Stiff brown grey silty clay. Context number (30007)	
	0.30	0.55	Clay	**G5d** - Homogenised brown stiff clay. Upper part of G5 unit.	
	0.55	0.65	Clay	**G5b** - band of heavy Mn mottling within G5. Discontinuous in this trench.	
	0.65	0.90+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (30002)	
31	0.00	0.15	Silty clay	**G1** - Brown silty clay AP. Context number (31001)	Trench showing G2, and G5 beneath topsoil. Change in the upper from G1 to G15 occurs at around 22.5m from SW end of trench, and may be related to modern disturbance (brick etc) observed in this part of the trench. G15 therefore is likely to be very recent.
	0.00	0.15	Clay silt	**G15** - Dark blackish brown clayey silt, organic rich AP. Is the topsoil in the NE part of the trench, grades into G1 at c. 22.5m from SW end of trench. Context number (31007)	
	0.15	0.30	Silty clay	**G2** - Stiff brown grey silty clay. Context number (31002)	
	0.30	0.50+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (31003)	
32	0.00	0.15	Silty clay	**G1** - Brown silty clay AP. Context number (32001)	Standard G1, G2, G5 sequence. Palaeochannel filled by G14 visible in plan but not in section.
	0.15	0.25	Silty clay	**G2** - Stiff brown grey silty clay. Context number (32002)	
	0.25	0.80+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (32003)	
33	0.00	0.15	Silty clay	**G1** - Brown silty clay AP. Context number (33001)	Standard G1, G2, G5 sequence. What is likely to be a very modern ditch was visible in section beneath the A horizon, filled by G16 and G17.
	0.15	0.25	Silty clay	**G2** - Stiff brown grey silty clay. Context number (33002)	
	0.25	0.75+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (33003)	
			Clay	**G16** - Firm greyish orangey brown clay - redeposited G5 fill of ditch.	
			Peaty silt	**G17** - Black organic peaty silt, at edges of modern ditch. Context number (33008)	
34	0.00	0.15	Silty clay	**G1** - Brown silty clay AP. Context number (34001)	Standard G1, G2, G5 sequence. What is likely to be a very modern ditch was visible in section beneath the A horizon, filled by G16 and G17.
	0.15	0.25	Silty clay	**G2** - Stiff brown grey silty clay. Context number (34002)	

Trench	Top	Base	Keyword	Sediment unit	Notes
	0.25	0.75+	Clay	**G5** - Mottled blue grey and orange stiff clay, trace of sand. Partially matured soil? Context number (34003)	
			Clay	**G16** - Firm greyish orangey brown clay - redeposited G5 fill of ditch. Context number (34006)	
			Peaty silt	**G17** - Black organic peaty silt, at edges of modern ditch. Context number 34005)	

APPENDIX C REFERENCES

Fawn AJ, Evans KA, McMaster I, Davies GMR, 1990, The Red Hills of Essex: Salt-making in Antiquity, with contributions by Barford, PM and Jefferies RS, Published by Colchester Archaeological Group

Oxford Archaeology (June 2008) London Gateway: Northern Triangle (East); Habitat Creation and Enhancements. Written Scheme of Investigation for Archaeological Monitoring.

Oxford Archaeology (July 2008a) London Gateway: Geoarchaeological deposit model interim report; prepared by OA for DP World

Oxford Archaeology (July 2008b) London Gateway: Archaeological mitigation proposal for geophysical survey in the alluvial floodplain; Prepared by OA for DP World

Oxford Archaeology (August 2008) London Gateway: Project design for site-wide palaeoenvironmental study; Prepared by OA for DP World

Oxford Archaeology (2003) *London Gateway Archaeological Mitigation Framework* prepared by OA for P&O

Oxford Archaeology (2002) *Cultural Heritage Assessment Report.* Environmental Statement chapter and technical appendices, prepared by OA for P&O

APPENDIX D SUMMARY OF SITE DETAILS

Site name: London Gateway: Compensation Site A Archaeological Trench Investigation
Site code: COSAGE09
NGR: 569900E, 181100N
Type of investigation: 34 trenches placed to ground-truth magnetometer and electrical resistivity survey results. Trenches varied in length and depth but were typically 2m x 30m in dimensions. Longer trenches were excavated to investigate the interface between the gravel terrace and adjacent alluvial deposits.
Date and duration of project: 4th-22nd February 2009
Area of site: *c.* 41.5 hectares in total
Summary of results:
A combination of gradiometer survey, electrical resistivity survey and evaluation trenching at Compensation Site A, to the west of the main London Gateway development, has revealed evidence for regionally significant multi-period archaeological remains, adjacent to Mucking Creek, in Stanford-le-Hope, Essex. In February 2009, OA carried out a series of trench excavations in a 41.5 Ha area which is to be transformed into an inter-tidal mudflat habitat as part of the ecological mitigation for the London Gateway development. This involves reducing the ground level across the site by 500 mm and then breaching the sea wall to allow the site to flood at high tide.

The significant archaeology discovered to date includes a concentration of prehistoric worked flint tools, including probable late Mesolithic or early Neolithic artefacts, a series of early Romano-British rectangular settlement enclosures and contemporary salt-making sites. Salt-making seems to have been an important regional industry in the centuries immediately before and after the Roman conquest of Britain, from c.150BC to c.250AD. Sites of this kind, known as 'red hills', are a characteristic feature of the Essex coastal marshes, although only a few have been systematically excavated (Fawn et al, 1990). Medieval pottery has been recovered from the same area as the Roman finds. The post-medieval site of Stanford-le-Hope Wharf, which was active into the 20th century, lay immediately adjacent, completing the impression of persistent riverside activity at this location from at least the early Neolithic until the modern period, although this need not have been continuous. A second, less complex focus of archaeological remains, at the eastern edge of Compensation Site A appears to comprise further evidence for Romano-British salt-making, in the form of a second red hill.

Extensive assessment of the geoarchaeological sequence, using a combination of techniques, has successfully characterised the depth and distribution of alluvial sediments across the site. The relationship of archaeological deposits to major palaeochannels has been partially defined, and the age of major sediment units has been estimated using stratigraphic evidence. Within this 41.5 Ha site, archaeological features appear, on present evidence, to be concentrated in areas where the gravel terrace rises to the surface in the northern half of the site, but appear sparsely distributed or absent in the southern part of the site where the alluvial deposits are deeper. As a result of the discoveries, a programme of mitigation is proposed before construction takes place, involving detailed excavation of the most significant remains, controlled archaeological stripping throughout the northern part of Site A, and monitoring during construction in the remainder of the site.

Location of archive: The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES, and will be deposited Thurrock Museum, Essex in due course.

