

Archaeological Evaluation  
and Palaeoenvironmental  
Assessment:  
Treading Wind farm Site  
Sutton St Edmund  
Lincolnshire



**Archaeological  
Evaluation Report**



Novemeber 2010

**Client: Archaeo-Environment on  
behalf of Wind Ventures**

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**Archaeological Evaluation and Palaeoenvironmental Assessment:  
Treading Windfarm Site, Sutton St Edmund, Lincolnshire**

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## Summary

*Between 21st and 23rd September 2010, Oxford Archaeology East were commissioned to carry out an archaeological evaluation and palaeoenvironmental survey across a 2km site east of the village of Sutton St Edmund, on the Cambridgeshire / Lincolnshire border. The investigation consisted of six trenches and hand augered boreholes within the footprint of proposed wind turbines and additional augerholes across the site to map the sediment deposits.*

*Two undated ditches were recorded, one located within the topsoil, high up in the stratigraphic sequence within Trench 4 and the other at over -2.93m OD at the very base of Trench 3.*

*The hand-auger cross section revealed a relatively continuous macro-stratigraphy to the deposits in this locality, with a change from a silt dominated horizon to a clay dominated horizon. This change potentially represents a marine regression from outer to inner/peri-estuarine conditions and would have increased the amount of available land for human settlement/utilisation, such as the recorded marine retreat in the Romano-British period, before a further period of marine transgression.*

*A silt dominated unit identified towards the centre of the site may represent a topographic rise in the landscape, and would have formed a favourable location for human habitation/utilisation.*



## 1 INTRODUCTION

### 1.1 Location and scope of work

- 1.1.1 An archaeological evaluation was conducted at the proposed site of Treading Wind Farm in the parish of Sutton St Edmund, on the Cambridgeshire/Lincolnshire border. The proposed development site is located on arable land, approximately 7.5km north west of Wisbech and 2km to the east of the village of Sutton St Edmund. Two turbines are located within the Fenland District of Cambridgeshire and four within South Holland district of Lincolnshire (Figure 1).
- 1.1.2 This archaeological evaluation was undertaken in accordance with a Written Scheme of Investigation prepared by Niall Hammond of Archaeo-Environment Ltd and discussed and approved by the county archaeologists of Lincolnshire and Cambridgeshire County Councils.
- 1.1.3 The work was designed to assist in defining the character and extent of any archaeological remains within the proposed redevelopment area, in accordance with the guidelines set out in *Planning Policy Statement 5: Planning for the Historic Environment* (Department for Communities and Local Government 2010). The results will enable decisions to be made by Lincolnshire County Council and Cambridgeshire County Council, on behalf of the Local Planning Authority, with regard to the treatment of any archaeological remains found.
- 1.1.4 The site archive is currently held by OA East and will be deposited in Cambridgeshire County Council Stores in due course.

### 1.2 Drift geology

- 1.2.1 The site and adjacent area is underlain by several metres of Holocene (Flandrian) marine alluvium, mapped as tidal flat deposits 1 (BGS sheet 258). These deposits consist of mainly soft, silty clays with numerous root traces which were deposited as part of a salt marsh. These deposits contain a complex network of silt in-filled channels or roddens which are the remnants of tidal creek deposits and are often seen at surface as sinuous ridges. These roddens are marked in definite areas of the site on the geological map, and are clearly seen on various aerial surveys including coverage available through Google Earth (accessed 27.09.2010).
- 1.2.2 The location of this site on a substantial Holocene sediment stack requires a digression into understanding the Holocene evolution of the Fen basin, and relating this to the archaeological potential of the sediment body. In essence, the archaeological potential of such wetland/alluvial sites is opposite to that of 'normal dryland' archaeological sites.
- 1.2.3 In the case of dryland archaeology, the geological deposits are laid down in advance of the Holocene, with human activity occurring on top of them and archaeological remains being either cut into them or located in shallow soil profiles above them. In this sense the geology is chronologically static and does not interact in a stratigraphic sense with the archaeological remains.
- 1.2.4 The situation on wetland sites is the opposite, with episodes of human activity interspersed by burial and erosion of sediments. Therefore, the sediment body (or geology) is stratigraphically, chronologically and spatially interacting with the human

