



**CROSTON
FLOOD
ALLEVIATION
SCHEME

CROSTON,
LANCASHIRE**

**Archaeological
Watching Brief**



Oxford Archaeology North
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SUMMARY

Oxford Archaeology North (OA North) was commissioned by the Environment Agency to maintain an archaeological watching brief during the course of a geotechnical investigation. This investigation was undertaken along a section of the River Yarrow in advance of the development of a flood elevation scheme for the village of Croston in West Lancashire. The Proposed Development Area (PDA) took in an area of land approximately 575m in length, extending between Roemoor Farm in the north (NGR 352162, 418521), Plump Farm to the south-west (NGR 352163, 417683) and Bradley Hall to the south-east (NGR 352744, 417825). The investigation entailed two phases of excavation, the first conducted in December 2013 involving three cable percussive boreholes, three windowless sampling holes and 34 trial pits, and the second conducted in July 2014 involving a further 39 test pits.

The wider peat bogs or ‘mosses’ of the Lancashire Plain have been the subject of comprehensive archaeological, palaeoecological and geomorphological survey and analysis by OA North, with the smaller moss of Croston/Mawdesley and Hoscar being considered in a volume that was published in 2013. This research identified the potential of the mosses to mask archaeological activity, in particular relating to the prehistoric exploitation of the wetlands from the Mesolithic period onwards. This activity is thought to probably focus upon the many sandy islands that would have existed within the undulating land of the wetlands, which would have provided a secure base for the exploitation of the surrounding wetland resources, and are gradually emerging from below the retreating peat deposits. In contrast later historical activity was identified as predominantly focusing upon the edge of the wetland areas, as represented by several Roman coin hoards and evidence for medieval and post-medieval agriculture.

Monitoring the test pitting produced no evidence for archaeological activity of any period, and whilst the ground investigations identified the presence of organic layers north of the river, no buried soils or peat deposits were observed. The likelihood of the development impacting upon any palaeoenvironmental significant deposits is thus considered to be minimal.

Based upon the results of the watching brief, there are little or no significant archaeological deposits of interest across the study area, and it is recommended that no further archaeological mitigation is merited.

ACKNOWLEDGEMENTS

Oxford Archaeology North (OA North) would like to thank the Ed Wilson, acting as Senior Archaeologist for the Environment Agency, for commissioning the project. OA North is also grateful to Neil Forsythe, Project Manager for the Environment Agency, for logistical support.

The archaeological watching brief was undertaken by Lewis Stitt and Vickie Jamieson. The report was written by Adam Tinsley and edited by Ian Miller, and the drawings were produced by Mark Tidmarsh. The project was managed by Ian Miller.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF THE PROJECT

1.1.1 Oxford Archaeology North (OA North) was commissioned by Ed Wilson, acting as Senior Archaeologist for the Environment Agency, to undertake an archaeological watching brief during geotechnical investigations within the Proposed Development Area (PDA) of a flood elevation scheme on the River Yarrow near the village of Croston, West Lancashire (Fig 1). This formed a precursor to a programme of flood defence improvement, involving the proposed creation of a damned storage area.

1.2 LOCATION AND TOPOGRAPHY

- 1.2.1 The PDA straddles the River Yarrow, and takes in an area approximately 575m long, extending between Roemoor Farm in the north (NGR 352162, 418521), Plump Farm to the south-west (NGR 352163, 417683) and Bradley Hall to the south-east (NGR 352744, 417825). The area and its surrounds largely comprises agricultural fields with some housing located on adjacent land immediately to the north around Roemoor Farm.
- 1.2.2 Topographically, the River Yarrow occupies a low lying, shallow and slightly undulating valley, varying in height from approximately 15m to 26m aOD.

1.3 SOILS AND GEOLOGY

- 1.3.1 The underlying solid geology of the site is characterised as sedimentary bedrock of the Sidmouth Mudstone formation (BGS 2014).
- 1.3.2 The overlying drift geology is characterised as slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils upon the river terraces and loamy and clayey floodplain soils with naturally high groundwater within the immediate channel of the River Yarrow (Cranfield 2014).

1.4 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

- 1.4.1 **Introduction:** prior to the archaeological watching brief outlined in this report, the PDA formed part of a much wider archaeological, palaeoecological and geomorphological survey programme conducted by OA North , and falls under the discussion and analysis relating to the general Croston/Mawdesley and Hoscar mosses featured in Volume 7 of the publication series (Middleton *et al* 2013). This survey identified the potential of peat deposits to mask archaeological activity extending as far back as the Mesolithic period and contributed a number of small assemblages to support this supposition.

