KWNL11/002

KEADBY WIND FARM NORTH LINCOLNSHIRE

Palaeoenvironmental Report on the Results of the Gouge Auger Sediment Survey

for SSE Renewables

June 2012

HEADLAND ARCHAEOLOGY Ltd

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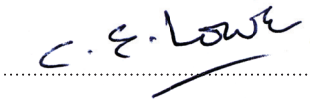

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Key

- APPLICATION AREA
- PLANNING APPLICATION BOUNDARY
- SITE TRACK - UPGRADE
- SITE TRACK - NEW
- MET MAST PERMANENT
- TURBINE AND CRANE HARDSTANDING
- CONSTRUCTION COMPOUND
- BRIDGE WORKING AREA & CONSTRUCTION COMPOUND
- SUBSTATION
- BORE HOLE
- TEST PIT
- TEST PIT WITH MADE GROUND (>0.5M)
- AUGER TRANSECT
- AP AUGER POINT

0 600 m

1:20,000 @ A3

KEADBY WIND FARM

ILLUS 01:
SITE PLAN SHOWING LOCATION OF AUGER TRANSECTS, TEST PITS AND BORE HOLES

KEADBY WIND FARM NORTH LINCOLNSHIRE

Palaeoenvironmental Report on the Results of the Gouge Auger Sediment Survey

In accordance with the archaeological mitigation plan for the development area of the Keadby wind farm, North Lincolnshire, a series of manual gouge auger transects were conducted in order to assess the palaeoenvironmental and archaeological potential of the sediments present. Previous assessment of the borehole and test pit logs for the area had shown the presence of peats in areas of the site which have high palaeoenvironmental potential as well as the potential to contain materials of cultural significance. The results of the present auger transect survey which forms Phase I of the mitigation programme aimed to refine and update the existing deposit-model for the site. The results of the study have helped identify areas of the site of greater archaeological and palaeoenvironmental value and as such it will inform a targeted programme of archaeological work.

1. INTRODUCTION

Headland Archaeology was commissioned by SSE Renewables to undertake a series of manual gouge auger transects at Keadby Wind Farm, North Lincolnshire in order to assess the palaeoenvironmental and archaeological potential of the sediments present.

Planning permission has been granted for the construction subject to a number of conditions related to archaeology (Condition 10n: GBDC/003/0025C/1 and Conditions 9–11: PA/2011/0583). An Archeological Mitigation Plan has been previously prepared by Headland Archaeology setting out a strategy that will mitigate the impacts of the Keadby wind farm development on the cultural heritage resource of the Development Area (DA). The work reported here forms part of this mitigation strategy (Phase I) designed to address the terms of the archaeological conditions to the satisfaction of the Planning Authority.

1.1 Site location and description

Keadby Wind Farm is located on the western side of the River Trent between the villages of Keadby and Crowle. The Development is for 34 wind turbines located within an area of *c*9.5km^2 centered on NGR SE 818 133.

The site is divided into large fields which are bounded by drainage ditches and tracks, with most of the fields being used to grow arable crops. The southern half of the site is bisected by the Doncaster to Scunthorpe railway and the Stainforth and Keadby Canal; to the north, the site is crossed by the Pauper's and Warping Drains, which drain into the River Trent. The site is generally very flat and low-lying, roughly 0–2m OD and the current land-form is a product of historic land reclamation and warping undertaken in order to produce rich agricultural land.

1.2 Scope of work

The Phase I scheme, reported here, is focussed on auger transect surveys of the development area, to clarify the nature of below-ground deposits and refine the existing deposit-model for the site. Targeted trial trenching within the area of Compound 3 has also been undertaken as part of Phase I. The results of that element of work have been reported elsewhere (Timpany 2012b).

Phase II will be informed by the results of the Phase I auger survey. It will generally comprise a combination of further coring from the deepest peats and targeted trial trenching.

2. BACKGROUND

2.1 Planning background

One Condition (Condition 10n) relates to the original Section 36 Permission of 28/02/2008 for the wind farm development which followed a Public Local Inquiry (GBDC/003/0025C/1).

A second suite of conditions (Conditions 9–11: PA/2011/0583) relate to the planning consent of 17/07/2011 concerning new sections of internal permanent access track and track widening.

The resulting Archaeological Mitigation Plan was prepared, accompanied by a Written Scheme of Investigation providing a unified approach for the discharging of the relevant 2008 and 2011 planning conditions that relate to the archaeological and palaeoenvironmental issues of the Development.

2.2 Archaeological and palaeoenvironmental potential of below-ground deposits

The archaeological desk-based assessment incorporated into the Environmental Statement concluded that the site:

> *'has a medium to high potential for prehistoric activity and Romano-British settlement remains and also the potential for preserved organic archaeological remains in the alluvial and peat deposits of the River Trent floodplain, as well as associated palaeoenvironmental deposits. Also more recent evidence for drainage and warping activities have been identified from aerial photographs'.*

The latter is a particular issue here because of the masking effects of both alluvium and subsequent warping practices. Moreover, the presence of humified peat means that the deposits have the potential to contain well-preserved organic materials such as wooden artefacts, structures and human remains, and to preserve palaeoenvironmental evidence of past human activities, habitats and climate.

The Archaeological Mitigation Plan proposed a progarmme of works in order to test and evaluate the nature and extent of the archaeological and palaeoenvironmental potential.

This included an assessment (Timpany 2012a) of the available bore-hole data derived from surveys reported in 2005 (Fugro Engineering), 2009 (Geotechnical Engineering) and 2011 (BAM Ritchies) in order to assess the archaeological and palaeoenvironmental implications of these data. This was key to proposing mitigation measures for archaeological testing as it would allow us to focus on those areas of the greatest value.

The assessment of the borehole and test pit logs showed the presence of peats in areas of the site, which have high palaeoenvironmental potential as well as the potential to contain materials of cultural significance (*eg* wooden objects and trackways).

The borehole and test pit records also showed that in some locations, particularly test pit locations, the sedimentary record below 4m (the extent of the logs) was unknown. It was also observed that the borehole records may not be sensitive to small-scale changes in the sedimentary sequence (*eg* thin peat bands) and therefore some data may be missing from these sequences. These are addressed by the methodology for the present phase of work reported here (see below).

An archaeological evaluation by means of trial trenching has already been undertaken targeting the area of Compound 3. Four trenches were excavated across the site, exposing light grey alluvial sands at 0.4m to 0.6m below ground surface. A series of drains, aligned north to south and east to west, was cut into the sand, but no significant archaeological features were uncovered. In conjunction with the trial trenching an auger survey was carried out over the area of the compound, to clarify the nature and extent of below-ground deposits. Although not previously identified during test-pitting for site investigations work, nonetheless it is clear that peat deposits are present here. The peat was found to be a wood peat up to 2.4m deep containing fragments of birch and alder together with large oak trees.

3. AIMS AND OBJECTIVES

The overarching aim of the work is to fully test and evaluate the extent of the archaeological and in particular palaeoenvironmental resource. It seeks to identify:

- Which areas of the DA may require further investigation and by what means such investigation may be most efficiently undertaken
- Which areas of the DA require no further investigation based on the results of the auger survey.

The particular objectives of the auger survey, in conjunction with the previous palaeoenvironmental assessment of borehole data, are to:

- Investigate the sedimentary sequence below 4m
- Investigate for the presence of small-scale changes in sedimentary sequences, including thin peat bands
- Update the 2D contour map of existing peat within the development area.

4. METHOD

4.1 Fieldwork

A total of twelve transects measuring between 150m to 500m were undertaken using a manual gouge auger across the DA (Illus 1). Transects covered areas that borehole data indicated had <0.5m of Made Ground present at the top of the sedimentary sequence (Geotechnical Engineering Ltd 2009). This would enable the gouge auger to penetrate through the sediments.

A total of fifty-six auger points (APs) were undertaken from all transects. The sedimentary sequence was recorded at each location. All of the auger points were then leveled through survey in the field, with a differential GPS to record their position and the OD heights of the current ground surface. The results of the auger survey transects are provided in Illus 2–13. Full sedimentary descriptions for each auger point are given in Appendix 1.

4.2 Deposit model construction

The auger and survey results from the fieldwork have been combined with the auger data gathered from the previous work at the compound facility in the southern area of the DA (Timpany 2012b) and available borehole and test-pit logs (Fugro Engineering Services Ltd 2005; Geotechnical Engineering Ltd 2009; Bam Richies 2011). All of this data was entered into a digital surface mapping and contouring program (Surfer 10) to produce a 2D contour map of peat thickness across the DA (Illus 14).

5. RESULTS

5.1 Auger survey

A brief overview of the stratigraphy encountered in the auger transects is provided below. The locations of each transect are shown in Illus 1.

5.1.1 Transect AP1 to AP2

Four auger points reached a maximum depth of approximately 2m below the ground surface, which was at *c*0.5m OD at transect AP1–2. Four main sedimentary units were present within the recorded sequence (Illus 2). The upper part of the sequence consisted of a stiff grey-brown clay, underlain by a peat unit that was seen to thin out southwards. Peat attained a maximum thickness of 0.29m within AP1, which was also observed to contain wood fragments. Underlying the peat in one location (AP1) was a thin layer of peaty, silty sand. Below the peat (and sand layer) was a dark grey-brown silty sand layer, which in two locations (AP2.i and AP2) was underlain by an orange-brown fine to medium sand.

5.1.2 Transect AP3 to AP4

At Transect AP3–4, four auger points reached a maximum depth of approximately 1.75m below the ground surface, which was at *c*0.25m OD (Illus. 3). The upper part of the sequence consisted of a stiff grey-brown clay of around 0.6m in thickness. Below this clay layer was a wood peat, which had an undulating thickness across the auger points, seen to shallow, thicken and then shallow again; going eastwards. The wood peat attained a maximum thickness of 1.02m in AP3. Unfortunately the sediments below the peat in AP3 were too wet to be recovered and thus the sediments below the peat in this location are unknown. However, the record within AP3.i and AP4.i shows that grey-brown sandy silt is present below the peats. There is then some variation between the sediment records in each AP, highlighting the complexity of sedimentary deposition within the DA. Below the peat layer in AP3.i and AP4.i is peaty silty sand (AP3.i) or silty sand with organic banding (AP4.i), suggesting they relate to the same context. Underlying these units at these APs is a silty sand layer, which in AP3.i is recorded as containing wood fragments.

In AP4 below the wood peat layer there is a grey clay layer, underlain by light brown fine sand, which in turn is underlain by a thin monocotyledon peat band (0.01m in thickness). This suggests that different depositional regimes were in place at this part of Transect AP3–4, indicating it was in a more fluvially active location. Below the peat band, grey brown clay is recorded, which is underlain by light brown silty sand. This basal layer is likely to be the same unit recorded at the base of AP3.i and AP4.i.

5.1.3 Transect AP5 to AP6

Eleven auger points were recorded at Transect AP5–6, reaching a maximum depth of approximately 3.75m below the ground surface, which lay at between *c*0 to 0.75m OD (Illus 4). Grey-brown stiff clay makes up the upper part of the sedimentary sequence and is underlain by a range of deposits as you move south along this transect from AP5 to AP6. In general, the clay is underlain by grey-brown clayey silt, often sandy (*eg* AP5), however in some APs the clay is underlain by clayey silt (*eg* AP6.ii) or orange-brown silty sand (*eg* AP6.iii). This again highlights that even in a relatively small area there is a complex depositional history. Below the clays in AP5.ii to AP5.iv there is a wood and/or monocotyledon peat layer, which in AP5.iii is seen to be intercalated with clays and silts. This peat band is quite thin and attains a maximum thickness of 0.22m in AP5.ii and lies at around -0.8m OD (Illus 4).

Below these layers there is a sequence of mainly grey to blue-grey sandy silts in the northern part of this transect from AP5 to AP5.iii, which rest on a deposit of pink-grey clay. A second wood peat is recorded in AP5 and AP5.i at approximately -1.25 to -1.5m indicating a prior period of carr-woodland development in this part of the DA. This wood peat layer is absent in AP5.ii and AP5.iii but is then recorded further in AP5.iv to AP6.ii; within AP5.iv and AP6.v it also appears as a silty monocotyledon peat. The wood peat layer is then absent in AP6.i but is recorded in AP6.