activity. Archaeological remains can be cut into or be buried by the sediment body, in a generally vertically accreting sediment wedge. Preservation of organics is common, in both ecofactual and artefactual materials. As a consequence, wetland zones provide a much richer archaeological and palaeoenvironmental resource than equivalent dryland archaeological sites. As the body is vertically and laterally accreting conventional methods of archaeological prospection are ineffective in such environments, such as aerial photography, fieldwalking and shallow geophysical survey, e.g. gradiometry. Instead, archaeological prospection needs to understand sediment stratigraphy and use this to predictively model the distribution of archaeological resources based on the identification of geomorphological features, such as areas of buried higher topography, palaeochannels and buried land surfaces.

### 1.3 Holocene evolution of the Fenland basin

1.3.1 The evolution of the Holocene (Flandrian) sediment body in the Fens is relatively complex and is composed of three main geomorphic zones, being the dryland (or landward) fringe, the marine (or seaward) zone, and the freshwater riverine zones. Within these different zones and a product of their geomorphology are six Holocene events (French 2003):

- Channel peats
- Limited marine incursion
- Basal peat
- Fen clay marine incursion
- Upper peat
- Upper silt marine incursion

1.3.2 Not all events are represented in every sequence and there is often localised confusion in application of this macro-stratigraphic overview of the Fenland sequence. In particular Wheeler and Waller (1995) have described the problems of terminology in lithological and chronostratigraphic correlation throughout the Fen. This report will give a generalised overview of the Holocene succession derived from French (2003, 134 - 141) and then highlight the problems of terminology discussed by Wheeler and Waller (1995).

1.3.3 Since the end of the Pleistocene, there have been rising sea levels around the British Isles. These rising sea levels have caused more of the seaward fen edge to come under marine influence, with associated impeded drainage over the Fens. This has caused more overbank deposition of sediment through freshwater flooding, and associated marsh formation. All these factors have contributed to a vertically accreting sediment stack.

1.3.4 The Fenland early Holocene dryland environment supported a mixed deciduous woodland dominated by lime. Throughout the first half of the post glacial period sea levels rose, reaching its present height by the first millennium BC. At the deepest levels of the Fen (c. -7 to -9m OD) a eutrophic peat forms, as early as the 6th to 5th millennium BC, in response to rising water levels. The peat is dominated by wood/reed. An example of this early basal peat is recorded by Shennan (1986) at Tydd St Giles at -9.1m OD, with a date of 7690+/- 400 BP.

1.3.5 However, except for the lowest levels of the Fens, the Mesolithic saw dryland vegetation dominate. The end of the Mesolithic witnesses an increasing marine influence, with minor marine incursions and deposition of marine silts. By the 4th millennium BC until the end of the 3rd millennium BC there is the onset of the main

body of peat formation. This is common lithological unit throughout the Fens and is coincident with rising base water levels.

- 1.3.6 Above this peat body is a marine incursion that resulted in the deposition of the Fen Clay or the Barroway Drove Beds. This lithological unit is estimated to have been deposited over a long period dated, starting in the later Neolithic or third millennium BC. Although a basic and commonly referred to unit, the Barroway Drove Beds (or Fen Clay) is not a single unit and has localised variations, making lithostratigraphic correlations between sites difficult.
- 1.3.7 The maximum extent of the Barroway Drove Beds is well established and does not occur above -1.0m OD. The earliest dates for the Fen Clay are c. 4860 cal. BC, with a continuation until. c. 2075 cal BC, with the end date of deposition consistent across the Fens. This Barroway Drove Beds clay represents the marine transgression, of a brackish/salt marsh environment or coastal reed swamp, dissected and drained by tidal creeks.
- 1.3.8 From the Late Neolithic/Early Bronze Age, there is a seaward extension of freshwater conditions, overlapping with the period of Fen Clay deposition, resulting in peat formation. This is the upper peat unit, and is correlated with rising base water levels. It is thought to be the reason that for the abandonment of many archaeological sites, such as Flag Fen. The development of this upper peat is initially associated with alder and willow carr, but with continued rising water levels it is succeeded by Sedge Fen and open water conditions.
- 1.3.9 There is a second marine transgression recorded through the formation of The Upper Barroway Drove Bed, which occurs in the north and north west of the fen. It is dated to the later Bronze Age (late 2nd early 1st millennium BC). This deposit is recorded as a grey silty clay, but is more sticky with more silt. The deposition of this deposit is associated with a tidal creek system.
- 1.3.10 A further phase of marine influence is recorded in the north east of the fens around the Iron Age/1st millennium BC, but in the south there is the deposition of an upper peat unit, above the Barroway Drove Beds. In the southern half of the Fens at the same point is the formation of an upper peat bed, with the development of some meres in the landscape.

