Geoarchaeological Field Evaluation and Palaeolithic Period investigation of Land at Conningbrook Park, Wetland Mitigation Ashford, Kent

Site Code: CNW-EV-22

NGR Site Centre: 603440 144134

Planning Application Number: 22/00051/AS

SWAT ARCHAEOLOGY

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Tables

Abstract

Swale & Thames Survey Company (SWAT Archaeology) was commissioned to undertake an archaeological evaluation on Land at Conningbrook Park, Wetland Mitigation, Ashford in Kent. The archaeological programme was monitored by the Senior Archaeological Officer at Kent County Council.

The archaeological works have investigated the extents of the proposed development area. No deposits that can conclusively be attributed to the Pleistocene were identified during the evaluation.

Quaternary deposits attributed to the last aggradation of the River Great Stour were found to underlie the site, this comprised: fluvial sands and gravel, alluvial sands silts peats and clay. No Pleistocene artefacts or fossils were found within the sands and gravels, nor were there samples suitable for OSL dating, which could be used to equivocally date these deposits. The basal sands and gravels were identified across the site at the lower elevations resting on or cutting through the bedrock of the Gault Clay (Folkstone Beds), stratigraphically relationships with the current river and higher river terrace deposits mapped in the area suggest that these sands and gravels may have been deposited during the warming phase of immediate last post glacial period. Subsequently a warmer and less turbulent phase of the Stours evolution is identified by the thick deposits of finer sands, silts and peaty deposits (loam) sealed below a thick blue alluvial clay, from these deposits numerous artefacts and palaeoenvironmental material was recovered. There is evidence of early Holocene human activity, and the finding of Castor fiber (Beaver) lower mandible (with cut marks), indicates a still and brackish and wooded river environment.

The evidence from the evaluation suggests that the Quaternary deposits across the site are latest Pleistocene or earliest Holocene and as such there is a very low possibility of in-situ Palaeolithic archaeology, it is however still likely that there may be occasional Palaeolithic artefacts reworked into the Quaternary sands and gravels from the reworking of the older and higher terraces which are of a known Pleistocene age.

The Quaternary deposits do preserve significant Palaeoenvironmental evidence and samples were taken for various dating methodologies: C14, Dendrochronology, Amino-acid racemization, calcite OSL dating, MAZ, and lithic technologies, peaty samples may also contain pollen.

As the archaeological bearing loam deposits are in places ~1.4m BGL, further archaeological mitigation may be required for these areas. It is likely that these deposits will contain further evidence of early Holocene activity and a low possibility of rare upper Palaeolithic archaeology. However the excavation associated with this particular wetland development won't be deeper than ~1.0m BGL therefore it won't

be having an impact on buried resources and the archaeological bearing loam deposits can be preserved in-situ precluding the necessity of any further work on this site.

The archaeological evaluation has been successful in fulfilling the primary aims and objectives of the Specification and has assessed the archaeological potential of land intended for development. The results from this work are showing that development proposals won't be having any significant impact on buried archaeological resource. .

The full results, recommendations and methodology are presented in Appendix 3.

This report will be used to aid and inform the Senior Archaeological Officer of any further archaeological mitigation measures that may be necessary in connection with any future development proposals.

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1 Introduction

1.1 Project Background

1.1.1 Swale & Thames Survey Company (SWAT Archaeology) was commissioned to undertake a Geoarchaeological Field Evaluation and Palaeolithic Period investigation on land at Conningbrook Park, Wetland Mitigation Ashford, Kent (Figure 1).

1.1.2 The proposed development comprises the construction of a wetland mitigation area involving the division of the area into a series of beds separated by the creation of berms. Water levels within the wetland area will be controlled by the installation of several water channels supported by a network of water pipes and a pumping station in the southwest corner of the evaluation area. Management of silt and soil erosion will be via the construction of several weir chambers distributed across the evaluation area and through excavating a series of spreader channels.

1.1.3 A planning application (22/00051/AS) has been submitted to Ashford Borough Council and the following conditions were imposed on the permission with regard to archaeology:

Condition: Prior to the commencement of development the applicant, or their agents or successors in title, will secure:

• *geoarchaeological field evaluation works in accordance with a specification and written timetable which has been submitted to and approved by the Local Planning Authority; and*

• *further geoarchaeological and Palaeolithic period investigation, recording and reporting, determined on the results of the evaluation, in accordance with a specification and timetable which has been submitted to and approved by the Local Planning Authority;*

• *Programme of post-excavation assessment and publication*

Reason: To ensure that feature of geoarchaeological and Palaeolithic interest are properly examined, recorded, reported and disseminated.

1.1.4 *Condition: Prior to the commencement of development the applicant, or their agents of successors in title, will secure:*

- *Archaeological field evaluation works in accordance with a specification and written timetable which has been submitted to and approved by the Local Planning Authority; and*
- *Further archaeological investigation, recording, reporting, determined by the results of the evaluation, in accordance with a specification and timetable which has been submitted to and approved by the Local Planning Authority;*
- *Programme of post excavation assessment and publication.*

Reason: To ensure that features of archaeological interest are properly examined, recorded, reported and disseminated.

1.1.5 This document responds to a first condition and presents the results of Geoarchaeological Field Evaluation and Palaeolithic Period investigation which was carried out over the course of 5 days in June 2022 (see Table 1 below). The evaluation was carried out in accordance with an archaeological Written Scheme of Investigation (WSI) prepared by Wessex Archaeology (2022), prior to commencement of works.

1.2 Timetable

1.2.1 A timetable for the archaeological programme of works, to date, is provided below;

Task	***Dates***	***Personnel/Company***
Archaeological Desk-Based Assessment	2020/2021	Wessex Archaeology
Geoarchaeological Deposit Model and Desk-Based Assessment	2020/2021	Wessex Archaeology
Submission of the Written Scheme of Investigation	March 2022	Wessex Archaeology
Archaeological Evaluation: Fieldwork	6th-21st June 2022	SWAT Archaeology
Archaeological Evaluation Report	July 2022	SWAT Archaeology

Geoarchaeological Field Evaluation and Palaeolithic Period investigation	This document	SWAT Archaeology

Table 1 *Timetable for the archaeological programme of works*

1.3 Site Description, Topography and Geology

1.3.1 The proposed development area (PDA) is located 2.8 km northeast of the centre of Ashford and 3.2 km southwest of the village of Wye. It comprises an irregular parcel of land of c.4.7 ha, comprised of two fields.

1.3.2 The PDA forms a part of the Great Stour Valley floodplain and is flooded seasonally by the Great Stour. It has a surface height of between 31 and 32 m above Ordnance Datum (OD), with the surrounding land at a similar topographical level.

1.3.3 The Geological Survey of Great Britain shows that the natural geology at the PDA (Proposed Development Area) consists of a bedrock comprising Folkestone Formation - Sandstone. Sedimentary Bedrock formed approximately 101 to 126 million years ago in the Cretaceous Period and Gault Formation – Mudstone, sedimentary Bedrock formed approximately 101 to 113 million years ago in the Cretaceous Period. Local environment previously dominated by shallow seas. Bedrock geology was capped by River Terrace Deposits comprising Sand and Gravel. Superficial Deposits formed up to 3 million years ago in the Quaternary Period in local environment previously dominated by rivers.

1.4 Scope of Report

1.4.1 This report has been produced to provide initial information regarding the results of the Geoarchaeological Field Evaluation and Palaeolithic Period investigation. The results from this work will be used to aid and inform the Senior Archaeological Officer (KCC) of any further archaeological mitigation measures that may be necessary in connection with any future development proposals.

2 Archaeological and Historical Background

2.1 Introduction

2.1.1 The archaeological and historical background was assessed in prior desk-based assessment (WA 2021a), which considered the recorded historic environment resource within a 1 km study area of the evaluation area. A summary of the results is presented below, with relevant entry numbers from the Kent Historic Environment Record (HER) and the National Heritage List for England (NHLE) included. Additional sources of information are referenced, as appropriate.

2.1.2 Further details of previous discoveries and investigations within the immediate and wider area may be found in the Kent County Council Historic Environment Record (HER) and have been summarised in correspondence with the KCCHC Senior Archaeological Officer.

2.2 Archaeological and historical context

Palaeolithic (970,000–10,700 kya)

2.2.1 The Palaeolithic and geoarchaeological context of the Site is considered in detail in Section 3.

Mesolithic (9,300–4,300 BC)

2.2.2 No Mesolithic activity has been identified within the evaluation area or its surrounding areas, but two flint scatters were discovered in colluvial/alluvial deposits in the East Great Stour valley at Smeeth, near Sellinge 7km southeast of the evaluation area (Glass 1999; Welsh 1998).

Neolithic–Iron Age (4,300 BC–AD 43)

2.2.3 During the later prehistoric periods, the broader landscape of Ashford is known to have supported well-settled and widespread prehistoric communities since the Neolithic period through to the Late Iron Age. These communities altered the landscape from that of one covered in dense woodland, as part of the 'Forest of Anderida', to a managed and farmed landscape with forest and wildwood clearings providing open wood pasture (Ashford Borough Council 2017).

2.2.4 Although there is abundant evidence of occupation in Ashford, the only discovery within 1km of the evaluation area relates to the recovery of a Bronze Age copper alloy socketed axe. Yet, the evaluation area's proximity to the River Great Stour would have made it favourable land for use as farmland or settlement. However, any settlement would probably have been located slightly further away from the river to avoid the seasonal flooding, possibly on the higher ground to the west or east of the evaluation area.

2.2.5 The lack of evidence within the landscape could be related to a lack of previous archaeological intrusive investigation. Cropmarks of two possible ring ditches, are located 470m to the northeast of the evaluation area. These have yet to be investigated through intrusive archaeological surveys but are likely to be prehistoric. They would imply a prehistoric community was present in the landscape though at which point in time remains unknown.

Romano-British (AD 43 – 410)

2.2.6 Archaeological evidence of a Roman presence in Ashford is abundant in the southern section of the town with a large Roman roadside settlement discovered at Westhawk Farm, Kingsnorth, 5km to the southwest of the evaluation area. However, evidence in the northern section of the town is scarce, possibly as a result of activity being focused to the south. Only a single find is recorded in the KHER within the 1km study area comprising a fragment of a Roman vessel 510m to the north of the evaluation area.

2.2.7 A possible Roman road ran from Ashford to Canterbury on a similar alignment to Canterbury Road. Roman roads would often be a hub for past activity with a known Romano-British farmstead in Wye found 600 m to the west of its projected alignment (Brindle et al 2017). It is possible that further settlements may have existed along the route, maybe in the Kennington area. Therefore, it is possible that there was a more defined Romano-British presence within this landscape than the current archaeological evidence is implying.

Early Medieval (AD 410 – 1066)

2.2.8 Little is known of the settlement pattern or use of the landscape within Ashford until the creation of the town sometime during the 9th century (Ashford Borough Council 2017). The evidence that has been uncovered shows a focus of activity in the Willesborough area of the town approximately 3km to the south of the evaluation area. Minor settlements are also thought to have existed at some of the surrounding villages, now districts within the town, by the Late Anglo-Saxon period such as Kennington, 1.3km to the northwest of the evaluation area.

Medieval (AD 1066 – 1540)

2.2.9 The closest settlement to the evaluation area recorded in the Domesday Book of 1086 is the manor of Kennington though many of the villages located in the wider landscape (Sevington, Wye, Brook) had been established by this time too. Most of Ashford fell under the jurisdiction of the Abbey of St Augustus in Canterbury both prior to and following the Norman Conquest.

2.2.10 There is evidence within the archaeological record and in documentary sources that there was a well-settled and prosperous agricultural society in Ashford during the medieval period. This was first recognised as early as 1243 when Henry III granted the town a charter to hold a market for livestock. Later during the 15th and 16th centuries cloth and wool trade flourished with much of the agricultural landscape around Ashford and around many of the dispersed settlements in the wider region of the Borough given over to use as pasture for grazing of sheep. Several medieval moated sites, symbols of medieval aristocrats are present within Ashford that point towards a concretion of wealth and status in the countryside (Ashford Borough Council 2017).

2.2.11 A medieval manor house known as Conningbrook Manor is thought to have existed to the south of the evaluation area, possibly close to the later post-medieval house that is also known as Conningbrook Manor. There are almost no records of the manor as it was part of the larger manor of Kennington and was not recorded separately in documentary evidence. However, Ashford Archaeological Society have conducted investigations along the north-eastern bank of Conningbrook Lakes and revealed the medieval remains of a Conningbrook Chapel, a former church associated with the Manor, along with a medieval well.

Post-medieval (AD 1540 – 1900)

2.2.12 Conningbrook Manor is a 17th century Grade II Listed house located 650m to the south of the evaluation area (TR 04 SW 267). Possibly the replacement of an earlier medieval manor house, the listed building was later developed into a working farmstead with farm buildings constructed to the east (MKE 87368). It is likely that the land to the north of the farmstead including the evaluation area fell with the landholdings of the manor during the postmedieval period.

2.2.13 In addition to Conningbrook Manor farmstead, several other farms were established during the post-medieval period pointing to a well organised and highly developed farming community in the area. A contributing factor to their establishment may have been the creation of a network of drainage ditches in the farmland around the evaluation area to help control the seasonal flooding of the area by the River Great Stour. This would have meant that the lands use of farming was more stable and could be more profitable.

Modern (AD 1901 – Present)

2.2.14 Historic mapping from the middle of the 19th century up to present day shows the evaluation area has not changed in almost 180 years and that its use has, since this the production of the earliest detailed cartographic map of the area, been for farming. The only distinct variation is the later creation/expansion of the drainage ditches present within the evaluation area. Apart from the later excavation of Conningbrook Quarry and suburban expansion of former villages, such as Kennington, the wider area has remained undeveloped.

2.2.15 The only significant alteration to the landscape during this period was the construction of the of the railway line to the west of the evaluation area that formed part of the Southeastern Railway. Set on its own embankment, the construction of the line severed the agricultural landscape that existed between Willesborough Road and Blackwall Road in two.

2.2.16 Geophysical survey in the fields on the western side of the railway line, 240m to the west of the evaluation area, revealed a number of linear anomalies. These were later investigated as part of an archaeological evaluation and identified to be the remains of post-medieval or possibly medieval, field boundaries (SWAT 2018). The discovery indicates that the more regular large open field system that we see today was previously subdivided into smaller fields likely under ownerships of several individuals. The later re-organisation of the field system was probably a result of the Enclosure Acts from the 17th-19th centuries that saw land ownerships boundary changes and the removal of former medieval strip field systems.

2.2.17 The KHER records a World War II Supermarine Spitfire crash sites 280m to the southwest of the evaluation area. The aircraft is noted to have crashed on 11th September 1944 following engagement with German fighter craft.

3 PALAEOLITHIC ARCHAEOLOGICAL AND GEOARCHAEOLOGICAL BACKGROUND

3.1 Introduction

3.1.1 The Palaeolithic archaeological and geoarchaeological potential of the evaluation area has been specifically highlighted and was assessed in a prior Palaeolithic archaeological and geoarchaeological desk-based assessment, which included the production of an initial deposit model and the creation of a Geoarchaeological Landscape Characterisation (GLC) (WA 2021b). The results are summarised below.

3.2 Previous Palaeolithic archaeological and geoarchaeological investigations related to the proposed development

Harrison Collection (1980s-1990s)

3.2.1 Aggregate extraction beginning in the early 20th century and increased towards the end of the century at the Conningbrook Quarry, located immediately south and west of the evaluation area and mapped by the BGS as River Terrace Deposits 3 of the River Great Stour. When aggregate extraction began producing artefactual and faunal material, a team led by David Harrison conducted regular site visits, recovering Pleistocene fauna and artefacts both from the conveyor, excavations and amateur collections (ASE 2017b).

3.2.2 Finds included the discovery of a bison horn core and the presence of intact Holocene and Pleistocene deposits of the Great Stour. The collected flint artefacts contained a range of material including handaxes (Lower Palaeolithic), Levallois cores (Middle Palaeolithic) and a blade point (Upper Palaeolithic; Jacobi et al 2006; Jacobi 2007). The blade point is typotechnologically diagnostic of the Lincombian-Ranisian-Jerzmanowician (LRJ) technocomplex. The LRJ is regarded to be the first Upper Palaoelithic techno-complex in Britain (Jacobi and Higham 2011), dated early in late MIS 3 (40–29 kya).

