Land off Andrews Lane, Formby, Merseyside

Archaeological Strip, Map and Record Report

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Land off Andrews Lane, Formby, Merseyside

Archaeological Strip, Map, and Record Report

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Summary

Oxford Archaeology North (OA North) was commissioned by CgMs Heritage to undertake a program of archaeological strip, map and record at the proposed development site on land off Andrews Lane, Formby. The proposed development will comprise the construction of up to 95 dwellings and associated infrastructure. The archaeological works were required by Doug Moir of the Merseyside Environmental Advisory Service (MEAS), in order to discharge a planning application condition. Specifically, the work was required to assess the presence of remains associated with Brickkiln Hole (MME 1099) mentioned in the Formby Manor Court Rolls of 1757.

The site lies on the southern edge of the town of Formby, in an area that has been subject to rising sea levels and encroaching sand in the past. Map regression showed that the proposed development area was historically on agricultural land, but finds such as the Formby Point footprints, approximately 2km from the proposed development site, prove that the landscape has had a long history of human occupation. A nearby dwelling named Clayhole Cottage, strengthens the argument that the remains of Brickkiln Hole were in the vicinity, and that clay was sourced from this area.

The strip, map and record was undertaken on the footprint of an attenuation pond, which measured approximately 63 x 25m. The fieldwork took place from 8th to 19th October 2018.

The excavation of the area revealed a series of field boundary ditches, dividing an area of windblown sand to the north, from a more clay-rich natural geology to the south. Earliest in the stratigraphic sequence, 0.35m below the present-day ground level, was subsoil (***143***). Above this was a peaty buried soil (***144***) sealed below a windblown sand (***145***). All these deposits were truncated by the earliest boundary ditch (***178***), which was not closely dated, but could date to the post-medieval period. The buried soil was radiocarbon dated to the late Bronze Age and contained pollen evidence for a damp alder carr woodlands, succeeded by a saltmarsh, which formed as sea levels and the water table rose. Ditch ***178*** was replaced by a more substantial boundary formed by parallel ditches ***176*** and ***177***, either side of a central bank. The latest phase of boundary redefinition comprised a recut (***184***) to south-western boundary ditch (***176***). Historic mapping showed that the boundary was still extant in the nineteenth century and a shoe recovered from the latest backfill to ***184*** was dumped at this time. No evidence for quarrying or brick manufacture was found that could have been associated with Brickkiln Hole.

Acknowledgements

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The fieldwork was directed by Becky Wegiel, assisted by Steve Clarke. Thanks are also extended to the OA staff that cleaned and packaged the finds, processed the environmental remains, and prepared the archive under the supervision of Dot Broughton. Fraser Brown managed for the project for Oxford Archaeology North.

1 INTRODUCTION

1.1 Scope of work

1.1.1 Oxford Archaeology North (OA North) was commissioned by CgMs Heritage, acting on behalf of Redrow Homes Ltd, to undertake an archaeological strip, map, and record at the site of a proposed housing development at Andrews Lane, Formby, Merseyside (NGR SD 2927 0592; Fig 1). The work was undertaken as a condition of Planning Permission: Outline permission was granted for 95 dwellings in 2017 (planning ref. DC/2016/01740). A verbal brief was set by the Merseyside Environmental Advisory Service (MEAS) and a written scheme of investigation was produced, by CgMs Heritage, detailing the Local Authority's requirements for work necessary to discharge the planning condition. The work was confined to the area of a proposed attenuation pond, initially planned to cover 60m x 40m, but which was reduced to 63 x 25m following a design change. This document outlines how OA North implemented the specified requirements.

1.2 Location, topography and geology

1.2.1 The development site is located immediately to the south of the town of Formby on what was formerly pastoral and arable land. Overall, it extends to approximately 6.15ha, over a relatively flat topography, at an elevation of approximately 4.15 – 4.60m AOD. It is flanked, to the north and north-west, by an existing housing estate, a railway line bounds it to the east, and agricultural land lies to its south (Fig 1).

1.2.2 The solid geology of the area is mapped as Singleton Mudstone Member overlain by superficial deposits of sand (http://mapapps.bgs.ac.uk/geologyofbritain/home.html). The soils are sandy and loamy (http://www.landis.org.uk/soilscapes/).

1.3 Archaeological and historical background

1.3.1 A rapid review of the historical background to the site has been undertaken to put it in its wider context and this is summarised below.

1.3.2 ***Prehistory***: during the 1950s and 1970s studies were carried out on the area of Downholland Moss, to the east of Formby, where underlying peat and clay deposits have assisted in understanding fluctuating sea-levels since the last glaciation (https://www.liverpoolmuseums.org.uk/mol/archaeology/historic-characterisation-project/Sefton-Part-6.pdf). The dunes have been dated to 6500 BC, although the present system probably dates to the seventeenth century (*ibid*). The exposure of a suite of human and animal footprints formed in marine sediments weathering out on the foreshore has been locally known about since the 1970/80s. Prehistoric human and wild animal footprints in beach sediments at Formby Point have been recorded. and are believed to date from *c* 6000 BC to *c* 2400 BC (Burns 2014, 6-7).

1.3.3 The Victoria County History for the town of Formby documented that the town was mentioned in the Domesday Book as *Fornebei*, then was known variously as *Fornebi*, or *Forneby*, finally settling as Formby in the 16th century (Farrer and Brownbill 1907). It was likely that the town had been larger until rising sea levels swamped much of the land changing the coastline, which was also affected by an inundation of wind-blown sand at the beginning of the eighteenth century. This latter problem was of such concern that an Act was passed in 1710 ensuring the planting of grasses in order to halt the ingress of the sand. Evidence of earlier land surfaces were observed during sand clearances (*ibid*).

1.3.4 Brickkiln Hole (MME 1099) is mentioned in the Formby Manor Court Rolls of 1757. It was thought that the archaeological excavation in advance of the construction of the attenuation pond might provide evidence for this kiln and any associated structures, although this proved not to be the case.

1.3.5 ***Historic Mapping***: the site was superimposed onto various historic maps, the earliest being Yates' Map of Lancashire, 1786 (Fig 2). The proposed development area lies to the east of the village of Formby, which depicts the town as a small scatting of buildings, which begin to peter out to the east towards the sand dunes. One building was depicted within the site boundary, but this fell to the north of the area subject to the strip, map and record.

1.3.6 By the time of Hennet's Map of Lancashire, 1830 (Fig 3), the town had grown slightly. A north-north-west/south-south-east-aligned road was added to the east of the town, suggesting that land was being reclaimed from the sea. Significantly, a 'burying ground' is depicted to the south-east of the town, as a rectangle with no associated structure apparent. Again, this fell to the north of the proposed development area.

1.3.7 The Ordnance Survey map 6":1 mile, 1848 (Fig 4) shows expanses of regular rectangular fields on reclaimed land spreading to the east of the newly built Liverpool, Crosby and Southport Railway. The 'burying ground' seen on Hennet's map is now depicted as the Old Church Yard, where St Luke's church is now (MME902).

1.3.8 .

1.3.9 The Ordnance Survey map 25":1 mile, 1893 (Fig 5) shows many new farms to the east of the town. With names such as Marsh Farm and Sandhills Cottages suggesting that they were sited on reclaimed land. The ruin depicted on the previous map has been replaced by farms and cottages to the south of Andrews Lane, which is named on this map for the first time. Clayholes Cottage is illustrated in the west of the development area, its name perhaps hinting at the former use of the site. There was also evidence for some slight reorganization, merging and subdivision of the fields in the locale, with boundaries being formalized and straightened.

2 EVALUATION AIMS AND METHODOLOGY

2.1 Aims

2.1.1 The strip, map, and record aims and objectives were as follows:

i. fully excavate and record the buried archaeological remains;
ii. ensure that any below-ground archaeological deposits exposed are promptly identified;
iii. provide information that will enable an assessment of the impact of the development on any potential archaeological remains identified; and
iv. ensure the recording of archaeological remains, to place this record in its local context and to make this record available.

2.2 Methodology

2.2.1 The area of the proposed attenuation pond was set out by a Redrow surveyor. Due to changes in the design of the site, this was smaller than that quoted in the WSI, measuring 63 x 25m. The archaeological features were surveyed by OA North staff using differential Global Positioning System (dGPS) and altitude information has been established with respect to Ordnance Survey Datum.

2.2.2 The topsoil was mechanically removed under archaeological supervision, by an excavating machine fitted with a wide toothless ditching bucket, to the surface of the first significant archaeological deposit. This deposit was cleaned by hand, using either hoes, shovel scraping, and/or trowels depending on the subsoil conditions, and inspected for archaeological features. All features of archaeological interest were investigated and recorded.

2.2.3 All information identified in the course of the site works was recorded stratigraphically, using a system adapted from that used by the former Centre for Archaeology - English Heritage, with an accompanying pictorial record (plans, sections, and digital photographs). Primary records were made available for inspection at all times.

2.2.4 Results of all the field investigations were recorded on *pro forma* context sheets. The site archive includes both a photographic record and accurate large-scale plans and sections at an appropriate scale (1:50, 1:20 and 1:10). All artefacts were recorded using the same system, and will be handled and stored according to best practice (following current IfA guidelines).

3 Results

3.1 Introduction and presentation of results

3.1.1 The results of the evaluation are presented below. The full details of all contexts can be found in *Appendix A*. Finds data and spot dates, and palaeoenvironmental and radiocarbon data are tabulated in *Appendices B* and *C*.

3.2 General soils and ground conditions

3.2.1 The soil sequence across the site was fairly uniform. The natural geological substrate (***100***) comprised windblown sand to the north of the site, and sand with clay patches to the south. These deposited were overlain by a sandy subsoil (***101***; 0.10m thick), which in turn was overlain by topsoil (***102***; 0.30m thick).

3.2.2 Ground conditions over the strip, map and record area were generally good, although the southern part of site was prone to flooding. Archaeological features, where present, were easy to identify against the underlying natural geology.

3.3 Strip, map and record

3.3.1 A series of north-west-/south-east-aligned ditches were observed cutting the sandy natural geology (Fig 6). When these were excavated in section, a sedimentary sequence was exposed (Fig 7) that had formed prior to the ditches being cut. The earliest stratigraphic element was marine deposit (***174***), comprising an anaerobic grey-blue clay silt (Plates 1-3), which contained blackened plant stems, interpreted as washed in detritus (*Appendix C.2.1*; Fig 3). Sealing this was a laminated sandy-silt subsoil (***143***), above which was an organic peaty layer (***144***), probably a buried land surface (Fig 7; Plates 1 and 2). This latter occurred at approximately 0.30m below the present-day ground level, was approximately 0.05m thick, and occurred in patches across the northern portion of the site. Humic and humin samples from this deposit produced two late Bronze Age dates (*Appendix C.6.2*). A deposit of windblown sand (***145***) sealed ***144***.