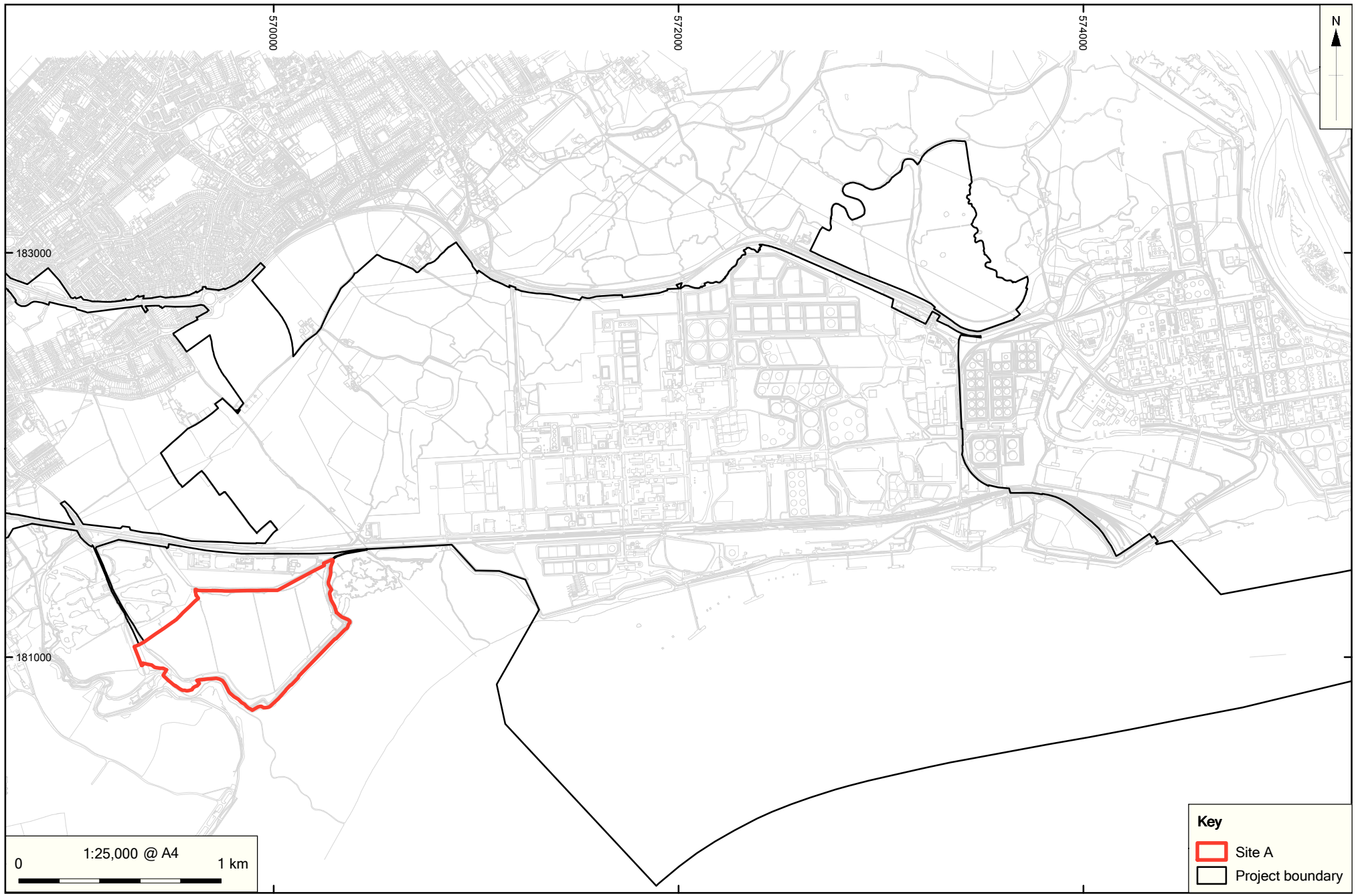

Figure 1: Location map

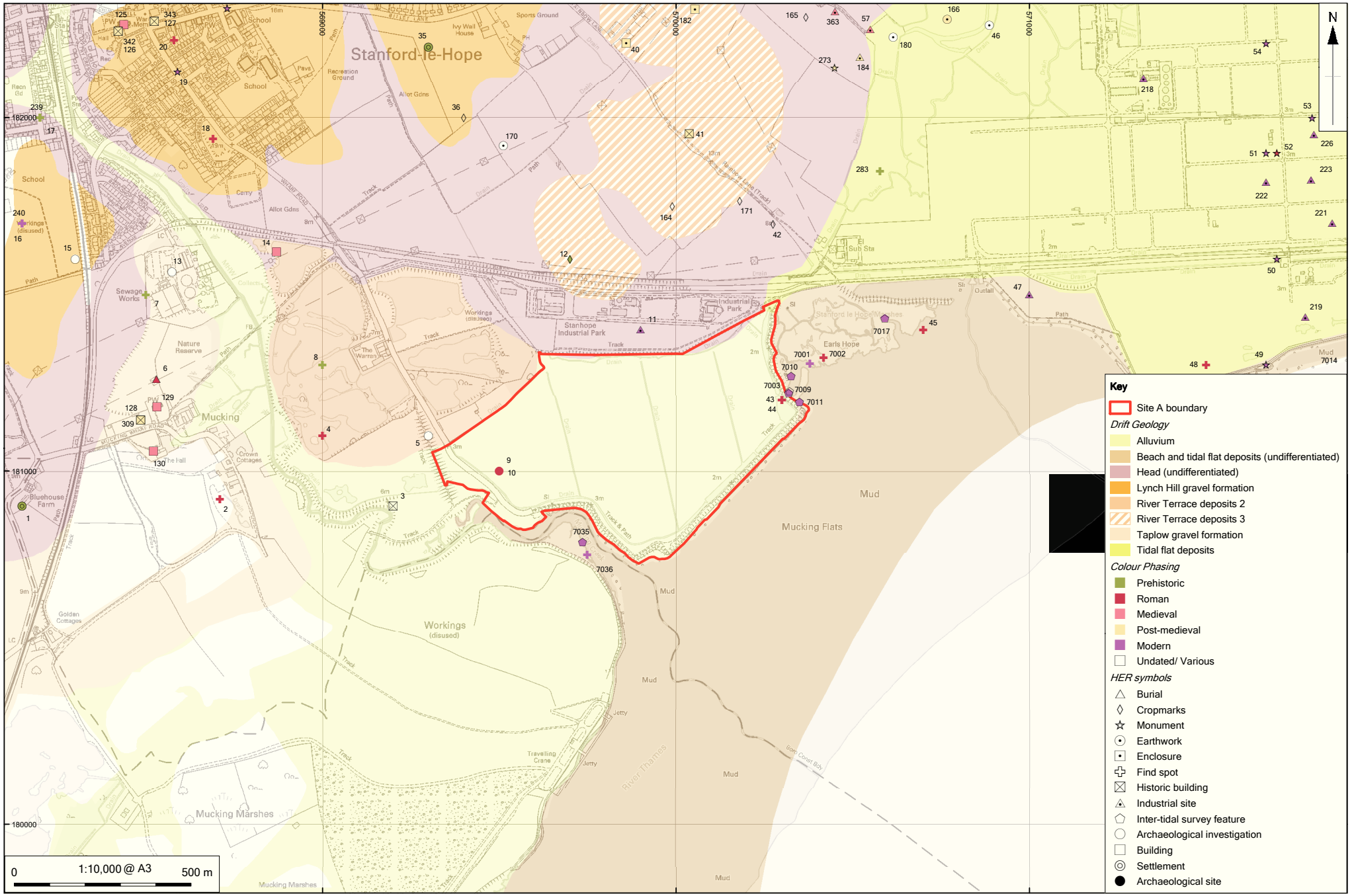

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Figure 2: Compensation Site A - 1:2500 OS map, overlaid with BGS drift geology and HER data

Figure 3: Lidar topographic image, Compensation Site A

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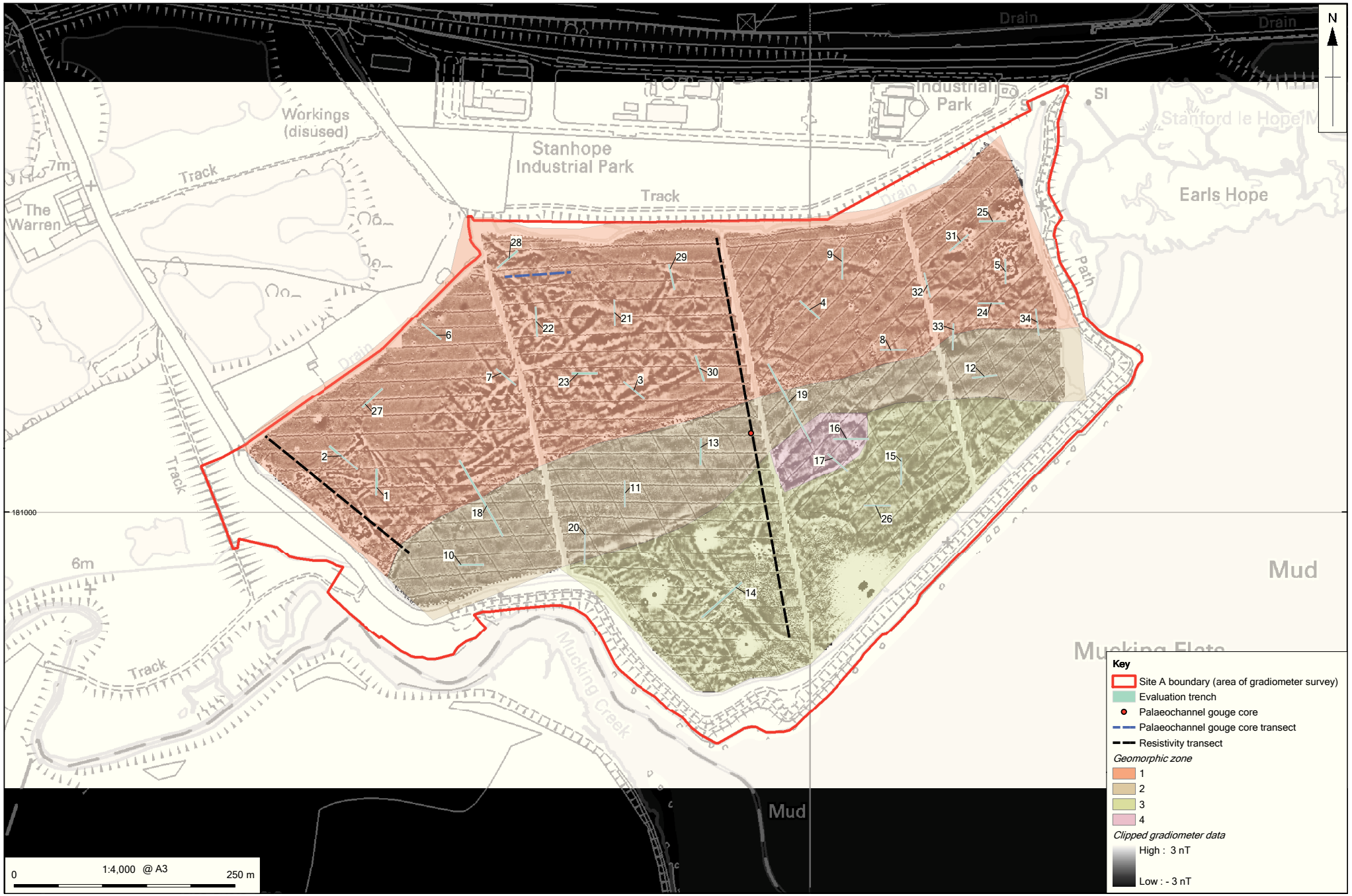

Figure 4: Summary gradiometer survey results for Compensation Site A, showing preliminary geomorphic zones, evaluation trench plan, gouge core and resistivity lines