3.2.3 The faunal material recovered from base of the sequence has been attributed by Currant and Jacobi (2011) as belonging to the Pinhole Mammal Assemblage Zone (MAZ), which is consistent with MIS 3 (57-29kya) (Currant and Jacobi 2011 ASE). The material and records are now curated at the Harrison institute (ASE2017a). 3.2.4 As part of the program of mitigation associated with redevelopment of the former Conningbrook Quarry, a series of radiocarbon dates on faunal material recovered by Harrison has been produced by the Oxford Radiocarbon laboratory (ASE 2017b). These are:

OxA-1069 Bone, mammoth 33200±1300 BP

OxA-1610 Bone, mammoth d13C=-21.0 35200±1600 BP

OxA-1611 Bone, mammoth d13C=-26.0 38600±2400 BP

OxA-1612 HZM58.14184, bone, w.rhino d13C=-21.0 34000±1400 BP

OxA-1613 HZM58.14184, bone, w. rhino d13C=-26.0 35000±1500 BP

OxA-1644 Bone, mammoth d13C=-26.0 37300±1900 BP

OxA-1645 HZM58.14184, bone, w. rhino d13C=-26.0 33600±1200 BP

3.2.4 These radiocarbon dates are consistent with a Middle Devensian date (MIS 3; 57–29 kya).

Geoarchaeological Interpretation of Geotechnical Site Investigations at Conningbrook Manor Pit, Kennington, Kent. (ASE2017a)

3.2.5 In 2017, in advance of development works at Conningbrook Lakes (the former quarry area), ASE reported on the results from a watching brief, integrating their results with previous geotechnical works at the Site, which identified the extent of intact Pleistocene and Holocene sediments.

3.2.6 The study confirmed the survival of Quaternary deposits at the Conningbrook Lakes site and a stratigraphy consistent with the deposits investigated by Harrison. They also identified additional intact Pleistocene Head deposits and Holocene alluvium across the site which was previously believed to have been removed by aggregate extraction.

Geoarchaeological Test Pits 1-8 and 12-15 at Conningbrook Manor Pit, Kennington, Kent. (ASE 2017b)

3.2.7 Following the above report, ASE conducted a geoarchaeological evaluation of the area directly west and south-west of the evaluation area which included an updated model incorporating their previous works. Small amounts of CBM (ceramic building material) were recovered from the made ground but no artefacts or faunal material was recovered from the intact Pleistocene deposits. A series of environmental samples and a single OSL sample have been taken but, as yet the results have not been reported.

3.2.8 The results of the evaluation determined the extent of disturbance from the quarrying activity and highlighted areas of intact Quaternary deposits. They concluded that, aside from minor mitigation works comprising a watching brief for the remaining phases of works, the development would not affect the intact deposits of archaeological significance and recommended that the samples be processed along with further analysis of the Harrison collection.

3.2.9 Conningbrook Park, Ashford, Kent: Pleistocene and Palaeolithic Desk-Based Assessment. QUEST, University of Reading (Allen 2019)

3.2.10 In 2019 QUEST assessed the Pleistocene potential of an area of land at Conningbrook Park located to the north of the present evaluation area and the previously investigated Conningbrook Lakes (ASE 2017b). The works demonstrated intact Pleistocene deposits were present in this area and interpreted as:

- River Terrace Deposits – Terrace 3 of the River Great Stour
- Head-Brickearth, and
- Floodplain Alluvium

3.3 Geoarchaeological Landscape Characterisation (GLC)

Introduction

3.3.1 The initial deposit model and Geoarchaeological Landscape Characterisation (GLC) produced for the evaluation area (WA2021) used the results of the recent and existing GI works (Geo-environmental 2021; RSK 2018), previous geoarchaeological investigations (ASE 2017a; 2017b; Allen 2019), BGS mapping (BGS online viewer) and a LiDAR survey to identify the principal superficial deposits across the evaluation area, defining their extent (where possible) and providing an initial assessment of their geoarchaeological and archaeological potential.

LiDAR

3.3.2 Environment Agency LiDAR data coverage for the Proposed Scheme was examined but no evidence was apparent for any buried landform features, such as palaeochannels or gravel eyots.

Stratigraphy

3.3.3 The stratigraphy encountered across the deposit modelling area is divided into three main units: Topsoil, Alluvium and Sands and Gravels. Deposits of Head and Made Ground were also recorded from the immediate vicinity of the evaluation area. These units are listed and described below.

Topsoil

3.3.4 Topsoil was recorded across the evaluation area and was present in all window samples along Transect 1. The Topsoil was characterised as a rooted sandy clay ranging in thickness from 0.20m at 0.00m bgl (32.26m OD) in WAWS2 to 0.30m at 0.00m bgl (32.40m OD) in WAWS5. This deposit represents modern soils formed along the current with floodplain of the River Great Stour.

Made Ground

3.3.5 Made Ground has been identified surrounding the evaluation area and is mostly associated with the 20th century quarrying. No made ground has been recorded within the evaluation area.

Alluvium

3.3.6 Alluvium was recorded in all boreholes across the evaluation area (WAWS1-8). Deposits generally consisted of fine-grained firm to soft silty and sandy clays. The units are described as clast free with occasional rooting in the upper levels. The alluvium ranges in thickness from 0.60m at 0.30m bgl (32.27m OD) in WAWS7 to 1.80m at 1.30m bgl (32.06m OD) in WAWS2.

Head

3.3.7 Whilst sediments identified as Head have been identified in the wider area, no Head deposits are recorded within the evaluation area.

Sands and Gravels

3.3.8 Sands and Gravels were recorded in three boreholes in the evaluation area (WAWS4, WAWS6 and WAWS7) sealed by Alluvium. WAWS6 recorded 0.2m+ at 1.80m bgl (30.69m OD) and WAWS7 recorded 1.10m at 0.90m bgl (31.67m OD) highlighting an increase in thickness and height consistent with river terrace deposits.

3.3.9 The lithological descriptions are generally consistent suggesting a clayey fine to coarse sand with the exception of WAWS6 which includes a gravelly component of sub angular to sub rounded flint. These deposits reflect fluvial deposition consistent with the BGS mapping of terrace deposits although the clay component within the lithology could suggest an element of solifluction/colluvial processes being present.

Bedrock

3.3.10 Although no interventions within the evaluation area have reached bedrock, the BGS attributes it to the Folkestone and Gault formations.

3.4 Palaeolithic archaeological and geoarchaeological potential

3.4.1 The Palaeolithic potential of the evaluation area can be considered in relation to zones of Palaeolithic archaeological potential provided by the Great Stour Basin Palaeolithic Project (Kent County Council 2015). The evaluation area falls within Palaeolithic Character Areas designated SP_34 and SP_36 and is located immediately west of the SP_37.

3.4.2 SP_34 has been suggested to contain Holocene alluvial deposits, underlain by later Pleistocene terraces deposits of the Great Stour, with late Pleistocene slope and can be underlain at its edges by Pleistocene slopewash. SP_36 is characterised as areas with poorly dated later Middle Pleistocene or Late Pleistocene (500,000-10,000 BP) terrace deposits and Head-Brickearth, whilst SP_37, located on the north/east side of the Great Stour valley has been identified as containing fluvial terrace deposits (attributed by the BGS as Terrace 4), most likely dating to the later middle Pleistocene (500-300kya).

3.4.3 The archaeological and geoarchaeological potential of the Quaternary deposits identified within the Site by the GLC are considered below.

Fluvial Sands and Gravels

3.4.4 The fluvial sands and gravels within the evaluation area are Pleistocene and belong to the terraces of the Great Stour. The age of these deposits is unclear, and they could include more than one terrace. However, they are likely to include deposits broadly equivalent to those located on the opposing western bank at Conningbrook Quarry (ASE 2017a, 2017b).

3.4.5 The deposits at Conningbrook Quarry have produced the Middle Devensian (59-27 Kya) faunal material, along with broadly contemporary Upper Palaeolithic archaeology (a blade point), as well as other Palaeolithic artefacts, which may be reworked from earlier deposits (handaxes and Levallois core) and a blade point (early Upper Palaeolithic; Jacobi et al 2006; Jacobi 2007). There is potential for similar early Upper Palaeolithic archaeology and paleoenvironmental evidence to occur with these deposits within the Site. Furthermore, if earlier terrace deposits are also present, these have broad potential to contain earlier contemporary, as well as reworked, Palaeolithic archaeology.

Alluvium

3.4.6 The Pleistocene Sands and Gravels in the Site are overlain by Holocene alluvium. The deposit modelling showed that the Holocene alluvium accumulated upon an uneven Pleistocene surface highlighting potential eyots forming islands of sands and gravel deposits and channelling which could be suggestive of braiding or an older route of the Great Stour. Such eyots may have formed a focus for archaeological activity by prehistoric human groups during the late Upper Palaeolithic and/or Mesolithic. The alluvium record in GI from the evaluation area is minerogenic, with low potential to preserve significant paleoenvironmental evidence or material for radiocarbon dating. Whilst palaeoenvironmental remains (such as pollen) are likely to be present, they may be derived from large source areas within the catchment and are thus of limited precision and value. Such minerogenic alluvium does, however, have the potential to contain, or mask, archaeological features and layers, alluvium still has the potential to contain or mask archaeology, although thus far no archaeology has been recorded / known from the alluvium in the area of the evaluation area.

3.4.7 Currently there is insufficient GI coverage across the evaluation area to precisely determine the presence/absence of peat which can often be locally present or existing as more extensive beds. It is possible that there may be highly localised peats preserved, either along the margins of the floodplain or in palaeochannel features. Where present these deposits would have a high geoarchaeological potential. The topography of the underlying Pleistocene deposits suggests highs and lows, the latter potentially forming depressions in which peat or other fine-grained deposits may have accumulated.

3.5 Recent investigations in the area

3.5.1 There are no known recent archaeological investigations within the area.

4 Aims and Objectives

4.1 Archaeological evaluation

General aims

4.1.1 The general aims (or purpose) of the evaluation, in compliance with the CIfA Standard and guidance for archaeological field evaluation (CIfA 2014a), are to:

- provide information about the archaeological potential of the site; and
- inform either the scope and nature of any further archaeological work that may be required; or the formation of a mitigation strategy (to offset the impact of the development on the archaeological resource); or a management strategy.

General objectives

4.1.2 In order to achieve the above aims, the general objectives of the evaluation are to:

- determine the presence or absence of archaeological features, deposits, structures, artefacts or ecofacts within the specified area;
- establish, within the constraints of the evaluation, the extent, character, date, condition and quality of any surviving archaeological remains;
- place any identified archaeological remains within a wider historical and archaeological context in order to assess their significance; and
- make available information about the archaeological resource within the site by reporting on the results of the evaluation.

4.2 Palaeolithic evaluation

General aims

4.2.1 The general aims (or purpose) of the evaluation, in compliance with the CIfA Standard and guidance for archaeological field evaluation (CIfA 2014a), are to:

- provide information about the Palaeolithic archaeological and geoarchaeological potential of the site;
- consider the possible significance of any Palaeolithic archaeological and geoarchaeological evidence present in the context of national and regional research priorities and agendas, and
- inform either the scope and nature of any further Palaeolithic archaeological work that may be required; or the formation of a mitigation strategy (to offset the impact of the development on the archaeological resource); or a management strategy.

General objectives

4.2.2 In order to achieve the above aims, the general objectives of the evaluation are to:

- to establish the potential for Quaternary deposits in the site to preserve significant Palaeolithic archaeological and geoarchaeological remains;
- to establish the potential of the Quaternary deposits to preserve significant paleoenvironmental evidence;

- where appropriate, obtain samples from Quaternary deposits for palaeoenvironmental assessment and scientific dating;
- make available information about the archaeological and geoarchaeological resource within the site by reporting on the results of the evaluation; and
- to make recommendations for further work, where appropriate, including for paleoenvironmental assessment and scientific dating of retained samples from Quaternary deposits.

5 METHODOLOGY

5.1 Introduction

5.1.1 All fieldwork was conducted in accordance with the methodology set out in the Specification (Wessex 2022) and carried out in compliance with the standards outlined in the Chartered Institute for Archaeologists' Standards Guidance for Archaeological Evaluations (CIfA 2014).

5.2 Fieldwork

5.2.1 A total of fifteen geoarchaeological test pits were excavated (Figure 3 in appendix). Excavation was carried out using a mechanical excavator fitted with a toothless ditching bucket, removing the overburden to the top of the first recognisable archaeological horizon, under the constant supervision of an experienced geoarchaeologist.

5.2.2 A detailed methodology and results of Geoarchaeological & Palaeolithic Evaluation at Conningbrook Park Wetlands, Ashford, Kent are presented in the appendix 3.

6 Results

6.1 Introduction

6.1.1 The archaeological works have investigated the extents of the proposed development area using fifteen geological test pits. The results of Geoarchaeological & Palaeolithic Evaluation at Conningbrook Park Wetlands, Ashford, Kent are presented in the appendix 3.

6.1.2 As the archaeological bearing loam deposits are in places ~1.4m BGL, further archaeological mitigation may be required for these areas. It is likely that these deposits will contain further evidence of early Holocene activity and a low possibility of rare upper Palaeolithic archaeology.

6.1.3 However the excavation associated with this particular wetland development won't be deeper than 1.0m BGL therefore it won't be having an impact on buried resources and the archaeological bearing loam deposits can be preserved in-situ precluding the necessity of any further work on this site.

6.1.4 For full detailed results and recommendations go to Appendix 3

7 Archive

7.1 General

7.1.1 The Site archive, which will include paper records, photographic records, graphics and digital data, will be prepared following nationally recommended guidelines (SMA 1995; CIfA 2009; Brown 2011; ADS 2013).

7.1.2 All archive elements will be marked with the site/accession code, and a full index will be prepared. The physical archive comprises 1 file/document case of paper records and A4 graphics. The Site Archive will be retained at SWAT Archaeology offices until such time it can be transferred to a Kent Museum.

8 ACKNOWLEDGMENTS

8.1.1 SWAT would like to thank the Client for commissioning the project. Thanks are also extended to Wendy Rogers, Senior Archaeological Officer at Kent County Council, for her advice and assistance.

8.1.2 Pete Knowles supervised Geoarchaeological Field Evaluation and Palaeolithic Period investigation and additional fieldwork and sieving on-site was aided by Joe Cantwell, Bobbie-Jo Campbell, Django Rayner and Peter Cichy

8.1.3 Survey was carried out by Bartek Cichy and Django Rayner and this report was written by Pete Knowles with contributions from Peter Cichy. On behalf of the client project was directed by Dr Paul Wilkinson MCIfA, FRSA of SWAT Archaeology.

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10 APPENDIX 1 – Core personnel

Project Management - Fieldwork	**Role**
Dr Paul Wilkinson, MCIfA, FSA	Director
Peter Cichy	Project Manager
Pete Knowles	Site Supervisor
Django Rayner	Surveyor
Finds	**Specialist**
Flint	Pete Knowles
Early Prehistoric Pottery	Paul Hart
Later prehistoric and Roman pottery	Dr Malcolm Lyne
Saxon, Medieval and Post Medieval pottery	Luke Barber
Metal finds, glass and oyster	Ges Moody
Conservation support and x-ray photography	Dana Goodburn-Brown, MSc
Samples and human remains	**Specialist**
Environmental soil processing	QUEST
Faunal, floral micro and macro remains	Dr Mike Allen
Animal Remains (Bones)	Carol White
Palaeomagnetism	Peter Cichy
Human Remains	Dr Chris Dieter
Micro-excavation (cremation burials)	Dana Goodburn-Brown
Post-Excavation and publication	**Role**
Pete Knowles	Author
Peter Cichy	Introduction

11 APPENDIX 2 – HER FORM

Site Name: Land at Conningbrook Park, Wetland Mitigation, Ashford in Kent

SWAT Site Code: CNW-EV-22

Site Address: As above

Summary

Swale & Thames Survey Company (SWAT Archaeology) was commissioned to undertake an archaeological evaluation on Land at Conningbrook Park, Wetland Mitigation, Ashford in Kent. The archaeological programme was monitored by the Senior Archaeological Officer at Kent County Council.