3.3.2 The earliest ditch in the sequence (***178***), cut ***144*** and was 2.3m wide and 0.45m deep (Plate 1; Fig 7). From the north-western corner of the site, it was observed to traverse the area, on a west-north-west/east-south-east-alignment, for 13.5m, where it was excavated in section. East of the excavation, it could not be confidently traced and was probably truncated away by a later ditch (***177***). Ditch ***178*** was initially filled with a laminated sand that graded into more silty deposits (all recorded as ***158***), which contained rare wood fragments and insects, unfortunately none of which was suitable for radiocarbon dating. A slip of material (***159***; presumably from a bank associated with the ditch) infilled it from its north-eastern side. This included lenses of peaty soil, which could have derived from the surface of a long-stabilised bank, or from buried soil ***144***. Ditch ***178*** had not completely silted up when two later north-west/south-east ditches (***176*** and ***177***) were excavated on either side of it. The sandy bank material (***155***; Plate 1), up cast when these later ditches were first excavated, was piled up in the center of the two, levelling the depression remaining in ditch ***178***.

*Plate 1: south-east-facing view of ditch **156**, cut through buried soil on the north-western side*

3.3.3 The south-west ditch (***176***) was the larger of the two, measuring up to 3.5m wide, and was 0.60m deep (Plate 2; Fig 7). The smaller ditch (***177***) measured 2.10m wide and was 0.55m deep (Plate 3; Fig 7). Further evidence that these ditches were contemporary was provided by the near identical silting pattern in each. Initially their profiles stabilized, with lenses of sand entering the ditches from both sides, making the edges difficult to discern. Secondary organic fills then accumulated, including deposits ***148*** and ***153*** in ditch ***177***, and ***162*** and ***165*** in ditch ***176***, all of which were observed to be rich in organic material, suggesting the presence of standing/flowing water (*Appendix C.2.3*). The upper fills in each ditch (respectively ***154*** and ***166***) were a contrastingly distinctive reddish-brown colour, possibly comprising levelling deposits deriving from a slighted bank. Several sherds of pottery of eighteenth- to nineteenth-century date were recovered as surface finds from the upper deposits in these ditches (*Section 4.1.2*). Although these were poorly stratified, they probably date the backfilling of the ditch, and this was confirmed by a radiocarbon date obtained from roundwood fragments within deposit ***165*** (*Section C.12*).

*Plate 2: north-west-facing view through ditch **177***

*Plate 3: oblique angle showing north-west-facing section through ditch **176**, with ditch **184*** cutting through the final deposits

3.3.4 Ditch ***176*** had silted up completely, when it was recut along its south-western edge by ditch ***184***, which measured over 2m wide and was 0.5m deep (Plate 3; Fig 7). The very dark organic fills of this ditch were significantly different to those of its predecessor and contained a shoe of early- to mid-nineteenth century date (*Appendix B*). The dark organic nature of the fill, along with the recovered shoe, suggests that the ditch was backfilled with domestic refuse from nearby properties.

3.3.5 Ditch ***127*** branched off from ***184***, on a north-north-east/south-south-west-alignment, cutting across ditches ***177***, ***176*** and ***178*** (Fig 6). The ditch was shallow compared to other features, measuring only 0` .15m deep and was 0.50m wide. It had silted up with material from the surrounding soils, with lenses of windblown sand. A small fragment of clay pipe bowl dating from the mid-nineteenth century was recovered from its basal deposit (***133***; *Appendix B*).

3.3.6 As oval pit ***112***, in the east of the site (Fig 6), was observed to cut through a field drain (not planned, as not visible at the stripped level), it was probably the latest feature on the site. It measured 3.25 x 1.95m, and was excavated to a depth of 1m, before the edges became too unstable to continue, although a small trial hole confirmed that the pit exceeded 1.2m in depth. The pit's fills contained organic material, such as straw, that had barely decomposed, suggesting that it was modern.

3.3.7 Along the northern edge of the site, was observed an indistinct east/west-aligned linear feature (***110***; Fig 6). This was very shallow (0.05m deep) and was filled with a deposit very similar to windblown sand ***100***. It is likely that this was in fact a modern agricultural tyre track.

4 DISCUSSION

4.1 Interpretation

4.1.1 The results of the strip, map and record confirmed the presence of archaeological remains (a buried soil and a series of boundary ditches), although none were clearly associated with the presence of a kiln. The earliest archaeological element was an organic peaty buried soil (***144***), radiocarbon dated to the late Bronze Age (*Appendix C*). This was observed at a height of 3.90m AOD, buried below topsoil and a layer of windblown sand *c* 0.30m thick. Similar 'ancient' land surfaces, exposed when clearing sand, were mentioned in the Victoria County Histories (Farrer and Brownbill 1907, 45-52). Pollen assessment (*Appendix C*) showed that the landscape surrounding the site, at the time this deposit was forming, would have been alder woodlands or carr, with small clearings. Wet, boggy areas would also have existed, indicated by the presence of pondweed and bulrush pollen. As the climate changed, and the sea level rose, the surrounds became saltmarsh in nature. It was possible that animals were grazing nearby to the site over this time. Unfortunately, due to poor preservation, the diatom assessment (*Appendix C*) could not add much to this. Those diatoms that did survive, were freshwater specimens, found towards the centre of the peat deposit, suggesting that there was no marine inundation at this point in time.

4.1.2 The sequence of boundary ditches (***178***, ***177***, ***176*** and ***184***) was much later than the buried soil, as the ditches cut the deposits that sealed it. Three phases of the same boundary could be identified, each phase of redefinition presumably relating to a change in the status of the land or the reorganisation of land management. The dating of the earlier two phases is not straightforward, as no diagnostic finds or material suitable for radiocarbon dating was recovered from primary contexts within these ditches (the pottery from them was recovered from the stripped surface and may relate to the levelling of the features). A radiocarbon date (*Section C.12*) from small round wood fragments within deposit ***165***, a secondary silt in ditch ***176***, shows that the deposit post-dates the mid 1600s, but as this coincides with the modern calibration curve plateau, it could have accumulated any time from 1665 cal AD to the present day. A shoe from the backfilling of the latest boundary ditch (***184***), which re-cuts ditch ***176***, suggests that it fell into disuse in the early- to mid-nineteenth century. This refines the dating of the silting of ditch ***176***, meaning that this was likely to have taken place at the end of eighteenth century or the beginning of the nineteenth century, although it is possible that the ditch was first cut much earlier than this. The similarity of the sediment sequences in ditches ***176*** and ***177***, means that they are probably contemporary.

4.1.3 The earliest mapping available, Yates' Map of Lancashire, 1786 (Fig 2), shows the area as being largely undeveloped, with only occasional buildings and landmarks. There is little change to the area, shown on Hennet's 1830 Map of Lancashire (Fig 3), apart for the depiction of a 'burying ground' to the north of the site. The field boundary to the south-east of the proposed development was denoted as the township boundary on the 1848 map (Fig 4), marked by a road with boundary stones. The boundary feature detected during the excavations is depicted on the same map as intersecting with this township boundary. The fields to the south-west of it, were of contrasting form and were much more regular than those to the north-east, evidently draining and enclosing land that was probably reclaimed during the nineteenth century. The excavated boundary may, therefore, have originally subdivided agricultural land from dunes or saltmarshes during earlier times.

4.1.4 The lack of finds from the lower fills of the earlier ditches (***178***, ***177*** and ***176***) is consistent with a marginal location away from any settlement. The larger size of the intermediate phased ditches (***177*** and ***176***), as well as the bank between them, could indicate a concern with drainage and that the boundary may even have formed a minor sea defence or defence against flooding from the River Alt. Palaeoenvironmental assessment (*Appendix C*) showed that the ditches would have been filled with standing or flowing water and were sedge and reed lined.

4.1.5 The backfilling of the latest phase of boundary ditch (***184***) with domestic refuse in the early- to mid-nineteenth century (*Appendix B*), might reflect that a substantial boundary was no longer deemed necessary, as the risk of marine flooding reduced when land to the south and west was reclaimed from the marsh. It might also indicate the encroachment of settlement into the area, for example Clayholes cottage on the 1848 map (Fig 4).

APPENDIX A CONTEXT INVENTORY

Context	Type	Group	Description
100	Deposit		Natural geology, wind-blown sand
101	Deposit		Subsoil
102	Deposit		Topsoil
103	Deposit		Buried soil horizon, same as *144*
104	Cut	*177*	Boundary ditch
105	Deposit	*177*	Fill of ditch *104*, natural buildup of sand
106	Deposit	*177*	Fill of ditch *104*, secondary silting
107	Deposit	*177*	Fill of ditch *104*, sandy fill derived from bank material
108	Deposit	*177*	Fill of ditch *104*, secondary silting
109	Deposit	*177*	Fill of ditch *104*, final secondary silting
110	Cut		Tyre tracks
111	Deposit		Fill of tyre tracks *110*, compacted natural sand
112	Cut		Pit
113	Deposit		Fill of pit *112*, mixed backfill deposit
114	Deposit		Fill of pit *112*, mixed backfill deposit
115	Deposit		Fill of pit *112*, mixed backfill deposit
116	Deposit		Fill of pit *112*, mixed backfill deposit
117	Deposit		Fill of pit *112*, mixed backfill deposit
118	Deposit		Fill of pit *112*, mixed backfill deposit
119	Deposit	*184*	Fill of ditch *181*, same as deposit *182*, dark mixed domestic refuse deposit
120	Deposit	*184*	Fill of ditch *181*, same as deposit *183*, sandy secondary deposit
121	Void		Not used
122	Cut	*177*	Boundary ditch
123	Deposit	*177*	Fill of ditch *122*, lenses of windblown sand and secondary silting
124	Deposit	*177*	Fill of ditch *122*, lenses of windblown sand
125	Deposit	*177*	Fill of ditch *122*, final secondary silting
126	Deposit		Buried soil horizon
127	Cut		Drainage ditch
128	Cut	*177*	Boundary ditch
129	Deposit	*177*	Fill of ditch *128*, secondary silting
130	Deposit	*177*	Fill of ditch *128*, lens of windblown sand
131	Deposit	*177*	Fill of ditch *128*, secondary silting
132	Deposit		Fill of ditch *127*, lens of windblown sand
133	Deposit		Fill of ditch *127*, secondary silting
134	Deposit		Fill of ditch *127*, lens of windblown sand
135	Deposit	*177*	Fill of ditch *128*, secondary silting
136	Cut		Boundary ditch
137	Deposit	*177*	Fill of ditch *136*, secondary silting