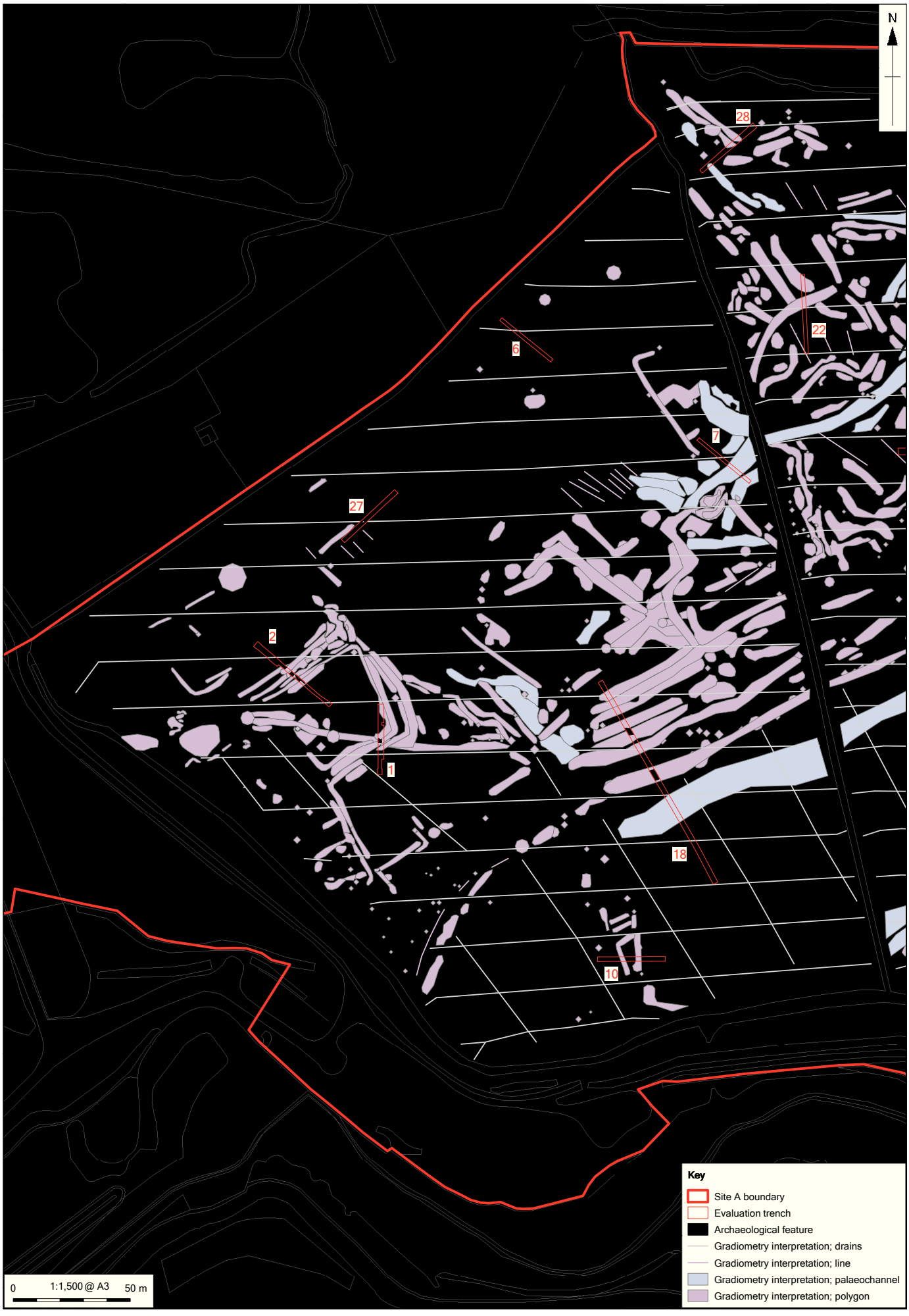

Figure 5: Detailed Gradiometer plots showing trench locations and archaeological features - Sheet 1

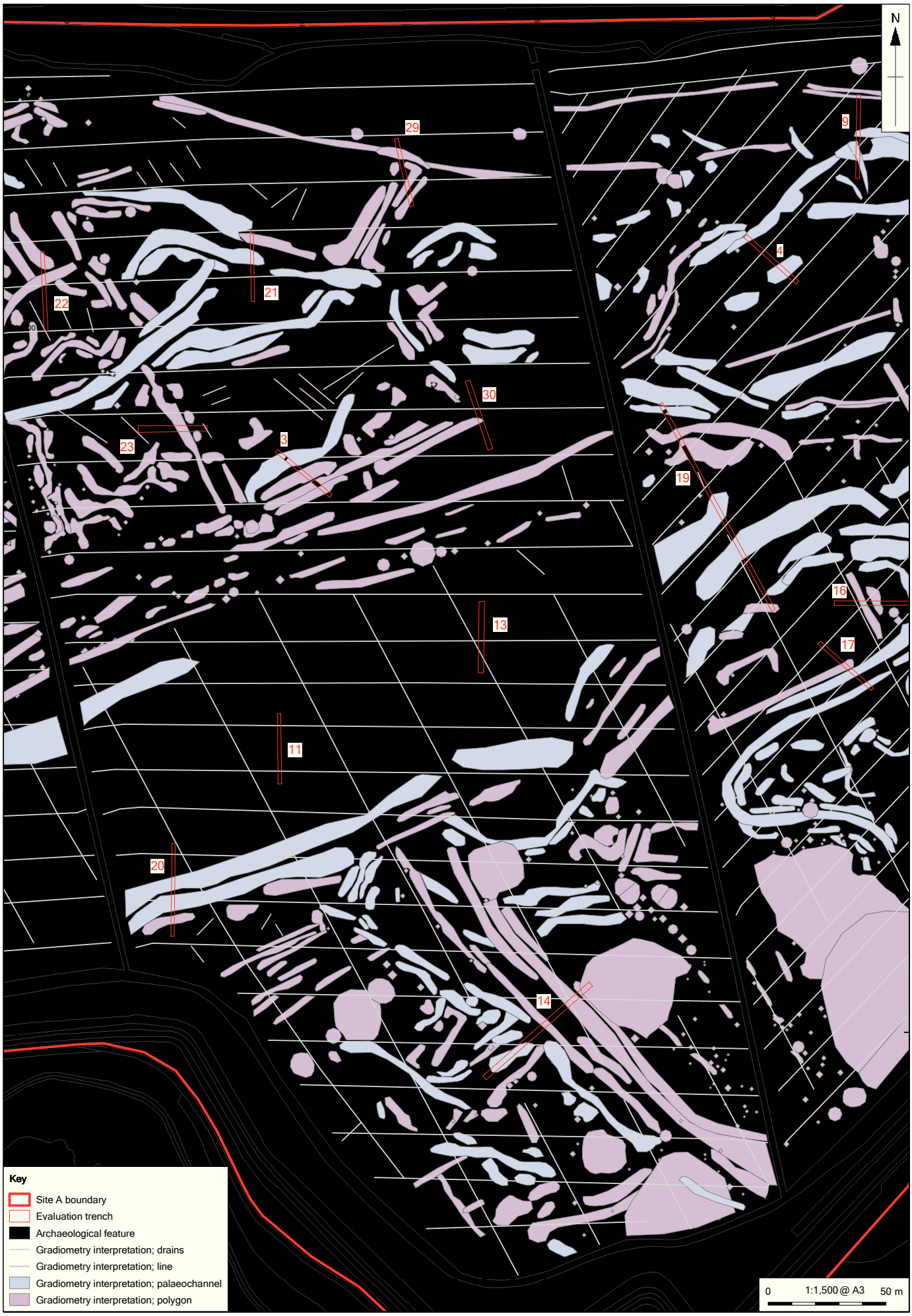

Figure 6: Detailed Gradiometer plots showing trench locations and archaeological features - Sheet 2

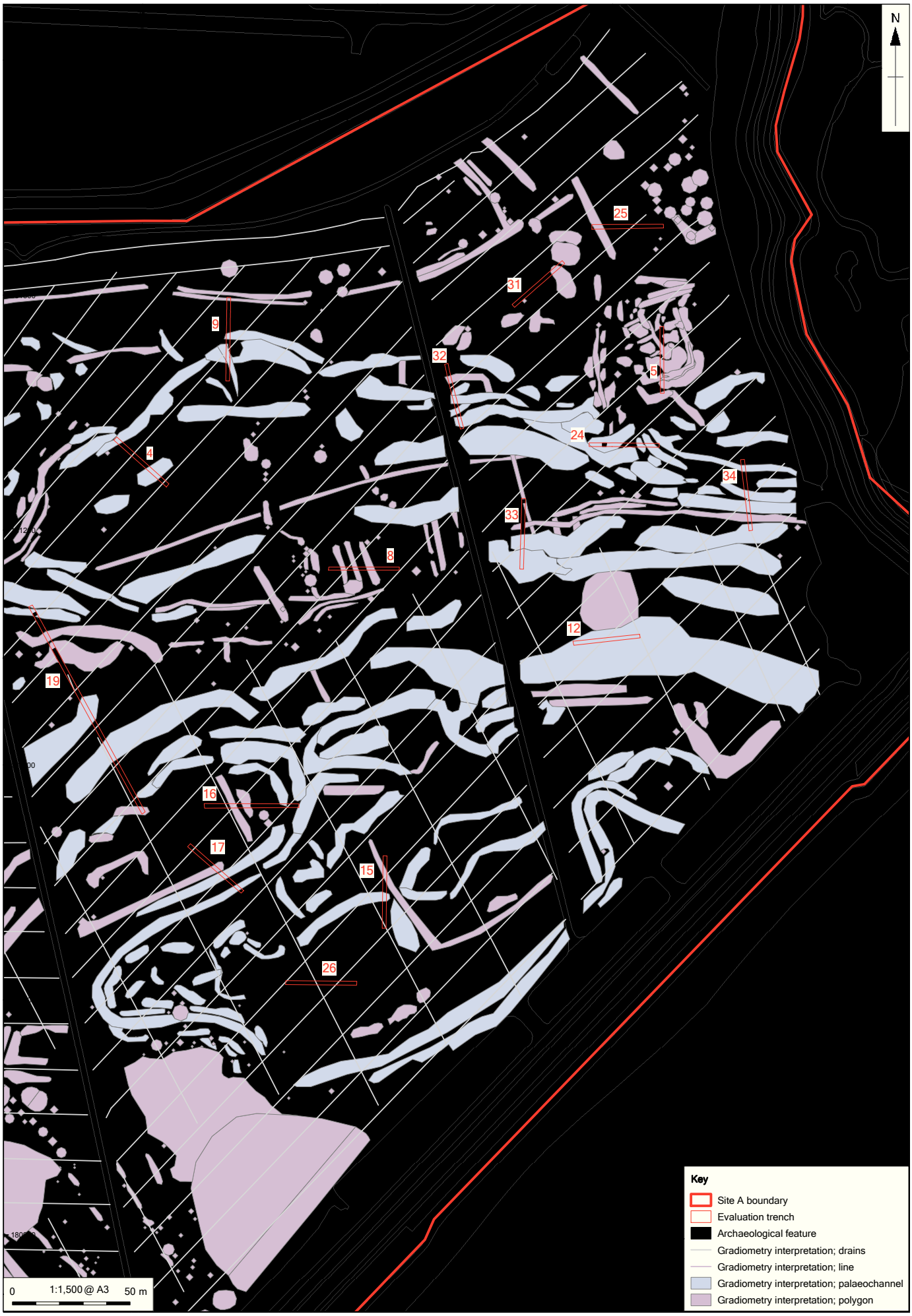

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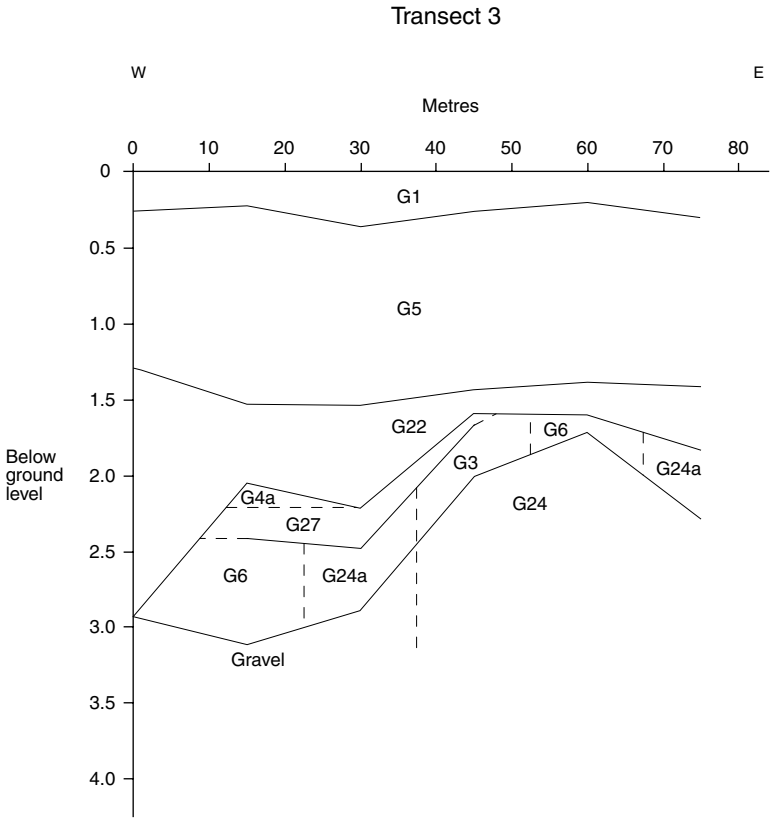
Figure 7: Detailed Gradiometer plots showing trench locations and archaeological features - Sheet 3