This interrupted record for peat development across this transect suggests that this former carr-woodland environment was affected by frequent inwash or flooding events, which in those wetter areas led to the formation of sedge swamp (monocotyledon peat) rather than carr-woodland. The frequency of these events is also shown in the AP5.iv and AP.6.v sequences where intercalated peat and clayey silt layers are recorded at these levels.

These peat sequences from the central to the southern end of this transect are again underlain by sequences of silty sands and sandy silts (Illus 4). The presence of wood fragments and organic staining within these lower levels are likely to represent the root systems of trees associated with the overlying wood peats. At AP6.i no peats were recorded and the sequence is recorded as mainly orange brown, silty fine sand with gravels. This deposit may relate to a high energy flood deposit, which may have formed a channel through this area of the site, which eroded out the peat, indicating this channel activity is of a later date.

5.1.4 Transect AP7 to AP8

Transect AP7 to AP8 comprised four auger points, extending to a maximum depth of 4.5m below ground surface, which lay between *c*0.5 to 1.25m OD (Illus 5). The upper part of the sedimentary sequence comprises grey-brown stiff clay and is underlain by brown silty sand, which at AP8 at the western end grades into a silty sandy clay. This layer is in turn underlain by brown silty sand in AP7 to AP8.i, indicating an upper sequence dominated by fluvial deposits. Below these silts and sands is a peat layer, which is thickest at the eastern end of this transect (*c*0.33m) where it is present as a silty peat with wood fragments. It then thins to the west where it is present as a monocotyledon peat. The height difference in this layer from AP7 (*c*-0.45 to -0.8m OD) through to AP7.i (*c*-0.25 to -0.3m OD) suggests there is some question as to whether they form part of the same peat layer or different periods of peat formation.

This upper peat layer is then seen to be underlain by a series of sands and silts, which in some sequences such as that of AP7.i include laminated sequences, suggestive of frequent flooding or inwash episodes. A second peat is recorded in AP7 at around -1.1 to -1.3m OD (Illus 5). This wood peat layer is separated by a layer of grey silty sand indicating a flooding event during a phase of carr-woodland formation. The brown sandy silts, which underlie this wood peat, had wood fragments recorded within it, again suggesting the presence of roots related to the former woodland. The deepest auger sequence, AP7.i indicates the sedimentary sequence underlying the peats is a series of minerogenic deposits of silty sands, which gradually change into pink-brown clays recorded in the deepest deposits, to a depth of around -3.3m OD.

5.1.5 Transect AP9 to AP10

Four auger points make up Transect AP9 to AP10, which extended to a maximum depth of 2.26m below ground surface, which lay between approximately 0.75 to 1.2m OD (Illus 6). The upper parts of the sequence again comprise grey-brown stiff clay, which are underlain by silty sands in AP9 to AP9.i, which grade into silty clays in the north of this transect at AP10.i. A thin band of monocotyledon peat is present at AP10, underlying the clay at approximately -0.15m OD and is around 0.05m in thickness. This peat layer may relate to a similar thin peat recorded in AP10.i at *c*-0.25m OD; no further peats were recorded in this transect. The remaining sequence in the four auger points is seen to consist of a number of silty sand deposits through to the bottom of the recorded sediments (Illus 6).

5.1.6 Transect AP11 to AP12

Transect AP11 to 12 consists of four auger points, which extend to a maximum depth of 2.05m below surface, which lies at around 0.6 to 1.35m OD (see Illus 7). The upper sequence is made up of grey-brown clay, which is underlain by a series of clay, sands and sandy silts moving eastwards across this transect. A peat layer is then present in AP11, which potentially is of the same date as similar monocotyledon peat and silty peat within AP11.i and AP12.i. No peats were recorded in AP12. This peat is present between approximately 0.6m OD (AP11) to 0.1m OD (Ap12.i) and has a maximum thickness within AP11 of 0.15m.

The peat layer within AP11 to AP12.i is then underlain by a series of sands and silty sand, with occasional silt layers. Within AP11 there is light grey silty clay with occasional wood fragments at approximately -0.15m OD, indicating that at this location of this transect it may have fringed a former carr-woodland environment. The sequence within AP12 differs to the auger points and has more substantial sand deposits, particularly in the upper sequences suggesting this area was more prone to periods of increased alluvial deposition of sediments, thus never allowing peat to form. There is, however, peaty silt present at around -1.1m OD, which may relate to the development of reed or sedge swamp. The lowermost sequence in all the auger points was brown silty sand.

5.1.7 Transect AP13 to AP14

Seven auger points make up Transect AP13 to AP14, which reached a maximum depth of 2.4m below ground surface, which was at around 0.65 to 1.45m OD (Illus 8). Underlying the clay is a mix of clays, clayey sands and silty sands, which is in turn underlain by a monocotyledon peaty silt layer, which is present in all the auger points, with the exception of AP14.ii. This peaty silt is likely to reflect a period of relative stability with peat beginning to develop before it was flooded by the overlying minerogenic sediments. This peaty silt layer reaches a maximum thickness of approximately 0.2m within AP13 at the northern end of this transect and is present between 0.65 to 0.15m OD.

Below the peaty silt layer can be seen a transgression of brown and orange-brown silty sands, which can be seen to grade into blue grey sandy silts. The latter sediments had bands of blue-grey clay recorded within them at AP13.i, suggesting frequent inwash or flooding episodes laying down minerogenic sediments. The complexity of these fluvial sequences is again highlighted at AP14 where this sandy silt has orange fine sand inclusions and clay bands are absent.

5.1.8 Transect AP15 to AP16

Transect AP15 to AP16 consists of four auger points which extend to a maximum depth of 0.95m below the surface, which lies at between *c*0.05 to 1.1m OD (Illus. 9). The upper sequence again consists of grey-brown stiff clay, which is ubiquitous across the DA. Below this is a layer of silty peat in AP15, AP15.i and AP16, which grades into peaty clay at AP16.i. This layer lies at between *c*0.5 to 0.6m OD and has a maximum thickness of 0.11m.

Immediately below this peaty layer is a sequence from west (AP15) to east (AP16) of clays with peat inclusions, peaty sandy silt, and sandy peat to peaty sandy silt (Illus 9). This transect suggests that this thin peaty layer developed over a series of different minerogenic sediments but probably quicker on the less compact sands and silts, which were observed to have higher peat contents. The presence of monocotyledon peats indicates the development of tall-herb swamp such as sedge swamp or reedswamp. Underlying the peaty layer was a sequence of sands, with orange silty, fine sand the basal layer found at each auger point.

5.1.9 Transect AP17 to AP18

Four auger points make up Transect AP17 to AP18, which attained a maximum depth of 1.54m below the present ground surface, which lies between approximately 1.1 to 1.5m OD (Illus 10). The top part of the sequence comprised of grey-brown stiff clay, which was underlain in AP17 to AP17.ii by silty sand with organic bands (AP17) and peaty silt (AP17.i and AP17.ii). This peaty layer is recorded between 0.8m and 0.2m OD, with a maximum thickness of 0.2m. These deposits suggest that peat was beginning to develop in these areas before the deposition of the upper grey-brown clay across the DA. This layer was absent in the small section observed in AP18 but may well be present in the layers below the maximum depth reached, in accordance with the rest of this transect.

Sandwiched by a layer of light grey sandy, clayey silt within AP18.i is a lower band of peaty silt, which lies at around *c*0 to 0.05m OD. This layer is likely to reflect an earlier period where peat began to develop before the area was flooded once more. The remaining sequences in this transect consist largely of sandy silt deposits (Illus 10). The sandy silts were seen to rest on a layer of orange silty fine sand.

5.1.10 Transect AP19 to AP20

Transect AP19 to AP20 comprises four auger points, which extend to a maximum depth of 1.26m below the current ground surface, which lies at between around 1.05 to 1.25m OD (Illus 11). Grey-brown stiff clay again makes up the uppermost part of the sequence, which is underlain by a series of silty sands and sandy silts. A layer of peaty silt was recorded in only one auger point, AP19 lying directly underneath the grey-brown clay layer similar to that recorded at AP17 to AP18 (see above). This peaty layer occurs between *c*0.55 to 0.59m OD and was found to contain monocotyledon plant fragments, suggesting that only at the southern end of this transect were surface conditions stable enough to allow a period of peat development.

5.1.11 Transect AP21 to AP22

There are four auger points in Transect AP21 to AP22, which extended to a maximum depth of 3m below the current ground surface, which lies at approximately 0.5 to 0.6m OD (Illus 12). The upper part of the sequence consists of grey-brown clay, which at AP21 and AP21.i is underlain by pink-grey clay, which in AP21.i also contained sand inclusions. Below the clays was a substantial layer of wood peat, which is seen to have an undulating thickness along this transect (Illus 12). This wood peat layer attains a maximum thickness of 1.36m in AP22 and was present between approximately -0.2 to -1.55m OD. The base of this wood layer contained large wood fragments, which is likely to represent trunks, branches and roots of the former carr-woodland. This can be seen in AP22.i where there is 0.12m layer of wood below the peat.

This wood peat layer is then underlain by a sequence of blue-grey silty clays and clayey silts to the bottom of the recorded sequences. Frequent wood fragments were present within these silts and clays (Illus 12) indicating that trees may have been present around this southern part of the DA prior to peat formation. A thin band of monocotyledon peat is also recorded in AP21.i at around -2m OD, which is around a 0.01m in thickness. This peat may relate to a brief period of colonisation by tall-herb communities, such as the development of sedge or reedswamp.

5.1.12 Transect AP23 to AP24

There are four transect points in Transect AP23 to AP24, which extends to a maximum depth of 1.7m below the present ground surface, which lies at between approximately 0.1 to 0.6m OD (Illus 13). The top part of the sediment sequence comprises grey-brown stiff clays, which in turn is underlain by a significant deposit of wood peat. This wood peat layer is seen to undulate in depth and thickness across this transect. It is thickest in AP23, where this 1.03m of wood peat was recorded and is present between *c*0.5 to -1.6m OD (Illus 13). Large wood fragments, which are likely to be remnants of the former carr-woodland such as branches and roots, were also recorded in the base of the peat similar to those observed in the southern part of the DA at AP21 to AP22. This peat layer is underlain by a series of sandy silts, which were recorded as overlying light brown silty sand, the basal sediment encountered.

6. DISCUSSION

The manual gouge auger for the auger survey proved unsuccessful in penetrating the dense clay and sands of the sediment sequence below the 4m originally aimed for. Penetration below 4m only occurred at one auger point location; AP7.i on Transect AP7 to AP8 in the central part of the DA (Illus 1 and 5). However, the sequences that were recorded were found to generally relate well to the borehole sequences; although these larger sequences were found to miss some of the smaller scale changes.

These small-scale changes can be largely seen in the presence of peats across the DA, where the additional data from the auger transects has allowed the presence of peat to be mapped over a much wider area than previously (Timpany 2012a). This is particularly apparent for the southern end of the DA where there was previously not enough information to map the presence of peat. Transects have also picked up thin layers of peat in areas where borehole data suggested they may be absent.

In total there are a probable two main episodes of peat formation at the site recorded in the auger transects. These occur at elevations of approximately +0.8m to +0.1m OD and -0.25m to -2.1m OD. The upper peat layer was recorded in four of the twelve transects and is present largely in the central western and south western areas of the DA. The lower peat layer occurs ubiquitously across the DA. The overall peat thickness has been mapped using Surfer10 to create a 2D contour map of peat located across the DA (Illus 14). The map shows that peat is either absent or of shallow depth across the western part of the DA and increases in thickness to the north and south. There are two locations where peat thickness is seen to be around 2m or over 2m in thickness; these are the compound area in the south and to the north of Transect AP3 to AP4 in the area of borehole WS08.