The archaeological works have investigated the extents of the proposed development area. No deposits that can conclusively be attributed to the Pleistocene were identified during the evaluation.

Quaternary deposits attributed to the last aggradation of the River Great Stour were found to underlie the site, this comprised: fluvial sands and gravel, alluvial sands silts peats and clay. No Pleistocene artefacts or fossils were found within the sands and gravels, nor were there samples suitable for OSL dating, which could be used to equivocally date these deposits. The basal sands and gravels were identified across the site at the lower elevations resting on or cutting through the bedrock of the Gault Clay (Folkstone Beds), stratigraphically relationships with the current river and higher river terrace deposits mapped in the area suggest that these sands and gravels may have been deposited during the warming phase of immediate last post glacial period. Subsequently a warmer and less turbulent phase of the Stours evolution is identified by the thick deposits of finer sands, silts and peaty deposits (loam) sealed below a thick blue alluvial clay, from these deposits numerous artefacts and palaeoenvironmental material was recovered. There is evidence of early Holocene human activity, and the finding of Castor fiber (Beaver) lower mandible (with cut marks), indicates a still and brackish and wooded river environment.

The evidence from the evaluation suggests that the Quaternary deposits across the site are latest Pleistocene or earliest Holocene and as such there is a very low possibility of in-situ Palaeolithic archaeology, it is however still likely that there may be occasional Palaeolithic artefacts reworked into the Quaternary sands and gravels from the reworking of the older and higher terraces which are of a known Pleistocene age.

The Quaternary deposits do preserve significant Palaeoenvironmental evidence and samples were taken for various dating methodologies: C14, Dendrochronology, Amino-acid racemization, calcite OSL dating, MAZ, and lithic technologies, peaty samples may also contain pollen.

As the archaeological bearing loam deposits are in places ~1.4m BGL, further archaeological mitigation may be required for these areas. It is likely that these deposits will contain further evidence of early Holocene activity and a low possibility of rare upper Palaeolithic archaeology. However the excavation associated with this particular wetland development won't be deeper than ~1.0m BGL therefore it won't be having an impact on buried resources and the archaeological bearing loam deposits can be preserved in-situ precluding the necessity of any further work on this site.

The archaeological evaluation has been successful in fulfilling the primary aims and objectives of the Specification and has assessed the archaeological potential of land intended for development. The results from this work are showing that development proposals won't be having any significant impact on buried archaeological resource.

This report will be used to aid and inform the Senior Archaeological Officer of any further archaeological mitigation measures that may be necessary in connection with any future development proposals.

No Further work on-site is proposed. Other recommendations as per in Appendix 3

District/Unitary: Ashford Borough Council
Period(s): Early Prehistory, Holocene
NGR (centre of site to eight figures) 603440 144134
Type of Archaeological work: Geoarchaeological Evaluation and Palaeolithic period investigation
Date of recording: June 2022
Unit undertaking recording: Swale and Thames Survey Company (SWAT Archaeology)
Geology: Folkestone Formation - Sandstone. Sedimentary Bedrock formed approximately 101 to 126 million years ago in the Cretaceous Period and Gault Formation – Mudstone, sedimentary Bedrock formed approximately 101 to 113 million years ago in the Cretaceous Period. Local environment previously dominated by shallow seas. Bedrock geology was capped by River Terrace Deposits comprising Sand and Gravel. Superficial Deposits formed up to 3 million years ago in the Quaternary Period in local environment previously dominated by rivers.
Title and author of accompanying report: Peter Cichy (2022) Archaeological Evaluation of Land at Conningbrook Park, Wetland Mitigation, Ashford in Kent. Pete Knowles (2022) Geoarchaeological & Palaeolithic Evaluation at Conningbrook Park Wetlands, Ashford, Kent
Location of archive/finds: SWAT. Archaeology. Graveney Rd, Faversham, Kent ME13 8UP
Contact at Unit: Paul Wilkinson
Date: 22/07/2022

12 Appendix 3 Geoarchaeological & Palaeolithic Evaluation at Conningbrook Park Wetlands, Ashford, Kent (by Pete Knowles)

Pete Knowles

Lithics

Consultation and Curation

Report for a Geoarchaeological & Palaeolithic Evaluation at Conningbrook Park Wetlands, Ashford, Kent (NGR TQ 60176 74474)

Report by: Mr. Peter Knowles BSc (Hons) Ph.D. (student) 21st July 2022

Plate 1: View looking south and upstream of the River Great Stour at Conningbrook Park Wetlands, Test Pit 101 to the left

Tables

Plates

Figures

Introduction

1.1 Project Background

1.1.1 Swale & Thames Survey Company (SWAT Archaeology) was commissioned to undertake a Geoarchaeological Field Evaluation and Palaeolithic Period investigation on land at Conningbrook Park, Wetland Mitigation Ashford, Kent (Plate 1 & Figure 1).

1.1.2 The proposed development comprises the construction of a wetland mitigation area involving the division of the area into a series of beds separated by the creation of berms. Water levels within the wetland area will be controlled by the installation of several water channels supported by a network of water pipes and a pumping station in the southwest corner of the evaluation area. Management of silt and soil erosion will be via the construction of several weir chambers distributed across the evaluation area and through excavating a series of spreader channels.

1.2 Non-Technical Summary

1.2.1 The aims of the evaluation on land Conningbrook Park wetlands, Kent (National Grid Reference (NGR): TR 03440 44134; Figure 1) was to inform KCC about the Palaeolithic archaeological and geoarchaeological potential of the site. To establish sub-surface stratigraphy across the site and locate any evidence for Palaeolithic artefacts and Palaeoenvironmental remains.

1.2.2 Seventeen test pits (Figure 3) were sunk to a maximum depth of 3.2 m. BGL. No deposits that can conclusively be attributed to the Pleistocene were identified during the evaluation. Quaternary deposits that preserved significant palaeoenvironmental evidence were found across the site with evidence of early Holocene human activity

1.3 Scope

1.3.1 This report is an interim evaluation report that summarises the findings from the geoarchaeological test pit investigations carried out by Peter Knowles and SWAT Archaeology in June 2022. It provides an initial interpretation of those results. A full interpretation with correlation to previous work, results of: clast analysis, and sampling, full stratigraphic and photographic logs, and full analysis of lithic artefacts will be included in the subsequent final report.

1.3.2 A Written Scheme of Investigation for Pleistocene and Palaeolithic Investigation (wessexarchaeology, 2022) had previously been prepared for the site, the findings of which are largely reproduced in the following sections (sections 2.1 to 2.3), together with aims and objectives for the site (section 3).

2 Geoarchaeological Background

2.1 Site Context

2.1.1 The Site is located 2.8 km northeast of the centre of Ashford and 3.2 km southwest of the village of Wye. It comprises an irregular parcel of land of c.4.7 ha, comprised of two fields (Figure 1).

2.2 Topographic & geological context

2.2.1 The Site forms part of the Great Stour Valley floodplain and is flooded seasonally by the Great Stour. It has a surface height of between 31 and 33 m above Ordnance Datum (OD), with the surrounding land at a similar topographical level.

2.3 Bedrock Geology

2.3.1 The underlying bedrock geology across the Site is mapped as the Folkestone Formation, a sedimentary bedrock formed 126-100 million years ago (MA) (Figure 4).

2.4 Superficial Geology

2.4.1 The British Geological Survey mapping shows superficial deposits throughout the Site, deposits of Alluvium are recorded across most of the Site. The south-eastern section of the Site is mapped as River Terrace Deposits 4 of the Stour (Figure 5), this conflicts with current interpretations of the Stour, which would expect these to be Terrace 2 or lower (Bridgland et al., 1998; Kent County Council, 2018; Knowles, 2022; Knowles, in press).

2.5 Palaeolithic Archaeology

2.5.1 The Palaeolithic archaeological and geoarchaeological potential of the evaluation area has been specifically highlighted and was assessed in a prior Palaeolithic archaeological and geoarchaeological desk-based assessment, which included the production of an initial deposit model and the creation of a Geoarchaeological Landscape Characterisation (GLC) (wessexarchaeology, 2021).

2.5.2 The Palaeolithic potential of the evaluation area can be considered in relation to zones of Palaeolithic archaeological potential provided by the Great Stour Basin Palaeolithic Project (Kent County Council, 2018). The evaluation area falls within Palaeolithic Character Areas designated SP_34 and SP_36 and is located immediately west of the SP_37.

2.5.3 SP_34: South/east side of Stour valley through the Wealden gap north of Ashford. An area where there are Some fluvial terrace outcrops mapped, as well as Head and Head Brickearth deposits. A broad and uncertain date range covering the whole of the middle to upper Palaeolithic (500,000-10,000 BP) is given for any terrace deposits. There are no known findspots from this area and the likelihood of Palaeolithic remains is moderate.

2.5.4 SP_36: Stour alluvium, within Wealden basin. The area stretches as far north as Wye and is characterised by the Stour Alluvium which is Holocene; could be underlain at its edges by Pleistocene slopewash deposits that are mostly likely to be of Late Devensian age; likely to be a Late Glacial/Early Holocene buried channel as well as earlier Pleistocene Stour fluvial deposits buried under the alluvium in places or outcropping out of it as islands. The quarry (now redeveloped) at Conningbrook Manor west of the Stour, produced a rare Upper Paleolithic blade point and abundant palaeo-environmental remains dated to MIS-3. The likelihood of Final Upper Paleolithic material under the alluvium at the edge of the alluvial floodplain is moderate. Any Upper Palaeolithic remains are likely to be of high importance, or any recognition of buried Stour fluvial deposits with palaeo- environmental remains.

2.5.5 SP_37: North/east side of Stour valley through the Wealden gap and north of Ashford. An area where there are several fluvial terrace outcrops mapped, as well as Head and Head Brickearth deposits. A broad and uncertain date range covering the whole of the middle to upper Palaeolithic (500,000-10,000 BP) is given for any terrace deposits. There are several Palaeolithic find spots, all of which are surface finds, these may have derived from slopewash deposits. Finds from slopewash deposits are of low importance however any finds from fluvial terrace deposits would be of high importance, especially if associated with palaeo-environmental remains.

2.5.6 New detailed research and synthesis into the previous work and claims is now required, and no further interpretations of the previous work (Allen, 2019, 2022b; ASE, 2017a, 2017b; Harrison, 1996; Jacobi et al., 2007) will be repeated in this interim report, also without data from previous work it is not possible at this stage to satisfactorily complete valley wide correlations.

3 Aims and Objectives

3.1 Specific Aims

3.1.1 The specific archaeological requirement of this project relates to the potential for Palaeolithic finds and/or deposits of Pleistocene interest.

3.2 General Aims

3.2.1 The general aims (or purpose) of the evaluation were determined by Wessex Archaeology (2022), in compliance with the CIfA Standard and guidance for archaeological field evaluation (CIfA 2014a), are to:

- Provide information about the Palaeolithic archaeological and geoarchaeological potential of the site.

- Consider the possible significance of any Palaeolithic archaeological and geoarchaeological evidence present in the context of national and regional research priorities and agendas.

- Inform either the scope and nature of any further Palaeolithic archaeological work that may be required; or the formation of a mitigation strategy (to offset the impact of the development on the archaeological resource); or a management strategy.

3.3 General Objectives

1.1.3 In order to achieve the above aims, the general objectives of the evaluation were determined by Wessex Archaeology (2022) and are to:

- to establish the potential for Quaternary deposits in the site to preserve significant Palaeolithic archaeological and geoarchaeological remains.
- to establish the potential of the Quaternary deposits to preserve significant paleoenvironmental evidence.
- where appropriate, obtain samples from Quaternary deposits for palaeoenvironmental assessment and scientific dating.
- make available information about the archaeological and geoarchaeological resource within the site by reporting on the results of the evaluation; and

- to make recommendations for further work, where appropriate, including for paleoenvironmental assessment and scientific dating of retained samples from Quaternary deposits.

4 Methods

4.1 Fieldwork

4.1.1 The methodology followed the archaeological mitigation devised by Wessex Archaeology (2022), which proposed for at least 15 test pits to be sunk at the end of conventional archaeological trenches (Figure 2) located to target areas of high Palaeolithic-Pleistocene potential and positioned in order to provide suitable coverage across the site.

4.1.2 Not all of the test pits could be sunk due to the high-water table visible in some of the trenches, notably at the northern end of the site (Test Pit 114, 113). Additional test pits were sunk to compensate for this (Test Pit 115, 116,117). The completed test pit locations are shown in Figure 3.

4.1.3 Test Pit's were sunk using a mechanical digger with a toothless bucket: 1.8m wide.

4.1.4 To meet the aims and objectives, the pits were sunk until either: the bedrock was reached, the maximum reach of the excavator had been reached, or water ingress, face falls and collapses occurred, that made further excavation unsafe, this varied across the site.

4.1.5 For scale a surveying staff was used. A photographic record was made of sections of the pits, showing sedimentological changes. The pits were unsafe to enter beyond depths of 1m so much of the recording was made from photographs of the lower areas, with the staff in place as a scale, however this could not be safely achieved at the maximum depths of the pits due to the collapsing faces which has somewhat compromised the complete record of sections.

4.1.6 The base and facies of the Test Pits were inspected for Pleistocene fossils and Paleolithic artefacts at intervals during the excavation until the pits were at a depth that was unsafe to enter (c1.0 m), this process revealed Holocene Palaeoenvironmental material but not equivocal Palaeolithic artefacts. The spoil raised during digging was checked visually, samples were generally clayey which precluded dry sieving. Searching the spoil heaps with archaeological trowels resulted in numerous Holocene lithics and mammalian bone finds.

An on-site method of wet sieving was devised to try to improve this process using sieves with a mesh of c. 12mm.

4.1.7 Sediments with potential for palaeo-environmental recovery were encountered, and samples were taken, significant accumulations of molluscs were found in the spoil from Test Pit 100, these were sampled. Consideration was given as excavation progressed to the potential for OSL (optically stimulated luminescence) dating, but no suitable sediments were encountered or were safe to sample, so no OSL dating samples were taken. Gravel samples were collated for clast lithological analysis.

5 Results

5.1 Lithology

5.1.1 A summary of the test pit investigation is given here in this interim evaluation report, a full detailed report with clast analysis, stratigraphic and photographic logs will be included in the subsequent full report.

5.1.2 This evaluation identified seven main sedimentary units. These comprised of:

Topsoil [1]

5.1.3 Topsoil (representative photograph, Plate 2) was present across the entire site; it is characterised as a rooted sandy clay ranging in thickness from 0.20m at 0.00m BGL (32.79m OD) in TP102 to 0.40m at 0.00m BGL (32.41m OD) in TP117. This deposit represents the modern soil formation along with floodplain deposition relating to the modern course of the Great Stour. [Note: levels in brackets are top level of sedimentary unit]

Head [2]

5.1.4 A subsoil (representative photograph, Plate 2) comprising varying proportions of colluvial: clays, silts and fine sands underlies the topsoil in all Test Pits (TP), small quantities of sub-angular frost-shattered flint gravel and redeposited fluvial gravel, Pleistocene origin relating to slope processes under periglacial conditions. This may not be a true Head deposit and distinguishing between the topsoil and true alluvial clay is problematic, however this subsoil was recorded consistently across the site with thickness varying from 0.20m at 0.30m BGL (32.49m OD) in TP104 and 1.4m at 0.30m BGL (32.11m OD) in TP107.

Alluvium [3]

5.1.5 A Holocene floodplain deposit of alluvial clay sediments (representative photograph, Plate 3), gleyed due to the saturated conditions to a grey/ blue colour with brown mottling in the transition to the Head. With occasional seams of organic material in the basal zone. The alluvium ranges in thickness, from 0.3m at 1.60m BGL (30.81m OD) in TP117 and 1.05m at 0.60m BGL (31.61m OD) in TP109.

Loam [4]

5.1.6 Sealed beneath the Alluvial clay a widespread layer of organic preserved material (representative photographs, Plates 4 & 5), which has varying proportions of peaty soil, clay, silts and sands. The loam contains preserved palaeoenvironmental material and lithic artefacts. The loam ranges in thickness, from 0.10m at 2.20m BGL (30.21m OD) in TP107 and 1.25m at 1.85m BGL (30.44m OD) in TP106. The level of the loam varied between 1.40m BGL in TP110 and 1.9m BGL in TP100.