Context	Type	Group	Description
138	Deposit	*177*	Fill of ditch *136*, lenses of windblown sand
139	Deposit	*177*	Fill of ditch *136*, secondary silting
140	Deposit	*177*	Fill of ditch *136*, final secondary silting
141	Deposit	*177*	Fill of ditch *136*, secondary silting
142	Deposit	*177*	Fill of ditch *136*, final secondary silting
143	Deposit		Subsoil below buried soil *144*
144	Deposit		Buried soil horizon
145	Deposit		Windblown sand
146	Cut	*177*	Boundary ditch
147	Deposit	*177*	Fill of ditch *146*, primary silting from the south-western edge, probably bank material
148	Deposit	*177*	Fill of ditch *146*, basal secondary silting
149	Deposit	*177*	Fill of ditch *146*, secondary silting down the south-western edge
150	Deposit	*177*	Fill of ditch *146*, general secondary silting
151	Deposit	*177*	Fill of ditch *146*, lens of sandy material
152	Deposit	*177*	Fill of ditch *146*, windblown sand from the north-eastern side of the ditch
153	Deposit	*177*	Fill of ditch *146*, secondary silting from both sides of the ditch
154	Deposit	*177*	Fill of ditch *146*, final secondary silting
155	Deposit	*177*	Bank material associated with ditch *146*
156	Cut	*178*	Boundary ditch
157	Deposit	*178*	Fill of ditch *156*, secondary silting from the south-western edge
158	Deposit	*178*	Fill of ditch *156*, waterlogged silt
159	Deposit	*178*	Fill of ditch *156*, bank material eroding into the ditch
160	Deposit	*178*	Fill of ditch *156*, bank material from the excavation of ditches *146* and *161*
161	Cut	*176*	Boundary ditch
162	Deposit	*176*	Fill of ditch *161*, waterlogged secondary silting
163	Deposit	*176*	Fill of ditch *161*, waterlogged secondary silting
164	Deposit	*176*	Fill of ditch *161*, windblown sand deposit
165	Deposit	*176*	Fill of ditch *161*, general secondary silting
166	Deposit	*176*	Fill of ditch *161*, final secondary silting
167	Deposit	*176*	Fill of ditch *161*, secondary silting
168	Cut	*184*	Boundary ditch
169	Deposit	*184*	Fill of ditch *161*, secondary silting
170	Deposit	*184*	Fill of ditch *168*, secondary silting
171	Deposit	*184*	Fill of ditch *168*, lens of windblown sand
172	Deposit	*184*	Fill of ditch *156*, bank material from the excavation of ditches *146* and *161*
173	Deposit	*184*	Fill of ditch *168*, dark dumped deposit of domestic refuse

Context	Type	Group	Description
174	Deposit		Marine sediment
175	Deposit	*177*	Fill of ditch group *177*, finds allocated
176	Group	*176*	Large boundary ditch
177	Group	*177*	Inner boundary ditch
178	Group	*178*	Boundary ditch
179	Deposit	*177*	Fill of ditch *128*, same as *133*, secondary silting
180	Cut	*176*	Ditch, same as *181*
181	Cut	*184*	Ditch
182	Deposit	*184*	Fill of ditch *181*, same as *119*, dark mixed domestic refuse deposit
183	Deposit	*184*	Fill of ditch *181*, same as *120*, sandy secondary deposit
184	Group	*184*	Recut of ditch group *176*
185	Deposit	*176*	Fill of ditch *180*, final secondary silting
186	Deposit	*176*	Fill of ditch *180*, secondary silting
187	Deposit	*176*	Fill of ditch *180*, secondary silting
188	Deposit	*176*	Fill of ditch *180*, secondary silting
189	Deposit	*176*	Fill of ditch *180*, basal secondary silting
190	Deposit	*184*	Fill of ditch *181*, secondary silting
191	Deposit	*184*	Fill of ditch *181*, secondary silting
192	Deposit	*184*	Fill of ditch *181*, lenses of silt and windblown sand
193	Deposit	*176*	Fill of ditch *196*, secondary silting
194	Deposit	*176*	Fill of ditch *196*, waterlogged secondary silting
195	Deposit	*176*	Fill of ditch *196*, secondary silting
196	Cut	*176*	Ditch, same as ditch *180*
197	Deposit		Natural sand geology with large patches of clay
198	Deposit	*177*	Fill of ditch *136*, primary stabilization of the sides of the ditch

APPENDIX B FINDS REPORTS

By Dot Broughton

B.1 Introduction

B.1.1 ***Quantification***: one clay pipe fragment, 9 ceramic pottery sherds, one floor tile fragment, one fragment of wood and one leather shoe sole were recovered from the excavations. All of the finds apart from the shoe, the wood and the clay pipe were recovered as surface finds from the top of the backfilled ditches (***176*** and ***177***). Two black-glazed redware sherds join to form *c* 1/3 of the bottom of a vessel. Three slipware sherds came from the same vessel but do not join.

Site Code	Context	Feature	Object	Weight (g)	*Date*	*Total*
ALF18	*176*	Ditch *176*	Redware, Black	*51*	*17th-20th C*	*1 sherd*
ALF18	*176*	Ditch *176*	PW (white) TP	*11*	*1795-1830*	*1 sherd*
ALF18	*176*	Ditch *176*	Redware, Cream	*20*	*17th-20th C*	*1 sherd*
ALF18	*176*	Ditch *176*	Stoneware (BN)	*16*	*18th C*	*1 sherd*
ALF18	*176*	Ditch *176*	RW floor tile	*23*	*17th-20th C*	*1 frgm.*
ALF18	*133*	Ditch *127*	Clay pipe frgm.	*2*	*1830-1860*	*1 frgm.*
ALF18	*175*	Ditch *177*	Slipware	*58*	*17th-18th C*	*3 sherds*
ALF18	*109*	Ditch *177*	Redware, Lead	*149*	*17th-20th C*	*1 sherd*
ALF18	*107*	Ditch *177*	Wood	*18*	*17th-20th C*	*1 frgm.*
ALF18	*170*	Ditch *184*	Leather shoe sole	*210*	*19th C*	*1*
Total						*12*

Table 1: Summary of finds

B.1.2 ***Methodology***: all finds collected during the project were examined for the purposes of this assessment, and assigned an identification and date. Their state of preservation and potential for further work were assessed.

B.2 Ceramics

B.2.1 The 10 ceramic fragments come from seven different objects: six vessels and one floor tile. The floor tile fragment is extremely worn, especially the dark brown glaze; however, an eighteenth- to nineteenth-century date can be suggested for it. Two black-glazed red earthenware sherds join to make up the bottom and pedestal foot ring of a medium-sized vessel, possibly a jug. The pedestal foot ring would have been *c* 110mm in diameter. Like the fragments of both the lead-glazed and the cream-glazed red earthenware vessels, it dates from the late seventeenth- to the early-twentieth-century: black-, lead- or cream/white-glazed red earthenware vessels were very common and production continued for a long period. There was a small fragment of a Chinoiserie pearlware, decorated with one of the most popular transfer patterns: the “Willow” pattern. The sherd is a base sherd depicting the two birds and part of the tree. “Willow” pattern pearlware was most common in the very late-eighteenth and early-nineteenth centuries. A base fragment of a salt-glazed stoneware vessel of mid-eighteenth-century date. The exterior of the vessel, possibly a bowl or a jar, was coated with an iron oxide wash or brown clay slip. The three slipware sherds came from a late-seventeenth/early- to mid-eighteenth-century plate or platter, probably Staffordshire ware. The plate was made from bat- or press-molded buff/tan-coloured earthenware, probably mineral tempered. The inside surface is covered with a cream slip and decorated with lines of brown slip between slightly raised feathered lines of white slip, then lead-glazed. One of the sherds retains a small section of the typically crimped piecrust lip.

B.2.2 The clay pipe bowl fragment is very worn, but was probably from a mid-nineteenth-century (*c* 1830-1860) fluted pipe bowl, which is a common type.

B.3 Leather

B.3.1 The leather sole survives complete and in good condition. It probably comes from a heeled nineteenth-century ankle boot. The sole is asymmetrical rather than symmetrical suggesting it was meant to be worn on one foot (the right) rather than either left or right foot, like modern shoes. The softer inner sole only survives in worn fragments while the outer, thicker and sturdier sole survives complete. A row of *c* 80-90 very small iron boot nails secured the sole to the shoe; almost all of nails are still in place: their heads measure just over 1mm and they are less than 10mm long. There are six holes in the heel part of the sole suggesting that a heel was attached with six larger, thicker nails, also made from iron. They are now missing, along with the heel, but some ferrous residue is retained by the holes. The shape and small size of the sole suggest that it came from a right nineteenth-century ladies’ ankle boot. The differentiation between left and right shoes started in the late-eighteenth century, from *c* 1790s onwards and the number and size of nails that attached the sole to the shoe suggest an early- to mid-nineteenth-century date for the sole.

B.4 Wood

B.4.1 The wood fragment is rectangular in shape and square or D-shaped in cross-section. Its dimensions are *c* 68mm x 25mm x 25mm and there are definite breaks along the shorter sides and possible breaks along the longer sides. The wood had been cut with the grain and thin weathered layers are now coming off. Identification is difficult but size and shape suggest that it formed part of the lower section of a haft for a small tool such as a small shovel or a hammer, rather than a larger shovel or a spade. Part of the wood looks shaped, as it would have been for *eg* fitting into an iron socket or sleeve.

B.5 Date and potential

B.5.1 ***Date***: the general date for ceramic assemblage is most likely the early-eighteenth to early- or mid-nineteenth century, with the Staffordshire slipware being the oldest (late-seventeenth to eighteenth century) Chinoiserie pearlware being introduced in the 1820s/1830s. Both stonewares and redwares are long-lived (seventeenth to twentieth century) and cannot be dated with any more accuracy. The leather sole dates from the early- to mid-nineteenth century.

B.5.2 ***Potential***: the potential for further work (research, conservation or display) on this group of finds is minimal and further analysis of this group is not recommended.

APPENDIX C ENVIRONMENTAL REPORTS

C.1 Archaeobotanical remains

By Denise Druce

C.1.1 ***Introduction***: a targeted programme of palaeoenvironmental sampling was implemented in agreement with CgMs and in accordance with the Oxford Archaeology Environmental Sampling Guidelines (OA 2017). To comply with accepted professional guidelines (EH 2011) 40-litre samples, or the entirety of a deposit, were taken to assess their potential for containing archaeobotanical remains and/or suitable material for radiocarbon dating.

C.1.2 ***Quantification***: five bulk samples were selected for archaeobotanical assessment, selection being based on the ability of the deposits to provide material for dating, and to provide information on local environments and land use. The samples comprised three ditch fills (***148***, ***158***, and ***165***, from ditches **146** (group ***177***), **156** (group ***178***), and ***161*** (group ***176***) respectively), a possible marine deposit (***174***), and an organic buried soil (***144***) that was seen to be cut by at least two of the three ditches.

C.1.3 ***Methodology***: the samples were processed by hand flotation, during which flots were collected on a 250µm mesh, air-dried and examined under a binocular microscope. Residues were passed through a 500µm and 2mm mesh and were also air-dried. The fine residue (500 µm to 2mm size) was subsequently checked using a binocular microscope for the presence of small plant remains and finds, such as metalworking waste. Any finds recovered from the coarse residue (larger than 2mm) were assessed by a find specialist (*Appendix B*). Any palaeoenvironmental remains were added to the corresponding flots.