Assessment of the basal wood peat layer across the DA from plant macrofossil and wood remains at the compound area showed that a former woodland including oak (*Quercus* sp.), alder (*Alnus glutinosa*) and birch (*Betula* sp.) was present. Bramble (*Rubus fruticosus*) fruits and buttercup (*Ranunculus* sp.) achene where also noted to have been part of the field layer of this woodland. The plant remains were all found to be excellently preserved and showed good potential for further study and palaeoenvironmental reconstruction (Timpany 2012b). The development of this peat unit was seen to be continuous in some parts of the DA and fragmented in others; often it was observed as an intercalated sequence with silts and clays or as separate peat layers. The different levels of peat accumulation across the DA highlights the effects of the fluvial nature of this

area with peat development halted as parts of the DA became flooded from rising water levels. It is likely that later channels or flood episodes have eroded out peats in some parts of the DA.

The upper monocotyledon peaty silt and silty peat that is present has not undergone any assessment work to date. The nature of this stratigraphic layer suggests it represents a period of former tall-herb communities, colonising areas where water level was shallow and stable enough for them to gain a foothold. These tall-herb communities are likely to have been a mixture of reedswamp and sedgeswamp communities. However, investigation of these deposits is still needed to provide further comment on the landscape during this period.

The minerogenic sediments recorded across the DA are dominated by sand and silt deposits, together with clays. There is little uniformity observed in these sediments across the DA and even within transects, showing the complex nature of the accumulation of alluvial sediments. The peat thickness map (Illus 14) goes someway to highlighting the undulating surface that would have been in existence during the period of basal peat accumulation. This land surface would have created areas suitable for the deposition of minerogenic deposits in areas where fluvial processes were more active around the islands of peat and woodland development. The more low lying areas of peat were seen to be flooded frequently during periods of water level rise seen by the presence of intercalated deposits and in some locations significant units of silts and sands. It is likely these fluctuations in water level were driven by sea-level rise and comparison of dated peat sequences from the DA with the sea-level curve for this part of north eastern England may help to explain the wider landscape changes alluded to in the sediment record.

7. MITIGATION

The palaeoenvironmental potential of the peats (and organic deposits) has previously been commented upon in the Archaeological Mitigation Plan. The auger transects have helped to develop the peat map for the DA from that first attempt within the Archaeological Mitigation Plan (Timpany 2012a), especially for the southern part of the DA. The auger transect results have also shown that two main phases of peat accumulation occurred within the DA. Observation in the field of well preserved plant remains within the peats (*eg* wood fragments), together with the assessment of the basal peat in the compound area (Timpany 2012b) have shown the good potential of these sediments for palaeoenvironmental reconstruction work. This work would be able to show the evolution of this landscape, while dating of the peat sediments would be able to link this landscape change with broader sea-level change. There is good potential for the minerogenic sediments to contain diatom information that would also show the nature of fluvial activity and changes in salinity (*eg* changes from freshwater to brackish water systems).

It is recommended that two cores be taken from the DA; one from the deepest peat sequences in the north (around Turbine 29) and similarly from the south of the site (around Turbine 5). The development of the compound and road bridge on top of the deep peat deposits in the southern part of the DA, rules this area out for core sampling. However, the presence of significant peat and silts containing organic materials in the area of Transect AP21 to AP22 (Turbine 5) provides an alternative suitable location for sampling. A core in the north should be taken in the location of WS08 (around Turbine 29), where deep peat deposits were recorded. The difficulty in penetrating these sediments with a manual auger indicates that the most effective way to obtain cores will be to use a piston corer to collect sequences that can be used for further analyses.

No archaeological features or cultural materials were recorded during the auger transect across the DA or trenching within the compound area. The deep nature of the deposits within the DA, with peat seen to reach to depths of -2m OD indicate that archaeology has the potential to be present below even these depths. The top of the lower peat band would be exposed in trenches at the north of the site at borehole locations T37–39, where a maximum of approximately 0.9m of these peats would be exposed (Illus 15). However, trenching would not reach the basal layers of this peat deposit. For the remainder of the site only limited exposure of the basal peat would be exposed through trial trenching with the main deposits uncovered using this method relating to fluvial deposits. It is unlikely therefore that trial trenching to a standard depth of 1.2m below ground surface (between 0m to +1.5m OD), within these areas would penetrate to levels where cultural materials may be present. The most reliable method of investigating the presence and interaction of past people within this landscape would be through the pollen record.

8. REFERENCES

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APPENDICES

Appendix 1 – Auger transect results

Unit key:
1 peat
2 silt, cohesive alluvium
3 sand, granular alluvium
4 clay, cohesive alluvium
5 mudstone
6 sand with organics, granular alluvium

Transect	Core	Depth (cm)	Sediment
1	1	0–104	Stiff grey-brown clay
		104–133	Dark brown peat with wood fragments and monocotyledon plant fragments
		133–135	Brown-grey peaty silty medium sand
		135–163	Dark grey silty, medium sand
	1.i	0–98	Stiff grey-brown clay
		98–117	Dark brown-black peat
		117–159	Dark grey-brown peaty, medium sandy, silt
	2.i	0–97	Stiff grey-brown clay
		97–105	Dark brown-black peat
		105–178	Dark grey-brown peaty, medium sandy, silt with possible peat banding
		178–200	Orange-brown silty, fine to medium sand
		200–205	Blue-grey clayey, fine to medium sandy silt
	2	0–94	Stiff grey-brown clay
		94–96	Dark brown-black peat
		96–143	Dark grey-brown, peaty, medium sandy, silt with occasional wood fragments
		143–160	Orange-brown silty, fine to medium sand
2	3	0–58	Stiff grey-brown clay
		58–160	Dark brown-black peat with wood fragments and monocotyledon plant fragments
		160–178	Unrecovered - too wet - probable sand layer
	3.i	0–62	Stiff grey-brown clay
		62–94	Dark brown-black peat with wood fragments and monocotyledon plant fragments
		94–104	Light grey-light brown fine sandy, silt with black organic banding
		104–118	Orangey-grey silty fine to medium sand with occasional wood fragments and organic inclusions
	4.i	0–69	Stiff grey-brown clay
		69–123	Black fibrous peat with monocotyledon plant fragments
		123–132	Dark brown peaty silt with monocotyledon plant fragments
		132–145	Light brown silty fine sand
	4	0–58	Stiff grey-brown clay
		58–70	Black peat
		70–78	Grey clay
		78–78.2	Black peat band
		78.2–113	Light brown fine sand
		113–114	Light brown clay
		114–115	Black peat band
		115–123	Grey brown clay with peat inclusions
		123–127	Light brown silty fine sand
3	5	0–68	Stiff grey-brown clay
		68–106	Light grey-brown clayey silt
		106–141	Grey silty clay with occasional wood fragments
		141–148	Grey clayey silt
		148–172	Black peat with wood fragments
		172–174	Blue-grey-brown clayey silt
		174–186	Blue-grey clayey silt with fine sand inclusions
		186–190	Grey silty fine to medium sand
		190–319	Grey silty fine to medium sand with laminations of blue-grey clayey silt
		319–375	Pinky-grey clay
	5.i	0–89	Stiff grey-brown clay
		89–118	Orange-brown silty, fine sand

Transect	Core	Depth (cm)	Sediment
		118–148	Grey-brown clayey silt
		148–163	Orange-brown silty sand with grey-brown clay laminations
		163–186	Black peat with wood fragments
		186–250	Grey silty fine sand
		250–275	Grey silty fine sand with peat bands
		275–300	Grey silty fine sand
		300–346	Grey silty fine sand with occasional peat bands
		346–380	Pinky-grey clay
	5.ii	0–95	Stiff grey-brown clay
		95–96	Orange-brown silty, fine sand
		96–106	Not recovered – probably as above
		106–128	Black peat with wood fragments
		128–150	Grey-brown silty clay
		150–191	Light brown clayey silt with occasional organic staining (former roots)
		191–319	Grey silty fine sand with peat and clay bands
		319–336	Pinky-grey clay
	5.iii	0–93	Stiff grey-brown clay
		93–95	Black peat
		95–97	Grey-brown clay
		97–98	Black peat
		98–100	Light brown clayey silt
		100–115	Black peat
		115–186	Orange silty, medium sand with bands of silt
		186–330	Blue-grey silty sand with clay and peat bands
		330–348	Pinky-grey clay
	5.iv	0–89	Stiff grey-brown clay
		89–92	Black peat
		92–170	Grey silty fine sand with peat and clay bands
		170–178	Blue-grey clay
		178–179	Black peat
		179–180	Blue-grey silty, fine sand
		180–182	Dark brown peat
		182–183	Brown peaty clay
		183–185	Grey-blue clayey silt with wood fragments
		185–187	Light grey silty, clayey, medium sand
		187–191	Light grey silty medium sand
	6.v	0–77	Stiff grey-brown clay
		77–114	Orange-brown silty sand with grey-brown silt laminations
		114–120	Blue-grey clayey, medium sandy, silt
		120–127	Black peat
		127–132	Blue-grey clayey silt
		132–144	Dark brown peat with wood fragments
		144–146	Blue-grey clayey silt
		146–151	Dark brown peat with wood fragments
		151–163	Orange-brown silty sand with blue-grey clayey, silt laminations
		163–184	Wood layer
		184–191	Dark brown peat with wood fragments
		191–198	Wood layer
		198–210	Dark brown peat with wood fragments
		210–213	Wood layer
		213–217	Dark grey-brown silty fine to medium sand with wood fragments
		217–235	Not recovered – probably same as above
	6.iv	0–93	Stiff grey-brown clay
		93–124	Orange-brown silty fine sand with grey-brown silt and black peat laminations
		124–131	Blue-grey silty sand with blue-grey clay laminations
		131–139	Brown peaty silt with fine sand inclusions
		139–144	Light brown silty sand
		144–170	Light brown silty sand with occasional wood fragments
	6.iii	0–53	Stiff grey-brown clay
		53–154	Orange-brown silty fine sand with grey-brown silt and black peat laminations
		154–180	Blue-grey clay with occasional organic stainings
		180–220	Dark brown peat with wood fragments
		220–233	Light grey-brown fine sandy, silt with occasional woof fragments
		233–250	Orange-brown silty fine sand with occasional wood fragments.

Transect	Core	Depth (cm)	Sediment
	6.ii	0–61	Stiff grey-brown clay
		61–81	Grey-brown clayey silt with bands of clay
		81–100	Light grey-brown clay with sand inclusions
		100–120	Not recovered
		120–162	Dark brown peat with wood fragments
		162–172	Grey fine sandy silt
		172–185	Light grey sandy silt
		185–230	Light grey sandy silt with blue-grey clay bands and occasional wood fragments
		230–240	Grey-light brown silty fine to medium sand
	6.i	0–52	Stiff grey-brown clay
		52–190	Orange-brown silty fine sand with occasional sub-angular gravels
		190–196	Brown silty fine sand
		196–246	Light grey silty-fine sand
	6	0–80	Stiff grey-brown clay
		80–110	Orange-brown silty fine sand with clay bands
		110–115	Grey-brown clay
		115–147	Dark brown peat with wood fragments with occasional charcoal
		147–152	Brown peaty, silty medium sand
		152–165	Brown silty fine to medium sand with occasional monocotyledon plant fragments
		165–177	Light grey-brown silty fine to medium sand with monocotyledon plant fragments
		177–205	Light grey-brown silty fine sand
4	7	0–58	Stiff grey-brown clay
		58–95	Brown sandy silt
		95–100	Orange-brown silty fine sand
		100–133	Black silty peat with occasional wood fragments
		133–142	Brown silty medium sand with grey silty sand bands
		142–153	Grey sandy silt with wood fragments and occasional charcoal
		153–161	Grey-brown silty fine sand and occasional clay bands
		161–166	Dark brown peat with wood fragments
		166–168	Grey silty sand
		168–170	Dark brown peat with wood fragments
		170–186	Brown medium sandy silt with occasional wood fragments
		186–270	Blue-grey clayey fine sandy silt
	7.i	0–82	Stiff grey-brown clay
		82–100	Orange-brown silty sand with occasional peat bands
		100–124	Brown silty sand with orange sand, black peat and grey silty clay laminations
		124–129	Light brown silty sand
		129–131	Brown silty clay
		131–132	Light brown silty sand
		132–135	Grey silty sand with orange-brown sand inclusions
		135–136	Black peat
		136–140	Dark grey silty sand
		140–153	Light grey silty sand with dark grey silty sand laminations
		153–210	Light grey silty sand with orange sand inclusions
		210–238	Light grey silty sand
		238–241	Grey-brown silty sand with organic staining
		241–243	Grey silty sand
		243–246	Grey-brown silty sand
		246–342	Grey-brown silty sand with blue-grey silty clay laminations
		342–353	Pink-brown clay
		353–365	Grey-brown silty sand
		365–369	Pink-brown clay
		369–372	Grey-brown silty sand
		372–450	Pink-brown clay
	8.i	0–59	Stiff grey-brown clay
		59–84	Brown sandy silt
		84–91	Brown sandy silt with grey-brown clay and occasional peat laminations
		91–96	Brown silty sand
		96–97	Peat band
		97–142	Brown silty sand
		142–160	Orange-brown silty sand
		160–172	Unrecovered
	8	0–50	Stiff grey-brown clay