Sands and Gravel [5]

5.1.7 Sands and Gravels of River terrace deposits were found to underlie most of the site, but were not found at the higher elevations, Test Pits: 102, 103, 104, 105, an area which is mapped by the BGS as terrace 4 (Figure 5).

5.1.8 The sands and gravels graded from fine sands to coarse sands, sub-angular to sub-rounded gravels within a matrix of coarse to medium sands (representative photograph, Plate 7). Gravels are largely comprised of rolled flint but also contains large quantities of Folkestone-bed geologies and some redeposited rounded Tertiary flints and clast of Wealden geologies.

5.1.9 The sands and gravels in TP112 were revealed at a noticeably higher elevation than all the other test pits, 0.70m BGL (31.64m OD): they were not overlaid by the loam or alluvial clay. The extent of the depth of sands and gravels could not be established.

5.1.10 The sands and gravels in Test Pits: 100, 101, 107, 110, 111, 117 ranged in thickness, from 0.20m at 2.20m BGL (30.24m OD) in TP100 and 0.60m at 2.20m BGL (32.21m OD) in TP109. The level of the sands and gravels varied between 1.60m BGL (30.01m OD) in TP110 and 2.40m BGL (29.79m OD) in TP111.

Folkestone Beds [6]

5.1.11 Grey, green, compact sands and silts of the Cretaceous Greensand geology (representative photograph, Plate 10).

Folkestone Beds [7]

5.1.12 Grey, compact clay of the Cretaceous Gault Clay geology, fossiliferous. Solid geology underlying the entire site (representative photograph, Plate's 6 & 10).

Palaeo Channel

5.1.13 A steep cut channel seen in Test Pit 115 Trench 7, was identified as a Palaeo channel, cutting the Folkestone Sands (Lower Greensands).

5.1.14 The clay is darkest at the base where it has been filled with wash from the Gault Clay, which overlies the Greensands.

5.1.15 The clay gets lighter higher up in the test pit sequence, going brown/yellow at the top where the iron has oxidised, possibly during drier or waterless periods.

5.1.16 The sands which are true green at the base of the test pit are heavily oxidized at the top of the sequence, where air can easily penetrate the sands, and the iron incorporates oxygen to become ferric (Fe203) and is brown in colour (= rust). Hence the lighter colours upwards through the channel infill and the yellows and browns of the Folkestone Formation sands (Plates 11-12).

5.2 Site Stratigraphy and Deposit Modelling

5.2.1 A basic stratigraphic sequence has been established across the site which varied with elevation, this is shown in Table 1, and illustrated in Plate's 8 & 9.

Table 1: Stratigraphic units

Bed Deposit	Test Pits	Unit
Topsoil	All	1
Colluvial clay/silt	All	2
Alluvial Clay	100, 101, 106-112, 116, 117	3
Loam (organic, peaty, clay, silts and sands)	100, 101, 106, 107, 109, 111, 116, 117	4
Sands and Gravels (river terrace)	100, 101, 107, 109, 111, 112	5
Folkestone beds (Greensand)	115, 102-5	6
Folkestone beds (Gault Clay)	100, 106, 109, 111, 115, 102-5,	7

5.2.2 The deposit modelling comprised a series of modelled outputs, three cross-sections (Figures 5-10). Using the stratigraphic data from the test pits located within the site and sunk during this evaluation.

5.2.3 The cross-sections are composed of two-dimensional vertical visualisations of the stratigraphic records, along lines drawn through interventions within the Site. These transects model the possible make-up of the deposits between these individual deposit records, drawn as horizontal lines between the upper and lower surfaces of the stratigraphic units.

Cross-section 1 (Figure 7)

5.2.4 Cross-section 1 is a north-west to south-east orientated transect across the lower elevations of the site, it incorporates all the Test Pits which revealed alluvium. The position of the transect across the site and the incorporated test pits is shown in Figure 6. The transect illustrates the alluvial deposits that are present across the Site area, and in most areas overlie loam and sands and gravels. The Loam which contains archaeology is in some areas is less than 1.5 BGL (TP110). The sands and gravels have a higher surface elevation towards the northwest (TP112) and north (TP110), it is possibly that these continue through the northern quarter of the site, which wasn't evaluated.

Cross-section 2 (Figure 9)

5.2.5 Cross-section 2 is a north-west to south-east orientated transect across the highest elevations of the site. The position of the transect across the site and the incorporated test pits is shown in Figure 8. The transect illustrates that the alluvial deposits or river terrace deposits are not present in these locations. Topsoil and head mantle bedrock of the Folkestone formation and confer with the BGS mapping of bedrock geology (Figure 4) but not with the BGS mapped superficial deposits (Figure 5).

Cross-section 3 (Figure 11)

5.2.6 Cross-section 3 is a north to south orientated transect running from the highest to lower elevations of the site. it incorporates all the Test Pits which revealed alluvium. The position of the transect across the site and the incorporated test pits is shown in Figure 10. The transect illustrates the approximate edge of the alluvial deposits where they adjunct with the bedrock geology, which isn't showing evidence of being subjected to fluvial processes of the Stour Terrace formations in this area. The Palaeo channel seen in the section of TP115 is not illustrated in this transect.

5.3 Archaeology

5.3.1 No artefacts were recovered that can be conclusively attributed to the Palaeolithic.

5.3.2 A range of lithic artefacts from the Mesolithic was recovered from the organic layer (loam) below the alluvial clay, other lithic artefacts were recovered from the top and subsoil across the site.

5.3.3 Four ochreous flint pieces were recovered from inspections of the trench spoil heaps, these come from the topsoil and subsoil, they were retained for inspection off site. Two of these are naturally fractured, one is a secondary flake with a prepared platform, typologically it is indiscrete, and could have been produced in any period, it is ochreous due to ferrous staining patination shows a process of recortication or weathering has begun. The other artefact is possibly a Palaeolithic chopper found in the topsoil spoil heap of Test Pit 101, its origin is uncertain, but it has likely come from the higher terrace gravels to the west through a process of slope wash.

6 Discussion and Interpretation

6.1 Evolutions of the River Great Stour

6.1.1 A full analysis of previous work has not been attempted for this report, but some new initial interpretations and correlations are now given which may help in the understanding of the deposits revealed on the Site.

6.1.2 Long-profiles for the degradation and aggradation of the Stour have not yet been fully developed as they have for the correlative river systems of the wider region: Medway (Bridgland, 2003), Thames (Bridgland, 1994), this makes it difficult to place the deposits at the Site into a coherent chronostratigraphic framework with the major British rivers.

6.1.3 Mapping of the terrace deposits of the Great Stour in the region by the BGS, are inaccurate and now outdated. The BGS mapping of Terrace 4 deposits (Figure 5) is based on elevation of deposits which can not be extrapolated this far upstream past the Wye gap with the known Terrace 4 deposits east of Canterbury (Bridgland et al., 1998; Coleman, 1952; Coleman, 1954; Key et al., 2022; Knowles, in press; Wenban-Smith et al., 2019) and doesn't account for new understandings on river terrace formation (Bridgland, 2000; Westaway, 2017; Westaway et al., 2015) and the temporal patterns in their artefact assemblages which have chronological significance for the dating of the Middle Pleistocene fluvial archives of the major English rivers (Ashton & Hosfield, 2010; Bridgland, 1996, 2000; Bridgland, 2006, 2010; Bridgland et al., 2006; Bridgland et al., 2019; Bridgland & White, 2015; Chauhan et al., 2017; White et al., 2018).

6.1.4 Recent work (Allen, 2019, 2022b; ASE, 2017a; wessexarchaeology, 2021) has offered new interpretations. Radiocarbon dates from Pleistocene faunal remains and Mammal Assemblage Zones (MAZ) is suggesting a middle Devensian (last cold stage) date (MIS-3) for the gravels at Conningbrook Manor, however as suggested by Pope et-al(ASE, 2017a) a much needed review and integration of the Harrison archive is required to secure the provenance of this material to particular sediments, before these can be conclusively correlated to deposits at this evaluation site.

6.2 Quaternary Deposits

6.2.1 Sands and Gravels were identified at ~29-30mAOD, they overlie the bedrock geology of the Folkestone formations and are mantled by a Loam layer, they are however in places often intermixed with the Peaty and silty sands and clays of this overlying organic layer (Loam), the sands and gravels are stained a dark brown, black/grey.

6.2.2 The sands and gravels were found to be cutting the bedrock Gault Clay in TP111, 109, 107 and 100, therefore they can be attributed to the last degradation and aggradation phase of the Stour, and the eastern channel edge of that phase of the Stour, and no further older buried channels would now be expected in this area.

6.2.3 The Previous work at Conningbrook Manor to the west of this site has been able to date Pleistocene bones from the gravels in this pit to MIS3 – 33 Ka -27 Ka, these gravels lie at approximately 31-32mAOD, and at 34-35mAOD. Slightly higher than the sands and gravels found during this evaluation. Further work is required to establish if the Conningbrook Manor gravels represent a separate older terrace or if they are part of the same depositional sequence found during this evaluation. Generation of valley wide deposit model will help to answer these questions.

6.2.4 It is hypotheseised that these lower sands gravels that underlie the alluvial clay and loam of the Stour floodplain and identified during this evaluation were not deposited during the Pleistocene but were deposited during the initial aggradation of the Stour, during the immediate post-Devensian warming phase, the Holocene of the Quaternary period.

6.2.5 Test pit 112, showed a noticeably different composition of sands and gravels, clean bright yellow and ochreous, with a normal deposition grading sequence of sands, grit, gravel and coarse gravel which is associated with high velocity fluvial action. These may continue to the north on the site but further test pitting in this location was not possible due to the high-water table.

6.2.6 The extent of the sands and gravels north of TP112 is uncertain, although they weren't found in window sampling WAWS1-2. These gravels may correlate with those at Conningbrook Manor, but elevation data has yet to be provided by ASE so further correlation and interpretation is not possible at this stage. They could be Pleistocene.

6.2.7 At the higher elevations on the east edge of the site, deposits of the Stour were not identified, Test Pits 115, 102-105 only showed a sequence of topsoil and head overlaying bedrock of the Folkestone Beds, Greensand was found overlaying the Gault Clay in Test Pits 115 & 104. A Palaeo channel was found cutting the Folkestone beds in Test Pit 115.

6.3 Palaeo Channel

6.3.1 Test Pit 115 confirms the geological mapping at the site (Figure 4), there are Folkstone Sands and Gault Clay. But here they are cut by a Paleo channel, an interpretation of the formation of the Palaeo channel is that the Folkestone Beds were subject to gullying and then quickly in filled with wash from the Gault. These gullies can form very quickly in geological terms. Peter Allen (2022a) has observed in the Dorking area, where there are sands of the Hythe Beds, a footpath on a slope become gullied to a depth of over 1 m in a few months during a wet period.

6.3.2 This suggests that you don't need anything too exceptional to get a deep channel. Probably during a period of climatic deterioration in the Holocene deterioration of the vegetation surface run-off incised the channel and infilled it with the wash from the Gault. The infill could have happened very soon after the incision as gullies in sand tend to have sidewall collapse, so the banks become gentler and usually a mix of collapsed sand and (clayey) infill.

7 Conclusion and Recommendations

7.1.1 No deposits that can conclusively be attributed to the Pleistocene were identified during the evaluation.

7.1.2 Quaternary deposits attributed to the last aggradation of the River Great Stour were found to underlie the site, this comprised: fluvial sands and gravel, alluvial sands silts peats and clay. No Pleistocene artefacts or fossils were found within the sands and gravels, nor were there samples suitable for OSL dating, which could be used to equivocally date these deposits. The basal sands and gravels were identified across the site at the lower elevations resting on or cutting through the bedrock of the Gault Clay (Folkstone Beds), stratigraphically relationships with the current river and higher river terrace deposits mapped in the area suggest that these sands and gravels may have been deposited during the warming phase of immediate last post glacial period. Subsequently a warmer and less turbulent phase of the Stours evolution is identified by the thick deposits of finer sands, silts and peaty deposits (loam) sealed below a thick blue alluvial clay, from these deposits numerous artefacts and palaeoenvironmental material was recovered. There is evidence of early Holocene human activity, and the finding of *Castor fiber* **(**Beaver) lower mandible (with cut marks), indicates a still and brackish and wooded river environment.

7.1.3 The evidence from the evaluation suggests that the Quaternary deposits across the site are latest Pleistocene or earliest Holocene and as such there is a very low possibility of in-situ Palaeolithic archaeology, it is however still likely that there may be occasional Palaeolithic artefacts reworked into the Quaternary sands and gravels from the reworking of the older and higher terraces which are of a known Pleistocene age.

7.1.4 The Quaternary deposits do preserve significant Palaeoenvironmental evidence and samples were taken for various dating methodologies: C14, Dendrochronology, Amino-acid racemization, calcite OSL dating, MAZ, and lithic technologies, peaty samples may also contain pollen.

7.1.5 As the archaeological bearing loam deposits are in places ~1.4m BGL, further archaeological mitigation may be required for these areas. It is likely that these deposits will contain further evidence of early Holocene activity and a low possibility of rare upper Palaeolithic archaeology.

7.1.6 However the excavation associated with this particular wetland development won't be deeper than 1.0m BGL therefore it won't be having an impact on buried resources and the archaeological bearing loam deposits can be preserved in-situ precluding the necessity of any further work on this site.

7.1.7 Several recommendations have been identified following this evaluation

- BGS mapping of terrace deposits is unreliable and future mitigation should use caution when citing the terrace numbering and consult the latest research, particularly focusing on the known Palaeolithic archaeology from specific terraces which can now me more precisely attributed to marine isotope stages (White et al., 2018).

- Due to the uncertainty in the linkage between the dating of the MAZ from Conningbrook Manor and the deposits revealed in this evaluation, attempts at OSL sampling of the deposits underlying the alluvial floodplain in the Conningbrook area should be made a high priority for any future work; this will more equivocally establish dating frameworks, not just for the immediate area but also for the entire Stour fluvial archive. This will also contribute to the development of regional and national chronostratigraphic sequences. It will also aid mitigation strategies for potential Palaeolithic archaeology in the region.

- A complete reassessment of the Harrison archive is required to further secure the provenance of this collection and particularly to reposition the material to known sedimentary deposits, as has also been suggested by Pope(2012); this will aid its future and continued use as a dating proxy for the Stour. However, this is an academic exercise and is unlikely to be achieved through developer led archaeology.