## 1.4 The Nomenclature of the Holocene sediments

- 1.4.1 Whilst the broad sequence of events throughout the Holocene is understood, there has been considerable debate over the number, type and date of the main lithologies. The reason for this is multi-faceted and a summary is given below of the main sequences (Table 1), their authors and date of publication, derived from Wheeler and Waller (1995).
- 1.4.2 The most widespread scheme adopted was that of Gallois (1979) and subsequently modified by a number of other workers. There is a problem of terminology within the Fen sediment stratigraphy, caused by variability of local systems, and the effects of correlating stratigraphy based on lithology, when it represent localised depositional environments.
- 1.4.3 The original Gallois system recognised four main lithological members, which has subsequently been sub divided by further researchers. The basal unit is a peat unit, below the Barroway Drove Beds. The Barroway Drove Beds consist of very soft and

wet inter-laminated clays with silts, with occasional animal burrows. The Upper member of the Barroway Drove Beds are considered more silty than the lower member of the Barroway Drove Beds. Within this body of the Barroway Drove beds are several peat deposits, with a lower leaf of the Nordelph peat in the Barroway Drove Beds and a middle Peat. The middle peat sub-divides the lower member of the Barroway Drove Beds.

- 1.4.4 In this system the upper leaf of the Nordelph Peat is stratigraphically above the Barroway Drove Beds (the same as the Upper peat) and causes rooting and rhizomes in the top of the clastic Barroway Drove Beds. The Nordelph peat has a formation dated to c. 4000 – 2000BP. Above the Nordelph Peat are the Terrington Beds, consisting of finely laminated, dull, slightly reddy brown clays and pale brown silts. It includes the present day saltmarsh deposits and similar deposits on reclaimed land. It has probably been deposited since the Romano-British period.
- 1.4.5 Whilst macro-stratigraphic structure across the region is important, it should not be confused with micro-stratigraphic detail of individual sites and boreholes. This preceding discussion of terminology sets a context for the Treading Wind Turbine Site, but does not define its position within the lithological, chronological or stratigraphic development of the Fen basin.

Skertchly (1877)	Godwin and Clifford (1938)	Gallois (1979)	Wyatt (1984); Horton (1989); Horton and Aldiss (1992).
Fen Silt	Upper silt	Terrington Beds	Terrington Beds
Peat	Upper peat	Nordelph Peat	Upper leaf of the Nordelph Peat
	Fen Clay	Barroway Drove Beds	Upper member of the Barroway Drove Beds
Lower leaf of the Nordelph Peat bed			
Lower member of the Barroway Drove Beds			
Middle Peat			
Lower member of the Barroway Drove Bed			
Lower Peat	Lower Peat	Lower Peat	

**Table 1:** The main lithologies of the Holocene sediment stack in the Fen basin (after Wheeler and Waller, 1995).

## 1.5 Solid Geology

- 1.5.1 The drift deposits overlie rocks of the Jurassic Corallian Group which comprise the undifferentiated mudstones of the West Walton Beds and the clays of the Ampthill Clay.

## 1.6 Topography

- 1.6.1 The site is located on largely flat reclaimed fen land with an elevation between approximately -1m and +1m OD. The site is divided by a number of human-made drains, principally the Treading Drain running north-north-east to south-south-west

which feeds into the Lady Nunns old Eau which is aligned north-to-south. Several minor roads surround the site which is crossed by several wide, rough, surfaced farm tracks.