- 1.4.2 **Prehistoric to Roman:** although there is no direct evidence for prehistoric sites, or finds, within the PDA, the surrounding area was certainly utilised during this broad period. Prior to the survey conducted by OA North (*ibid*), Croston and Mawdesley Mosses had produced the only Mesolithic site known in south-west Lancashire (Wymer 1977, 162-71). The site of Blackmoor (Lancashire Sites and Monuments Record LSMR:1952) was located south-west of the village of Mawdesley and comprised two distinct flint scatters recovered from a sand quarry. The composition of this assemblage may suggest it is the product of seasonal exploitation of the wetlands (Middleton *et al* 2013, 146). Excavations carried out in the area subsequently were unable to locate additional material and concluded the site had been destroyed by quarrying activity, but did identify layers of carbonised wood within adjacent peat deposits that probably relate to associated Mesolithic activity (*op cit*, 145). The more recent survey of the area recovered a limited number of Mesolithic flints close to the Blackmoor site, as well as several isolated flints and a small scatter from the Mawdesley area (*op cit*, 146, Site ref. LA268:LA271) and a single scrapper from Croston Moss (*ibid*, LA250), which may also be of Mesolithic origin. All such sites were located adjacent to extant peat deposits and upon outcrops of sand deposits at relatively low altitudes. This probably indicates that Mesolithic peoples were making use of sandy within the surrounding wetland in order to exploit available resources. Evidence for Neolithic or Bronze Age activity is similarly limited, with a single find of a barbed-and-tanged arrowhead recovered from the southern edge of Mawdesley Moss (LSMR 1867). Additional isolated finds of flint tools and debitage, forming a diffuse scatter near the village of Croston, are probably of the same date and indicate a light but extensive utilisation of the boulder clay areas west of Chorley (*op cit*, 148).
- 1.4.3 No material relating to the Iron Age has been recovered from across the area although several Roman coin hoards were found along the northern edge of the moss, near the village of Croston (LSMR:1997; LSMR 0063). The paucity of finds may suggest a lack of sustained or intensive exploitation of the wetland areas during this period.
- 1.4.4 **Medieval to post-medieval period:** there is a distinct lack of artefactual material relating to this period, despite the fact that the village of Croston has been identified as the site of a pre-Domesday church and medieval crosses are known from the surrounding area (*op cit*, 148). The survey conducted by OA North did recover a single piece of medieval pottery as well as several other finds of a similar date. It also identified a number of fields containing ridge and furrow, which probably represent a remnant of a more extensive system of probable medieval date, organised around the edge of the mosses (*ibid*). While the field systems are poorly dated, they were probably in use up to a general reversion to pasture during the 19th century, and are known to pre-date a series of marl pits, which had clearly been cut through them, and were themselves out of use by the mid 19th century. These systems represent cultivation of the areas surrounding the mosses and indeed documentary sources suggest that the wetlands were not exploited greatly.

- 1.4.5 Efforts instead appear to be restricted to mitigating the danger posed by flooding from the wetlands as well as land reclamation, with numerous drainage schemes initiated from the 16th century onwards. This was followed and augmented by several programmes of canalisation during the 18th and 19th centuries, which not only provided transportation networks linked to the industrial development of townships across the Lancashire Plain but also improved drainage of the wider mosses.

2. METHODOLOGY

2.1 WATCHING BRIEF

- 2.1.1 The geotechnical investigation occurred in two phases: Phase 1 was carried out between the 4th and 19th of December 2013; and Phase 2 between the 21st and 28th of July 2014. All excavations were carried out by non-archaeological contractors, but monitored by a suitably qualified and experienced archaeologist at all times. Phase 1 involved the excavation of three cable percussive boreholes, three windowless sampling holes and 34 trial pits. The trial pits were excavated using a hydraulically powered mechanical excavator equipped with a variety of toothed and none toothed buckets. The turf was first removed using the ditching bucket and then a central pit, measuring approximately 3m by 0.60m and extending to a maximum depth of 4m, was opened. Phase 2 involved the excavation of 39 test pits which were excavated in an identical manner to previous investigations but measured approximately 5-5.5m by 0.60m, extending to a maximum depth of 4m.
- 2.1.2 The archaeological watching brief recorded the location, extent, and character of all surviving features and deposits of archaeological interest contained within the test pits. While no brief or specification was provided this was carried out in accordance with IfA Standards and Guidance for archaeological recording (IfA 2008a:2008b:2010).



Plate 1. Working shot of the typical excavation of a test pit (TP035), Viewed facing north.

2.2 ARCHIVE

- 2.2.1 A full professional archive has been compiled in accordance with the current IfA (IfA 2008b) and English Heritage guidelines (English Heritage 2006). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. A copy of this report will be forwarded to the Greater Manchester Historic Environment Record (HER).

3. RESULTS

3.1 INTRODUCTION

- 3.1.1 The geotechnical investigation occurred in two phases and consisted of three cable percussive boreholes, three windowless sampling holes and 34 trial pits in Phase 1, and 39 test pits in Phase 2. This section details the results of the archaeological monitoring conducted during the excavation of these interventions. The locations of the main interventions are plotted on Figure 2.