C.1.4 The flots were scanned using a Leica stereo-microscope and any plant material, including fruits, seeds, charcoal and wood fragments, was recorded. Other remains, such as bone, insects, small artefacts, industrial/metal waste, and coal/heat-affected vesicular material (HAVM) were also noted. Any surviving fruits/seeds were provisionally identified using the modern reference collection held at OA North, and with reference to the Digital Seed Atlas of the Netherlands (Cappers *et al* 2006). The presence of modern roots, earthworm eggs and modern seeds, was also noted to ascertain the likelihood of any contamination. The remains were quantified on a scale of 1–4 where 1 is rare (one to five items); 2 is frequent (6 to 50 items); 3 is common (51–100 items); and 4 is abundant (greater than 100 items). Plant nomenclature follows Stace (2010).

C.2 Results

C.2.1 The assessment results were recorded on *pro forma*, and are presented in Table 3. The potential of each sample for any further work and for radiocarbon dating was also highlighted.

C.2.2 The assessment indicated that all five deposits contained abundant organic material preserved through waterlogging. The presence of silt and/or sand suggests large inputs of minerogenic deposition during their development. Although much of the organic material comprised indeterminate roots/stems and amorphous plant material, varying quantities of well-preserved, identifiable, fruits/seeds were also recorded (Table 3).

Context No	Sample No	Feature	Matrix	Waterlogged Fruits/seeds	Other remains	Potential
144	9	Buried organic soil	Amorphous organic material and roots	(2) *Carex* sp, *Juncus* sp, *Chenopodium* sp, *Stellaria media*	Insect eggs (4)	none
148	17	Ditch *146*, Group *177*	Amorphous organic material and roots	(2*) Ranunculus sceleratus*, *Ranunculus repens*-type, *Carex* sp, *Zannichelia palustris*, *Chenopodium* sp, unknown	Insects (2)	none
158	12	Ditch *156*, group *178*	Amorphous organic material and fine roots	(4) Mostly *Juncus* sp, with *Ranunculus aquatilus*-type and *Chenopodium* sp	Insects (2), wood fragments (2)	none
165	14	Ditch *161*, group *176*	Roots	(3) *Ranunculus sceleratus*, *Potamogeton* sp, *Ranunculus aquatilus*-type, *Sparganium erectum, Juncus* sp, *Carex* sp, *Chenopodium* sp, *Conium maculatum, Urtica* sp, *Stellaria media*, *Rumex* sp, *Leontodon saxatilis*, *Apium* sp, *Persicaria lapathifolia*, *Ranunculus repens*-type, *Aphanes arvensis*	Insects (1), *Daphnia* ephippium (3), twig fragments (2)	Possible radiocarbon dating (twig fragment)
174	13	Marine deposit? Group *184*	Blackened plant stems (detritus?)	(1) *Chenopodium* sp	A single small leaf (possible contamination)	none

Table 2: results of the archaeobotanical assessment

C.2.3 Four of the deposits produced seeds/fruits characteristic of wet/damp environments, which might be expected in ditches or soils/sediment subjected to flooding. Sedges (*Carex* sp) and/or rushes (*Juncus* sp) were commonly recorded in the ditches and the buried organic soil. Other taxa, which appear to be more prevalent in the ditch deposits, include several from the buttercup (*Ranunculus* sp) genera, including celery-leaved buttercup (*R. sceleratus*) and possible creeping buttercup (*R. repens*) and common water-crowfoot (*R. aquatilis*). All these taxa grow in a wide range of wet environments, including ditches (Stace 2010). The presence of seeds/fruits of aquatic, or semi-aquatic plants, such as horned pondweed (*Zannichelia palustris*) in ditch ***146***, and pondweed (*Potamogeton* sp) and bur-reed (*Sparganium erectum*) in ditch ***161*** suggests these features contained standing/flowing water during the accumulation of these deposit. Similarly, the resting eggs (ephippia) of water flees (*Daphnia*), recovered from ditch ***161***, indicates the presence of standing bodies of water (Ebert 2005).

C.2.4 In addition to a suite of taxa indicative of wet/damp environments, all the samples, including marine deposit ***174*** contained rare to frequent goosefoot (*Chenopodium* sp) seeds, which is typical of cultivated/waste ground, especially next to human habitation (Stace 2010). Further evidence for waste/cultivated areas is also indicated by the recovery of a range of taxa in ditch ***161***, including common chickweed (*Stellaria media*) (also recorded in the buried organic soil ***144***), nettle (*Urtica* sp), pale persicaria (*Persicaria lapathifolia*), parsley-piert (*Aphanes arvensis*) and hemlock (*Conium maculatum*). A highly poisonous plant (Grieve 1973, 393), which grows in damp conditions, especially alongside ditches, roadside verges, or waste ground (*ibid*) hemlock is considered an archaeophyte by Stace (2010, 19), it is amongst a category of plants closely linked to human activities (*eg* cultivation). With regards the date of the ditch, it may be significant that archaeophytes are known to have existed in the British Isles since at least the medieval period, *ie* 1500 AD (*ibid*).

C.2.5 Possible marine deposit ***174*** contained abundant blackened root/stem fragments characteristic of a 'detritus' deposit (*ie* washed-in), rather than the *in-situ* organic accumulation developed from immediate vegetation. Its properties are consistent with its interpretation as a possible marine deposit. This deposit also contained rare goosefoot seeds, and a single leaf. The exact taphonomy of these remains, however, are questionable.

C.2.6 Other remains were relatively sparse, and included rare to frequent insect fragments, and frequent wood fragments in ditches ***156*** and ***161***. Buried soil ***144*** contained 1000s of tiny insect eggs, which may represent a localised modern nest.

C.2.7 In summary, the archaeobotanical remains recovered from the ditch deposits and organic buried soil, perhaps not surprisingly, indicate their development under wet conditions. The presence of aquatic and semi-aquatic flora and fauna in two of the ditches (***146*** and ***161***) indicate that both contained bodies of water. The relatively diverse macrofossil assemblage from ditch ***161*** presents a picture of a sedge and reed-lined ditch, with banks supporting plants of disturbed/waste ground adjacent to areas of cultivation.

C.3 Statement of potential

C.3.1 ***Archaeobotanical remains***: given the relative paucity and diversity of plant remains surviving in four of the five bulk samples, further investigations would not contribute significantly to the archaeobotanical data already provided by this assessment. Ditch ***161*** contained a much more diverse range of macrofossils, which have been reported on in this report. Subsequently, further analyses of this deposit would not add significantly to the existing data.

C.3.2 The small round wood fragments present in ditch ***161*** provided suitable material for radiocarbon dating (*Section C.12*). However, given that the material post-dates the mid 1600s, which coincides with the modern calibration curve plateau, the results indicate the deposits may have accumulated any time between 1665 cal AD to the present day.

C.3.3 The organic peaty buried soil deposit (***144***; *Section 3.3.1*) appears to represent a relatively short-lived period of organic development sealed by blown sand, thereby limiting the chances of contamination by re-worked or later material. As such, sediment samples of the humin and humic fractions of this deposit were submitted for radiocarbon dating. The results (*Section C.12*) indicate that the development of buried organic soil (***144***) took place during the late Bronze Age period. The significance of this date, and a possible shift to wetter conditions and/or a change in sediment accumulation at the site are discussed elsewhere (*Section C.6*).

C.4 Retention and disposal

C.4.1 Processed samples/material not required for further analysis or radiocarbon dating will be disposed of, as will any remaining unprocessed samples not required for further work.

C.5 Pollen analysis

By Mairead Rutherford

C.5.1 ***Introduction***: Four sub-samples were selected from a monolith sample, for initial pollen assessment. Two sub-samples were taken from the buried soil horizon, ***144***; one sub-sample was processed from beneath the buried soil, from deposit ***143*** and one from immediately above the buried soil, from deposit ***145***. The two sub-samples from deposit ***144*** contained sufficient pollen for analysis as did the sub-sample from immediately above the peat from deposit ***145***, but the fourth sub-sample from deposit ***143*** did not and was therefore eliminated from the study.

C.5.2 ***Methodology***: The monolith samples were cleaned prior to lithological assessment and sub-sampling for pollen assessment/analysis. The samples for pollen assessment were prepared using a standard chemical procedure (method B of Berglund and Ralska-Jasiewiczowa 1986), using HCl, NaOH, sieving, HF, and Erdtman's acetolysis, to remove carbonates, humic acids, particles > 170 microns, silicates and cellulose, respectively. The samples were then stained with safranin, dehydrated in tertiary butyl alcohol, and the residues mounted in 2000cs silicone oil.

C.5.3 Pollen counts of between 300-500 grains (including trees and shrubs, herbs and fern spores) have been achieved for the three sub-samples suitable for analysis from buried soil ***144*** and the overlying deposit ***145***. The pollen data are presented as percentage values on the pollen diagram (Fig 8), constructed using the computer programme Tilia (www.tiliait.com), and based on a total land pollen (TLP) sum that includes trees, shrubs, herbs and fern spores. Non-pollen palynomorphs (NPP), microscopic charcoal and deteriorated grains are expressed as percentages of TLP plus the respective sum to which they belong. The pollen data are zoned following context designations, based on the section drawing (Fig 7).

C.5.4 Pollen identification was made following the keys of Moore et al (1991), Faegri and Iversen (1989), and a small modern reference collection. Identification of non-pollen palynomorphps (NPP) follows van Geel (1978) and van Geel and Aptroot (2006). Plant nomenclature follows Stace (2010).

C.6 Results

C.6.1 The lithological data and sampling strategy are presented in Table 3 below:

Context No	Monolith Sample No	Lithological description	Sub-samples (m)	Depth of lithological unit (m)
-	2	No recovery		0-0.12
145	2	Fine soft grey / yellow sand overlying very soft grey clay and sand.	0.27-0.28	0.12-0.28
144	2	Soft, brown, clayey peat, sharp lower boundary.	0.29-0.30 0.31-0.32	0.28-0.33
143	2	Soft grey clay and fine sand; distinct upper boundary.	0.33-0.34	0.33-0.39
100	2	Yellow/grey sand – Natural geological deposit	-	0.39-0.47

Table 3: Lithological data and sampling strategy

C.6.2 ***Radiocarbon Dating***: A sample of the buried soil, ***144***, was extracted from a horizontal monolith sample and checked for plant macrofossils but none was found, and consequently the peat was subject to AMS dating of both the humin and humic acid fractions. The results are outlined in Table 4 below (*also see Section C.12*):

Context No	Sample No	Fraction	SUERC Number	Age cal BC (94.5%)	Age BP	Age
144	8	Humic	84157	820-780	2614±24	Latest Bronze Age
144	8	Humin	84158	970-830	2750±24	Late Bronze Age

Table 4: Radiocarbon dating results

C.6.3 The dates suggest a late Bronze Age date for the formation of the deposits. This must be accepted with some caution, however, as the dates are not statistically consistent (T'= 16.1; v=1: T'(5%)=3.8; Ward and Wilson 1978) and thus there is some taphonomic uncertainty regarding the sampled carbon.