## **1.7 Archaeological and historical background**

- 1.7.1 A search was carried out of both Cambridgeshire and Lincolnshire's Historic Environment Records and the National Monuments Record. Fourteen records/sites are located within the vicinity of the wind farm site, however, the only record located within the development footprint was a post-medieval duck decoy pond (CHER 8422, not illustrated).
- 1.7.2 The majority of the other records/sites are located to the east and south on marginally higher ground. Most of the identified sites (other than post-medieval listed buildings) are sub-surface crop or parch mark features identified from aerial photographs. As such, they are undated but in form they appear to be enclosures of likely late prehistoric or Romano-British date. One sub-surface scatter of Romano-British pottery has been recorded immediately outside of the eastern boundary of the site.
- 1.7.3 Prehistoric activity from the Mesolithic to Bronze Age is known from the wider area, but there are no specific sites close to the proposed development area. During the Roman period, the sea was in gradual retreat, and the newly exposed land provided a valuable area for population expansion. People settled on the drying silts and on the naturally silted creek banks (roddons). The economy not only relied on crop and live stock production, but also recognised that the coastal silt lands provided opportunities for making salt from sea-water. This industry prospered until about AD 250 and there are many Roman settlements and salt-making sites (salterns) known in the area. Approximately 4km to the south of the development site, excavations at Throckenholt Farm, Parson Drove in 1993 provided evidence of extensive Romano-British settlement.
- 1.7.4 The development site lies to the west of the "Roman Bank", a large sea defence, most likely late Anglo-Saxon in date which provided a sea defence from flooding, and was a significant factor in the gradual but more permanent reclamation of the land behind it to the west. Reclamation continued into the 13th and 14th centuries, in part directed by monastic land ownership, as did salt production with excavated examples of medieval salterns known from Parson Drove to the south of the development site and at Tydd St Mary to the north-east.
- 1.7.5 To the north of Gedney Dyke, the land was only reclaimed from the sea after 1660 and it was the 17th century which marked the beginning of substantial land drainage funded by merchant adventurers. These were often designed by Dutch engineers such as Cornelius Vermuyden, who drained 450 acres of saltmarsh at nearby Tydd St Mary, while around 7000 hectares were drained in 1660 between Gedney and Moulton a few kilometres to the north east of the development site. Further drainage improvements have taken place on the site during the 19th and 20th centuries with deep straight drains supplementing the more meandering Lady Nunns Old Eau, and a steam-powered pumping engine was installed to the north-west by the time of the 1st Edition Ordnance Survey map (c.1880s).

## **1.8 Acknowledgements**

- 1.8.1 The authors would like to thank Niall Hammond of Archaeo-Environment Ltd on behalf of Wind Ventures who commissioned and funded the archaeological work. The project was managed by Aileen Connor. Taleyra Fletcher carried out the evaluation and on-site

survey using a Leica GPS and Dr Chris Carey of Oxford Archaeology carried out the hand auger survey and assessment. Dr Carey was assisted by John Diffey.



## 2 AIMS AND METHODOLOGY

### 2.1 Aims

2.1.1 The objectives of the evaluation and hand auger survey were:

- To identify the presence of any sub-surface archaeological or palaeoenvironmental features across site.
- To provide a macro-stratigraphic overview of the site lithology and relate to this to palaeoenvironmental and archaeological potential through the definition of depositional environments and geomorphological features.
- To assist with the design and positioning of the proposed turbines.
- To establish the need for any further detailed investigation and recording within the foot print of the development.

### 2.2 Archaeological Evaluation Methodology

2.2.1 Machine excavation was carried out under constant archaeological supervision with a 360° excavator using a toothless ditching bucket. The site survey was carried out by the author using a Leica 1200 GPS.

2.2.2 Spoil, exposed surfaces and features were scanned with a metal detector. All metal-detected and hand-collected finds were retained for inspection, other than those which were obviously modern. All archaeological features and deposits were recorded using OA East's *pro-forma* sheets. Trench locations, plans and sections were recorded at appropriate scales and colour and monochrome photographs were taken of all relevant features and deposits. Four samples were taken for environmental analysis from the excavation areas, three from layers and one from an undated feature.