3.2 RESULTS

- 3.2.1 In all of the test pits the uppermost turf and topsoil was between 0.10m and 0.40m thick, and consisted predominantly of a medium brown sandy silt with low levels of rounded and rare sub-angular stones. This sealed an intermittent and slightly variable subsoil deposit of either medium brown sandy silt or silty clay, which varied in thickness between 0.10m and 0.30m. The remaining depth of the test pits comprised of a combination of mainly alluvial as well as glacial and potential fluvioglacial deposits, which varied in composition but included sands, gravelly sands and cobble rich sands, clays, sandy clays and boulder clays as well as cobble and gravel lenses or thin layers. A summary of the stratigraphic sequence of each test pit is included in Table 1, and Figure 3 depicts a sample of the typical range of variation encountered among the test pits.



Plate 2: An example of a typical section from TP123. Viewed facing west.

- 3.2.2 The only variation in the stratigraphic sequence, beyond that normally encountered and defined above, relates to the occasional occurrence of thin layers of organic silty deposits, as recorded for example in TP038.
- 3.2.3 Numerous test pits were only partially excavated and did not achieve the maximum depths outlined above due to poor ground conditions resulting in edge collapse and consequent unsafe working conditions. Where this occurred it is noted in Table 1.



Plate 3 An example of edge collapse due to adverse ground conditions in TP011. Viewed facing north-east.

- 3.2.4 No archaeological material or deposits was encountered in any of the excavations.

Table 1. Summary of test pit stratigraphy

Test Pit	Summary of Stratigraphic Sequence	
01	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
02	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
03	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
04	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
05	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay and sandy clay deposits over an organic rich sandy clay deposit and a basal sand layer (see Figure 3)
06	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits intermixed with sandy layers to maximum depth
07	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposit to maximum depth
08	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
09	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
10	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
11	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits. Possibly within a former river channel. Sides very unstable and subject to collapse at 1.20m. Test pit abandoned at this depth.
12	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
28	Topsoil	>0.30m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
29	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth

Test Pit	Summary of stratigraphic sequence	
30	Topsoil	>0.25m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
31	Topsoil	>0.30m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
32	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
33	Topsoil	>0.30m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
34	Topsoil	>0.30m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
35	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Gravely sand deposit >0.40m thick above clay extending to maximum depth See Figure 3
36	Topsoil	>0.25m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
37	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
38	Topsoil	>0.30m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits above a thin layer >0.10m thick of organic silt at a depth of 1.90m. Below this was a gravely deposit but the test pit was abandoned due to edge collapse and water inundation.
39	Topsoil	>0.30m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
40	Topsoil	>0.25m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth with a band of cobbles approximately 0.30m thick occurring between 1-1.5m below the current ground level
41	Topsoil	>0.30m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits. Abandoned due to edge collapse before maximum depth achieved.
42	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits. Abandoned due to edge collapse.
43	Topsoil	>0.30m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits. Abandoned due to edge collapse before maximum depth achieved.

Test Pit	Summary of stratigraphic sequence	
44	Topsoil	>0.25m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits. Abandoned due to edge collapse before maximum depth achieved.
45	Topsoil	>0.30m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits. Abandoned due to edge collapse before maximum depth achieved.
46	Topsoil	>0.30m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits. Abandoned due to edge collapse before maximum depth achieved.
47	Topsoil	>0.30m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits. Abandoned due to edge collapse before maximum depth achieved.
48	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
49	Topsoil	>0.35m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Undefined clay deposits to maximum depth
50	Topsoil	>0.30m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Cobble rich layer approximately 0.40m thick above boulder clays to maximum depth of test pit
101	Topsoil	>0.20m Medium grey sandy silt (includes turf line).
	Subsoil	>0.30m Medium brown grey silty clay
	Natural	Dark brown clay with occasional sub-angular gravels to maximum depth of pit
102	Topsoil	>0.20m Medium grey sandy silt (includes turf line).
	Subsoil	>0.30m Medium brown grey silty clay
	Natural	Dark brown clay with occasional sub-angular gravels to maximum depth of pit
103	Topsoil	>0.22m Medium grey sandy silt (includes turf line).
	Subsoil	None
	Natural	Mixture of light grey and medium brown clay with occasional well rounded stones to maximum depth of test pit
104	Topsoil	>0.24m Medium brown sandy silt (includes turf line).
	Subsoil	>0.30m Dark grey with brown mottling clayey silt with occasional well rounded stones
	Natural	Mixture of light grey and medium brown clay with occasional well rounded stones to maximum depth of test pit
105	Topsoil	>0.20m Medium brown sandy silt (includes turf line).
	Subsoil	>0.20m Dark brown and medium grey clayey silt deposits, possible flood deposits
	Natural	Dark yellow and blue grey clays with some silt. Contains organic material. Possible extinct river channel or flood deposits. Test pit abandoned at 2.10m due to edge collapse.