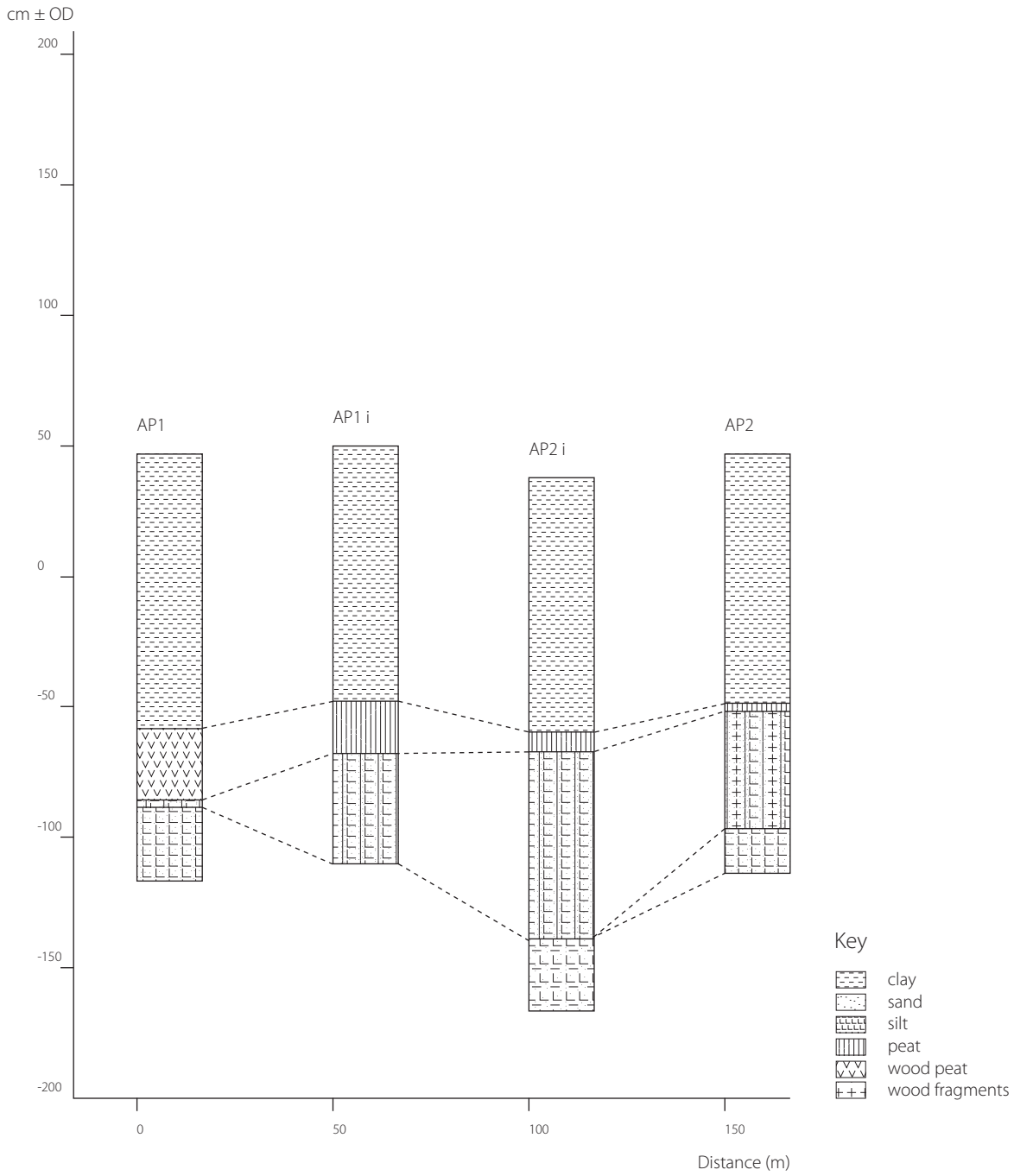
Transect	Core	Depth (cm)	Sediment
		50–98	Brown sandy silty clay with possible banding
		98–99	Black peat
		99–111	Grey silty sand
		111–122	Light grey silty sand with orange sand inclusions
		122–126	Orange-brown sand
		126–146	Dark brown silty sand
		130–146	Light brown silty sand
		146–154	Orange-brown silty sand
		154–168	Light brown silty sand
		168–177	Orange-brown silty sand with light grey silty sand inclusions
		177–179	Orange-brown silty sand
		179–200	Blue-grey silty sand with orange-brown silty sand inclusions
5	9	0–93	Stiff grey-brown clay
		93–112	Brown silty sand
		112–126	Orange-brown sand
		126–130	Dark brown silty sand
		130–146	Light brown silty sand
		146–154	Orange-brown silty sand
		154–168	Light brown silty sand
		168–177	Orange-brown silty sand with light grey silty sand inclusions
		177–179	Orange-brown silty sand
		179–200	Blue-grey silty sand with orange-brown silty sand inclusions
	9.i	0–87	Grey-brown clay
		87–98	Brown silty sandy clay
		98–126	Grey silty sand
		126–135	Light grey silty sand
		135–150	Dark grey silty sand
		150–164	Orangey brown silty sand
		164–176	Not recovered
	10.i	0–66	Stiff grey-brown clay
		66–80	Brown sandy silty clay
		80–125	Grey-brown silty sand with grey clay laminations
		125–133	Orange-brown silty sand
		133–134	Black peat
		134–144	Dark grey clayey silty sand with black peat bands
		144–150	Grey silty sand
		150–166	Light grey-brown silty sand
		166–174	Light brown silty sand
		174–200	Orange-brown silty sand
		200–216	Grey silty sand with orange-brown sand inclusions and occasional black organic banding
		216–226	No recovery
	10	0–60	Stiff grey-brown clay
		60–64	Black peat
		64–67	grey silty sand
		67–105	Light grey-brown silty sand with orange sand inclusions
6	11	0–41	Stiff grey-brown clay
		41–44	Pink-brown clay with peat inclusions
		44–59	Black clayey peat
		59–66	Dark brown peaty, clayey, silt
		66–73	Brown silty sand with organic staining
		73–76	Orange-brown silty sand
		76–102	Light grey silty sand
		102–121	Orange-brown silty sand with bandings of light grey silty sand
		121–127	Grey silty fine sand
		127–156	Brown sandy silt with bands of blue
		156–159	Light grey silty clay with occasional wood fragments
		159–160	Grey silty medium sand
		160–175	Not recovered
	11.i	0–75	Stiff grey-brown clay
		75–85	Orange-brown silty sand
		85–88	Pink-grey clay with orange-brown silty sand inclusions
		88–92	Black silty peat
		92–95	Dark grey silty sand
		95–98	Light grey silty sand
		98–132	Light grey-brown clayey silty sand with orange sand inclusions and occasional grey silty sand laminations and wood fragments
		132–154	Not recovered
	12.i	0–53	Stiff grey-brown clay
		53–70	Brown clayey sandy silt
		70–73	Pink-brown clay

Transect	Core	Depth (cm)	Sediment
		73–77	Black silty peat with monoctyledon plant fragments
		77–80	Dark grey silty sand
		80–98	Light grey silty sand
		98–115	Dark grey-brown silty sand with occasional organic banding
		115–118	Orange-brown sand silt with organic staining
		118–176	Light brown sandy silt
		176–179	Light grey sandy silt
		179–182	Light brown sandy silt
		182–205	Not recovered
	12	0–56	Stiff grey-brown clay
		56–66	Brown clayey silt
		66–78	Pink-brown clay with orange sand and black peat intrusions
		78–118	Orange-brown sand with organic staining
		118–150	Light brown silty sand
		150–161	Brown silty sand
		161–165	Light grey-blue silty sand
		165–166	Black peaty silty sand
		166–188	Brown silty sand
		188–200	Not recovered
7	13	0–63	Stiff grey-brown clay
		63–83	Pinky-brown clay with sand inclusions
		83–105	Dark brown peaty sandy silt
		105–119	Brown silty sand
		119–130	Not recovered
	13.i	0–70	Stiff grey-brown clay
		70–76	Pinky-brown clay with sand inclusions
		76–83	Dark grey peaty, silty fine sand
		83–86	Brown silty fine sand
		86–137	Light brown silty sand
		137–152	Orange-brown silty medium sand with black silty peat inclusions and light brown sandy silt inclusions
		152–156	Light grey sandy silt
		156–169	Orange-brown silty medium sand with black silty peat inclusions and light brown sandy silt inclusions
		169–176	Brown silty fine sand
		176–188	Brown silty fine sand with orange sand inclusions
		188–195	Blue-grey sandy silt
		195–230	Blue-grey sandy silt with blue-grey clay bands
		230–240	Not recovered
	13.ii	0–52	Stiff grey-brown clay
		52–69	Pinky-brown clay with sand inclusions
		69–80	Dark grey silty, medium sand
		80–124	Light brown silty sand
		124–130	No recovery
	14.iii	0–50	Stiff grey-brown clay
		50–58	Pinky-brown clay with sand inclusions
		58–63	Dark brown clayey silty sandy peat
		63–73	Dark grey silty sand with peat inclusions
		73–77	Orange-brown silty sand with organic staining
		77–93	Orange-brown silty sand
		93–120	Orange silty sand with bands of light grey silty sand and black silty peat
		120–135	No recovery
	14.ii	0–55	Stiff grey-brown clay
		55–60	Light grey-brown silty, medium sand with organic staining
		60–66	Orange-brown silty fine sand
		66–103	Light grey-brown silty, fine sand
	14.i	0–65	Stiff grey-brown clay
		65–73	Brown clayey silt
		73–79	Black silty peat
		79–81	Dark brown peaty medium sand
		81–100	Light grey silty fine sand
	14	0–35	Stiff grey-brown clay
		35–67	Pinky-brown clay with sand inclusions
		67–69	Black clayey peat with monocotyledon plant fragments
		69–97	Dark grey silty fine sand
		97–109	Light brown silty sand
		109–122	Blue-grey clayey silty fine sand with orange fine sand inclusions
		122–128	Blue-grey clay with orange sand inclusions and organic staining
		128–147	Blue-grey clayey silty fine sand with orange fine sand inclusions
		147–168	Not recovered
8	15	0–64	Stiff grey-brown clay