Sediment units:

G1	Brown silty clay Ap
G3	Light grey orange sandy silt, Fe mottling
G4a	Mid grey silt with and and trace of clay
G6	Medium - dark brown grey silt, with sand
G22	Dark greyish blue soft silty organic rich clay
G24	Mid grey brown clay with silt, firm
G24a	Mid grey brown loam
G27	Dark brown black peaty clay

Figure 8: Gouge core transect 3

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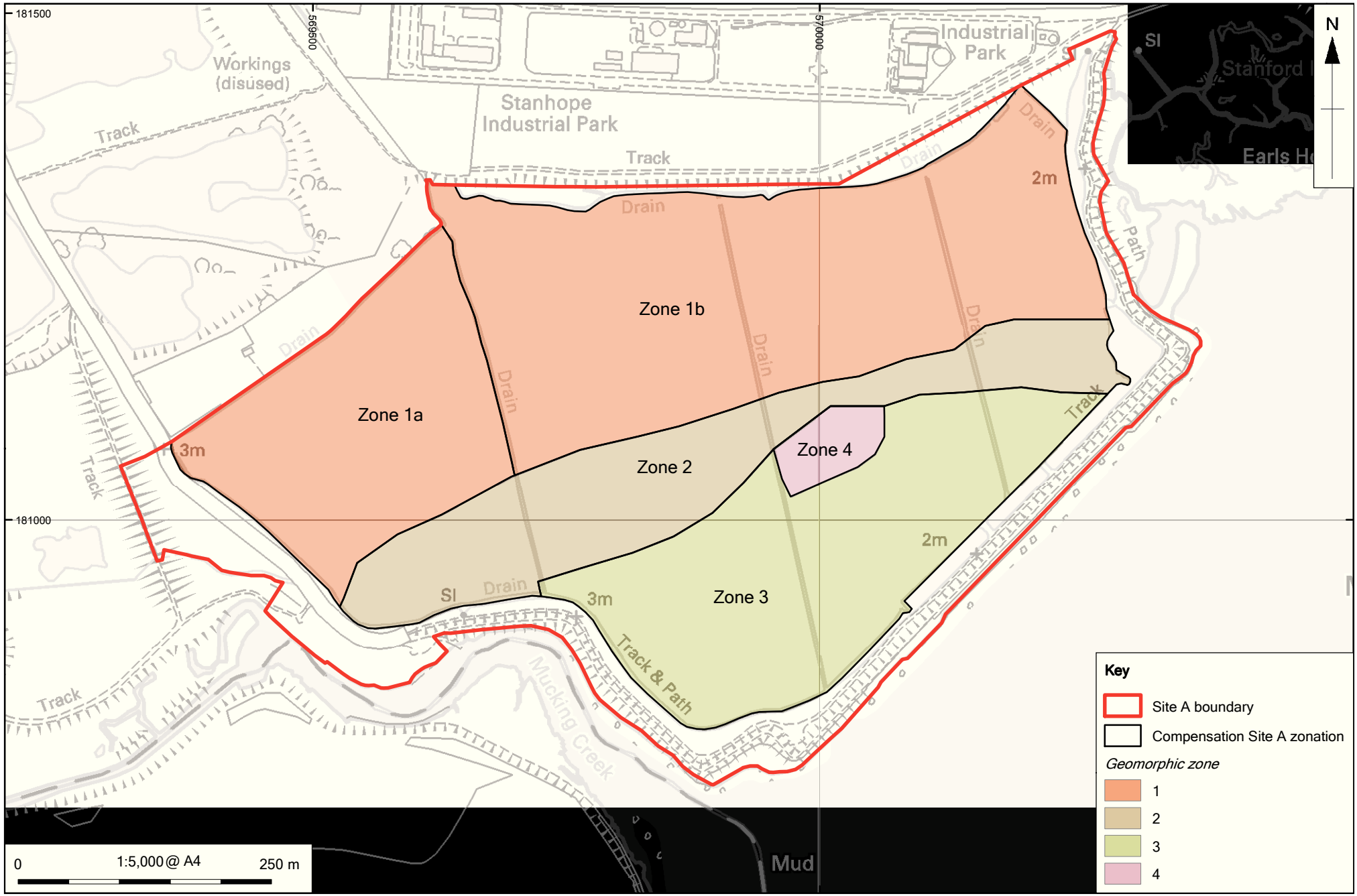

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Figure 9: Geomorphic zonation of Compensation Site A, with areas of site management