Test Pit	Summary of stratigraphic sequence	
106	Topsoil	>0.30m Medium brown sandy silt (includes turf line).with occasional well rounded stones
	Subsoil	None
	Natural	Medium orange and dark pinkish-brown sand with frequent well rounded river gravels >0.55m thick above mottled light grey and brown clay with lenses of orange sand. Sandy deposit towards the base may indicate the start of the river terrace but test pit abandoned due to collapse at 3.20m
107	Topsoil	>0.24m Medium brown sandy silt (includes turf line).with frequent well rounded stone
	Subsoil	None
	Natural	Medium orange and dark pinkish-brown sand with frequent well rounded river gravels >0.60m thick above mottled light grey and brown clay with occasional well rounded stones. Abandoned at a depth of 3.20m
108	Topsoil	>0.32m Medium brown sandy silt (includes turf line).with frequent well rounded stones
	Subsoil	None
	Natural	Dark orange and medium brown silty sand with abundant well rounded river gravels >0.46m thick above mixed dark pinkish-brown and light grey clay. Pit abandoned at 3.40m
109	Topsoil	>0.24m Medium brown sandy silt (includes turf line).with occasional well rounded stones
	Subsoil	Medium brown sandy silt with well rounded stones >0.18m
	Natural	Dark yellow sandy clay with occasional stones >0.30m thick above mottled light grey and brown clay with sand lenses. Pit abandoned at 3.40m.
110	Topsoil	>0.30m Medium brown sandy silt (includes turf line).with occasional well rounded stones
	Subsoil	None
	Natural	Medium orange and dark pinkish-brown sand with frequent well rounded river gravels >0.55m thick above mottled light grey and brown clay with lenses of orange sand. Sandy deposit towards the base may indicate the start of the river terrace.
111	Topsoil	>0.23m Medium brown sandy silt (includes turf line).
	Subsoil	Medium brown sandy silt with well rounded stones >0.11m
	Natural	Dark pink and light grey clay with occasional well rounded stones >0.50m thick over dark orange sand >0.50m thick over dark pink and light grey clay with occasional well rounded stone. Pit abandoned at 3m.
112	Topsoil	>0.35m Medium brown sandy silt (includes turf line).with occasional well rounded stones
	Subsoil	Medium brown sandy silt with frequent well rounded stones >0.22m
	Natural	Dark yellow sandy clay with occasional stones >0.30m thick over mottled light grey and brown clay with sand lenses. Pit abandoned at 3.20m.
113	Topsoil	>0.23m Medium brown sandy silt (includes turf line).with occasional well rounded stones
	Subsoil	None
	Natural	Medium reddish brown silty sand with frequent river gravels >0.25m thick over dark orange and light grey sandy clay with occasional rounded stones. Pit abandoned at 3.50m.
114	Topsoil	>0.24m Medium brown sandy silt (includes turf line).with frequent well rounded stones
	Subsoil	None
	Natural	Medium reddish brown glacial clay >3.20m thick over possible fluvial deposits of medium brown silty sand with small pea gravels >0.50m thick over light brown yellow pure sand extending beyond base of pit at maximum depth.
115	Topsoil	>0.32m Medium brown sandy silt with occasional small to medium sized rounded stones
	Subsoil	Medium brown sandy silt with frequent well rounded stones >0.20m
	Natural	Mottled light grey and medium brown clay with rare angular stones to bottom of pit
116	Topsoil	>0.20m Medium brown sandy silt (includes turf line) with occasional rounded stones. Contained modern pottery, glass, wire and plastic.
	Subsoil	Medium brown sandy silt with frequent well rounded stones >0.30m
	Natural	Mottled light grey and medium brown clay with rare sub-angular stone inclusions and lenses of sand to maximum depth of pit.