Transect	Core	Depth (cm)	Sediment
		64–70	Black silty peat
		70–76	Grey-brown clay with peat inclusions
		76–86	Pinky-brown clay with sand inclusions and small sandstone clasts
		86–92	Orange-brown, silty fine sand with peat bands (c2mm)
		92–95	Orange silty, fine sand
	15.i	0–62	Stiff grey-brown clay
		62–65	Dark brown, black silty peat
		65–83	Dark brown, peaty, fine sandy silt with occasional clay intrusions
		83–95	Orange silty, fine sand
	16.i	0–47	Stiff grey-brown clay
		47–52	Pinky-brown clay with occasional peat inclusions
		52–58	Black fine sandy, peat
		58–74	Brown silty fine sand with organic banding
		74–80	Pinky-brown clay
		80–92	Orange silty, fine sand
	16	0–48	Stiff grey-brown clay
		48–59	Dark brown silty clay with possible peat inclusions
		59–66	Dark brown peaty, fine sandy silt
		66–75	Orange-brown silty, fine sand with organic banding
9	17	0–40	Stiff grey-brown clay
		40–47	Light brown-grey silty fine to medium sand with possible organic bands
		47–53	Light grey silty, fine to medium sand
		53–55	Orange silty, fine sand
	17.i	0–51	Stiff grey-brown clay
		51–71	Grey-brown fine sandy, peaty silt
		71–75	Grey-brown fine sandy, silt
		75–126	Pinky-brown fine sandy, silty, clay with occasional charcoal inclusions
		126–144	Orange silty, fine sand
	18.i	0–75	Stiff grey-brown clay with fine sands
		75–116	Grey-light brown clayey, fine sandy silt
		116–133	Dark brown peaty, fine sandy silt
		133–147	Light grey fine sandy, clayey, silt
		147–150	Dark brown peaty, fine sandy silt
		150–152	Brown sandy silt with organic banding

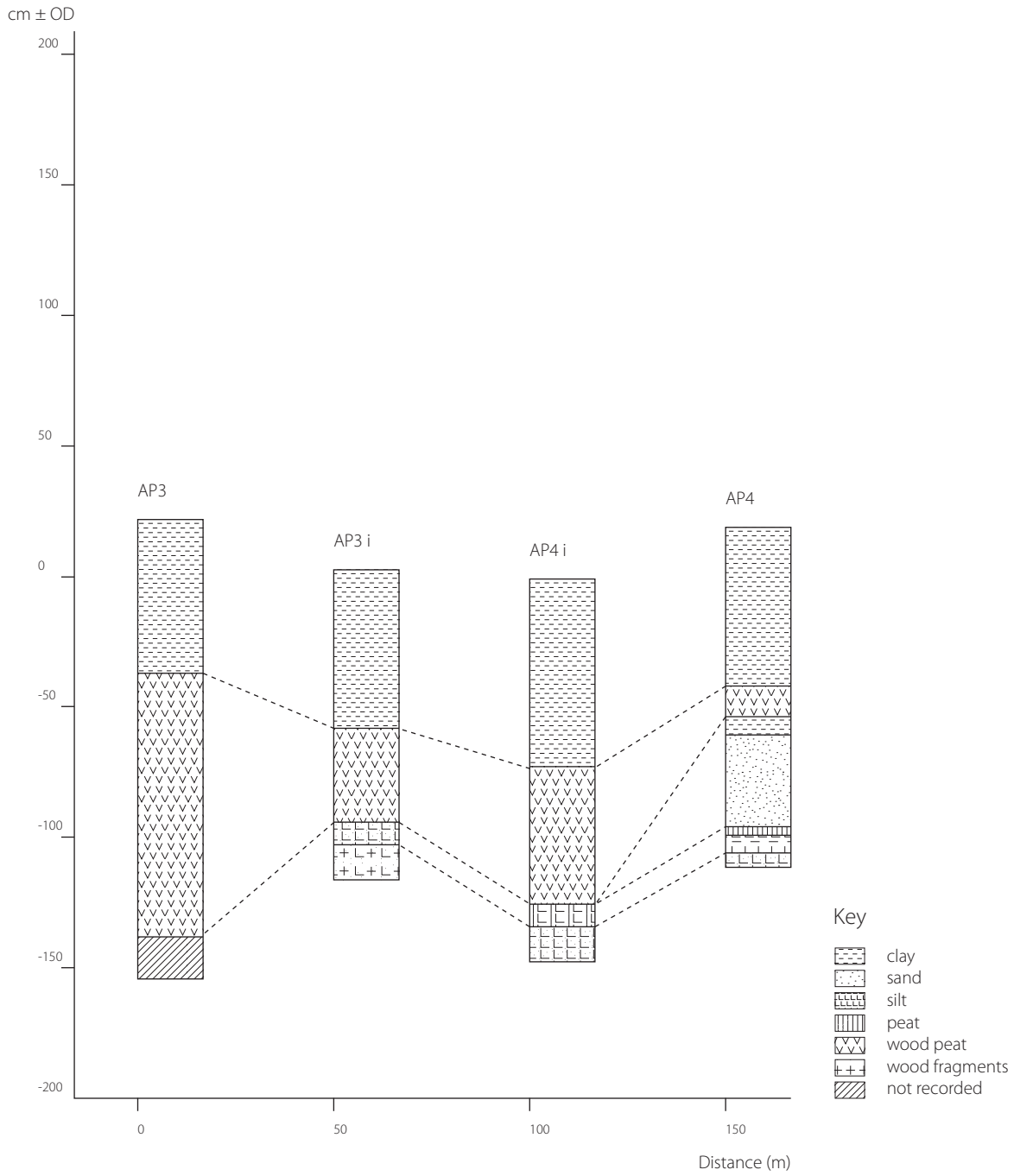
Transect	Core	Depth (cm)	Sediment
		152–154	Orange-brown silty, fine sand
	18	0–51	Stiff grey-brown clay
		51–53	Orange silty fine sand
10	19	0–54	Stiff grey-brown clay
		54–59	Dark brown-black peaty, medium sandy silt
		59–69	Dark grey-dark brown clayey, medium sandy silt
		69–75	Not recovered – too wet, possibly sands
	19.i	0–57	Stiff grey-brown clay
		57–73	Grey-brown sandy silt
	20.i	0–67	Stiff grey-brown clay
		67–80	Grey-brown sandy silt
		80–105	Orange-light brown silty, fine to medium sand
	20	0–71	Stiff grey-brown clay
		71–99	Dark grey-brown clayey, medium sandy silt
		99–105	Dark grey-brown clay with organic inclusions
		105–110	Orange-light brown silty, fine to medium sand with organic bands
		110–126	Orange silty, fine sand
11	21	0–60	Stiff grey-brown clay
		60–135	Pinky-brown clay
		135–221	Black-dark brown wood peat with monocotyledon plant fragments
		221–226	Blue-grey clayey, medium sandy silt
		226–273	Blue-grey medium sandy silt with occasional wood fragments and charcoal
	21.i	0–68	Stiff grey-brown clay
		68–94	Pinky-brown clay
		94–97	Pinky-brown clay with sand laminations
		97–153	Black-dark brown wood peat with monocotyledon plant fragments
		153–163	Black-dark brown clayey, wood peat with monocotyledon plant fragments
		163–177	Grey-brown peaty clay with monocotyledon plant fragments and wood fragments
		177–190	Blue-grey silty clay with wood fragments
		190–200	Blue-grey silty clay

Transect	Core	Depth (cm)	Sediment
		200–254	Blue-grey silty clay with wood fragments
		254–255	Grey silty clay
		255–256	Dark brown peat band
		256–270	Grey-brown silty, medium sandy clay with wood fragments
		270–295	Blue-grey medium sandy, silty clay with laminae
		295–300	Blue-grey medium sandy, clayey silt
	22.i	0–97	Stiff grey-brown clay
		97–117	Black-dark brown wood peat with monocotyledon plant fragments
		117–124	Black-dark brown clayey, wood peat with monocotyledon plant fragments
		124–150	Blue-grey medium sandy silt with occasional wood fragments
		150–162	Wood fragment
		162–290	Blue-grey medium sandy, silty clay with occasional wood fragments
		290–295	Unrecovered – too wet, probably sands
	22	0–97	Stiff grey-brown clay
		97–221	Black-dark brown wood peat with monocotyledon plant fragments
		221–224	Wood fragment
		224–227	Dark brown peaty silt
		227–234	Blue-grey medium sandy silt with occasional wood fragments and charcoal
		234–245	Light blue-grey silty medium to coarse sand with occasional wood fragments
		245–252	Light blue-grey silty medium to coarse sand with occasional wood fragments and sub-rounded pebbles
		252–268	Blue-grey medium sandy, silty clay with occasional wood fragments
		268–273	Blue-grey clayey, medium to coarse sandy silt with clay laminae
		273–275	Grey-dark brown clayey, medium to coarse sandy silt
12	23	0–63	Stiff grey-brown silty clay
		63–166	Black peat with wood fragments and monocotyledon plant fragments
		166–170	Grey sandy silt
	23.i	0–84	Stiff grey-brown silty clay
		84–128	Black clayey peat with wood fragments and monocotyledon plant fragments
		128	Wood layer couldn't penetrate.
	24.i	0–127	Stiff grey-brown silty clay
		127–143	Black peat with wood fragments and monocotyledon plant fragments
		143–160	Brown silty clay
		160–167	Brown peaty silt with fine sand inclusions
		167–170	Light brown silty fine sand
	24	0–70	Stiff grey-brown silty clay
		70–131	Black peat with wood fragments and monocotyledon plant fragments
		131–142	Dark brown peaty silt
		142–147	Brown fine sandy silt
		147–155	Light brown silty fine sand