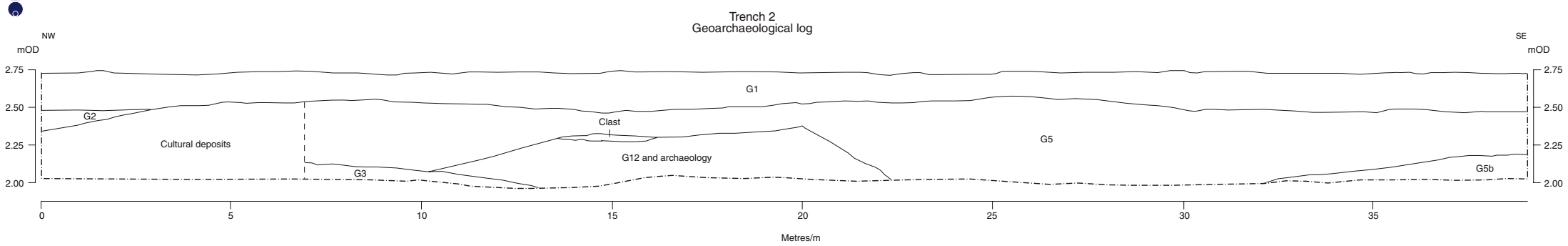

Figure 10: Geoarchaeological log, trench 2

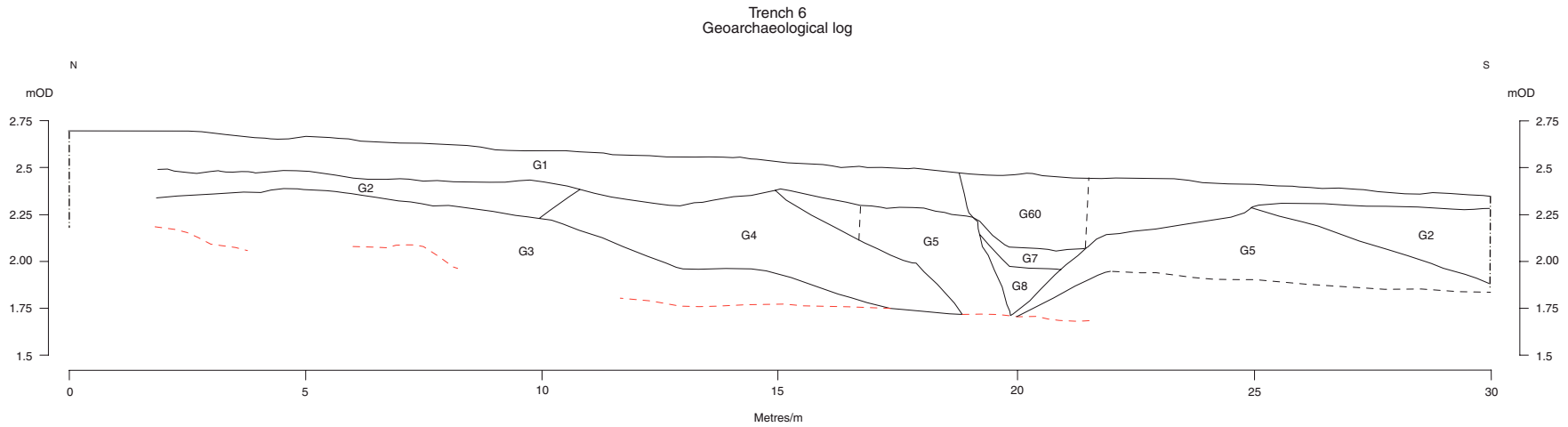

Figure 11: Geoarchaeological log, trench 6

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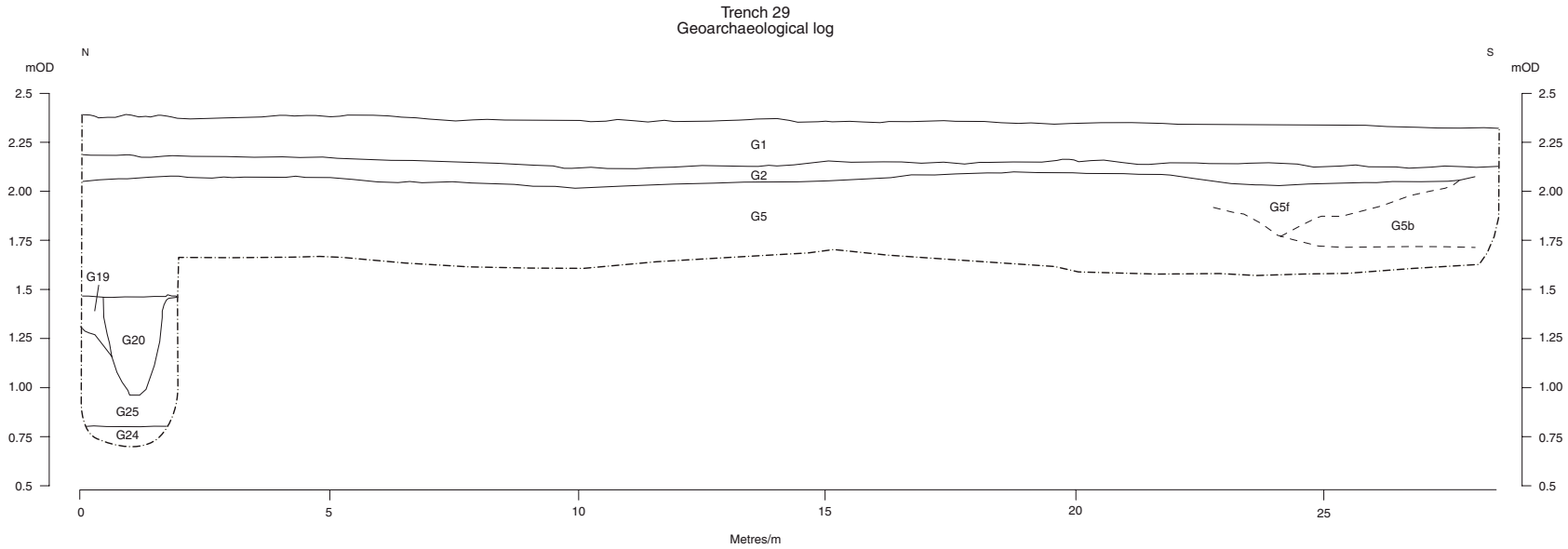