2.2.3 In addition to the machine excavation, hand auguring was also conducted at each trench location and at points inter-mediate between the trenches, to form a site cross-section across the site. Samples of the Holocene sediment stack were taken for palaeoenvironmental analysis.

2.2.4 Site conditions were good with little rain.

### 3 RESULTS

Cut numbers will be displayed in **bold** text, all other contexts in normal text. Hand augured holes were undertaken at the location of each of the trenches and numbered accordingly. The results are presented fully in section 4 of the report. The location of all trenches (Tr) and augur holes (AH) is given in Figure 1.

#### 3.1 Trench 1 (AH1)

3.1.1 Trench 1 measured 9.5m in length, 2.0m wide and was oriented east to west (Figure 2). This trench was excavated to a total depth of 2.0m and was sufficiently stepped out on all sides to allow for safe access/egress (Plate 1). This trench contained eight distinct sediment layers (described below) (Figure 3, Section 1). No archaeological features were discovered in this trench.

- Topsoil (101) was a brown grey silty clay. It measured 0.31m in thickness and did not contain any obvious inclusions.
- Below the topsoil was a thick deposit of alluvium (102). This layer was a light grey, silty clay with pockets of silty orange sand. It measured 0.80m in thickness and did not contain any obvious inclusions.
- Below 102 was a deposit of a clayey, mid-greyish brown coloured alluvium with frequent light yellow staining caused by decayed organic material (103). This layer had a maximum thickness of 0.14m and contained no other obvious inclusions. This sealed layer 104.
- Layer 104 was a light bluish grey, soft, silty clay with a maximum thickness of 0.16m. There were no obvious inclusions within this layer. This layer sealed 105.
- Layer 105 was a thin deposit of a rich reddish brown peaty clay. It measured 0.05m in thickness and other than visible evidence of decayed plant remains, there were no other obvious inclusions. A 10 litre sample was taken (sample number 1) which contained organic plant remains (reeds) and a few insect fragments (Appendix A). Beneath this was layer 106.
- Layer 106 was the same as 104; a light bluish grey, soft, silty clay with a maximum thickness of 0.26m. There were no obvious inclusions within this layer. This layer sealed 107.
- Layer 107 was a thin band of crushed shell measuring approximately 0.07m thick. A 10litre sample was taken (sample number 2) which contained ostracods, shell fragments and snails. Beneath this was layer 108.
- Layer 108 was a deep greyish blue, organic-rich deposit of silty clay. It measured 0.20m in thickness to the base of trench and the limit of excavation.

#### 3.2 Trench 2 (AH2)

3.2.1 Trench 2 measured 10m in length, 2.0m wide and was oriented east to west (Figure 2). This trench was excavated to a total depth of 2.40m and was sufficiently stepped out on all sides to allow for safe access/egress. This trench contained six distinct layers (described below) (Figure 3, Section 2; Plate 2). No archaeological features were recorded within this trench.

- Topsoil (201) was a brown grey silty clay Ap. It measured 0.44m in thickness and did not contain any obvious inclusions.

- Below the topsoil was a thin deposit of pale creamy yellow decayed organic material within a firm brown clay (202). This deposit measured 0.09m thick and did not contain any obvious inclusions. Beneath this layer was 203.
- Layer 203 was a thick deposit of alluvium. This layer was a light grey, silty clay deposit with pockets of silty orange sand. It measured 0.46m in thickness and did not contain any obvious inclusions. This layer was above 204.
- Layer 204 was a thick deposit of pale orange sandy silt. This layer had a maximum thickness of 0.70m and contained no other obvious inclusions. This sealed layer 205.
- Layer 205 was a light greyish brown silty clay with a maximum thickness of 0.64m. There were no obvious inclusions within this layer. This layer sealed 206.
- Layer 206 was a light bluish grey, soft, silty clay with a maximum thickness of 0.20m, revealed to the base of the trench. There were no obvious inclusions within this layer.