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9 Appendix 1 Maps and Deposit Models

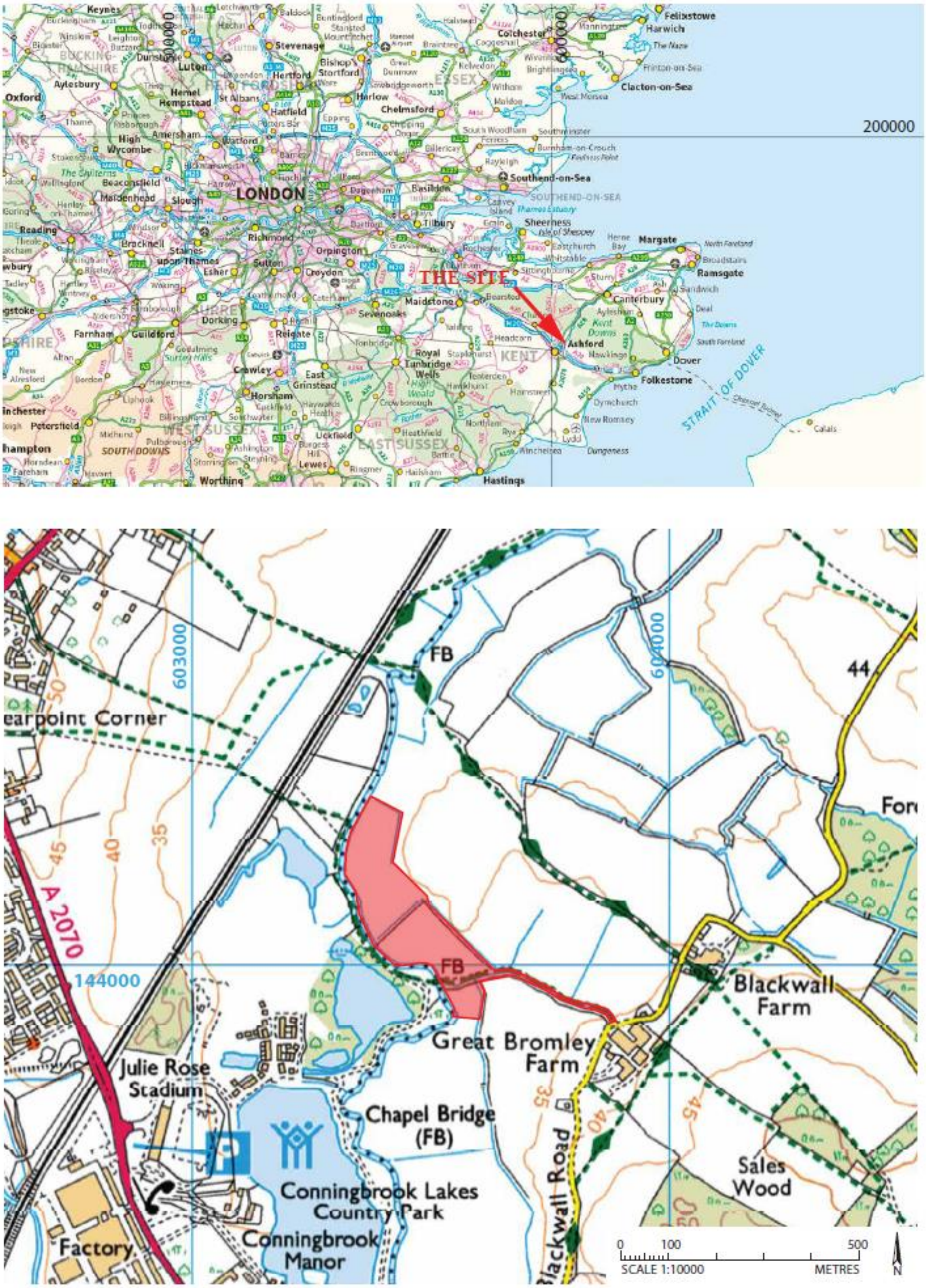


Figure 1: Site location

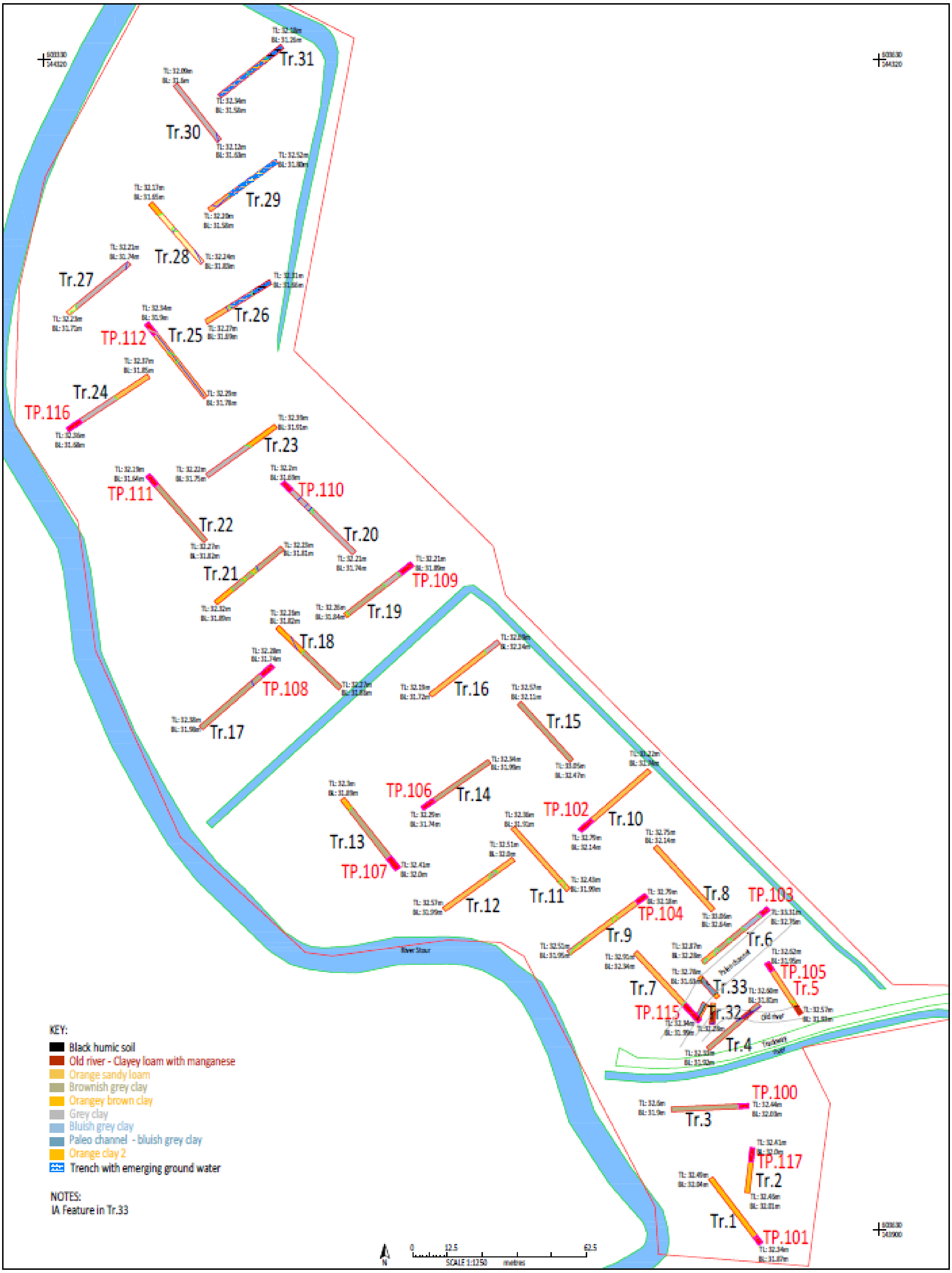


Figure 2: Archaeological trenches and geoarchaeological test pit locations

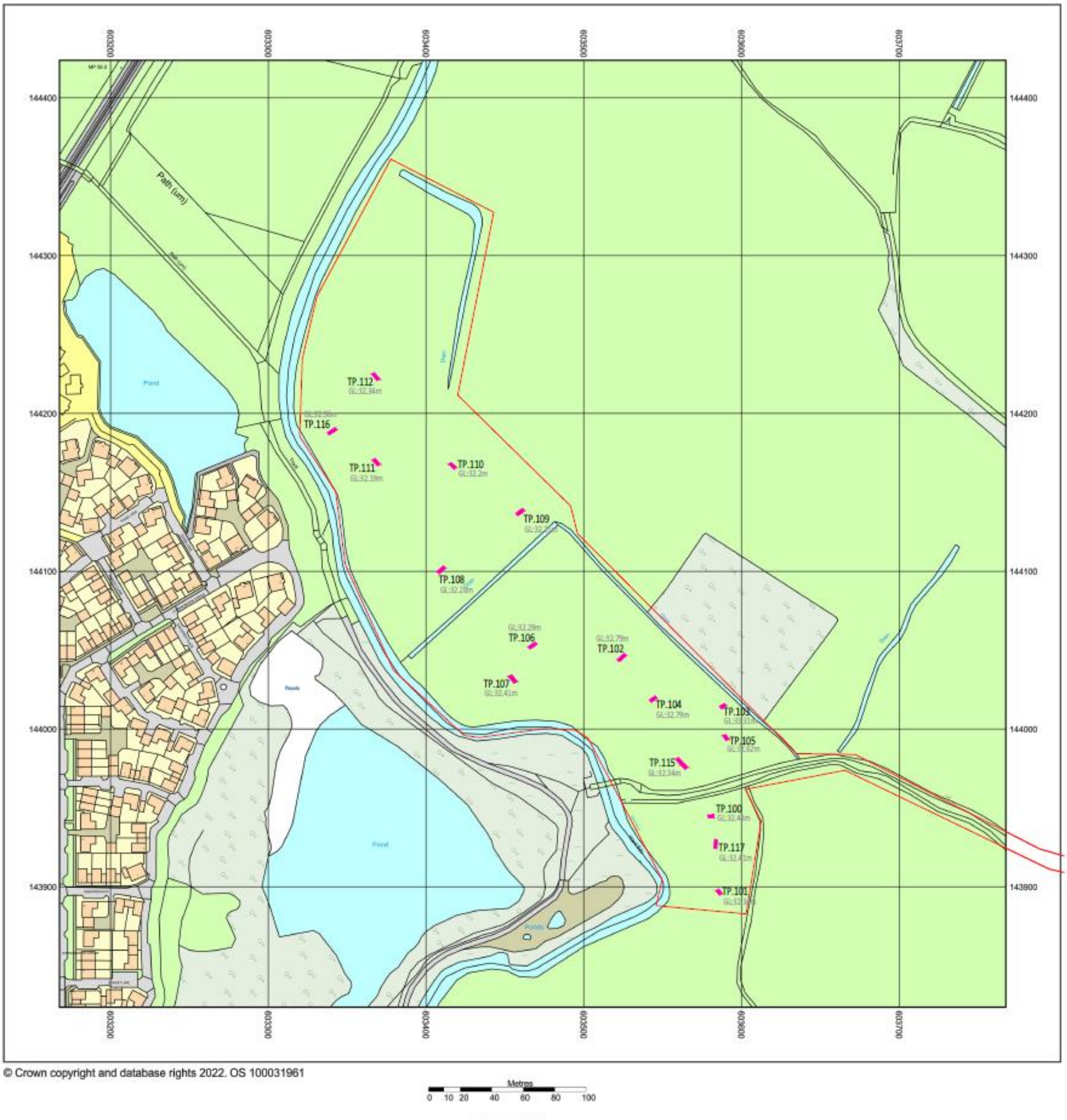


Figure 3: Site plan with Geoarchaeological test pit locations

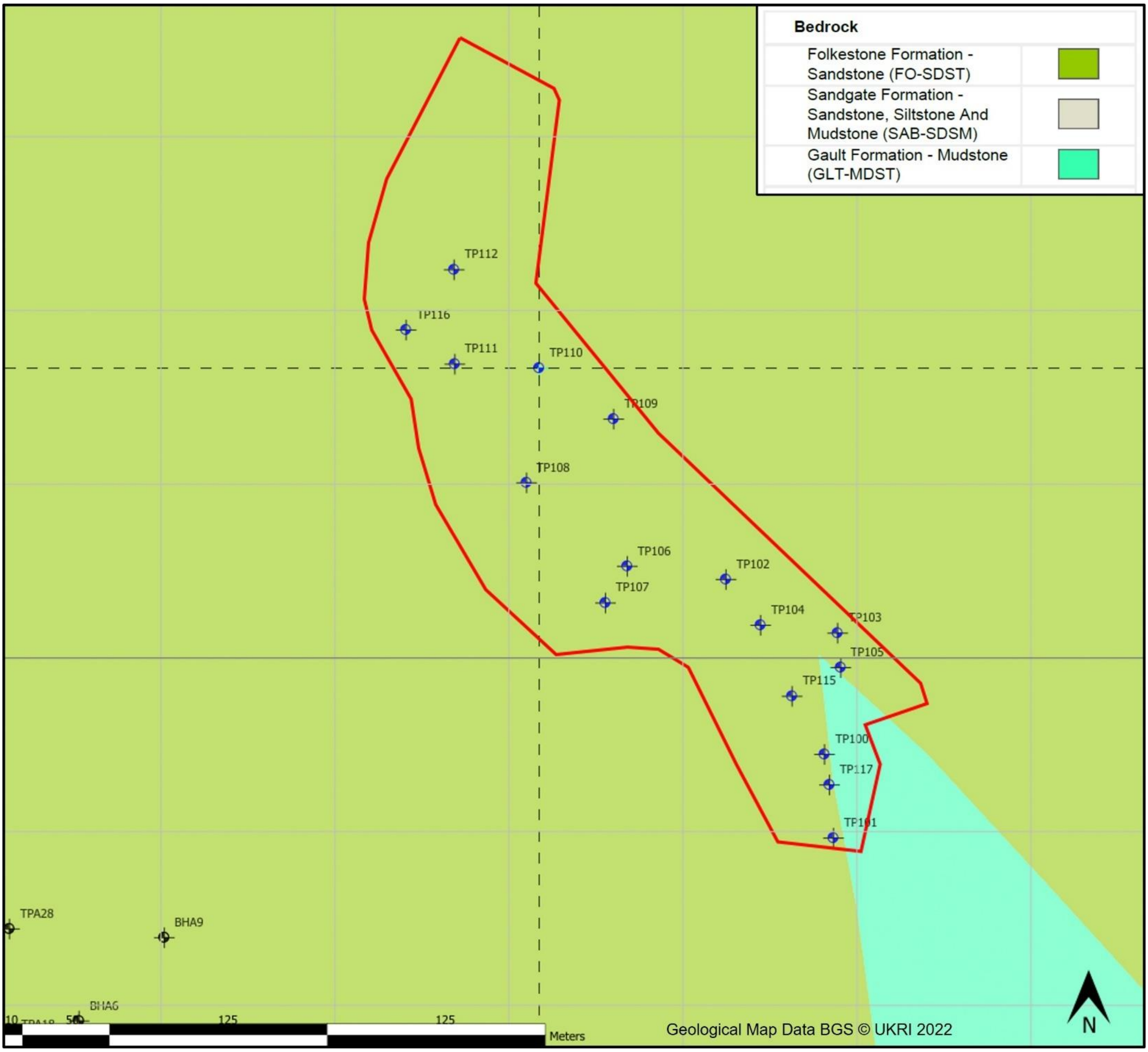


Figure 4: Site plan with Geoarchaeological test pit locations and BGS mapped bedrock geology