C.6.4 ***Pollen analysis description***: of the three sub-samples analysed (Fig 8), two from deposit ***144*** show very similar pollen assemblages but the third, uppermost sub-sample, from deposit ***145*** produced a different pollen assemblage. Both lower sub-samples contain an abundance of tree pollen, in particular, alder (*Alnus*), hazel-type (*Corylus*-type), birch (*Betula*) and oak (*Quercus*). Willow (*Salix*) is recorded commonly in the lowermost sub-sample. There are also occurrences of pollen of elm (*Ulmus*), lime (*Tilia*), heather *(Calluna*), holly (*Ilex*), pine (*Pinus)* and honeysuckle (*Lonicera*). Herb pollen is largely dominated by grasses (Poaceae) and sedges (Cyperaceae) with relatively rare occurrence of plants such as docks/sorrels (*Rumex* spp.), meadowsweet (*Filipendula*), mugworts (*Artemisia*), bird's-foot-trefoils (*Lotus*-type) and ribwort plantain (*Plantago lanceolata*). There are rare occurrences of cereal-type/large grass pollen, but it is difficult to separate cultivated varieties from wild grasses, as the dimensions for both overlap, and these grains could be representative of wild grasses such as sweet-grasses (*Glyceria* spp.) (Andersen 1979). Spores of the royal fern (*Osmunda regalis*) occur commonly within the lower two sub-samples, with fewer records for common polypody (*Polypodium vulgaris*), bracken (*Pteridium*) and monolete ferns (Pteropsida). Pollen of aquatic plants is recorded in low numbers, including occurrences of pondweed (*Potamogeton*) and bulrush (*Typha latifolia*). NPP are rare and include occurrences of the green algal type *Mougeotia* (HdV-313) and the microfossil type HdV-128. *Sphagnum* moss spores are consistently recorded. Microcharcoal particles are present in low numbers only.

C.6.5 The uppermost sub-sample from deposit ***145*** contains a significant increase in pollen of the goosefoot family (Chenopodiaceae/Amaranthaceae, a large group containing plants such as fat-hen, sea purslane and sea blytes). Pollen of grasses also increases and there are distinct decreases in tree pollen, in particular of alder, hazel-type and oak. Spores of the royal fern are much reduced but monolete fern spores show an increase in numbers. A slightly more diverse herb assemblage is interpreted from recovery of pollen of dandelion-type (*Taraxacum*-type), cabbage family (Brassicaceae, a group that includes plants such as mustards, sea-kale and radishes), bedstraws (Rubiaceae) and knotgrass (*Polygonum aviculare*).

C.6.6 ***Pollen analysis interpretation***: Pollen from the deeper part of the buried soil, deposit ***144***, may be interpreted as indicative of the presence of alder woodlands or alder carr, with evidence for small openings in the woodland, interpreted from occurrences of pollen of grasses, mugworts, docks/sorrels and ribwort plantain. A lowering of the water-table may have resulted in a relative decrease in alder carr and increase in hazel-type scrub woodland as this deposit accumulated.

C.6.7 The relative abundance of sedges in association with pondweed and bulrushes may be indicative of damp areas such as reed-swamps (Stace 2010) and this is supported by the poorly diverse NPP assemblage, which is also indicative of shallow, wet areas. The presence of abundant spores of the royal fern suggests local presence of wet woods, fens or bogs on peaty soil (Stace 2010). A single cereal-type grain within this assemblage is probably referable to pollen of wild grasses, such as sweet-grasses, which live in mud or shallow water by ponds or in marshes, ditches and wet meadows (Stace 2010).

C.6.8 Pollen from the uppermost sub-sample, which represents a transitional clay layer between the peaty lithology and the overlying grey/yellow sand deposit (***145***), is strikingly different to the pollen assemblage derived from the peat and suggests a largely cleared landscape, dominated by herbs, of which pollen of the goosefoot family is the most important. Although certain species of the goosefoot family, such as fat-hen, are known from cultivated and waste ground, there are also several varieties including sea blytes and sea purslane, which are known from coastal locations (Stace 2010). Unfortunately, goosefoot pollen cannot be distinguished to species level, nor did sub-samples assessed for diatoms contain viable assemblages, which may have otherwise confirmed the absence or presence of marginal marine environments (Cameron, *Section C.9*). However, previous work by Tooley (1978) and Innes and Tooley (1993) inferred a period of high sea level for a fossil dune slack deposit at Formby foreshore which was dated to 800-110 cal BC (2335±120 BP; Hv4709), a date slightly later than that obtained for the current study for deposit ***144***. This high sea level did not breach the protective sand dune barrier at Formby and so did not cause a major coastal transgression, but could have led to the development of coastal marshland and subsequent development of vegetation tolerant of saline conditions. The expansion of pollen of the goosefoot family and grasses may reflect development of salt tolerant sea blyte or sea purslane-type vegetation along with coastal grasses and possibly plants such as sea kale or sea radishes. A single cereal-type grain within this assemblage is probably referable to pollen of wild grasses, such as sweet-grasses, which live in mud or shallow water by ponds or in marshes, ditches and wet meadows (Stace 2010).

C.7 Discussion

C.7.1 The small peat deposit found at Formby is on the western edge of a large mossland complex (Sefton Moss; Cowell and Innes 1994), and, is part of a topographically narrow belt of coastal peat, largely overlain by blown sand. It is likely that the peat started to form in response to a rise in sea-level, resulting in a rise in the water-table, creating waterlogged areas which would have been vegetated by fen woodlands (alder carr) and reed swamps. Direct influence from rising sea levels may have led to the peat becoming inundated with muds and sands as the local environment changed to probable saltmarsh. At Formby, such a transition from fen carr to dune slack/saltmarsh vegetation has previously been descried (Cowell and Innes 1994).

C.7.2 The period represented by this deposit also coincides with a period of climatic change, as identified from studies of bog surface wetness, where a warm/dry phase was identified between *c* 1200-850 cal BC, but was replaced by a cold/wet phase from *c* 850-650 cal BC (the 2.6Ka event; Brown 2008). Palaeoenvironmental studies have identified a major shift across much of northwest Europe towards the end of the Bronze Age, to much colder and wetter conditions (Tipping *et al* 2008) and it has been inferred that these conditions may have had an impact on local agricultural practices.

C.7.3 This small sample provides new evidence regarding local vegetational history at Formby. Previous studies from the Sefton Mosslands (Cowell and Innes 1994) did not find records post-dating the Neolithic / early Bronze Age, that were analysed for pollen. The pollen data can only provide proxy data that may be interpreted to infer human impact and/or activity at the site. It is possible that grassy openings in the alder carr or hazel-type scrubby woodlands could have been used for grazing animals. It is also possible that the cereal-type/large grass pollen types could represent low scale arable cultivation, but it is more likely that they may in fact represent wild grasses growing in wet areas adjacent to muddy pools (there is evidence for such environments from the presence of pondweed, which lives with its leafy stems submerged (Stace 2010)).

C.7.4 If the deposits overlying the buried soil deposit ***144*** represent saltmarsh environments, which is likely in the topographical setting, then it is possible that this area could have been used for grazing animals during this time.

C.8 Conclusions

C.8.1 There is evidence for development of damp, alder carr woodlands that are the dominant vegetation type at this site during the late Bronze Age. Hazel-type scrubby woodland also existed, probably on drier ground. There is limited evidence for small openings in the woodland cover and these openings could have been used for grazing animals.

C.8.2 Following sea level rise and rising water-table levels, the peat would have become flooded, leading to a vegetation shift such that the area potentially become vegetated with saltmarsh plants. This environment could also have been used for grazing animals.

C.8.3 The development of vegetation inferred from the pollen record took place against a significant climatic shift to much wetter and colder conditions during the latest Bronze Age – early Iron Age.

C.9 Diatoms

By Nigel Cameron

C.9.1 ***Introduction***: a diatom assessment has been carried out on a sediment sequence retrieved from the site, sampling subsoil ***143*** (0.33-0.34m), below peaty buried soil ***144***; deposit ***145*** (0.27-0.28m), immediately above peaty buried soil ***144***; and from the sandy layer further above the peaty buried soil layer, from deposit ***145*** (0.24-0.25m).

C.9.2 The purpose of carrying out a diatom assessment was to test for the presence or absence of diatoms and the potential of the sediments for further diatom analysis. Of particular interest was the aquatic depositional environments and salinity conditions represented by the diatoms. The diatom assessment of each sample considered the numbers of diatoms, the state of preservation of the diatom assemblages, species diversity and diatom species environmental preferences.

C.9.3 ***Methodology***: Diatom preparation followed standard techniques (Battarbee *et al* 2001). Two coverslips were made from each sample and fixed in Naphrax for diatom microscopy. A large area of the coverslips on each slide was scanned for diatoms at magnifications of x400 and x1000 under phase contrast illumination.

C.9.4 Diatom floras and taxonomic publications were consulted to assist with diatom identification; these include Hendey (1964), Werff and Huls (1957-1974), Hartley *et al* (1996), Krammer and Lange-Bertalot (1986-1991) and Witkowski *et al* (2000). Diatom species' salinity preferences are indicated using the halobian groups of Hustedt (1953; 1957, 199), these salinity groups are summarised as follows:

1. Polyhalobian: >30 g l-1

2. Mesohalobian: 0.2-30 g l-1

3. Oligohalobian - Halophilous: optimum in slightly brackish water

4. Oligohalobian - Indifferent: optimum in freshwater but tolerant of slightly brackish water

5. Halophobous: exclusively freshwater

6. Unknown: taxa of unknown salinity preference.

C.10 Results and discussion

C.10.1 A summary of diatom evaluation results for samples from the site: (+ present; - absent; ex extremely; mar marine; fw freshwater; aero aerophilous; frag fragment), is presented in Table 5 below:

Diatom Sample Number	Diatoms	Diatom Numbers	Quality of Preservation	Diversity	Assemblage type	Potential for % count
D1/0.24-0.25m	+	ex low	ex poor	ex low	fw aero	none
D2/0.27-0.28m	+	ex low	ex poor	ex low	fw aero (cf mar)	none
D3/0.33-0.34m	+/-	-	-	-	indet.frag.	none

Table 5: Summary of diatom evaluation results

C.10.2 Diatoms were present in extremely low numbers and were very poorly preserved in samples D1 and D2. The diversity of the diatom assemblages in D1 and D2 was extremely low and there was no further potential for percentage diatom counting. With the exception of one indeterminate diatom fragment, recorded in sample D3, diatoms were almost completely absent from the lower sample and there was no further potential for diatom analysis.

C.10.3 The diatom assemblages of samples D1 and D2 were highly fragmented and, for the most part, only low taxonomic resolution was possible. Central raphe nodes and coarse striate fragments comparable with the freshwater, aerophilous diatom *Pinnularia major* were present in both D1 and D2.

C.10.4 *Pinnularia major* is tolerant of prolonged periods of desiccation. It is associated with soil or ephemeral aquatic habitats, such as small pools of freshwater, and the poorly preserved fragments found in these samples may be of autochthonous or allochthonous origin. A valve of the non-planktonic, freshwater diatom *Amphora pediculus* was recorded in sample D1 and a small fragment comparable with the marine diatom genus *Rhaphoneis* was found in D2. However, in these low numbers and in such poor condition these diatoms could represent allochthonous valves for example originating in wind-blown material. The diatoms in sample D1 do not provide any evidence for marine inundation in the period represented by the top sandy-silt layer.