Test Pit	Summary of stratigraphic sequence	
117	Topsoil	>0.25m Medium brown sandy silt (includes turf line) with occasional well rounded stones
	Subsoil	Medium brown sandy silt with frequent well rounded stones >0.20m
	Natural	Light grey and medium brown clay >2m thick over medium orange brown sand extending to maximum depth of pit.
118	Topsoil	>0.20m Medium brown sandy silt (includes turf line) with occasional well rounded stones
	Subsoil	Medium brown sandy silt with frequent well rounded stones >0.30m
	Natural	Mottled light grey and medium brown clay with rare sub-angular stone inclusions and lenses of sand to maximum depth of pit.
119	Topsoil	>0.20m Medium brown sandy silt (includes turf line) with rare well rounded stones
	Subsoil	Medium brown sandy silt with frequent well rounded stones >0.30m
	Natural	Light grey and medium brown clay with lenses of grey sand to maximum depth of pit.
120	Topsoil	>0.23m Medium brown sandy silt (includes turf line) with occasional well rounded stones
	Subsoil	Medium brown sandy silt with frequent well rounded stones >0.13m
	Natural	Mottled light grey and medium brown clay with lenses of sand >1.70m thick over light brown sand extending to maximum depth of pit
121	Topsoil	>0.20m Medium brown sandy silt (includes turf line) with occasional well rounded stones
	Subsoil	None
	Natural	Medium yellow brown clayey sand with occasional rounded stones >0.50m thick over mottled light grey and brown clay with lenses of orange sand extended to maximum depth of pit.
122	Topsoil	>0.15m Medium brown sandy silt (includes turf line) with occasional well rounded stones
	Subsoil	None
	Natural	Mottled light grey and brown clays with lenses of sand and gravel extending to maximum depth of pit
123	Topsoil	>0.20m Medium brown sandy silt (includes turf line) with occasional well rounded stones
	Subsoil	Medium brown sandy silt with frequent well rounded stones >0.30m
	Natural	Mottled light grey and medium brown clay with rare sub-angular stone inclusions and lenses of sand to maximum depth of pit.
124	Topsoil	>0.18m Medium brown sandy silt (includes turf line)
	Subsoil	None
	Natural	Light grey brown mottled clay with well rounded stones extending to maximum depth of pit
125	Topsoil	>0.18m Medium brown sandy silt (includes turf line)
	Subsoil	None
	Natural	Light grey brown mottled clay with well rounded stones extending to maximum depth of pit
126	Topsoil	>0.18m Medium brown sandy silt (includes turf line) with occasional well rounded stones
	Subsoil	None
	Natural	Light grey brown mottled clay with well rounded stones extending to maximum depth of pit
127	Topsoil	>0.24m Medium brown sandy silt (includes turf line) with occasional well rounded stones
	Subsoil	None
	Natural	Dark orange clay with occasional gravels > 0.20m thick over mottled light grey brown clay with lenses of dark orange and light grey sand extending to maximum depth of pit.
128	Topsoil	>0.14m Medium brown sandy silt (includes turf line)
	Subsoil	Medium brown yellow sandy silt with occasional well rounded stones >0.20m thick
	Natural	Mottled light grey and medium brown clay with frequent well rounded stone inclusions >0.55m thick over mottled light grey brown clay with lenses of dark orange sand extending to maximum depth of pit.

Test Pit	Summary of stratigraphic sequence	
129	Topsoil	>0.20m Medium brown sandy silt (includes turf line) with occasional well rounded stones
	Subsoil	None
	Natural	Mottled light grey and medium brown clay with lenses of dark orange sand to maximum depth of pit.
130	Topsoil	>0.18m Medium brown sandy silt (includes turf line)
	Subsoil	Medium brown sandy silt with frequent well rounded stones >0.20m thick
	Natural	Dark pink clay with rare well rounded large stones >3.50m thick over dark pink sand extending to maximum depth of pit.
131	Not monitored but reported to be the same as TP132	
132	Topsoil	>0.12m Medium brown sandy silt (includes turf line)
	Subsoil	Medium brown sandy silt with frequent well rounded stones >0.10m thick
	Natural	Dark orange clayey sand with frequent rounded stones >0.95m thick over mottled dark grey and brown sand with light grey clay patches >1.40m thick. Abandoned at 2.60m due to edge collapse.
201	Topsoil	>0.40m Dark brown clayey silt (includes turf line) with rare well rounded stones
	Subsoil	None
	Natural	Light grey and reddish brown clay extending to maximum depth of pit.
202	Topsoil	>0.10m Medium brown sandy silt (includes turf line) with rare sub-angular stones
	Subsoil	Medium brown sandy silt probable fluvial deposit with frequent well rounded stones >0.80m
	Natural	Medium brown clay extending to maximum depth of pit.
203	Topsoil	>0.25m Medium brown sandy silt (includes turf line)
	Subsoil	Light brown sandy silt possible fluvial deposit >2.60m
	Natural	Unrecorded. Abandoned at 2.90m due to edge collapse.
204	Topsoil	>0.30m Medium brown sandy silt (includes turf line)
	Subsoil	Light brown clayey silt >2.50m thick
	Natural	Light yellow and medium grey sand possible fluvial deposit >0.30m thick. Pit abandoned at 3.10m due to edge collapse.
205	Topsoil	>0.32m Medium brown sandy silt (includes turf line) with frequent well rounded stones
	Subsoil	None
	Natural	Dark orange sand and medium brown silt with abundant river gravels >0.65m over dark pink and light grey clay with orange sand lenses extending to maximum depth of pit.
206	Topsoil	>0.30m Medium brown sandy silt (includes turf line) with occasional well rounded stones
	Subsoil	None
	Natural	Medium yellow and orange sandy gravels >0.40m thick over mottled grey and dark pink brown clay with dark orange sand near base of pit, possibly start of river terrace.
207	Topsoil	>0.35m Medium brown sandy silt (includes turf line) with occasional well rounded stones
	Subsoil	None
	Natural	Medium yellow clayey sand with occasional stones >0.28m thick over mottled light grey and dark pinkish-brown clay with dark orange sand lenses extending to maximum depth of pit.