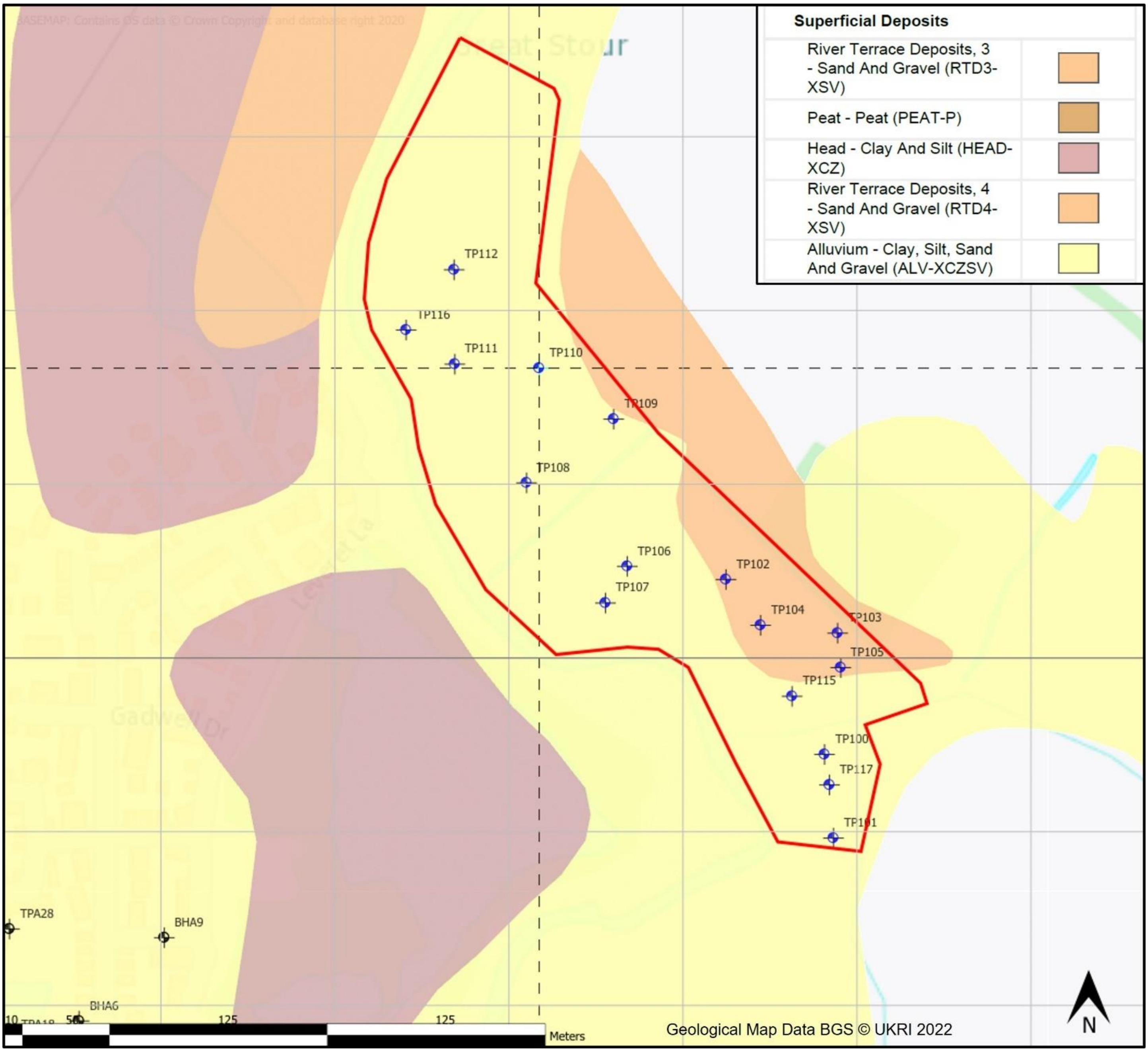
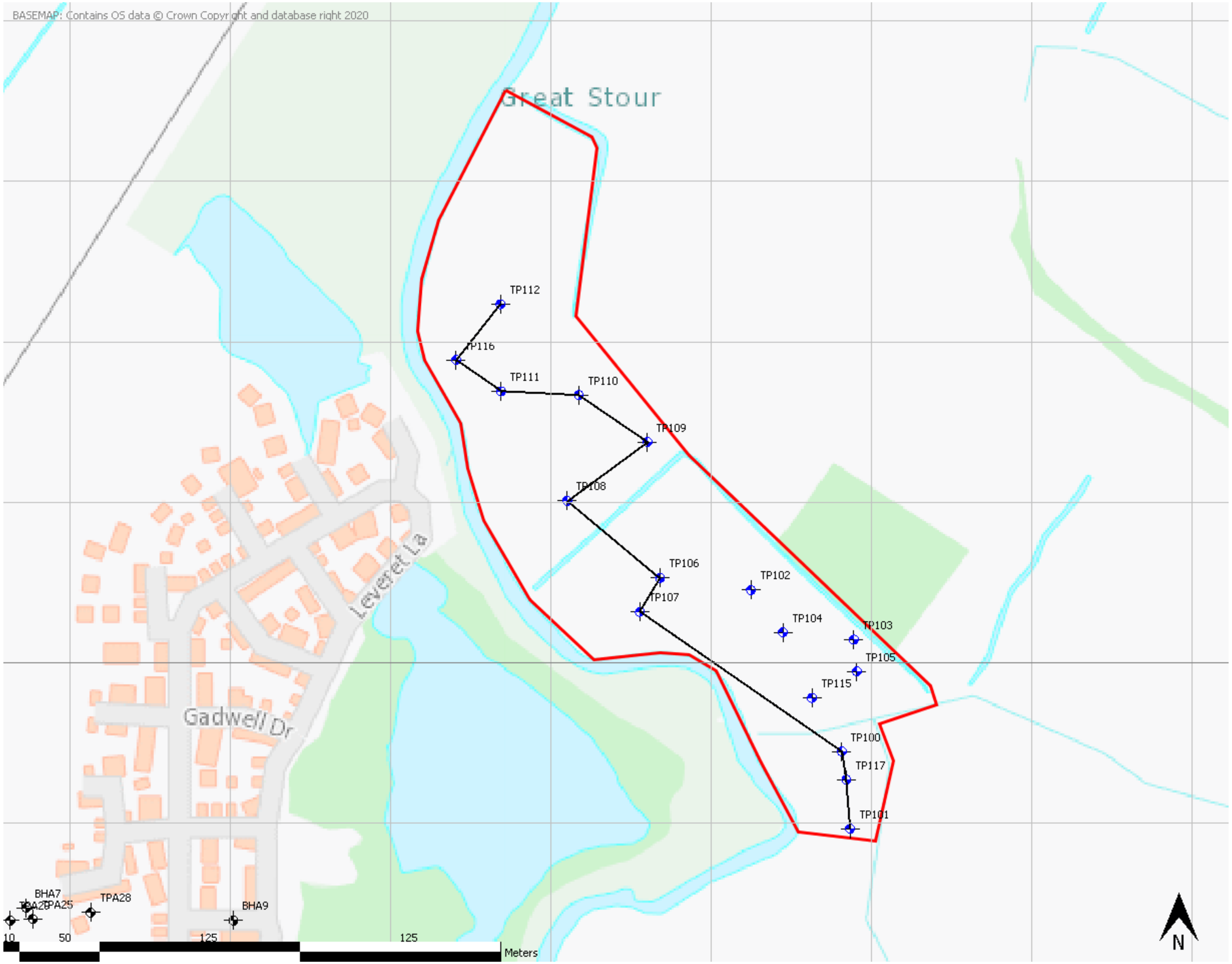


Figure 5: Site plan with Geoarchaeological test pit locations and BGS mapped superficial deposits


BASEMAP: Contains OS data © Crown Copyright and database right 2020
Great Stour
TP112
TP116
TP111
TP110
TP109
TP108
TP106
TP102
TP107
TP104
TP103
TP105
TP115
TP100
TP117
TP101
Leveret La
Gadwell Dr
BHA7
TPA25
TPA28
BHA9
10
50
125
125
Meters
N

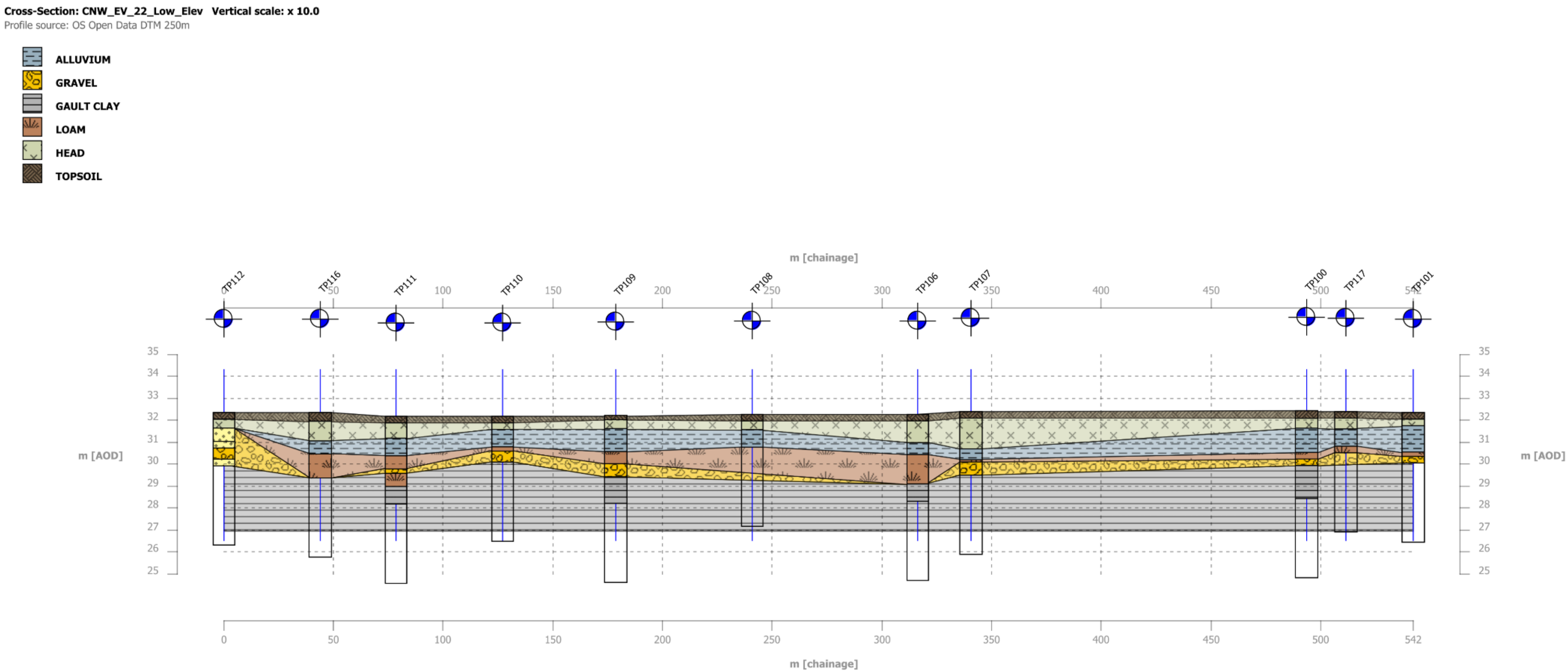


Figure 6: Transect 1, through geoarchaeological test pits that showed alluvial deposits

Figure 7: Deposit model developed from transect 1 test pit data

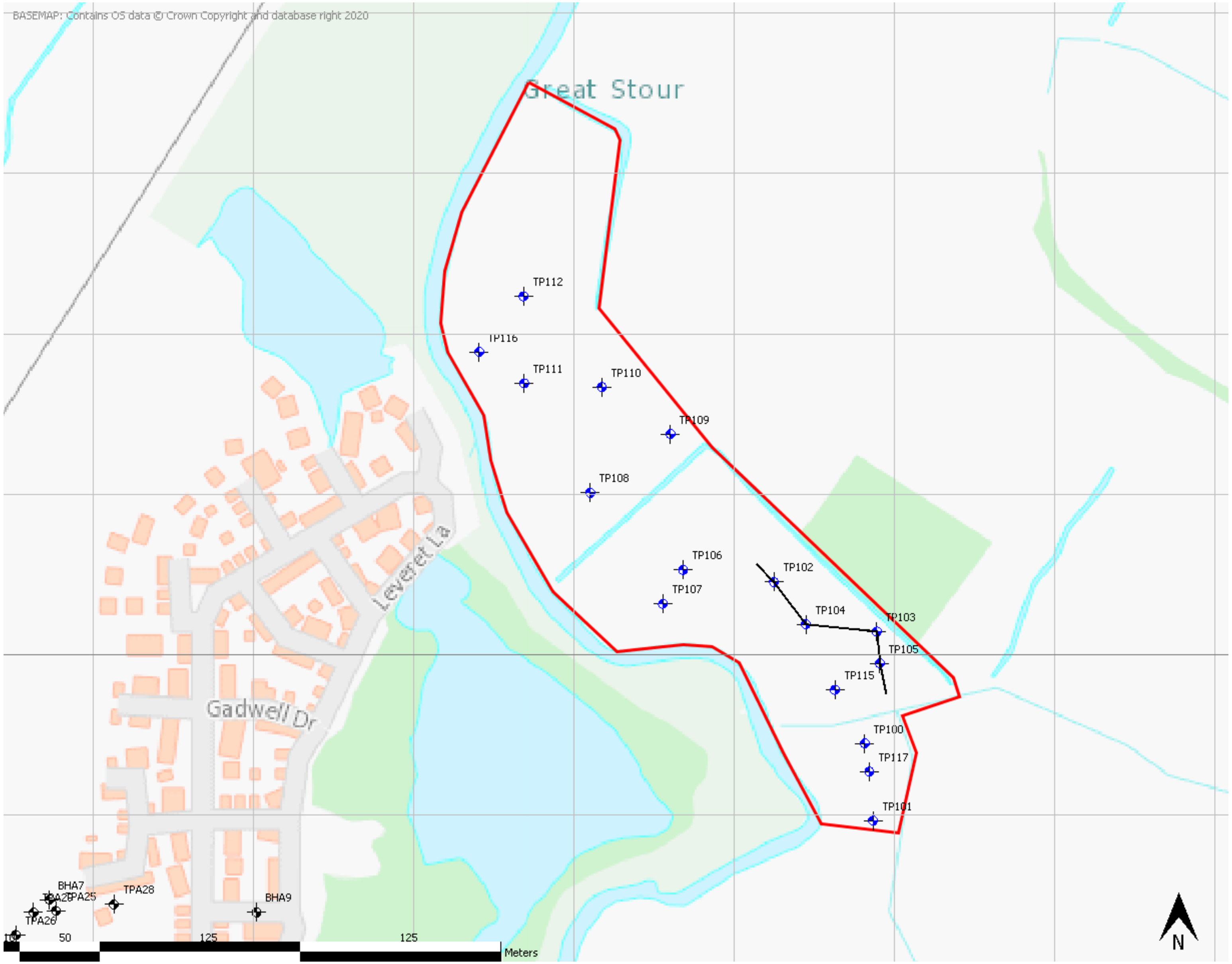
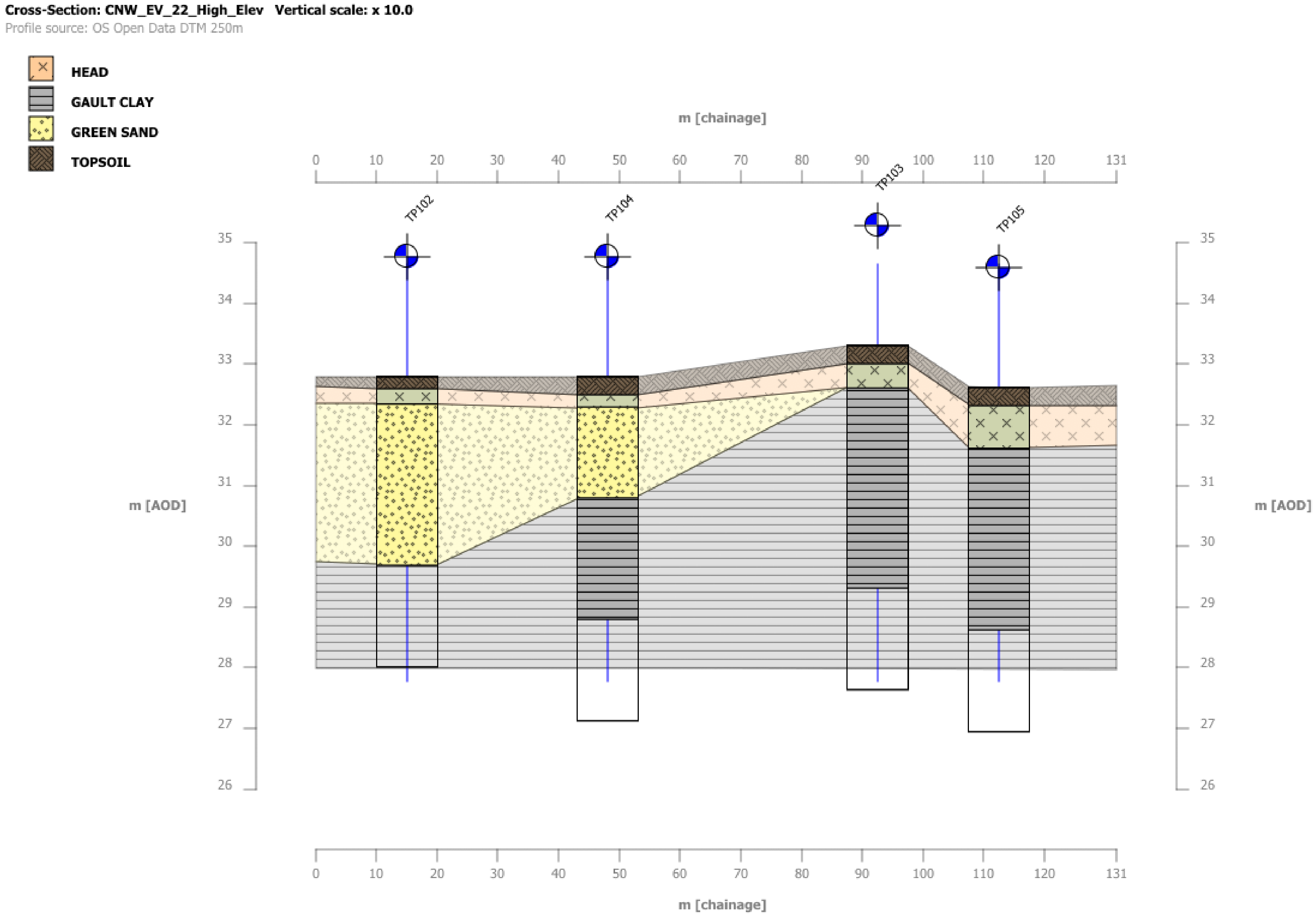