Figure 12: Geoarchaeological log, trench 29

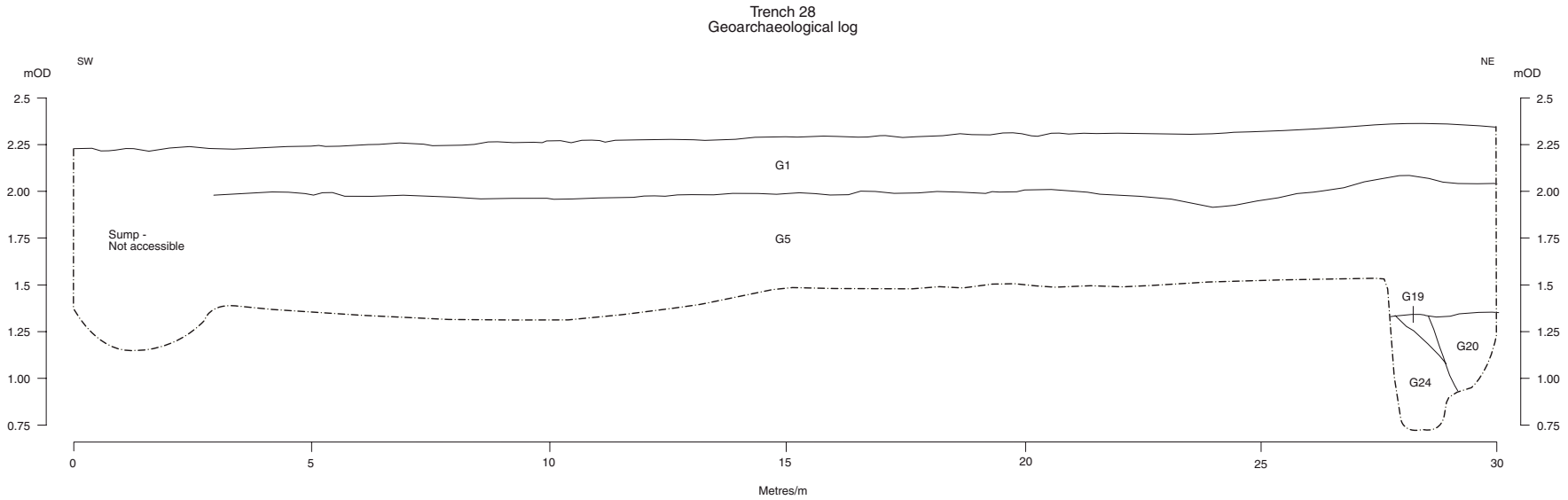

Figure 13: Geoarchaeological log, trench 28

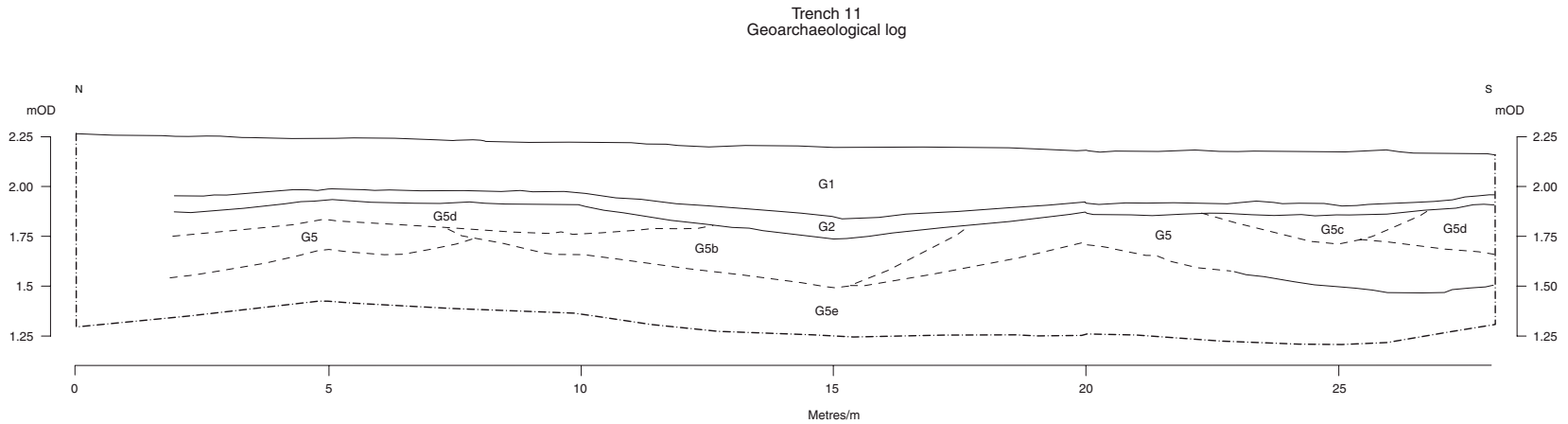

Figure 14: Geoarchaeological log, Trench 11

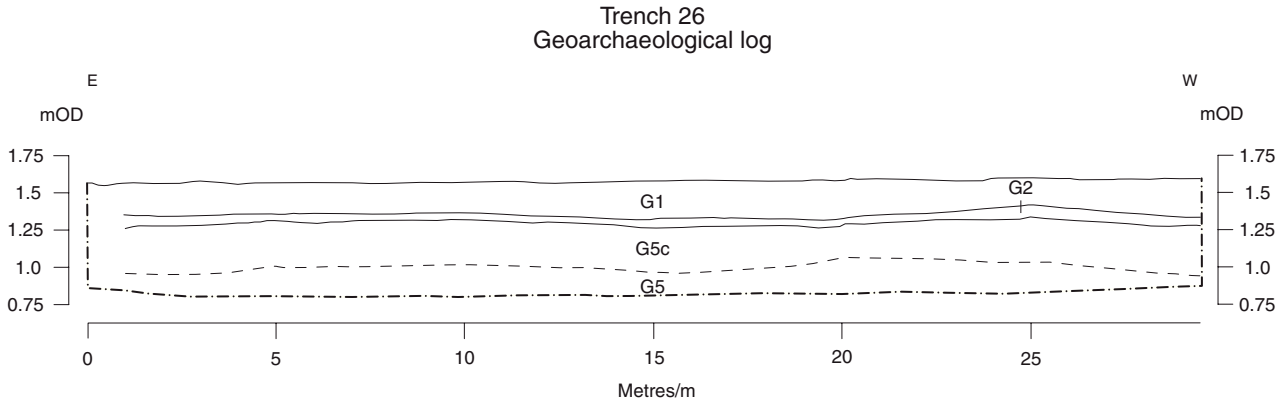

Figure 15: Geoarchaeological log, trench 26

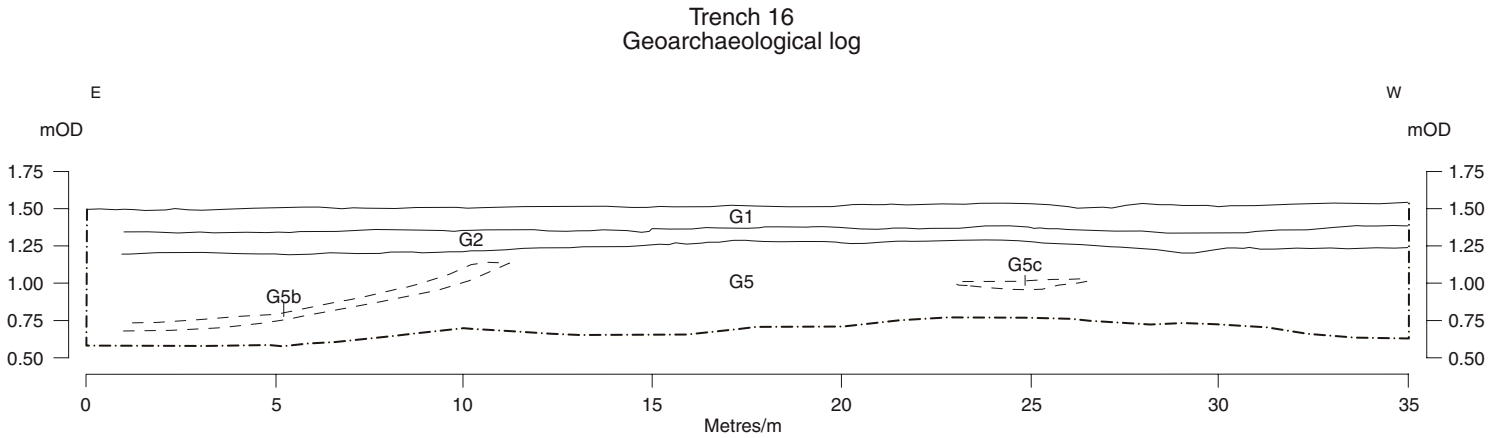

Figure 16: Geoarchaeological log, trench 16

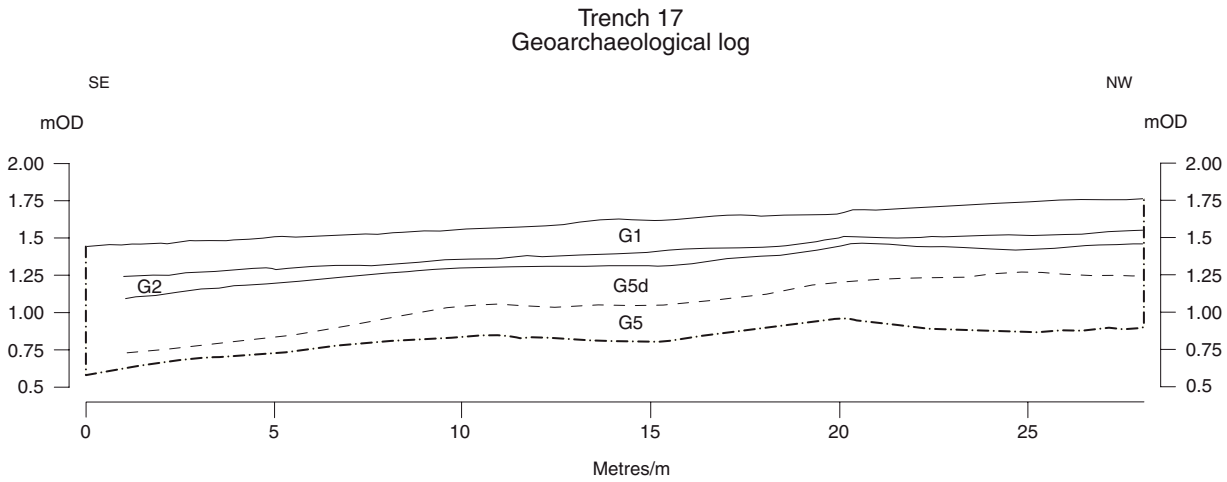

Figure 17: Geoarchaeological log, trench 17

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Figure 18: Trench plan overlaid on 1898 Ordnance Survey map

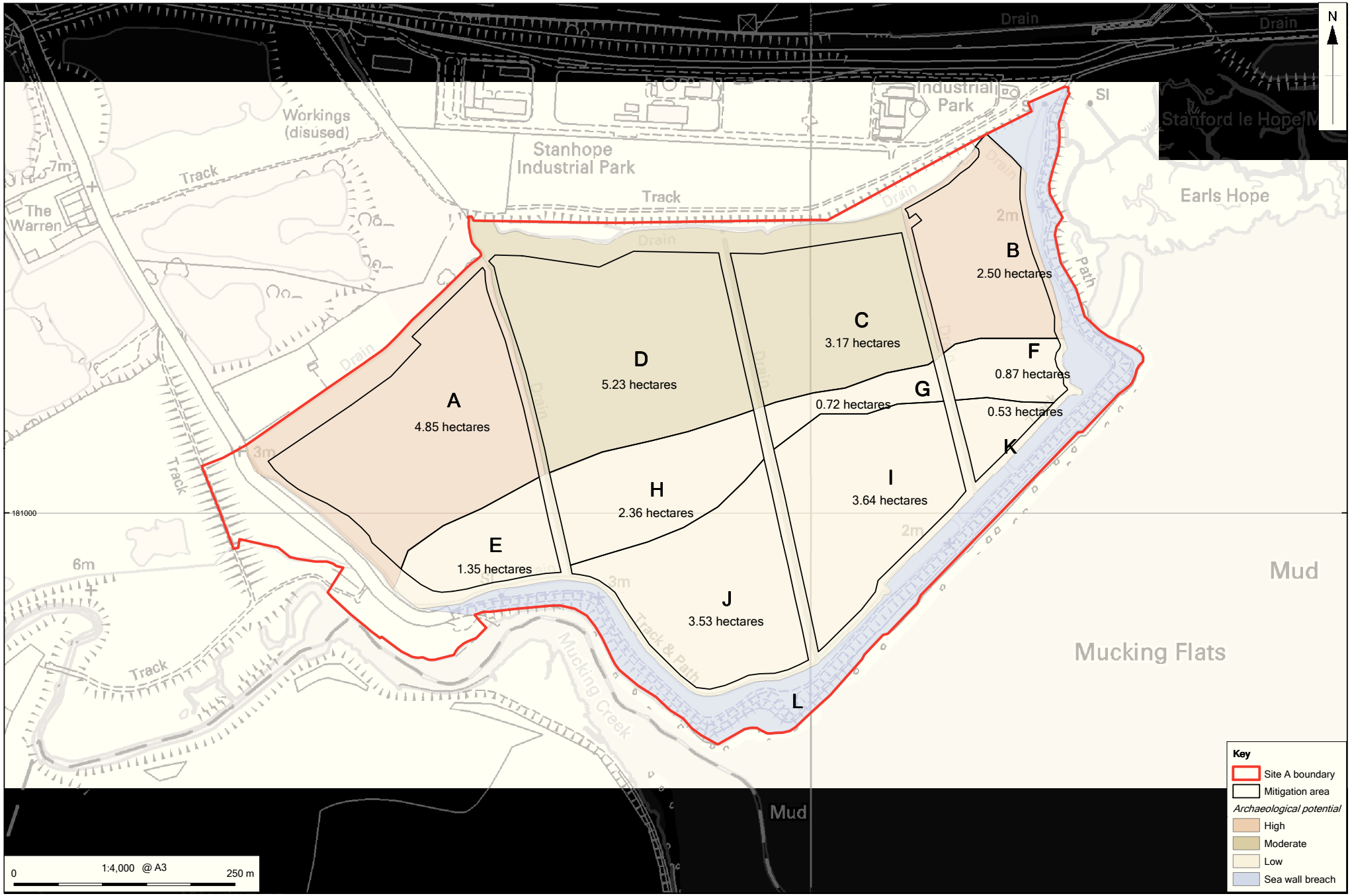

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Figure 19: Archaeological areas of potential, as defined for mitigation purposes