3.3 ENVIRONMENTAL ASSESSMENT

- 3.3.1 Environmental specialists at OA North reviewed the ground investigation report produced by Halcrow (2014) in order to determine the likelihood of the development impacting upon any archaeological and palaeoenvironmental significant deposits such as buried soil horizons or peat. South-west Lancashire is home to many wetlands, the remnants of former lowland peat located fairly nearby at Croston Moss, Mawdesley Moss, and Hoscar Moss (Middleton *et al* 2013).
- 3.3.2 The ground investigations indicate that much of the area of development consists of topsoil overlying clays and silts (cohesive alluvium), which, in turn, overly sands and gravels (granular alluvium). The underlying deposits consist of glacial till and/or glaciofluvial sands. The alluvium is likely to represent a riverine deposit laid down in fairly high-energy conditions. Bands of peat, representing periods of lower-energy conditions were recorded at three locations north of the current river (TP06, TP08 and WS02) (Halcrow 2014) A more in-depth study of the logs recorded at each of these locations suggests these organic layers were quite ephemeral. Probably developing during temporary reductions in alluvial sedimentation, leading to a subsequent increase in organic accumulation, perhaps at the river edge or in a backwater channel.
- 3.3.3 Such river-edge/backwater environments are prime locations for the discovery of archaeological wetland sites and for the preservation of peat deposits (OA North 2011, Middleton *et al* 2013). Accordingly, as well as features of archaeological significance, the OA archaeologist carrying out the watching brief during the second phase of ground investigations was advised to closely monitor the area north of the current river for organic deposits, allowances being made for an environmental specialist to visit the site should any significant peat deposits be encountered.

4. DISCUSSION

- 4.1 During the course of the watching brief no archaeological features, deposits or finds were encountered, other than a small quantity of modern material observed within the topsoil of TP116 (not retained). Given the limited nature of the investigations this does not conclusively rule out the presence of archaeology across the PDA, but would suggest that if present, evidence is highly dispersed and of low intensity.
- 4.2 Although the ground investigations (Halcrow 2014) identified the presence of organic layers north of the river, no buried soils or peat deposits were observed during the watching brief. The likelihood of the development impacting upon any palaeoenvironmental significant deposits is thus considered to be minimal.

5. RECOMMENDATIONS

- 5.1 Based upon the results of the watching brief, there is a very limited chance that future development would impact upon significant archaeological within the PDA, and it is recommended that no further mitigation is merited.

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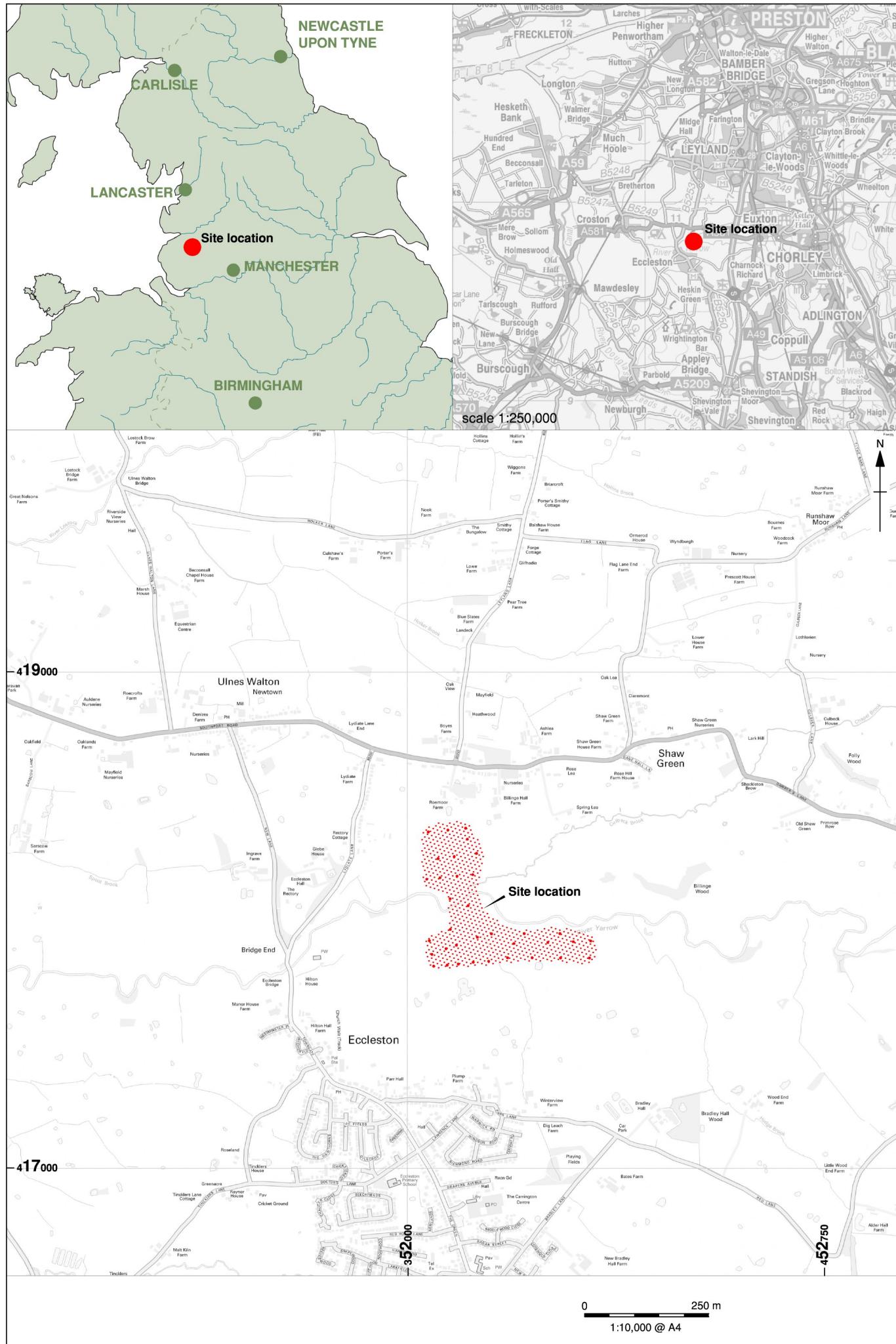