Figure 8: Transect 2, through geoarchaeological test pits at highest site elevations and didn't show alluvial deposits



Cross-Section: CNW_EV_22_High_Elev Vertical scale: x 10.0
Profile source: OS Open Data DTM 250m
HEAD
GAULT CLAY
GREEN SAND
TOPSOIL
m [chainage]
0
10
20
30
40
50
60
70
80
90
100
110
120
131
TP102
TP104
TP103
TP105
35
34
33
32
31
30
29
28
27
26
m [AOD]

Figure 9: Deposit model developed from transect 2 test pit data

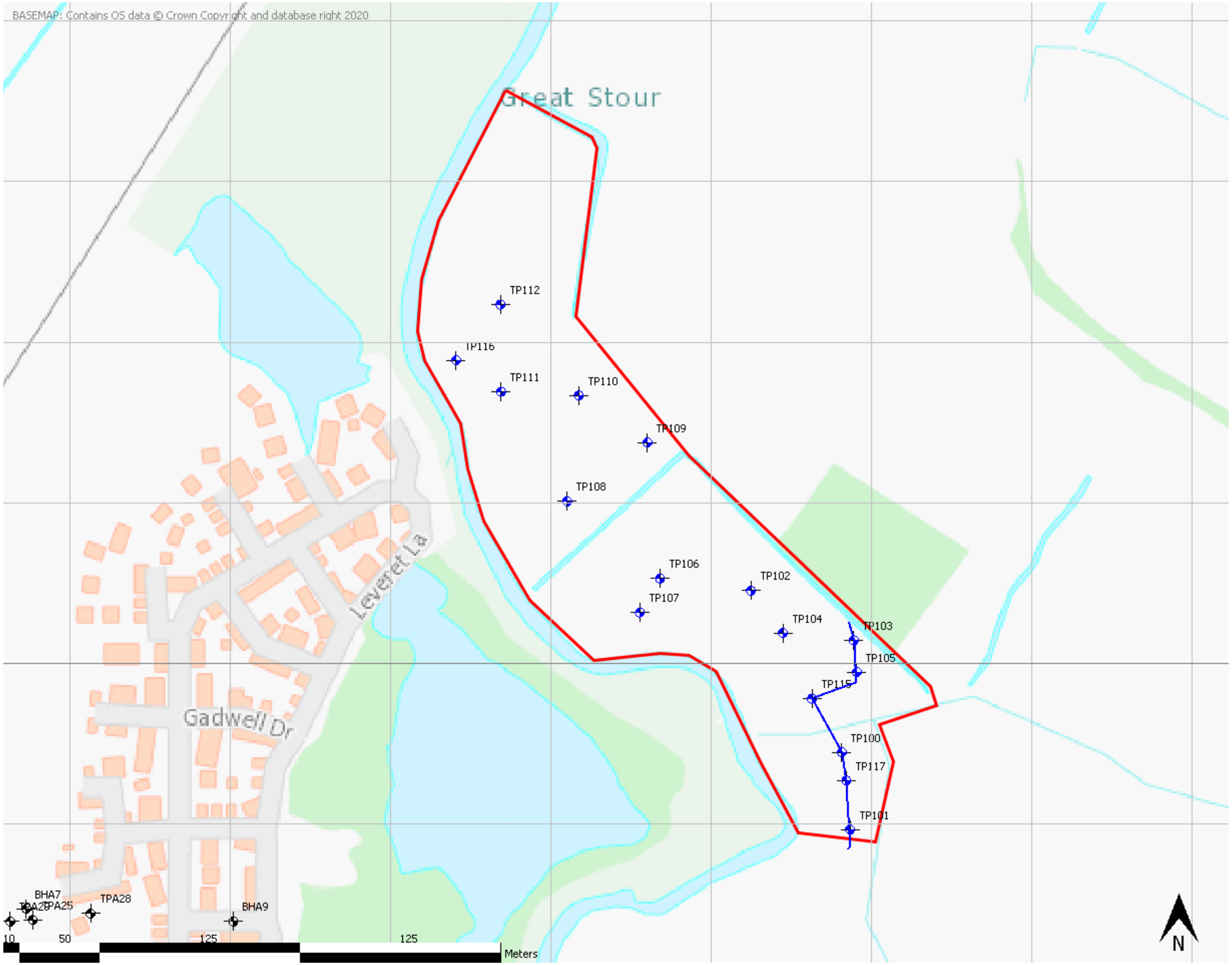


Figure 10: Transect 3, through geoarchaeological test pits from highest to lowest site elevations

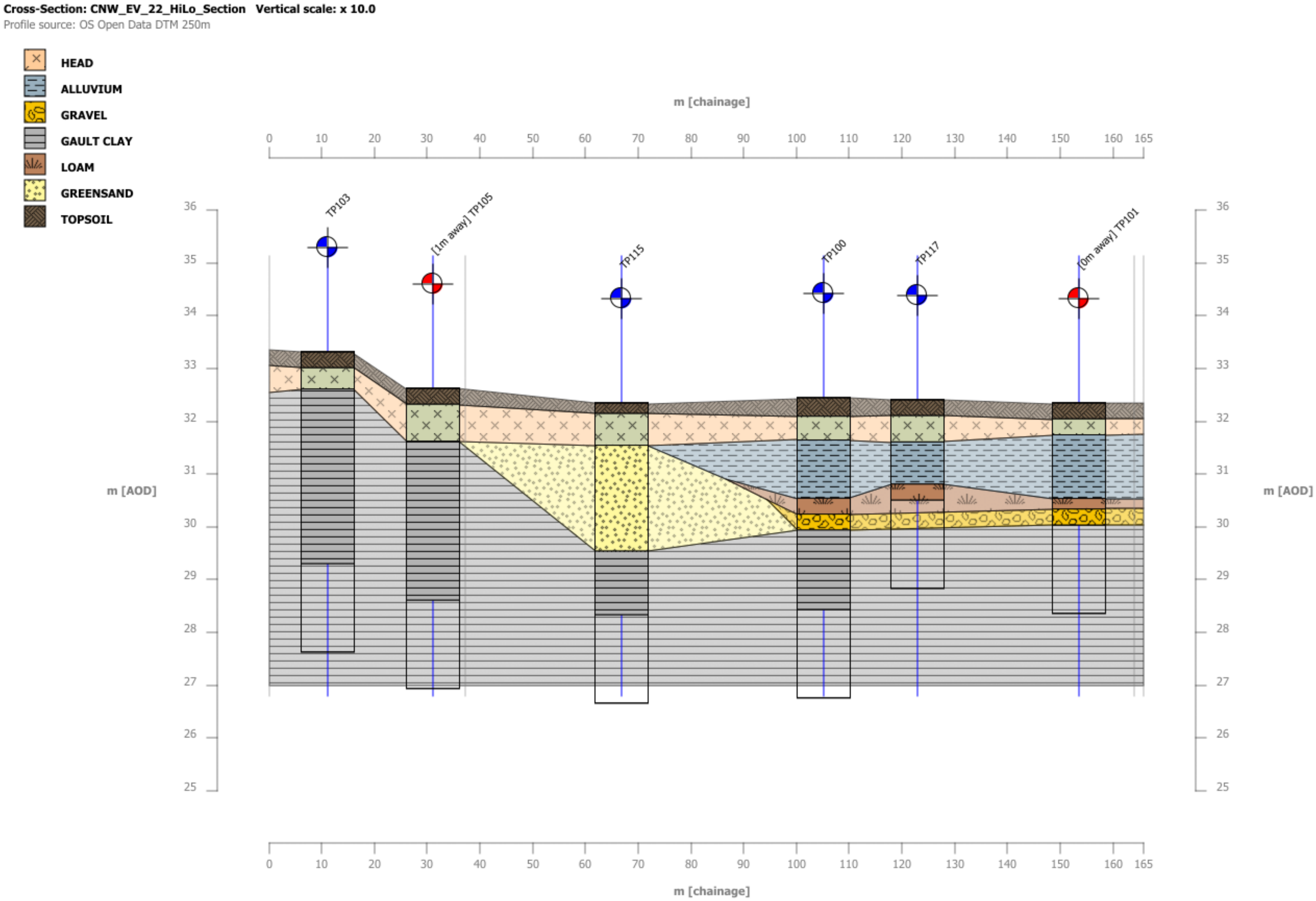


Figure 11: Deposit model developed from transect 3 test pit data

10 Appendix 2 Photographic Log

Plate 2: Test Pit 100, Beds 1-2, topsoil-subsoil (head), Unit 1 & 2

Plate 3: Test Pit 100, Beds 3, alluvial clay, Unit 3

Plate 4: Test Pit 100, Beds 4, Loam (Clayey Sand), Unit 4

Plate 5: Test Pit 100, Beds 4, Loam layer showing organic preservation in Clayey Sand, Unit 4

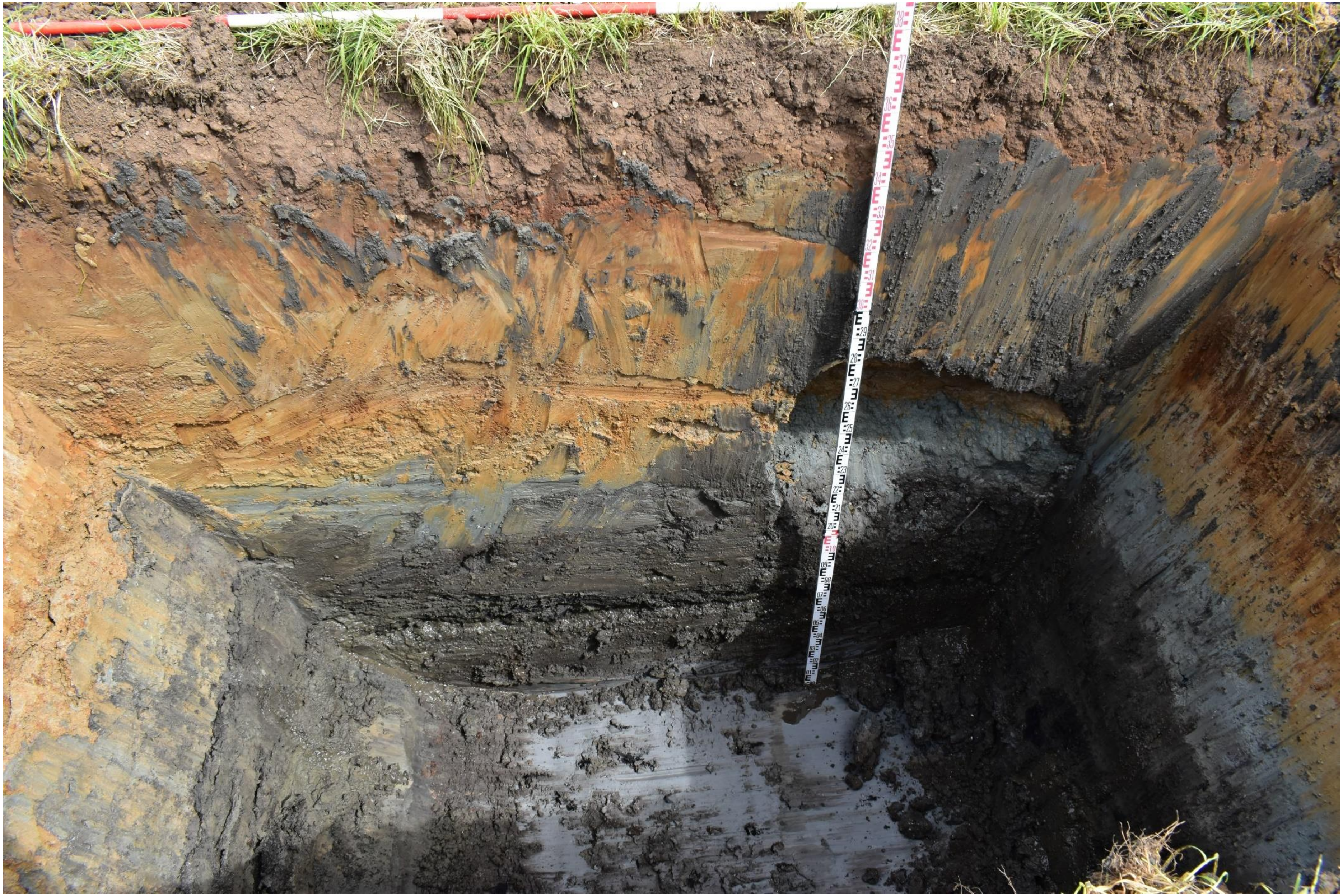


Plate 6: Test Pit 100, showing extent of excavation and top of Bed 7, Gault Clay, Unit 7