C.10.5 The poor preservation or absence of diatoms can be attributed to taphonomic processes (Flower 1993; Ryves *et al* 2001). This may be the result of diatom silica dissolution and breakage caused by factors such as extremes of sediment alkalinity or acidity, the under-saturation of sediment pore water with dissolved silica, cycles of prolonged drying and rehydration, or physical damage to diatom valves from abrasion, wind or wave action.

C.11 Conclusions

C.11.1 Diatoms were assessed from three subsamples taken from three different layers in the sediment sequence. Extremely low numbers of very poorly preserved, mostly fragmentary, diatoms were present in samples D1 and D2 and were almost completely absent from the lower sample, D3. Freshwater aerophilous diatoms, tolerant of desiccation, were present in both samples D1 and D2. One valve of a shallow-freshwater diatom was found in sample D1 and a small valve fragment comparable with a marine diatom was found in sample D2. The diatoms show no indication of marine inundation in the top layer. There is no further potential for diatom analysis of any of the samples assessed because of the absence or very low numbers of diatoms, or because of the very poor quality of diatom preservation.

C.12 Radiocarbon dating

C.12.1 Three radiocarbon samples from the site were assayed. One of these (SUERC-84156) was from woody twig fragments retrieved from deposit ***165***, in ditch ***176***. This produced a relatively recent date, probably post-medieval. The other two samples (SUERC-84157 and SUERC-84158) respectively dated the humic and humin content of a peaty buried soil ***144***. These were not statistically significant (T'= 16.1; v=1: T'(5%)=3.8; Ward and Wilson 1978) and thus there is some taphonomic uncertainty regarding the sampled carbon. They both, however, returned late Bronze Age dates, suggesting that the buried soil formed during this period. The details of the assay and the calibration of the dates are given in the lab certificates that follow below.

SUERC
Scottish Universities Environmental Research Centre
Rankine Avenue, Scottish Enterprise Technology Park, East Kilbride, Glasgow G75 0QF, Scotland, UK
Director: Professor F M Stuart Tel: +44 (0)1355 223332 Fax: +44 (0)1355 229898 www.glasgow.ac.uk/suerc

RADIOCARBON DATING CERTIFICATE
06 February 2019

Laboratory Code	SUERC-84156 (GU50030)
Submitter	Denise Druce Oxford Archaeology North Mill 3, Moor Lane Mills Moor Lane Lancaster LA1 1QD
Site Reference	ALF18
Context Reference	165
Sample Reference	14
Material	twig fragment : Maloideae/Prunus sp
$\delta^{13}C$ relative to VPDB	-29.4 ‰
Radiocarbon Age BP	165 ± 24

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

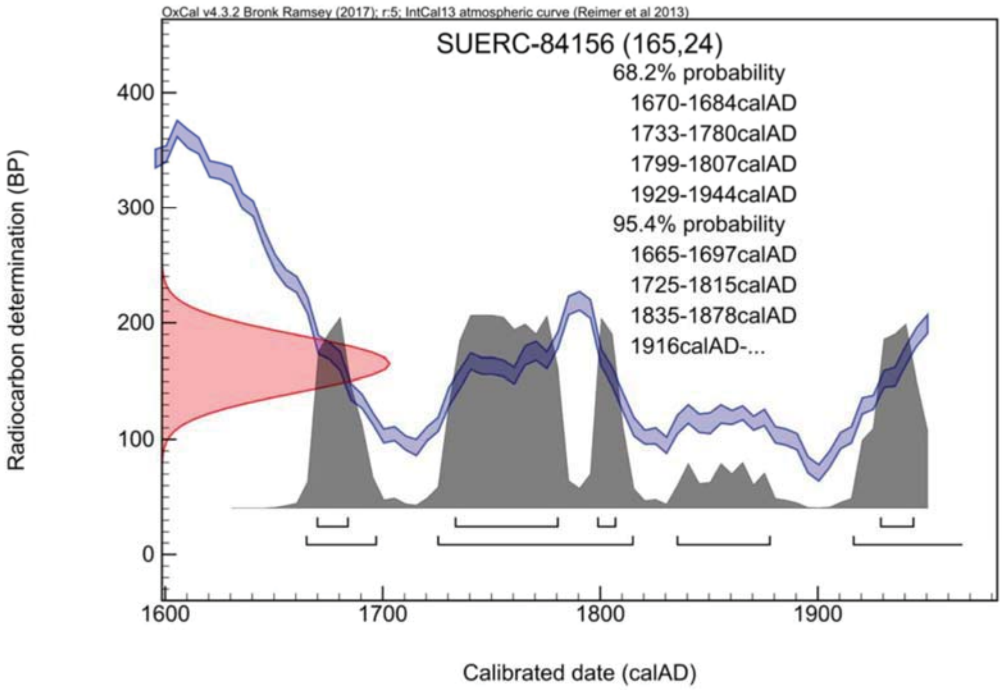
Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Laboratory and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

Detailed descriptions of the methods employed by the SUERC Radiocarbon Laboratory can be found in Dunbar et al. (2016) *Radiocarbon 58(1) pp.9-23.*

For any queries relating to this certificate, the laboratory can be contacted at suerc-c14lab@glasgow.ac.uk.

Conventional age and calibration age ranges calculated by : E. Dunbar

Checked and signed off by : P. Naysmith



The radiocarbon age given overleaf is calibrated to the calendar timescale using the Oxford Radiocarbon Accelerator Unit calibration program OxCal 4.*

The above date ranges have been calibrated using the IntCal13 atmospheric calibration curve†

Please contact the laboratory if you wish to discuss this further.

* Bronk Ramsey (2009) *Radiocarbon 51(1) pp.337-60*
† Reimer et al. (2013) *Radiocarbon 55(4) pp.1869-87*

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RADIOCARBON DATING CERTIFICATE
06 February 2019

Laboratory Code	SUERC-84157 (GU50031)
Submitter	Denise Druce Oxford Archaeology North Mill 3, Moor Lane Mills Moor Lane Lancaster LA1 1QD
Site Reference	ALF18
Context Reference	144
Sample Reference	8
Material	Peat : humic acid dated
$\delta^{13}C$ relative to VPDB	-29.5 ‰
Radiocarbon Age BP	2614 ± 24

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Laboratory and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

Detailed descriptions of the methods employed by the SUERC Radiocarbon Laboratory can be found in Dunbar et al. (2016) *Radiocarbon 58(1) pp.9-23.*

For any queries relating to this certificate, the laboratory can be contacted at suerc-c14lab@glasgow.ac.uk.

Conventional age and calibration age ranges calculated by : E. Dunbar

Checked and signed off by : P. Naysmith

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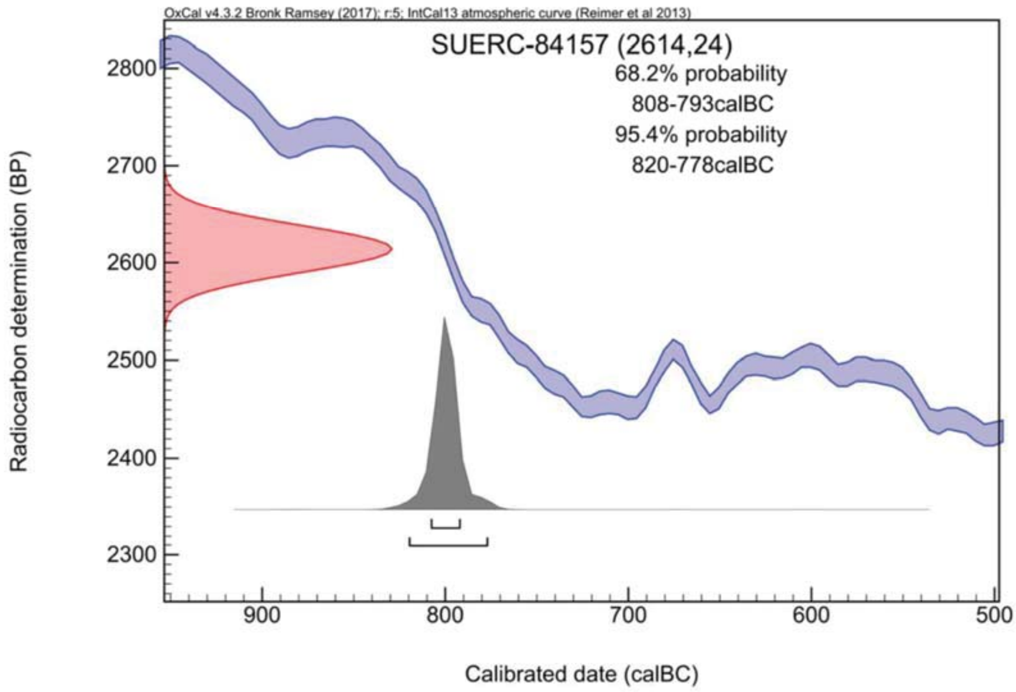

The radiocarbon age given overleaf is calibrated to the calendar timescale using the Oxford Radiocarbon Accelerator Unit calibration program OxCal 4.*

The above date ranges have been calibrated using the IntCal13 atmospheric calibration curve†

Please contact the laboratory if you wish to discuss this further.

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† Reimer et al. (2013) *Radiocarbon 55(4) pp.1869-87*

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RADIOCARBON DATING CERTIFICATE
06 February 2019

Laboratory Code	SUERC-84158 (GU50032)
Submitter	Denise Druce Oxford Archaeology North Mill 3, Moor Lane Mills Moor Lane Lancaster LA1 1QD
Site Reference	ALF18
Context Reference	144
Sample Reference	8
Material	Peat : humin dated
$\delta^{13}C$ relative to VPDB	-30.5 ‰
Radiocarbon Age BP	2750 ± 24

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Laboratory and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

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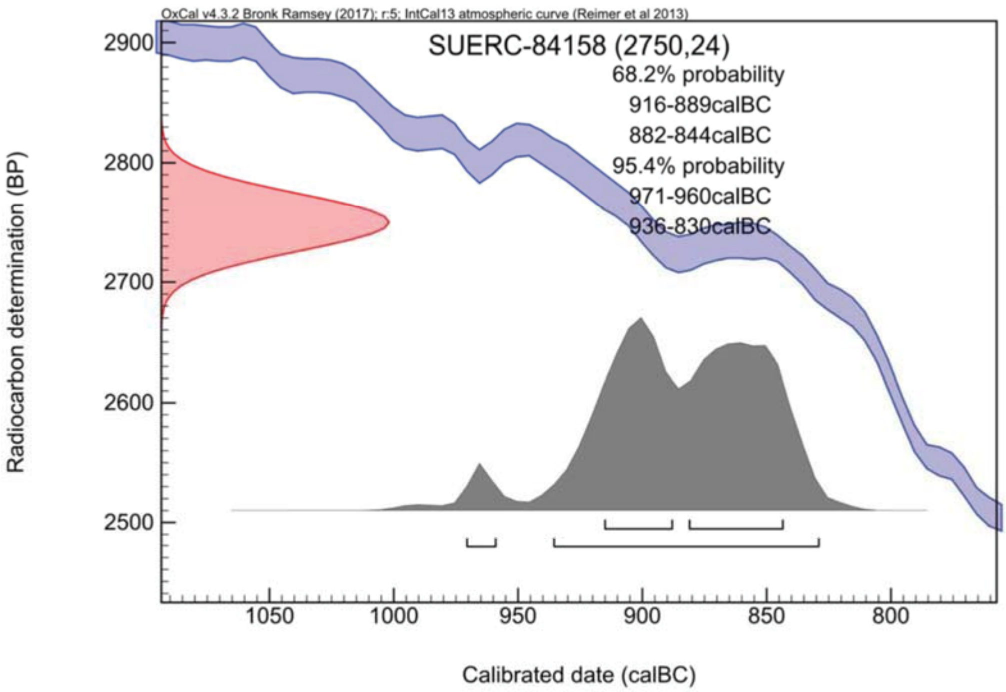
Conventional age and calibration age ranges calculated by : E. Dunbar