### 3.3 Trench 3 (AH3)

3.3.1 Trench 3 measured 8.50m in length at the base following collapse at the eastern end, 2.0m wide and was oriented east-to-west (Figure 2). This trench was excavated to a total depth of 1.80m and was sufficiently stepped out on all sides to allow for safe access/egress. This trench contained six distinct layers (described below) (Figure 3, Section 3). A possible undated ditch was recorded in the base of this trench (**308**).

- Topsoil (301) was a brown grey silty clay. It measured 0.38m in thickness and did not contain any obvious inclusions.
- Below the topsoil was a thick deposit of alluvium (302). This layer was a light grey silty clay with pockets of silty orange sand. It measured 0.72m in thickness and did not contain any obvious inclusions. Below this was 303.
- Layer 303 was a thin band of dark grey brown silty clay which contained a number of whole and broken cockle shells. It measured 0.06m in thickness and did not contain any other obvious inclusions. A 10 litre sample was taken (sample number 3) which contained waterlogged seeds of nettle (*Urtica dioica*) (Appendix A). Beneath this was layer 304.
- Layer 304 was a deposit of a light grey silty clay with pockets of silty orange sand. This layer measured 0.24m thick and did not contain any obvious inclusions. This sealed layer 305.
- Layer 305 was a thin band of crushed shell measuring approximately 0.04m thick. Beneath this was layer 306.
- Layer 306 was a light bluish grey, soft, silty clay with a maximum thickness of 0.34m until the base of the trench. There were no obvious inclusions within this layer. The trench was not excavated any further as a possible archaeological feature was recorded at this level.
- Ditch **308** was linear in plan, orientated north-east to south-west, continuing beyond the trench edges. It was excavated in a single slot which revealed moderately sloping edges and a concave base with a maximum width of 0.35m and depth of 0.14m (Figure 2, Section 7). It was filled by 307, a mid brown grey silty clay with no obvious inclusions. No dating evidence or environmental samples could be retrieved due to the depth of the trench and collapse caused by instability of the edges, despite stepping.

### 3.4 Trench 4 (AH4)

3.4.1 Trench 4 measured 10m in length, 2.0m wide and was oriented east-to-west (Figure 2). This trench was excavated to a total depth of 2.40m and was sufficiently stepped out on all sides to allow for safe access/egress. This trench contained seven distinct layers (described below) (Figure 3, Section 4; Plate 3). An undated ditch (**409**) was recorded in this trench. Positioned quite high in this stratigraphic sequence, this ditch was cut into/just below the topsoil (Plate 4).

- Topsoil (401) was a very dark, reddish brown, clayey peat deposit. It measured 0.44m in thickness and did not contain any obvious inclusions.
- Below the topsoil was a thick deposit of alluvium (402). This layer was a light grey, clayey deposit with pockets of silty orange sand. It measured 0.58m in thickness and did not contain any obvious inclusions. Below this was 403.
- Layer 403 was a thick deposit comprising several soft, sandy flood silt layers each slightly different in colour, but all a variant of a light orangey colour with a lens/layer of peat within it. It measured 0.74m in thickness and did not contain any other obvious inclusions. Beneath this was layer 404.
- Layer 404 was a deposit of soft orange silt. This layer measured 0.25m thick and did not contain any obvious inclusions. This sealed layer 405.
- Layer 405 was a light grey silty deposit with no obvious inclusions measuring approximately 0.10m thick. Beneath this was layer 406.
- Layer 406 was a thin deposit of a rich reddish brown peat. It measured 0.03m in thickness and other than visible evidence of decayed plant remains, there were no other obvious inclusions. Beneath this was layer 407
- Layer 407 was a light bluey clayey silt and fine sand. This layer measured 0.30m in thickness and did not contain any obvious inclusions, however this was not the full extent of the deposit as the trench was not excavated any further.
- Ditch **409** was linear in plan, orientated north-west to south-east, continuing beyond the trench edges. It was excavated in a single slot which revealed moderately sloping edges and a concave base with a maximum width of 0.50m and depth of 0.15m (Plate 4). It was filled by 408, a mid brown peaty clay fill with no obvious inclusions. A single 10 litre sample was taken for analysis. This sample contained a single charred grain and two charred plant stems (Appendix A).