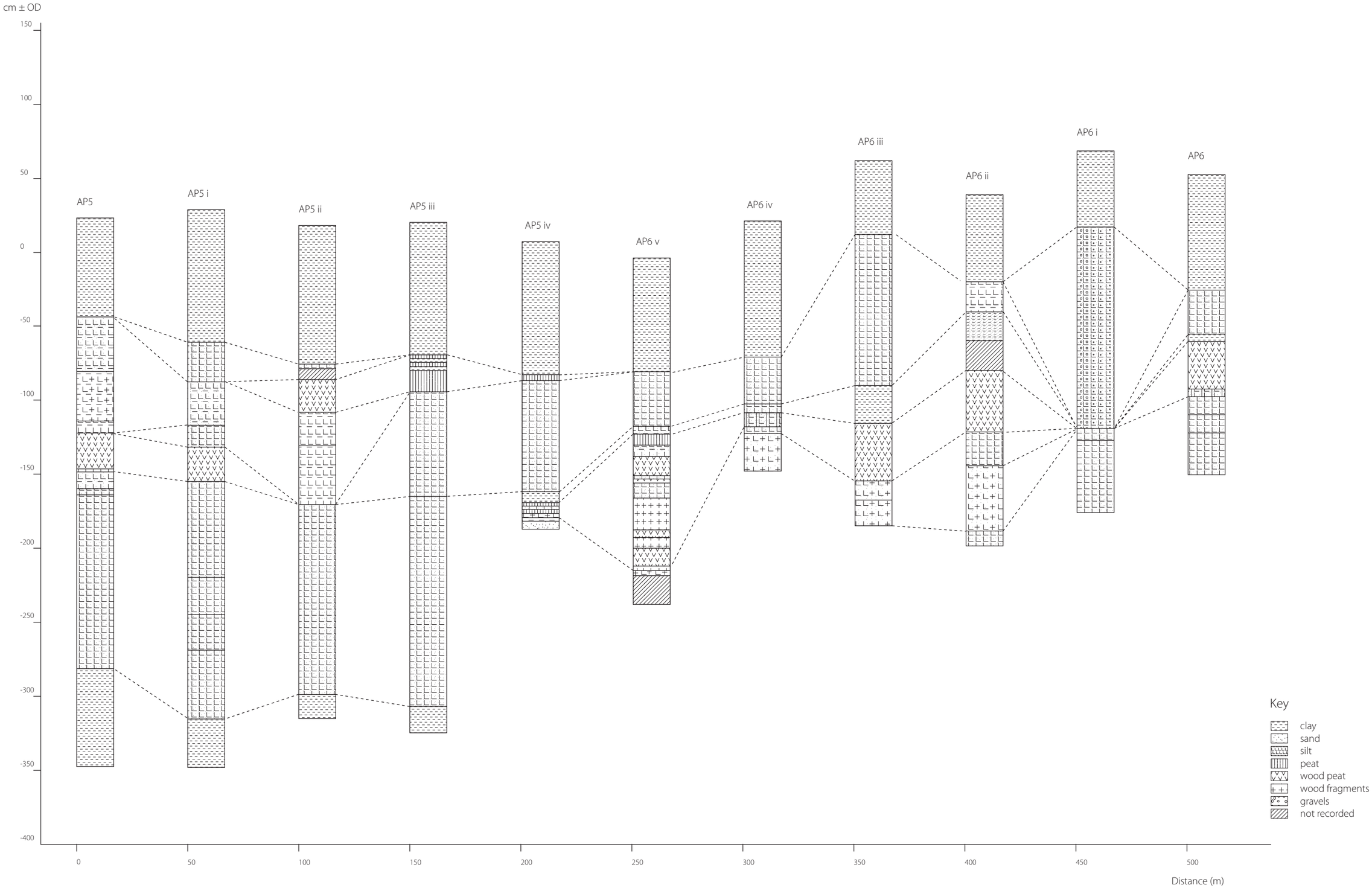
Illus 2

Transect AP1 – AP2

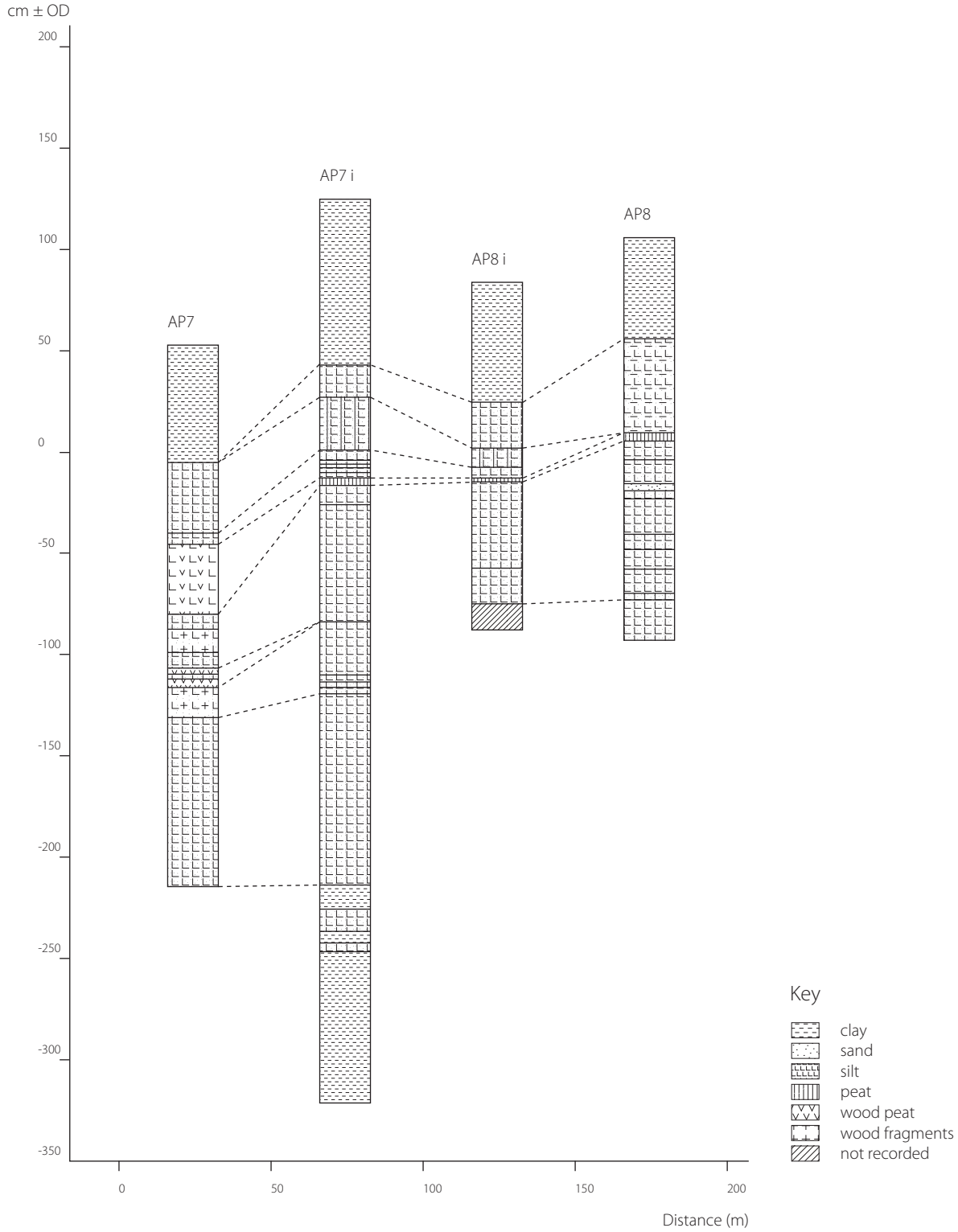


Illus 3

Transect AP3 – AP4

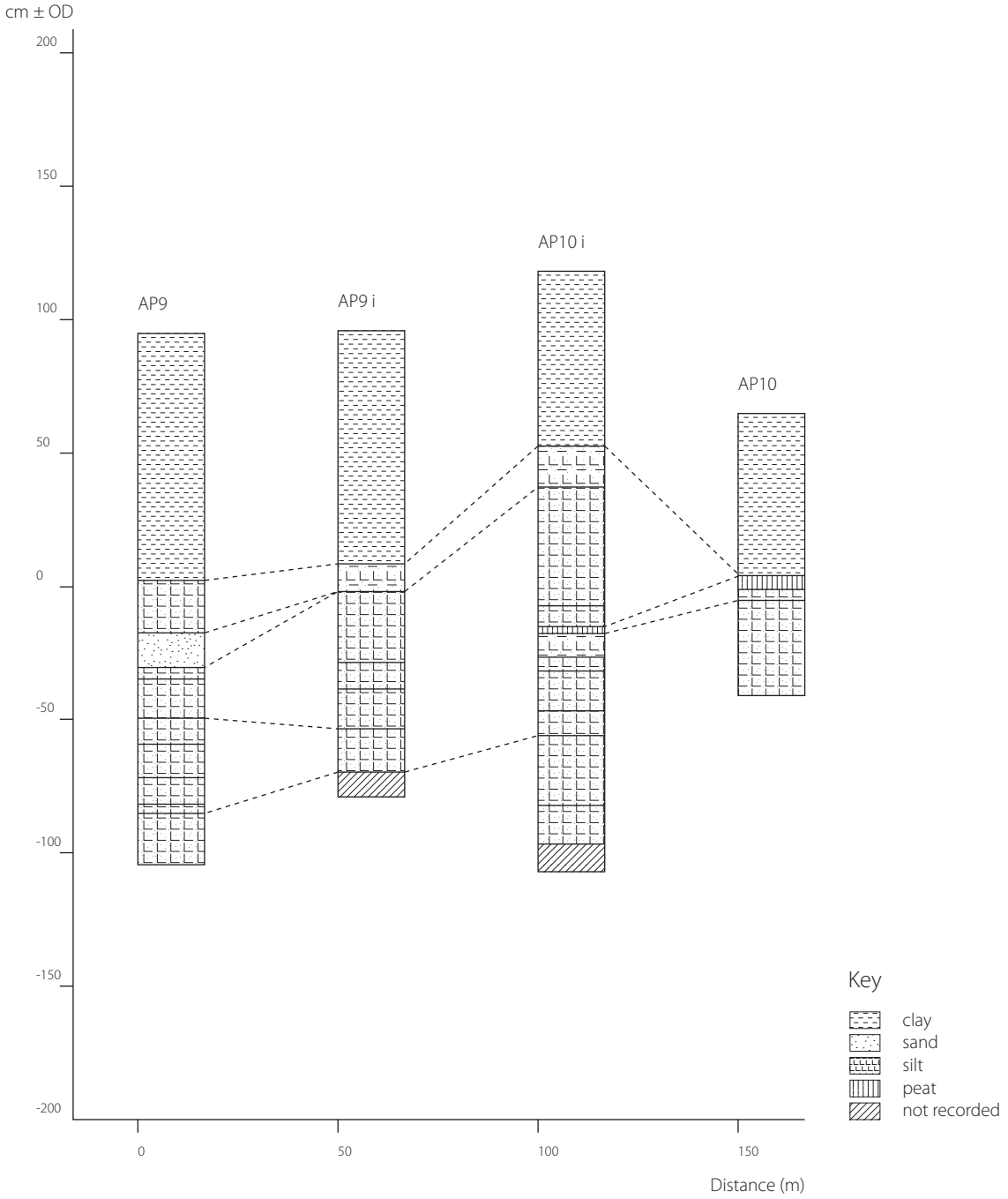


Illus 4
Transect AP5–AP6



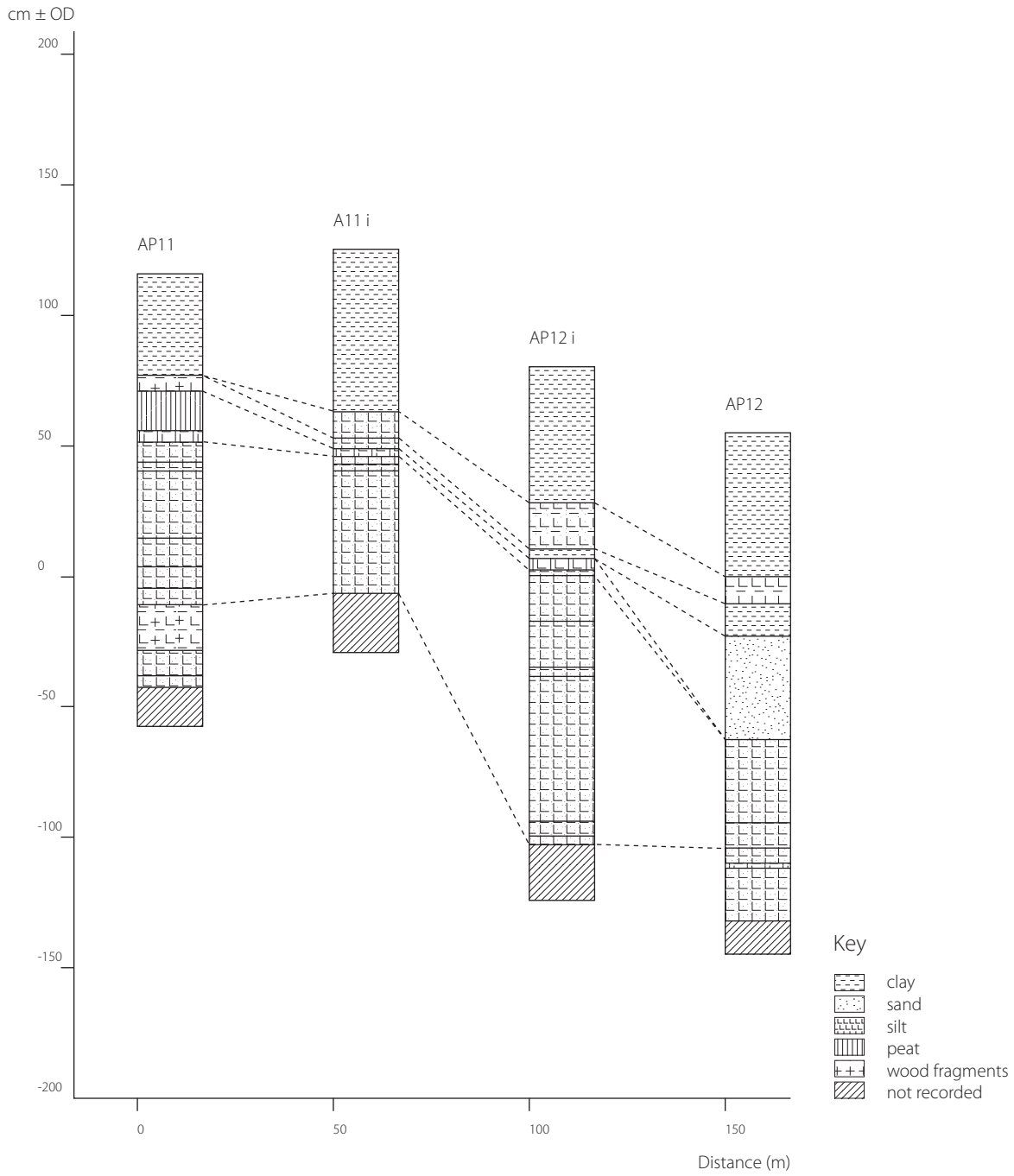
Illus 5

Transect AP7 – AP8



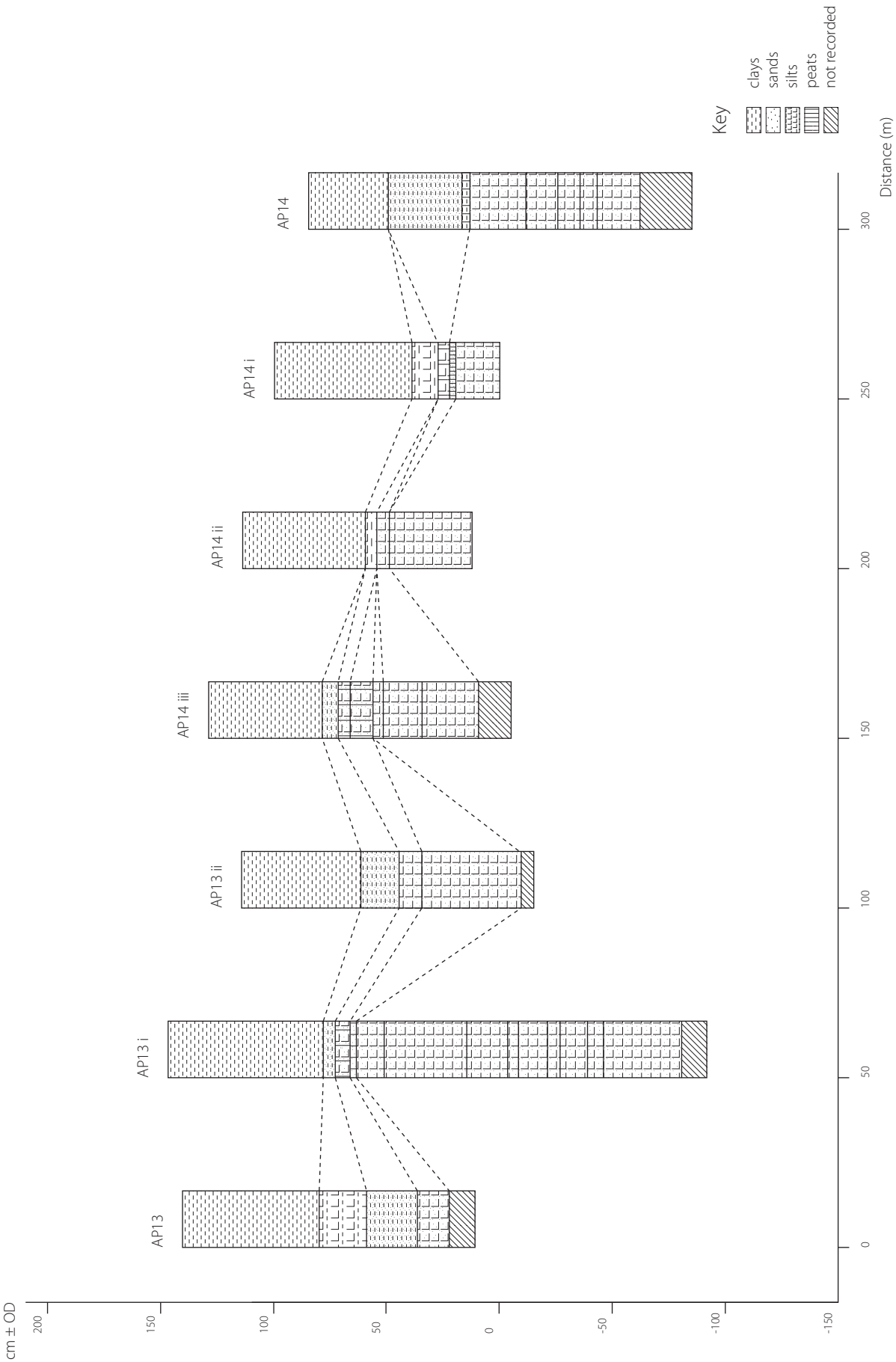
Illus 6

Transect AP9 – AP10

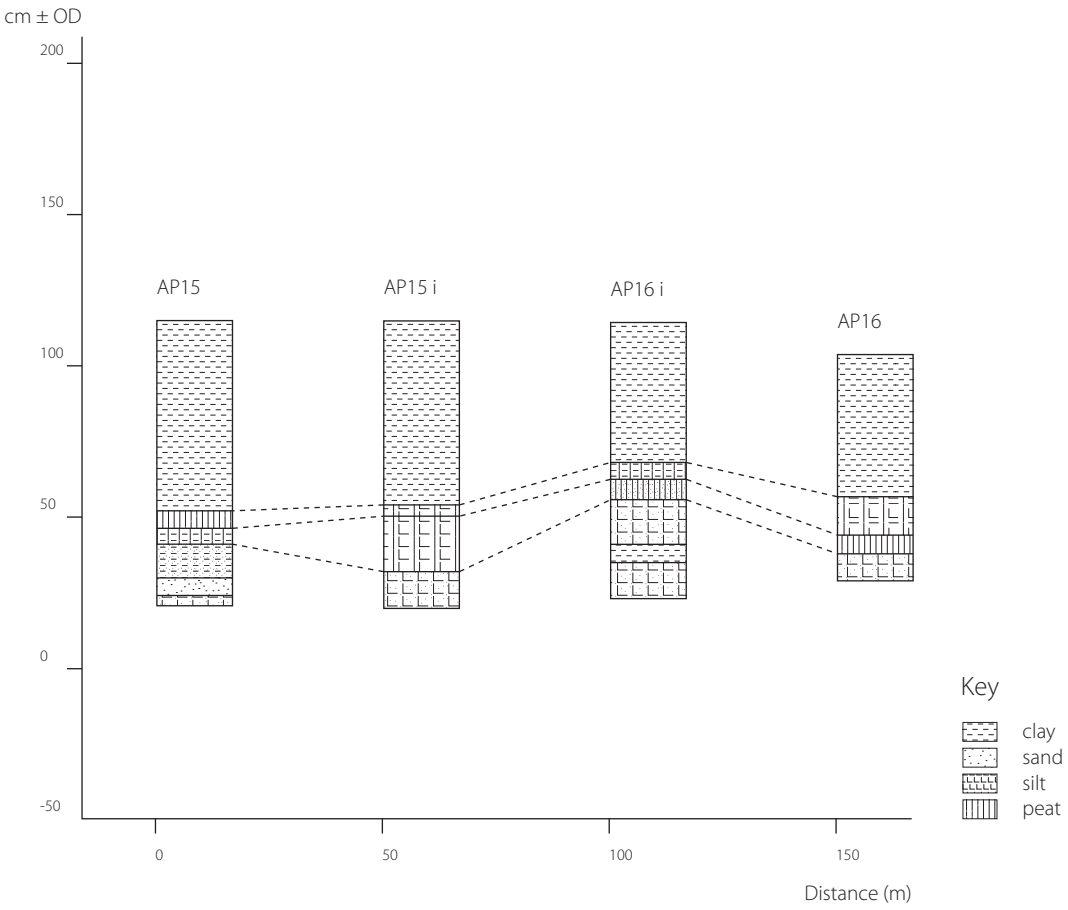


Illus 7

Transect AP11 – AP12

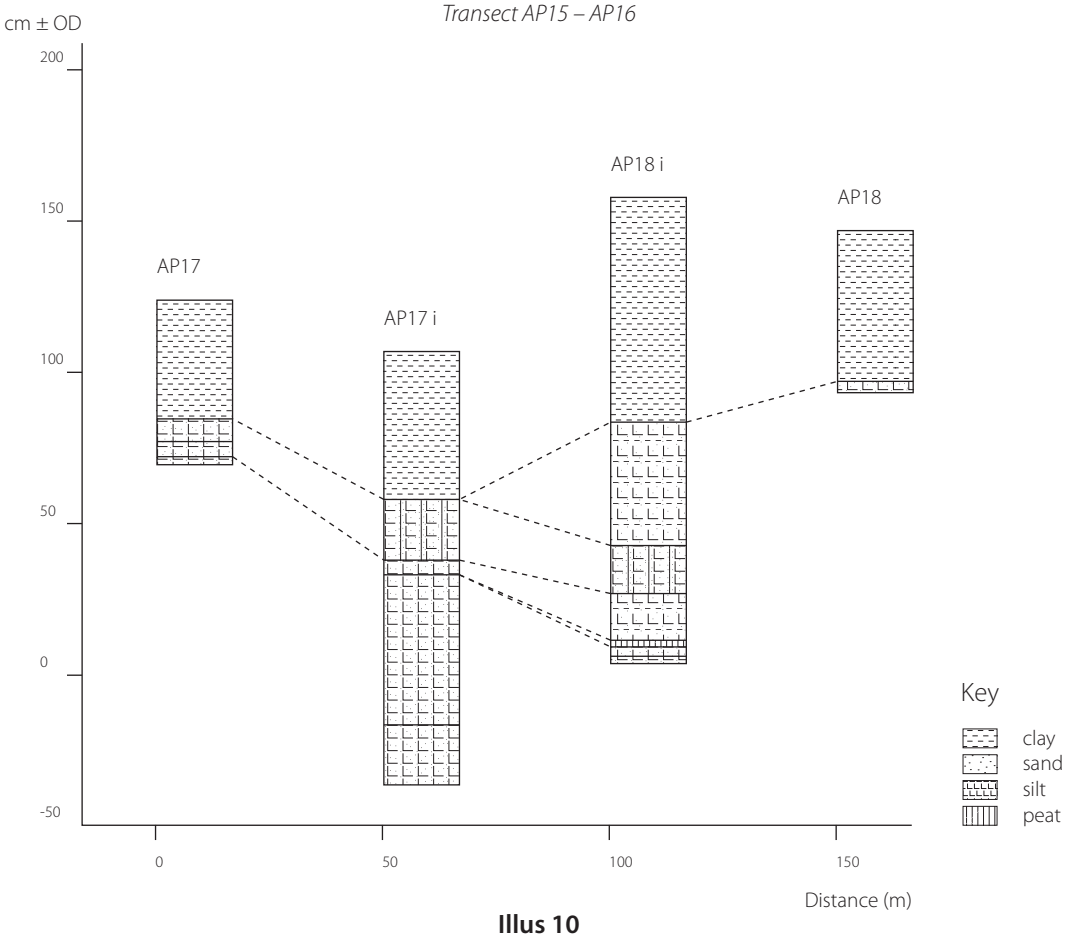


Illus 8
Transect AP13 – AP14



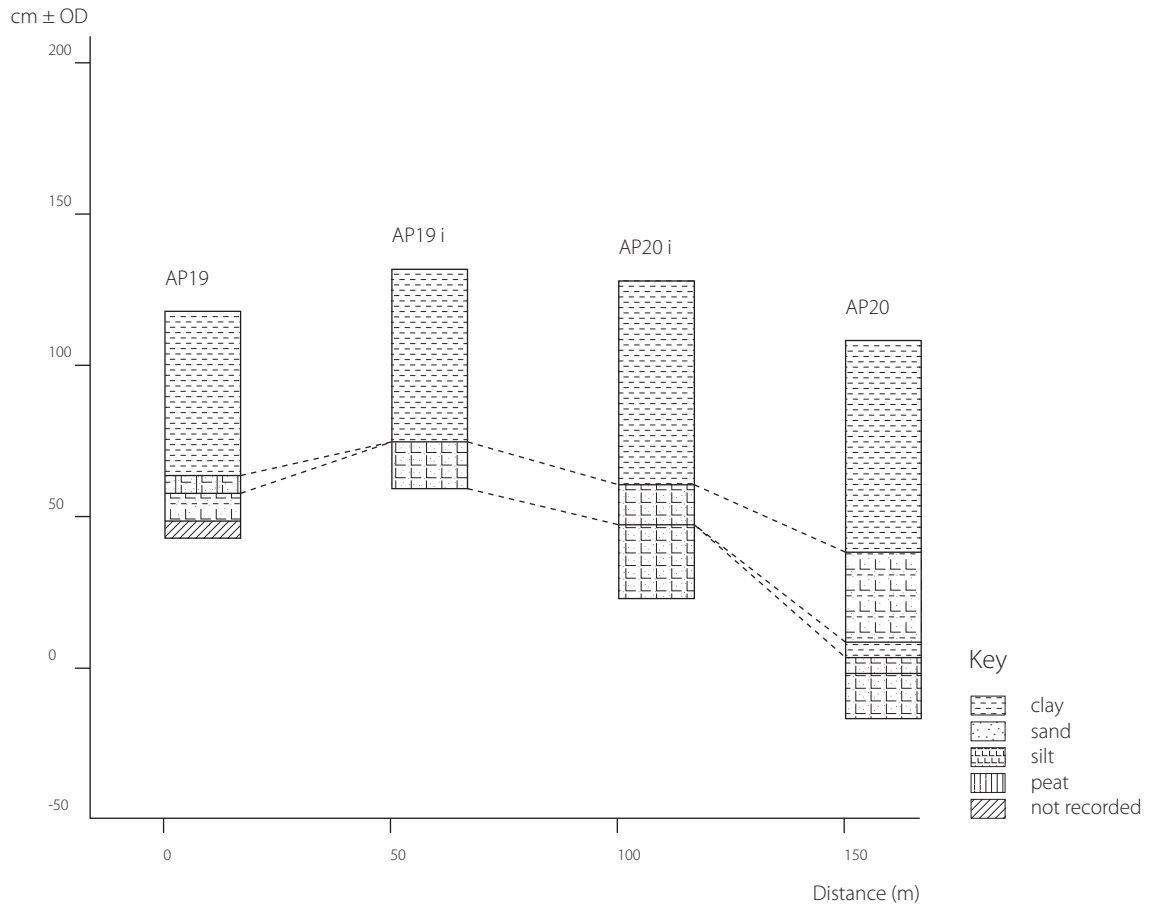
Illus 9

Transcect AP15 – AP16

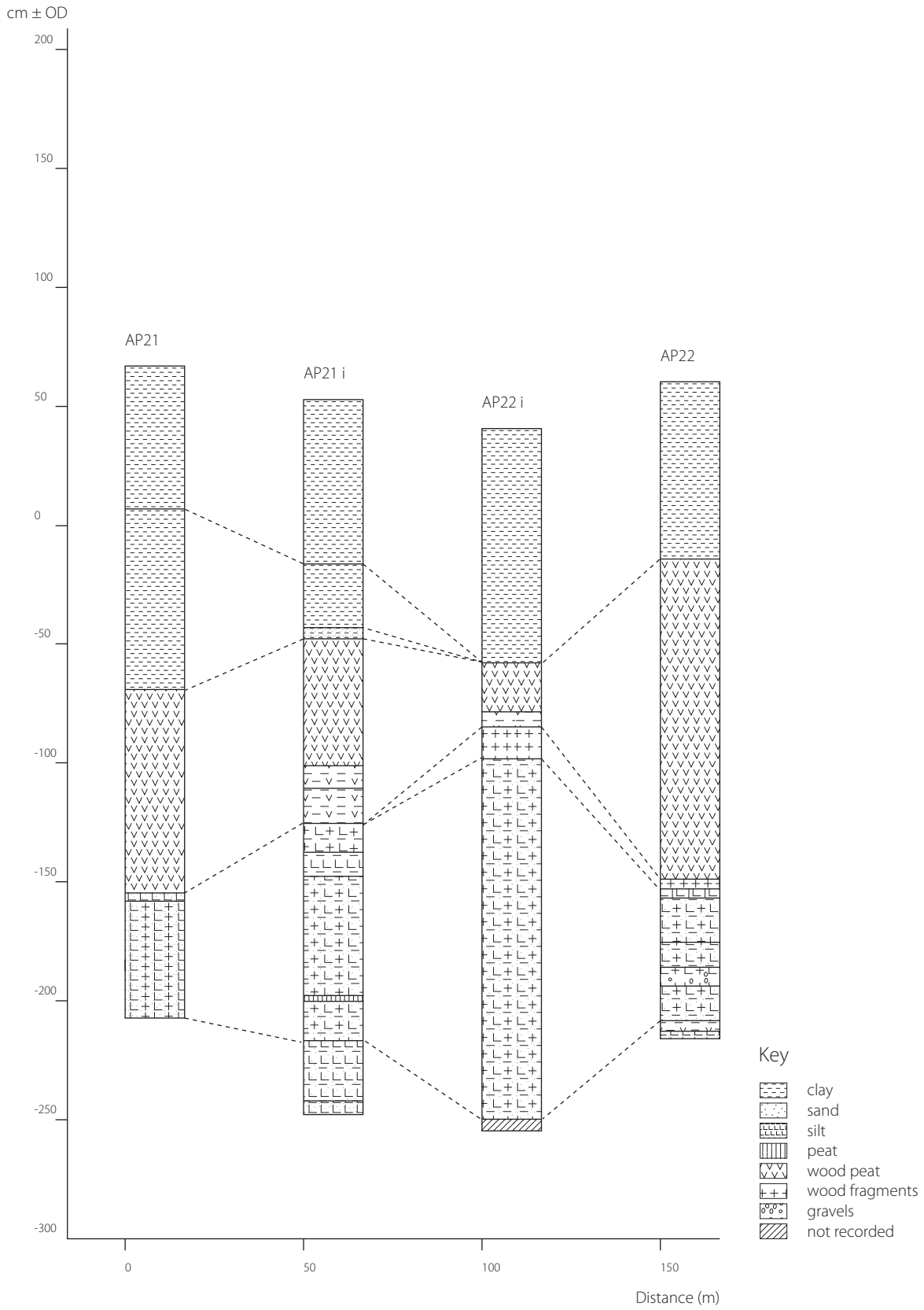


Illus 10

Transect AP17 – AP18

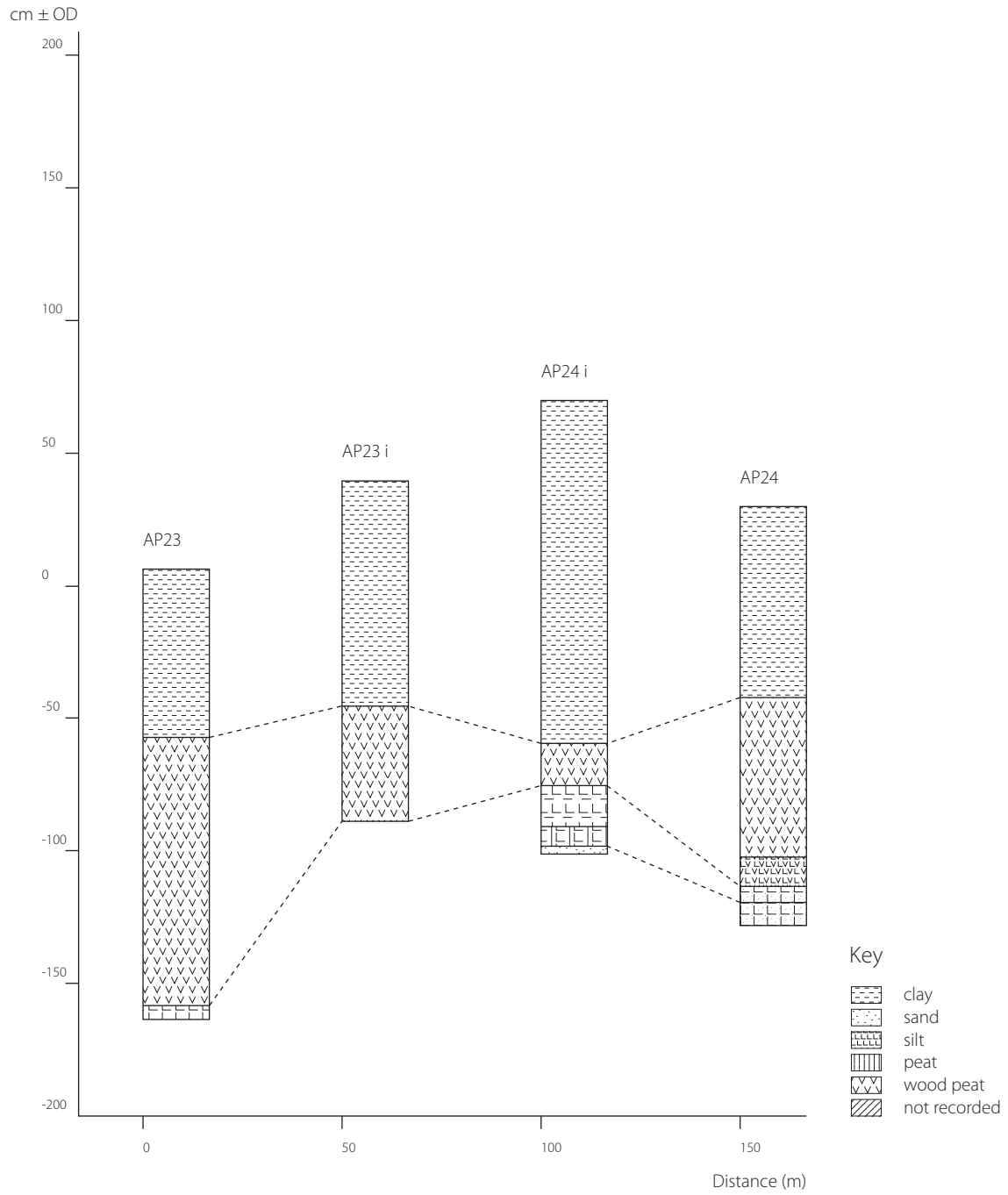


Illus 11
Transect AP19 – AP20



Illus 12

Transect AP21 – AP22



Illus 13

Transect AP23 – AP24