Checked and signed off by : P. Naysmith



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APPENDIX D BIBLIOGRAPHY

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APPENDIX E SITE SUMMARY DETAILS

Site name:	Land off Andrews Lane, Formby, Merseyside
Site code:	ALF18
Grid Reference	SD 2927 0592
Type:	Strip Map and Record
Date and duration:	8th to 19th October 2018
Area of Site	0.158ha
Location of archive:	The archive is currently held at OA, Mill 3, Moor Lane Mills, Moor Lane, Lancaster, LA1 1QD, and will be deposited with the Museum of Liverpool.
Summary of Results:	A late Bronze Age soil horizon was observed approximately 0.5m below ground level. This was sealed by windblown sands, which were cut by an agricultural (probably post-medieval) boundary/drainage ditch, dividing reclaimed land from saltmarsh.

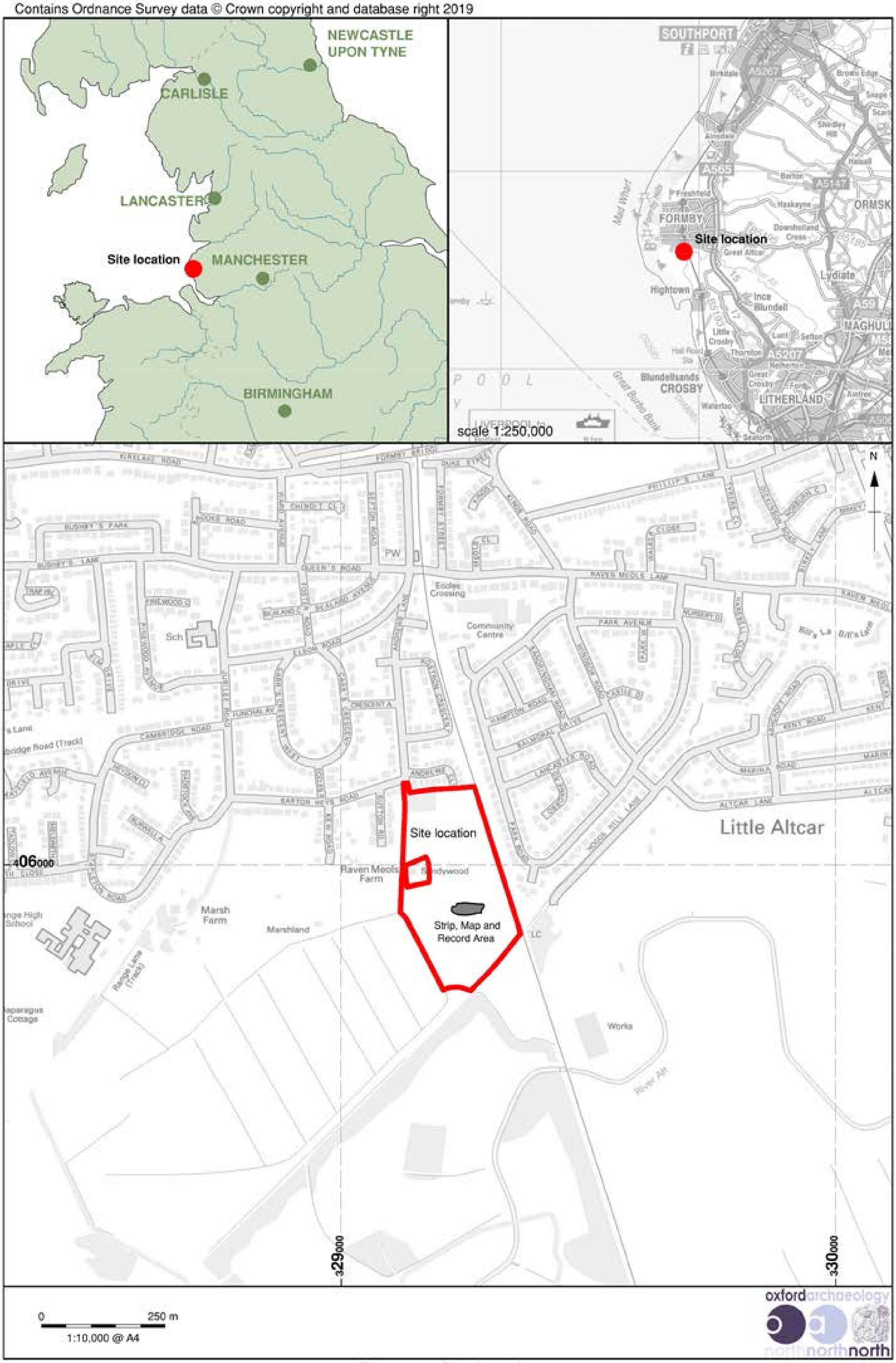

Figure 1: Site location

MOL.2018.62

Site Area (approximate Location)

Strip, Map and Record Area (approximate Location)

Not to Scale

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Figure 2: Strip, Map and Record Area superimposed on Yates Map of Lancashire,1786

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MOL.2018.62

Site Area (approximate Location)

Strip, Map and Record Area (approximate Location)

Not to Scale

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Figure 3: Strip, Map and Record Area superimposed on Hennets Map of Lancashire,1830

FB*L11190*MAT*July 2019

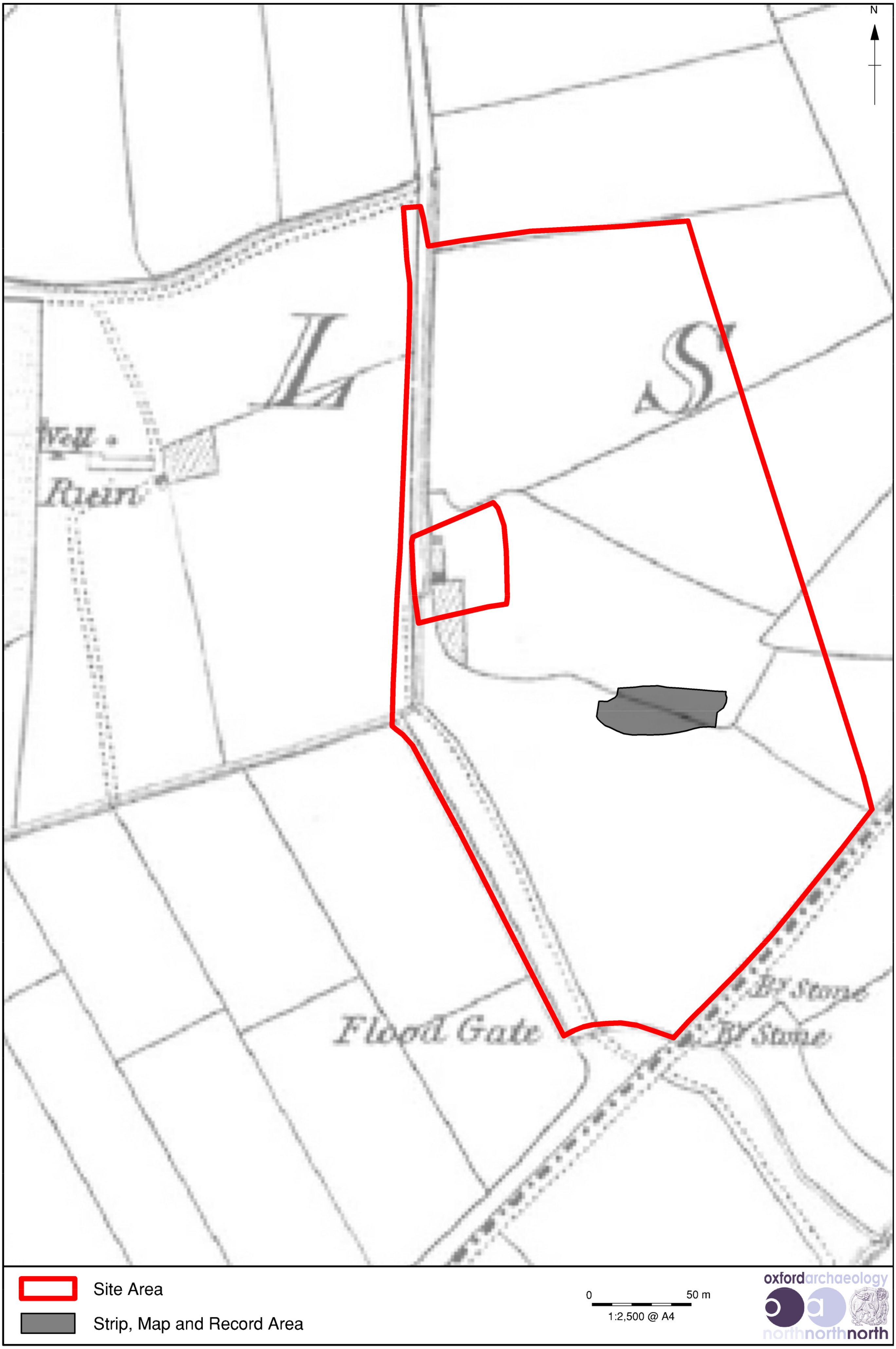

Figure 4: Strip, Map and Record Area superimposed on the Ordnance Survey 6":1 mile map, 1848

Site Area

Strip, Map and Record Area

0 50 m

1:2,500 @ A4

oxfordarchaeology northnorthnorth

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Figure 5: Strip, Map and Record Area superimposed on the Ordnance Survey 25":1 mile map, 1893