### 3.5 Trench 5 (AH5)

3.5.1 Trench 5 measured 9m in length at the base (following some collapse at the western end), 2.0m wide and was oriented east-to-west (Figure 2). This trench was excavated to a total depth of 2.32m and was sufficiently stepped out on all sides to allow for safe access/egress. This trench contained five distinct layers (described below) (Figure 2, Section 5).

- Topsoil (501) was a very brown grey silty clay. It measured 0.44m in thickness and did not contain any obvious inclusions.
- Below the topsoil was a thick deposit of alluvium (502). This layer was a light grey, silty clay with pockets of silty orange sand. It measured 0.88m in thickness and did not contain any obvious inclusions. Below this was 403.

- Layer 503 was a layer of crushed shell measuring approximately 0.18m thick. Beneath this was layer 504.
- Layer 504 was a thick deposit of alluvium. This layer was a light grey silty clay deposit with pockets of silty orange sand. It measured 0.56m in thickness and did not contain any obvious inclusions. Below this was 505.
- Layer 505 was a mid greyish blue, very organic-rich deposit of soft, moist clay. It measured 0.36m in thickness, to the bottom of the trench.

### **3.6 Trench 6 (AH6)**

3.6.1 Trench 6 measured 10m in length, 2.0m wide and was oriented east-to-west (Figure 2). This trench was excavated to a total depth of 2.30m and was sufficiently stepped out on all sides to allow for safe access/egress. This trench contained five distinct layers (described below) (Figure 2, Section 6 and plate 5).

- Topsoil (601) was a brown grey silty clay Ap. It measured 0.48m in thickness and did not contain any obvious inclusions.
- Below the topsoil was a thick deposit of alluvium (602). This layer was a light grey silty clay with pockets of silty orange sand. It measured 1.02m in thickness and did not contain any obvious inclusions. Below this was 603.
- Layer 603 was a layer of dark grey brown silty clay which contained a number of whole and broken cockle shells. It measured 0.18m in thickness and did not contain any other obvious inclusions. Below this was 604.
- Layer 604 was a thick deposit of alluvium. This layer was a light grey silty clay deposit, measuring 0.55m in thickness and did not contain any obvious inclusions. Below this was 605.
- Layer 605 was a mid greyish blue, very organic-rich deposit of soft, moist clay. It measured 0.08m in thickness, however this was not the full extent of the deposit as the trench was not excavated any further.

### **3.7 Hand augured cross section, Figure 4 (Plate 6)**

- 3.7.1 The hand auger cross-section describes a tripartite sediment system within the development area (Figure 4). The upper sediment body represents a ploughzone, with an Ap horizon c.0.3m deep across the site. Beneath this is a second clay dominated horizon, composed of a number of different silty clay units. This varies in depth between 0.5 – 5m. This unit is deepest at the west and east of the site, but becomes notably shallower in the middle of the transect.
- 3.7.2 Beneath this clay dominated horizon is a silt dominated horizon, again formed by several different units. This rises significantly in the centre of the transect (site) around trench 4. This unit was not bottomed by hand auger.
- 3.7.3 This basic stratigraphy was seen across the site, with the one exception of a sand/silt dominated area in the centre of the transect around trench 4. This unit is distinct in colour and has a higher sand content than the silt unit beneath it. It potentially represents a silt/sand filled palaeochannel within the clay dominated horizon.
- 3.7.4 The hand auguring other than revealing this macro-stratigraphic overview realised frequent organic remains in the silty clay dominated horizon. Localised variation was consistently recorded in the silt and clay dominated units, with often thin laminations occurring in larger sediment bodies. All of the trenches were excavated through the

ploughzone, into the clay dominated sediments and most of the trenches encountered the underlying silt dominated horizon. Of key importance to understanding the site is the nature and date of the different sediment bodies and understanding the depositional environments they represent.

### **3.8 Finds Summary**

3.8.1 No finds were recovered during the evaluation.

### **3.9 Environmental Summary**

3.9.1 Four bulk samples were taken for environmental analysis; three were from layers and one from an undated ditch in Trench 4. The results are presented in Appendix A.