Figure 1: Site location

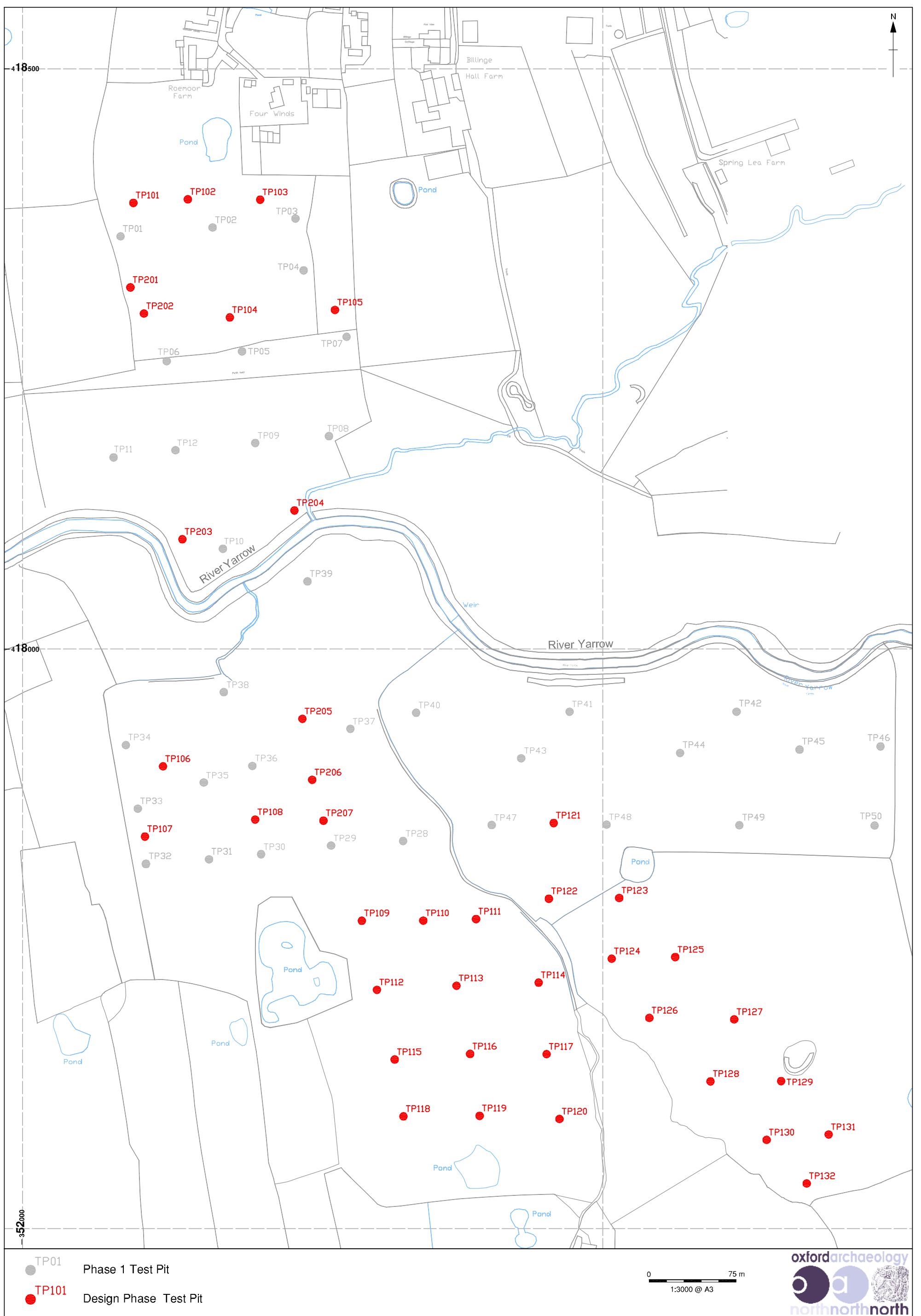


Figure 2: Plan of test pit locations