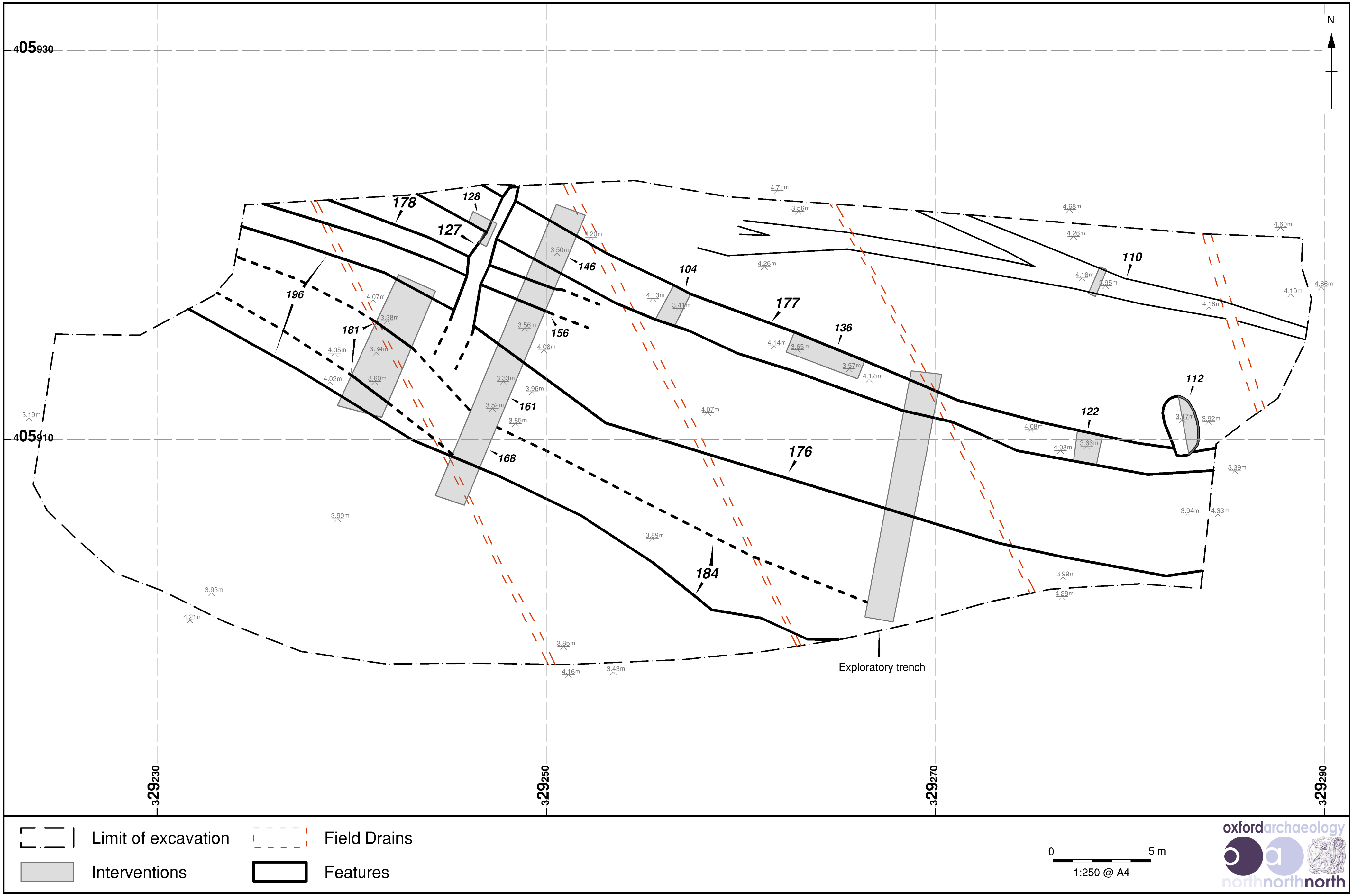

Figure 6: Archaeological remains revealed during Strip, Map and Record investigation

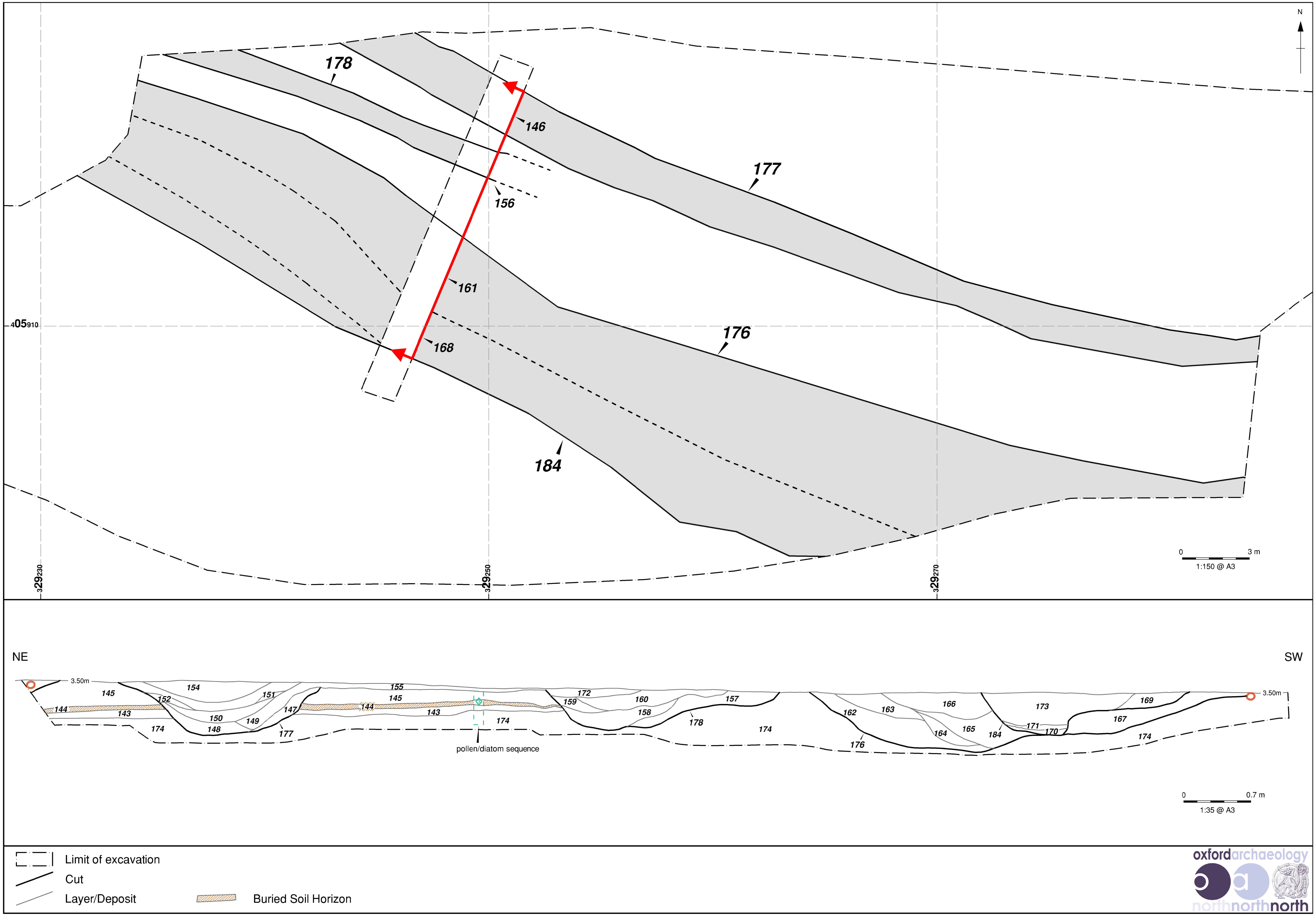

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Figure 7: Section through ditches *176*, *177* , *178* and buried soil horizon *144*

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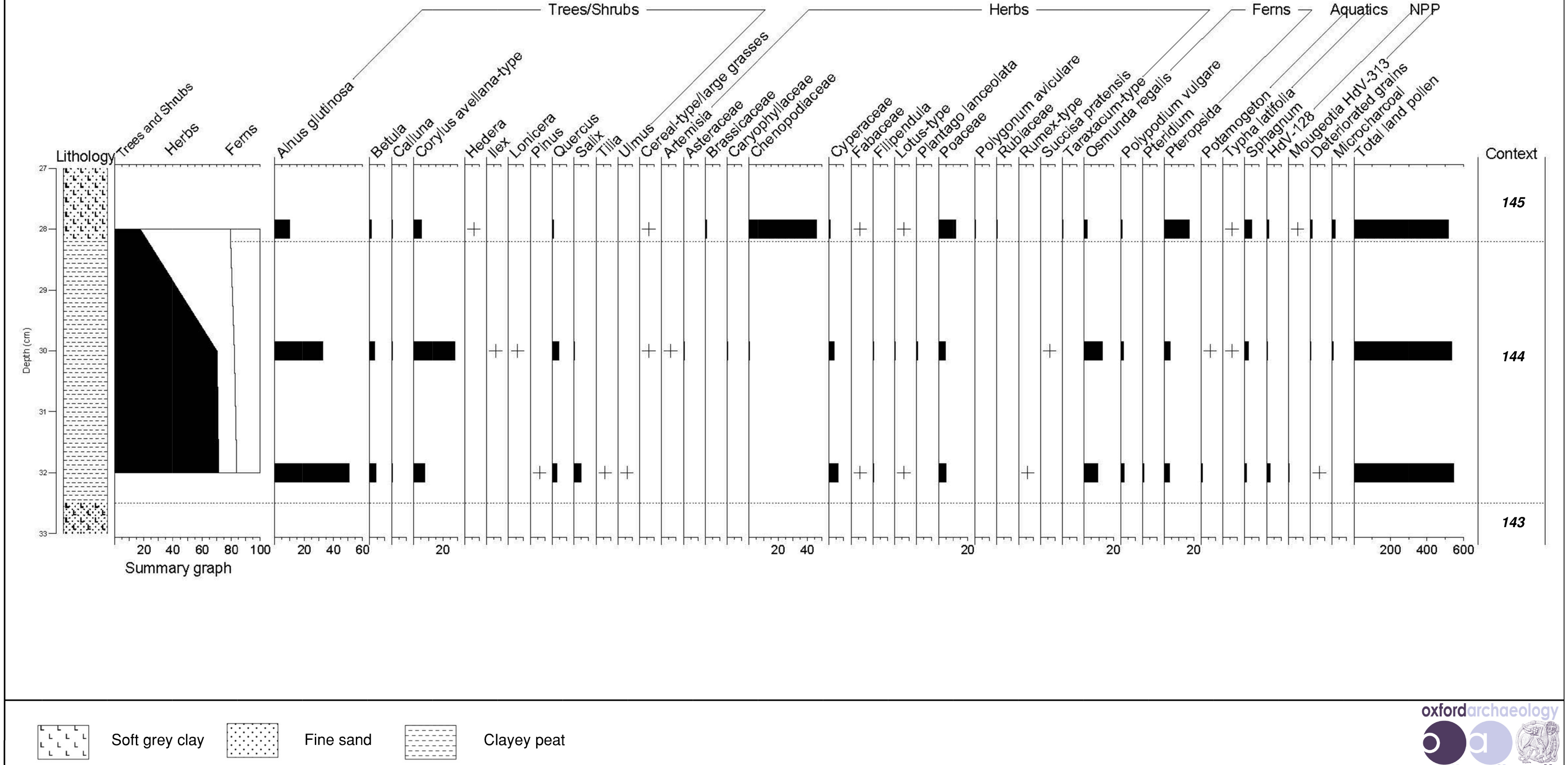

Figure 8: Pollen sequence recorded from deposits ***143***, ***144*** and ***145***

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