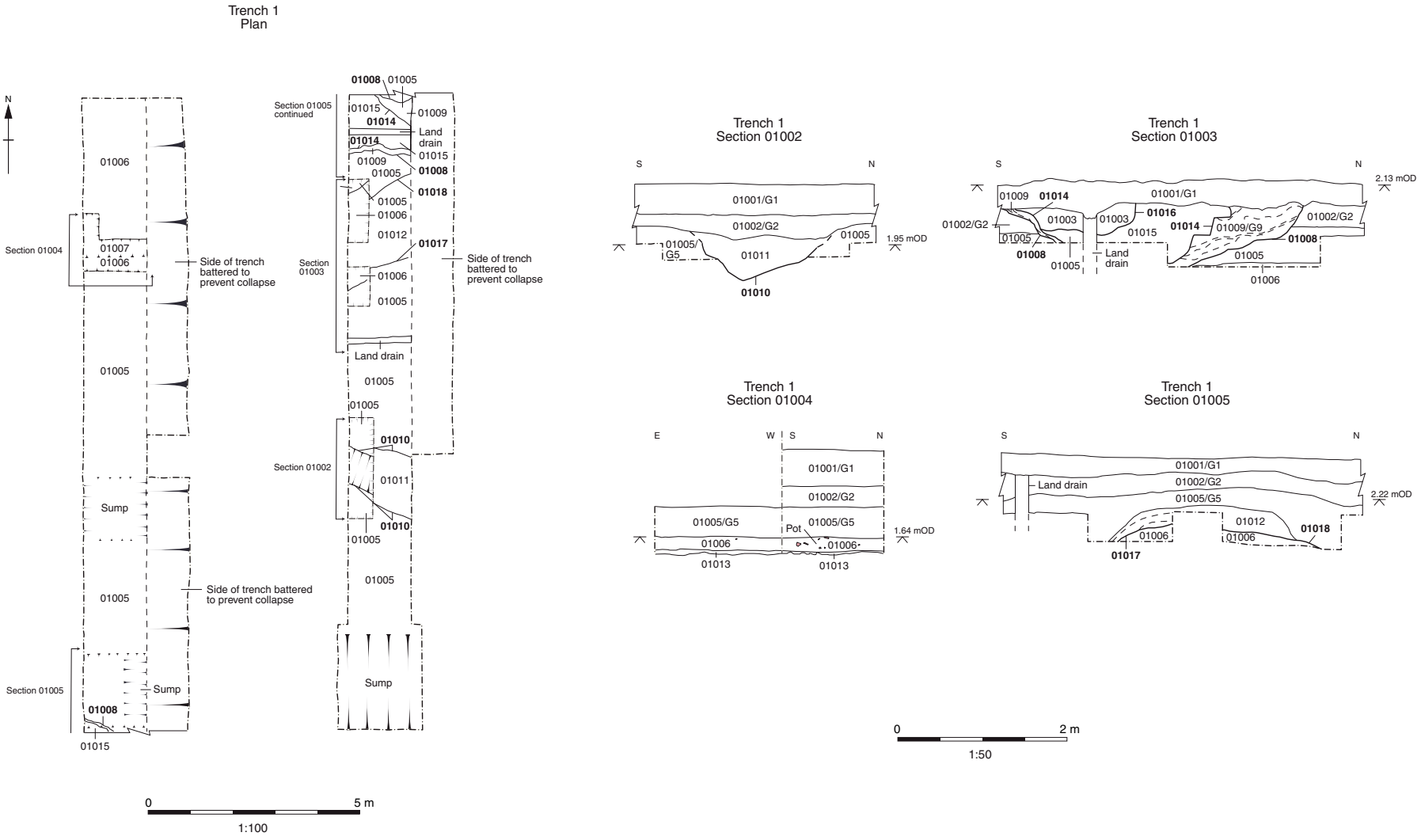


Figure 20: Trench 1, plan and sections

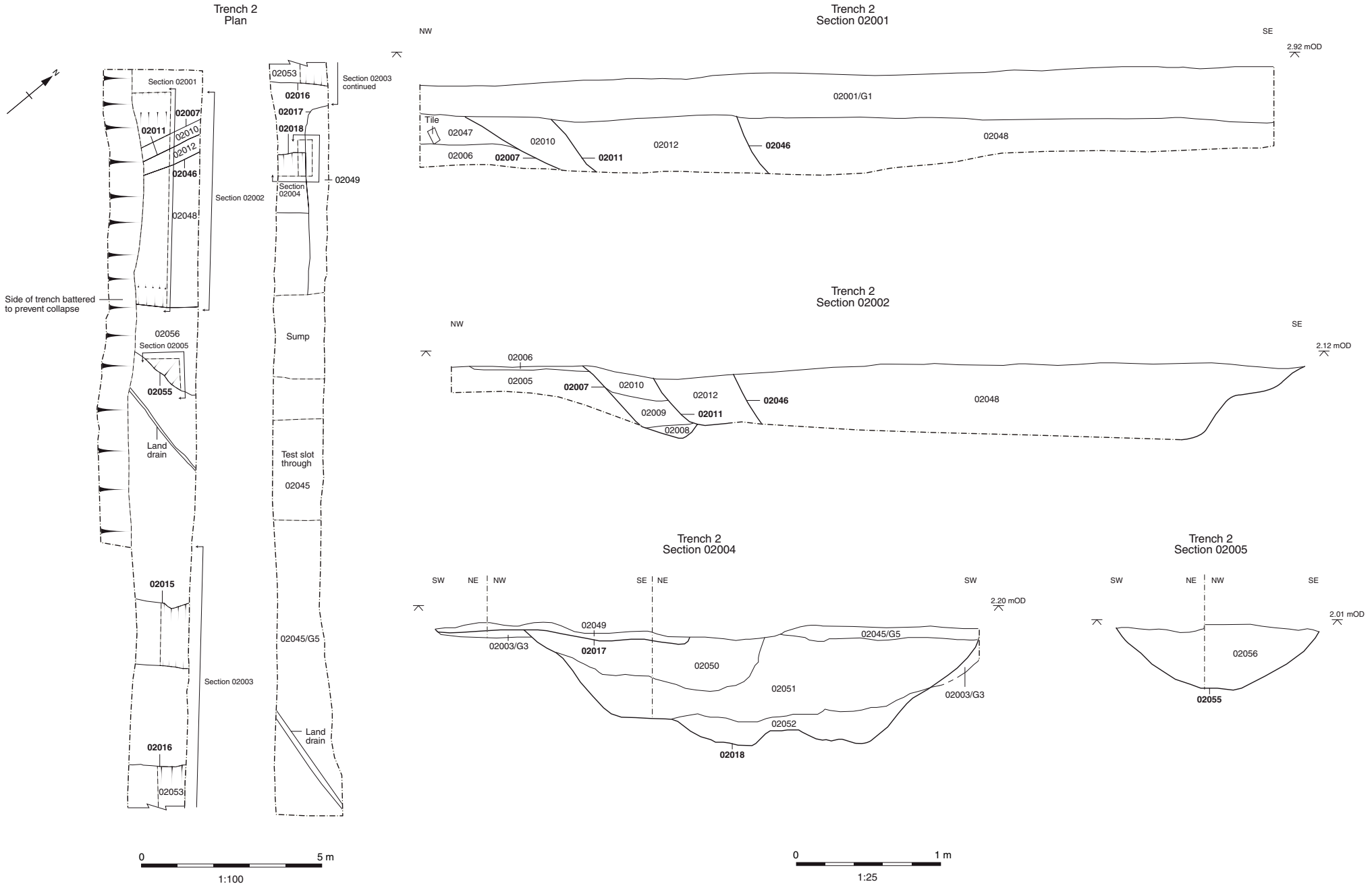


Figure 21: Trench 2, plan and sections

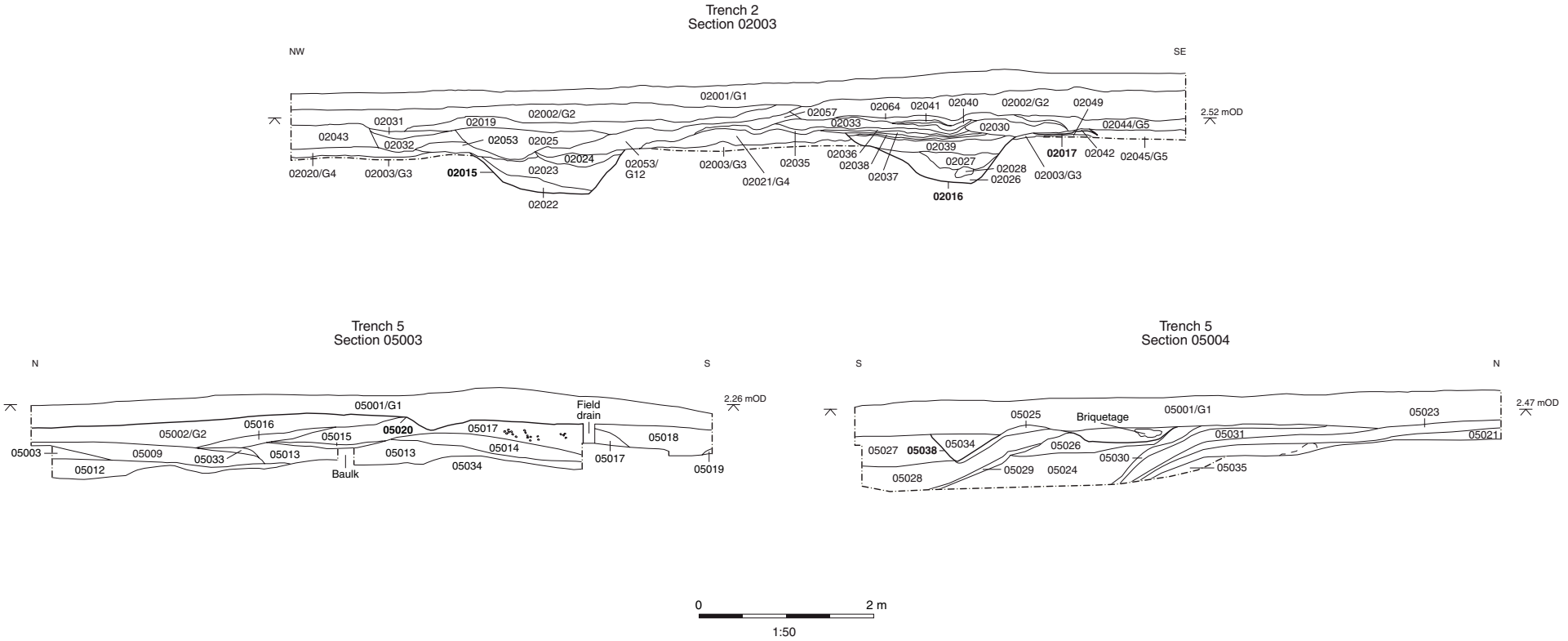


Figure 22: Trenches 2 and 5, long sections

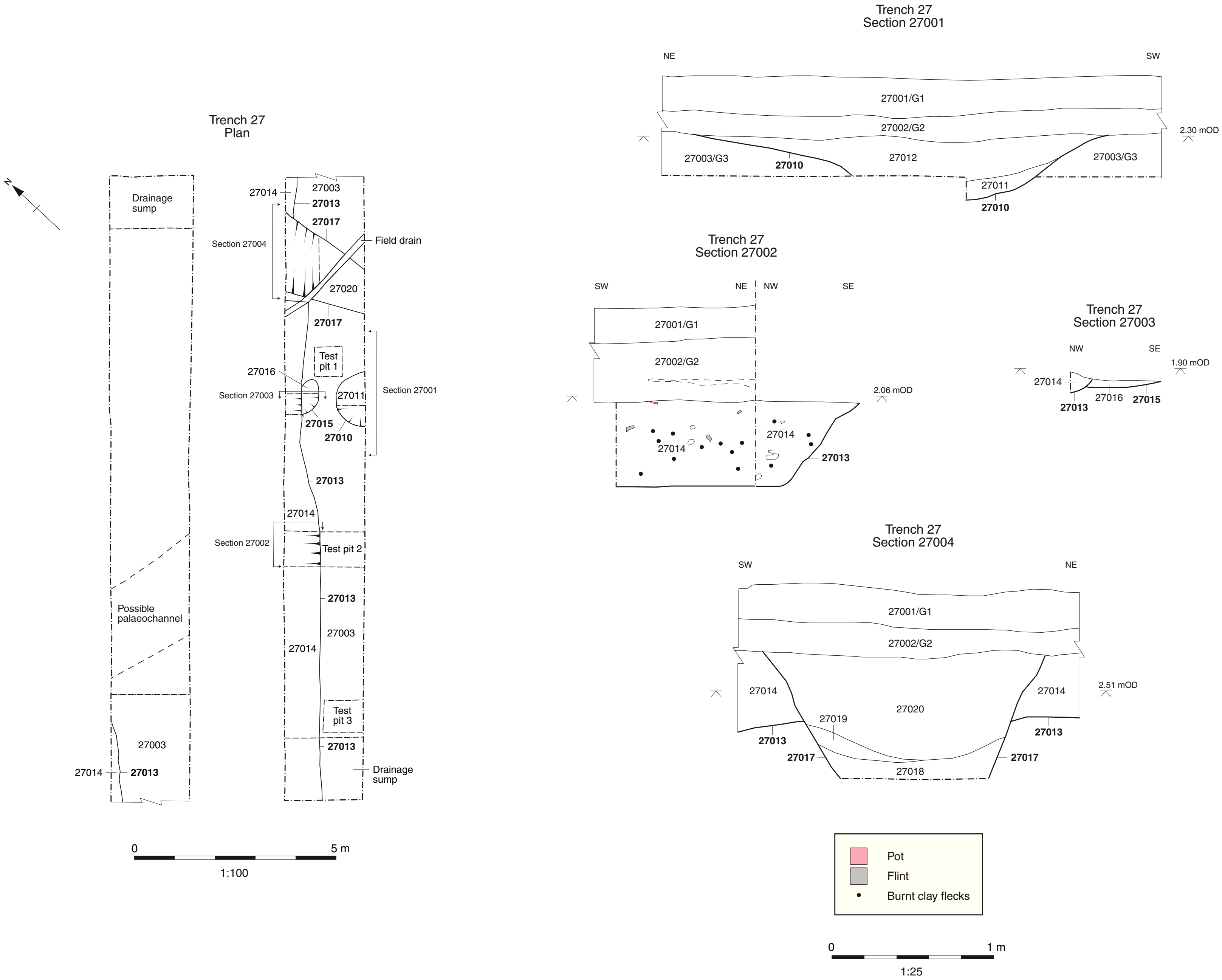
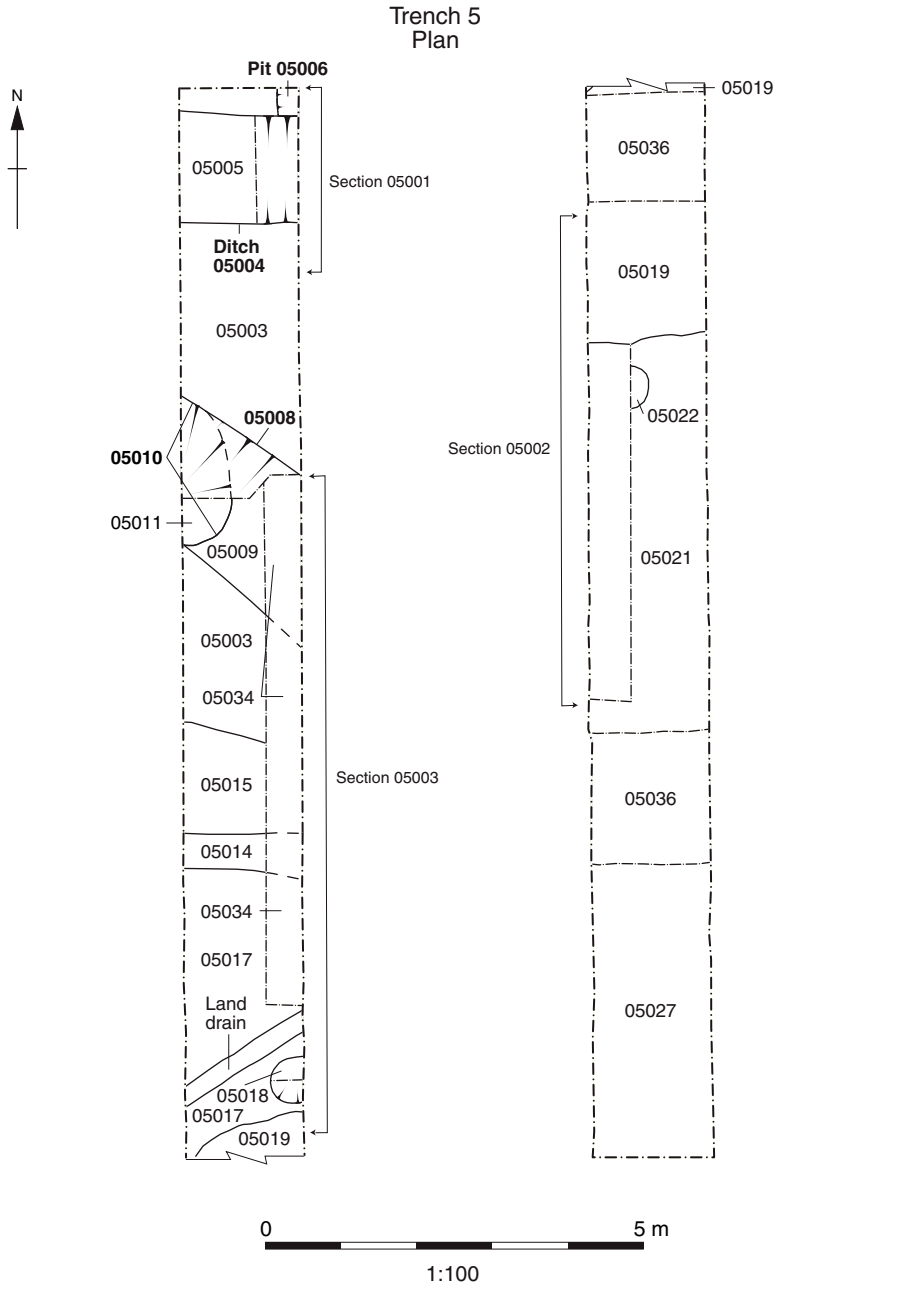


Figure 23: Trench 27, plan and sections



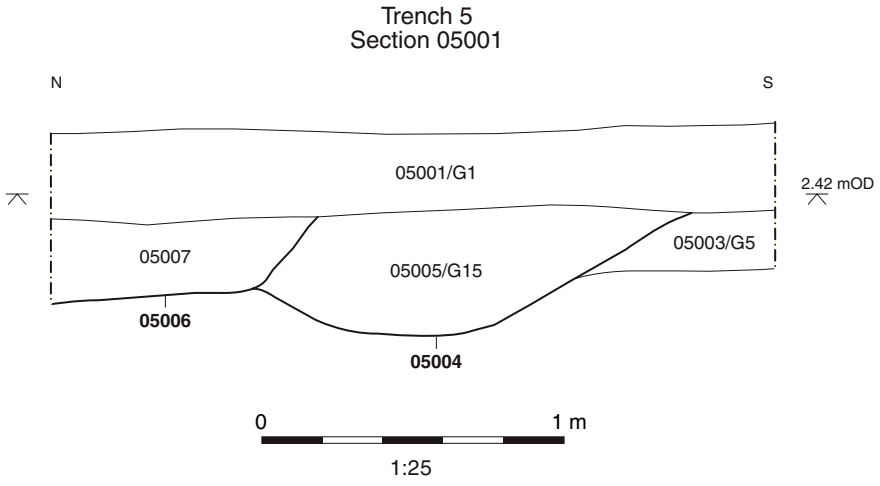


Figure 24: Trench 5, plan and section

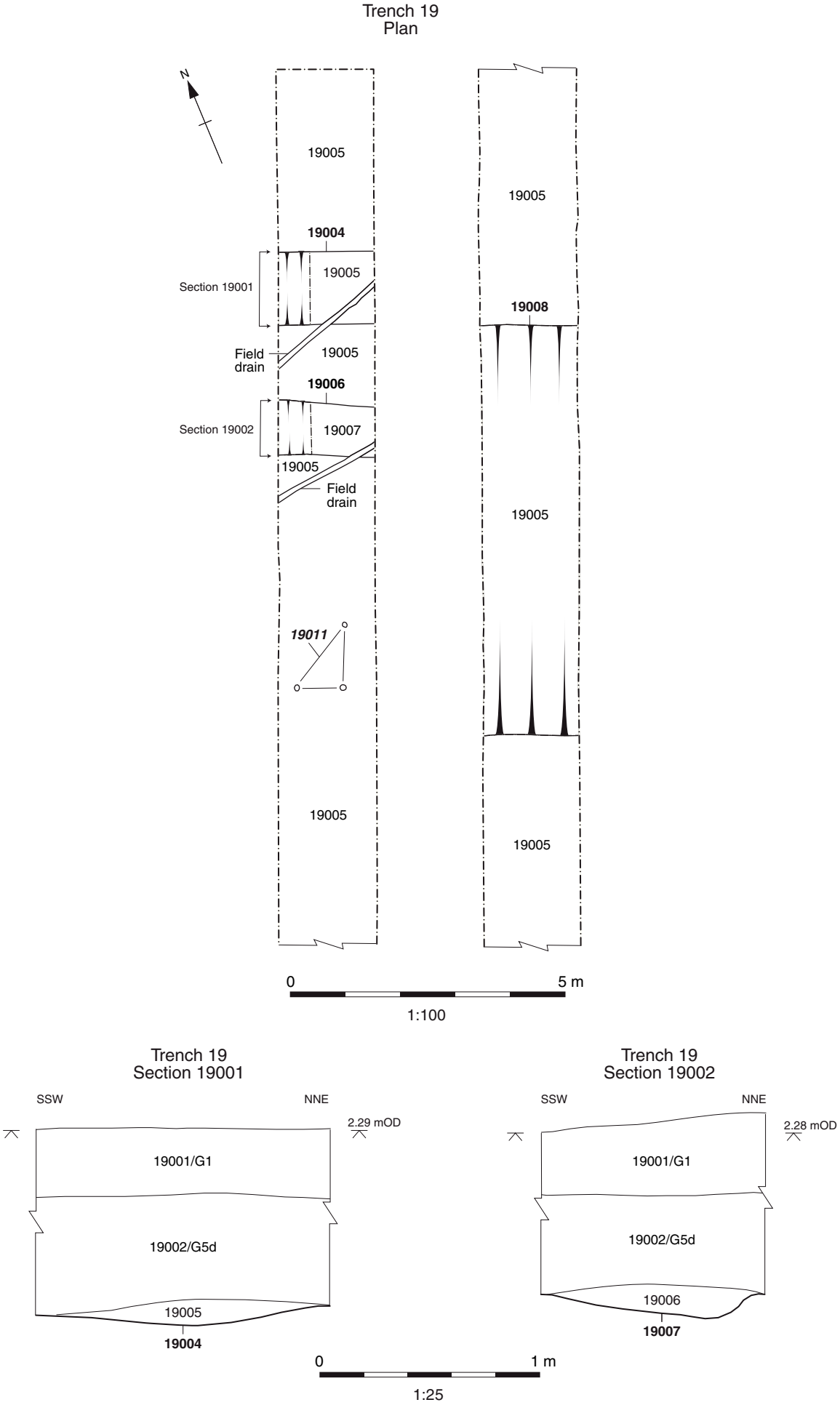


Figure 25: Trench 19, north plan and sections

Plate 1: Sand silt deposit (G3) above the Pleistocene gravels and underlying the red hill deposits Terrace gravels in trench 1

Plate 2: Head deposits in trench 28

Plate 3: Double ditch 01017/01018 and bank 01012 in trench 1

Plate 4: Ditch 02015 and 'red-hill' deposits in trench 2

Plates 3 and 4

Plate 5: Ditch 02016 and 'red-hill' deposits in trench 2

Plate 6: 'Red-hill' deposits and possible bank in trench 5

Plate 7: Flint scraper and retouched blades from layer 27003 in trench 27

Plate 8: Roman rim sherds from trench 2

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