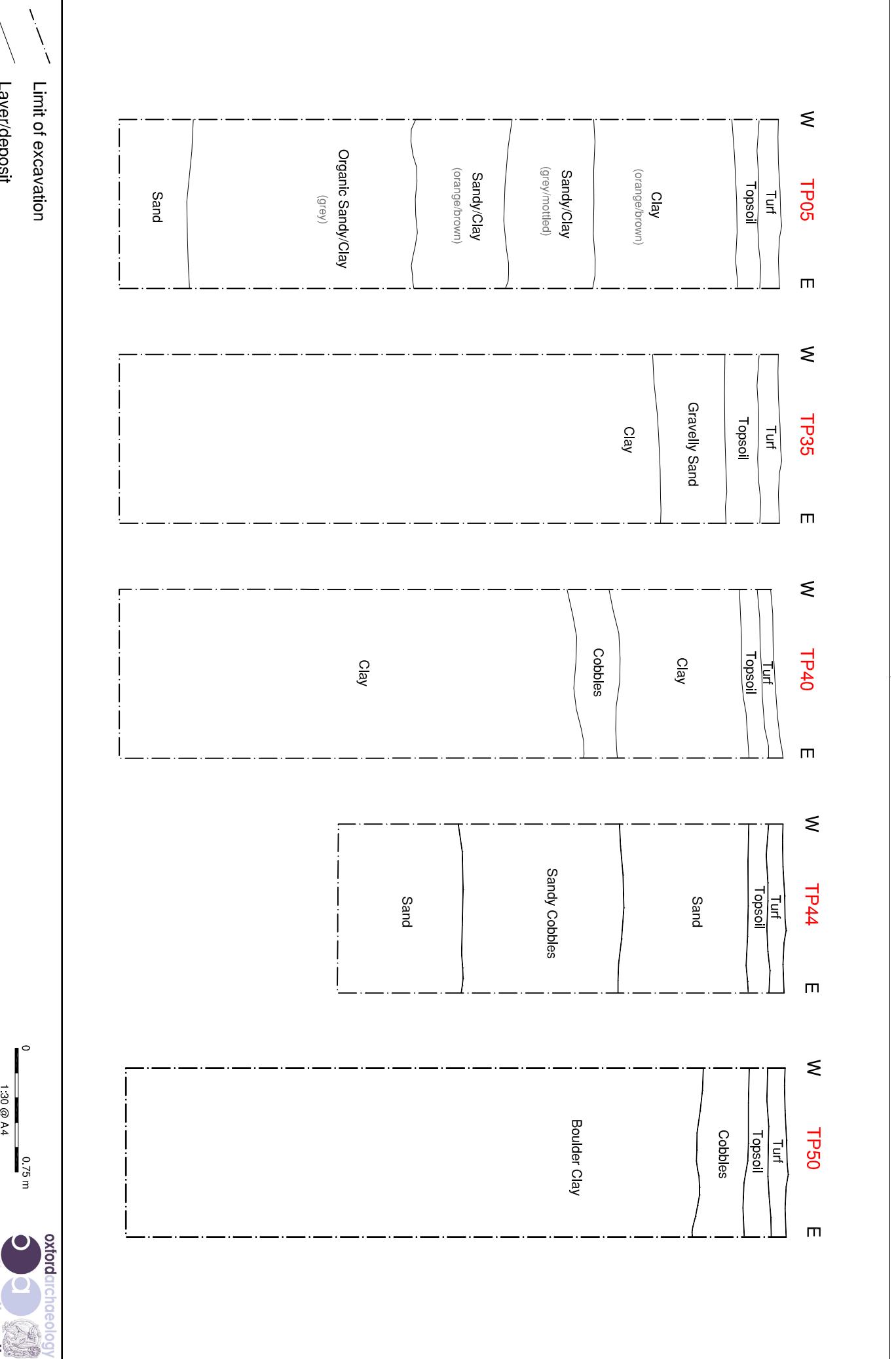


Figure 3: Sample sections of test pits