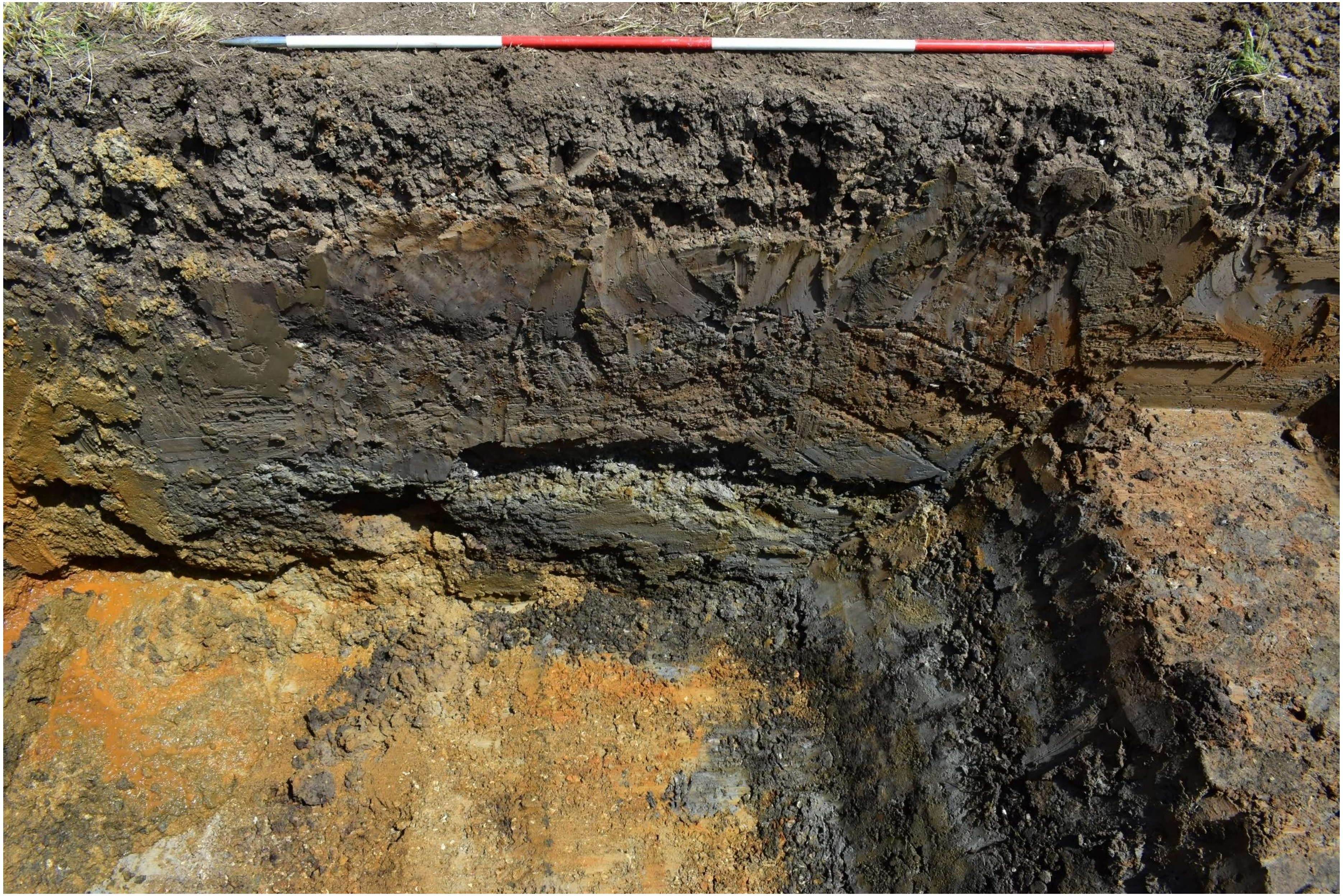


Plate 7: Test Pit 110, showing sands and gravels of Bed 6, Unit 5

Plate 8: Test Pit 100, stratigraphic sequence Beds 1-7

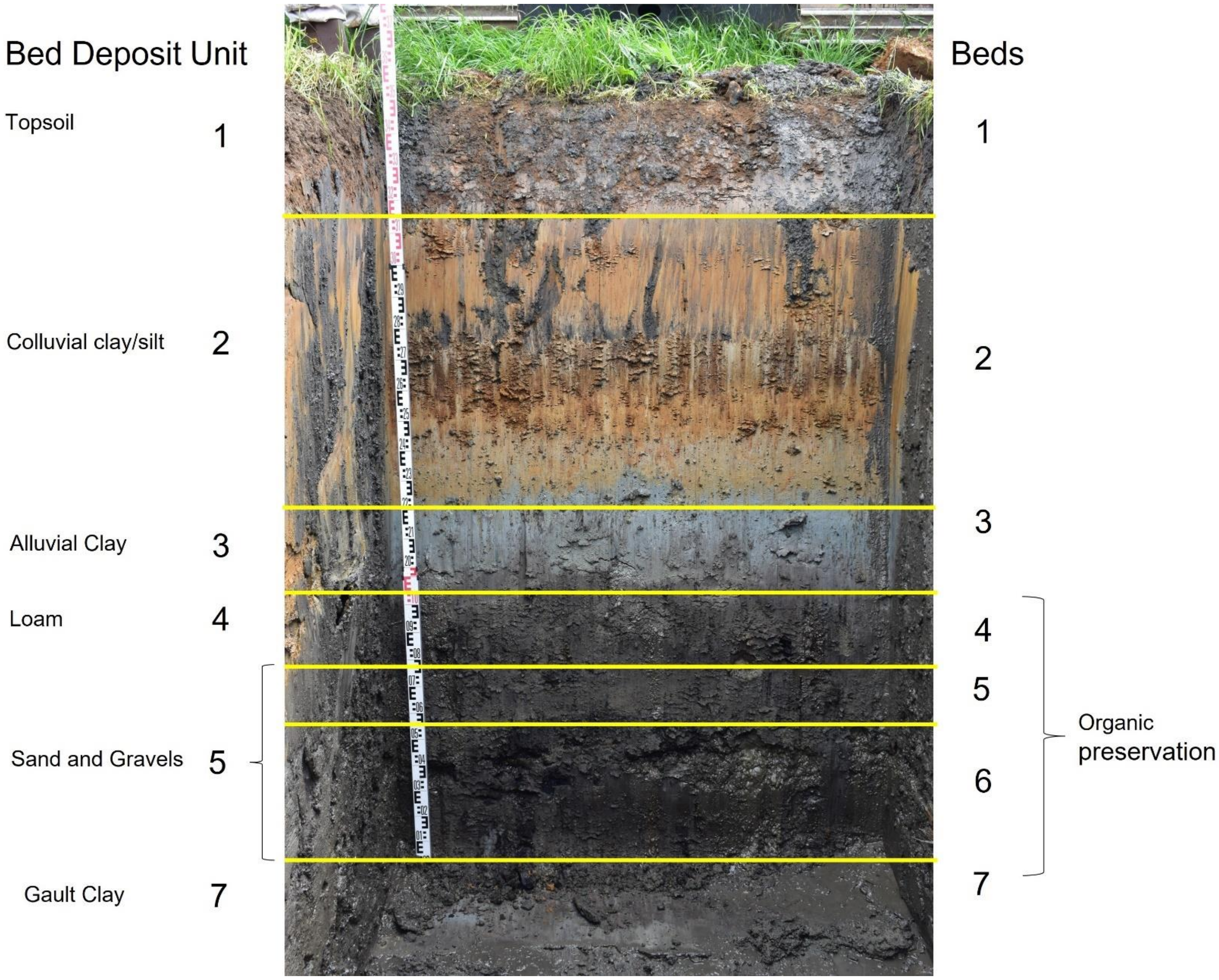


Plate 9: Test Pit 100, annotated stratigraphic sequence Beds 1-6, Units 1-5 & 7

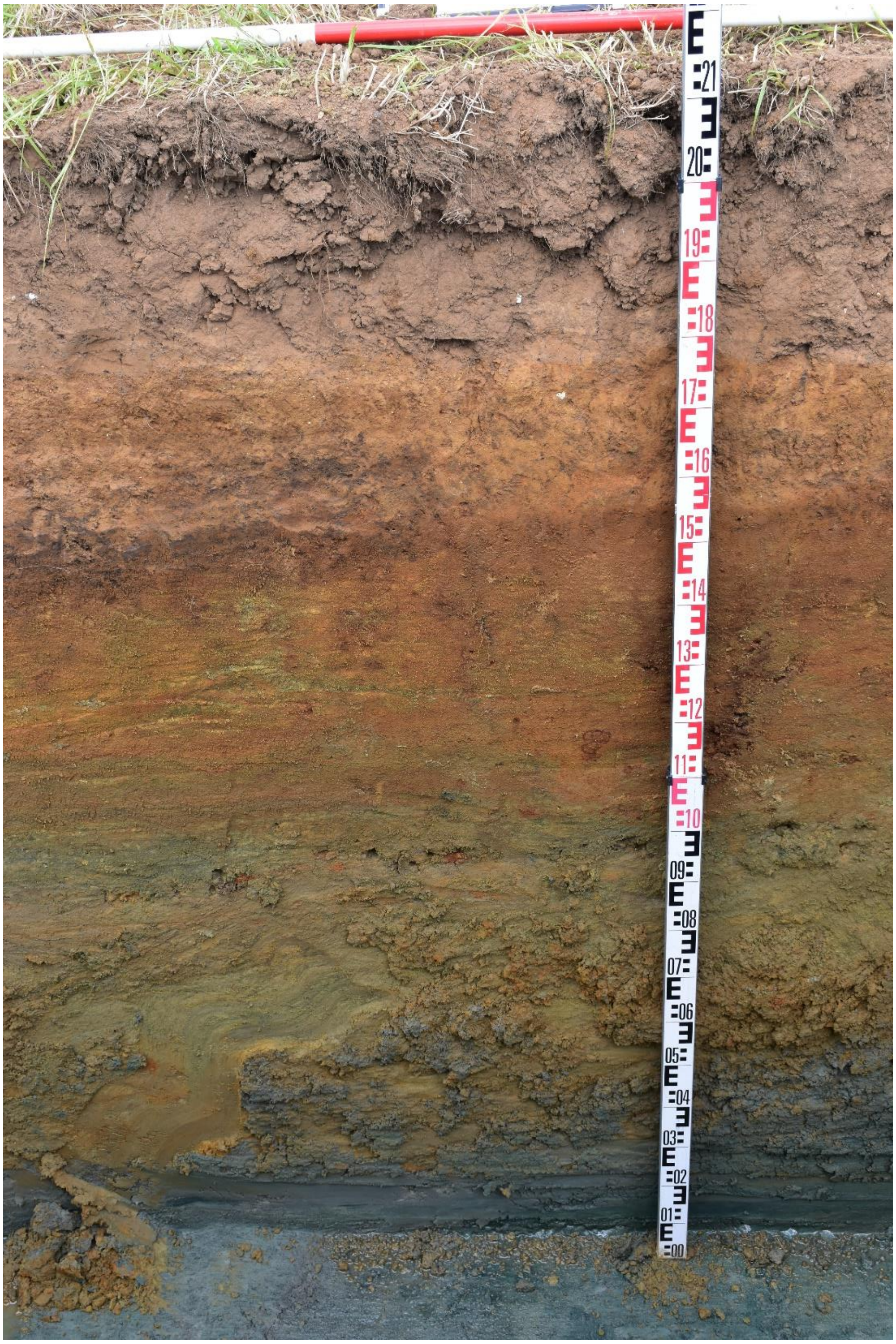


Plate 10: Test Pit 104, Folkestone beds, Greensand and Gault Clay, Units 7 & 8

Plate 11: Test Pit 115, Section facing east, showing Palaeo Channel cutting the Folkestone beds, Greensand.

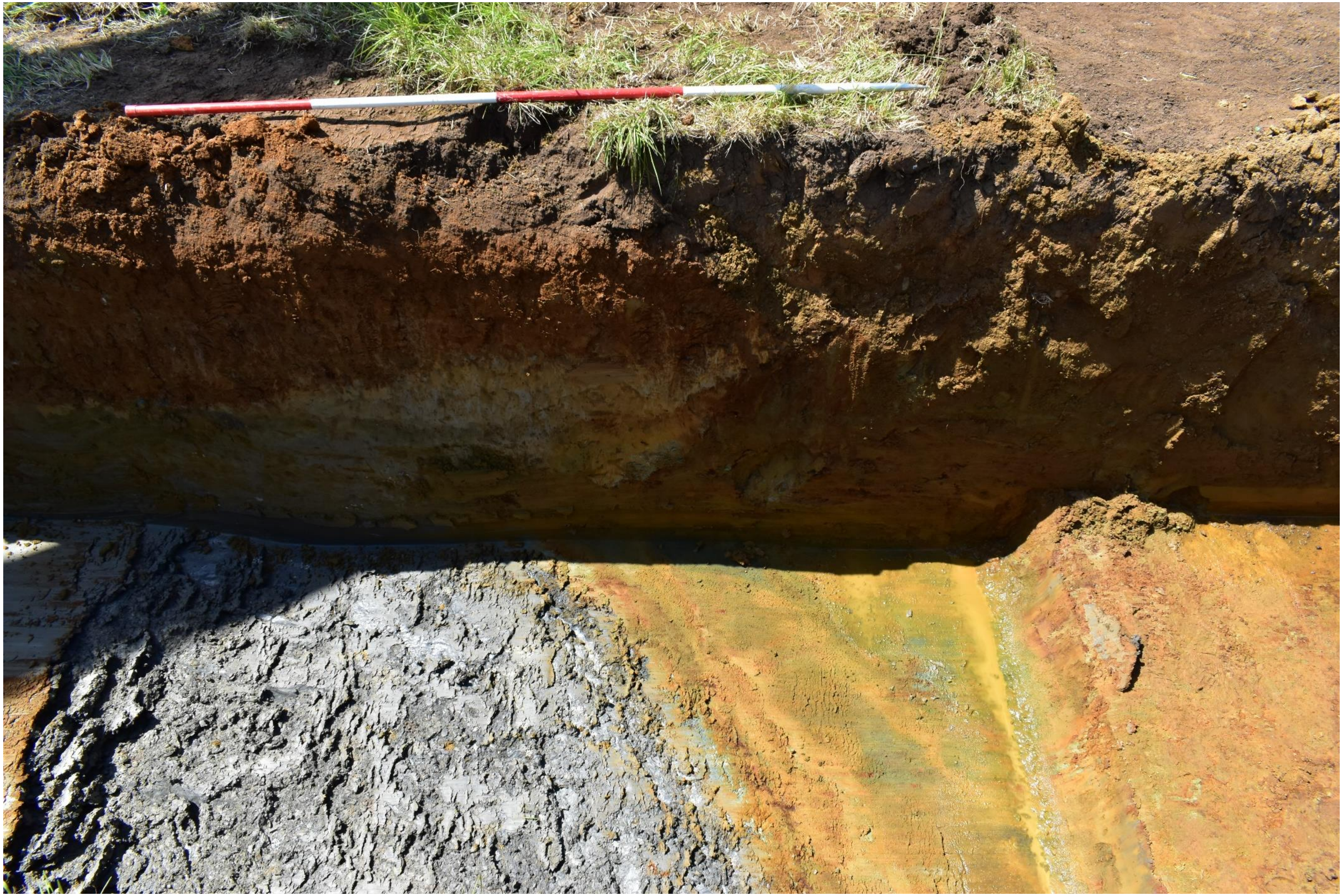


Plate 12: Test Pit 115, Section facing east, and plan view showing Palaeo Channel cutting the Folkestone beds, Greensand.

11 Appendix 3 Logs

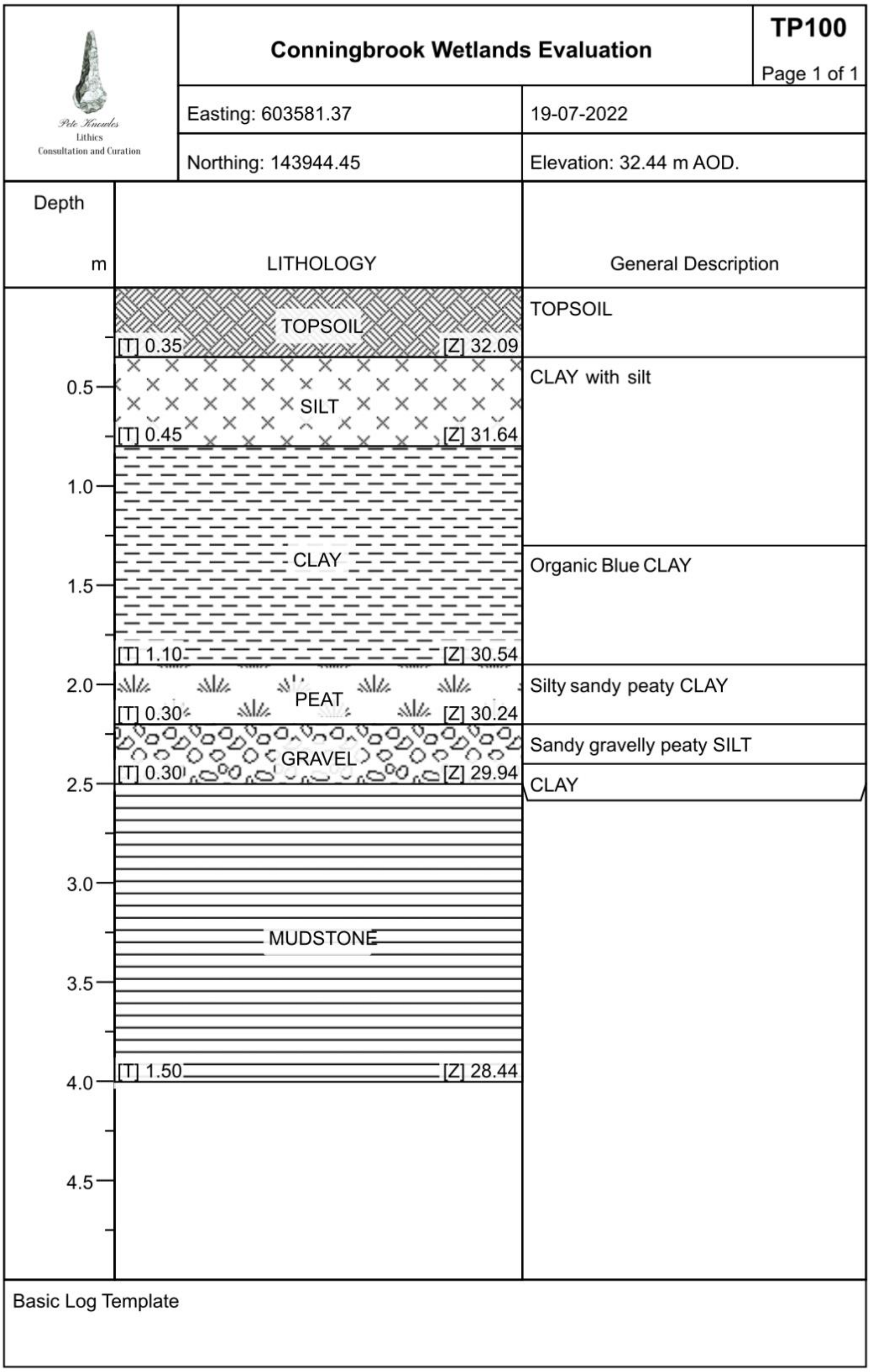


Figure 12: Representative Test Pit 100 log