HEADLAND ARCHAEOLOGY (UK) Ltd

N

AMCOTTS CP

GUNNESS CP

KEADBY WITH ALTHORPE CP

Isle of Axholm

Keadby Common

Brumby Common West

T37 T38 T39 T35 T34 T36 T26 T29 T25 T33 T27 T32 T24 T30 T31 T23 T21 T20 T16 T22 T18 T19 T17 T13 T14 T15 T12 T11 T9 T8 T7 T6 T5

AP1 AP2 AP3 AP4 AP5 AP6 AP7 AP8 AP9 AP10 AP11 AP12 AP13 AP14 AP15 AP16 AP17 AP18 AP19 AP20 AP21 AP22 AP23 AP24

illus 2 illus 3 illus 4 illus 5 illus 6 illus 7 illus 8 illus 9 illus 10 illus 11 illus 12 illus 13

412500

410000

480000 482500 485000

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Key

- APPLICATION AREA
- PLANNING APPLICATION BOUNDARY
- SITE TRACK - UPGRADE
- SITE TRACK - NEW
- MET MAST PERMANENT
- TURBINE AND CRANE HARDSTANDING
- CONSTRUCTION COMPOUND
- BRIDGE WORKING AREA & CONSTRUCTION COMPOUND
- SUBSTATION
- BORE HOLE
- TEST PIT
- TEST PIT WITH MADE GROUND (>0.5M)
- AUGER TRANSECT
- AP AUGER POINT

INTERPOLATED PEAT THICKNESS

MAX: 2 M

MIN: 0 M

0 600 m

1:20,000 @ A3

KEADBY WIND FARM

ILLUS 14: CONTOUR PLAN OF INTERPOLATED TOTAL PEAT THICKNESS

HEADLAND ARCHAEOLOGY (UK) Ltd

Key

- APPLICATION AREA
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- CONSTRUCTION COMPOUND
- BRIDGE WORKING AREA & CONSTRUCTION COMPOUND
- SUBSTATION
- BORE HOLE
- TEST PIT
- TEST PIT WITH MADE GROUND (>0.5M)
- AUGER TRANSECT
- AP AUGER POINT

EXPECTED DEPTH OF PEAT IN 1.5M DEEP TRENCH

MAX: 1 M

MIN: 0 M

0 600 m

1:20,000 @ A3

KEADBY WIND FARM

ILLUS 15: CONTOUR PLAN OF EXPECTED DEPTH OF PEAT IN 1.5M DEEP TRIAL TRENCH

412500
410000
480000
482500
485000

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