## 4 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

### 4.1 Discussion and Conclusions

- 4.1.1 The results of the trenching did not reveal any substantial archaeological remains, although two distinct linear features were investigated they, however, remain undated. The level at which the features were encountered is significant. Ditch **409** was located very high in the stratigraphic sequence of trench 4 and is likely to be post-medieval in date. In order to date ditch **308**, either further investigation is required or further analysis to include dating of the peat layer encountered across the site which would at least provide an “earlier than” date.
- 4.1.2 The British Geological Survey describe the drift geology as Tidal Flat deposits 1 (BGS sheet 258), not differentiating between the Barroway Drove Beds and the Terrington Beds. If the clay dominated horizon is a member of the Barroway Drove Beds, then deposition of the silty clay sediment units would date from the later Neolithic onwards, within a marine or peri-marine environment. The height of the silty clay deposit is potentially too high for the top of the Barroway Drove Beds at c. 0 - 1m OD, so there is the possibility it represents a member of the Terrington Beds.
- 4.1.3 The dating of the formation of the clay and the silt dominated horizons is key in ascertaining the archaeological potential of the site. The cross-section reveals a relatively continuous macro-stratigraphy to the deposits in this locality, with the change from a silt dominated horizon to a clay dominated horizon.
- 4.1.4 The reason for this sediment change is unclear, but it represents a change in deposition environment from a mid energy system depositing the silts, to a lower energy system depositing the clays. The change between the two units potentially represents a marine regression from outer to inner/peri-estuarine conditions. This would have increased the amount of available land for human settlement/utilisation, such as the recorded marine retreat in the Romano-British period, before a further period of marine transgression. The dating of the peat layer in trench 1 (context 105) will allow a proxy date to be gained for deposition of this upper sediment body.
- 4.1.5 Although the dating of these sediment units is a key issue, the landscape at the depth of impact is clearly one where there is some level of human activity. Of the two cut features linear [409] is clearly an anthropogenic ditch (interpreted through morphology) and shows some utilisation of this landscape. However, this could represent land use post dating the reclamation.
- 4.1.6 The second key issue is the silt dominated unit in the middle of the site, as represented by trench 4 and in the hand auger transect (the yellow dominated sediment block, Figure 4). This area of the site is notably different and it potentially represents a topographic rise in the landscape, toward the centre of the site.
- 4.1.7 If this is a topographic rise in the landscape, caused by variation in the underlying solid geology mudstone, this will have formed a favourable location for human habitation/utilisation, due to it standing above the localised wetland. Such locations often have rich archaeological records, such as low altitude terraces next to extant floodplain. The BGS sheet (superficial geology 158) adds evidence to this hypothesis, with trench 4 sat approximately equidistant between two channels, one to the east and one to the west.
- 4.1.8 Whilst the dating of the macro-sediment stratigraphy is a key aim in defining the archaeological potential of the site, the potential for archaeological remains within the

footprint of the turbine locations, to the depth of impact, is low, based on the evaluation results. The archaeological features that were detected are undated and of these [409] could represent a ditch that post-dates reclamation. However, further work should be undertaken on understanding the depositional environment and dating the sequence. In particular the Romano-British deposits, previously identified as a sub-surface scatter of pottery recorded on the eastern boundary of the site, should be correlated with sediment stratigraphy on the site on the basis of altitude and lithology. This will further help define the archaeological potential of the site.

- 4.1.9 Overall the site displayed a good to moderate preservation of macro-ecofactual materials such as wood, shell, *etc.* It is interpreted, based on the field inspection, that the quality of preservation will be high enough within the peat and clay dominated units to undertake palaeoenvironmental analysis such as diatom, pollen and ostracod counts.

## 4.2 Recommendations, by Dr Chris Carey, Oxford Archaeology South

- 4.2.1 The following recommendations are given for the assessment of sediment sequence at Treading Windfarm:

- a) Dating the clayey peat layer in Trench 1 (context 105).
- b) Some limited assessment of diatoms, ostracods and foraminifera to determine the depositional environment of the clay dominated horizon sampled through the gouge auger.
- c) Some initial characterisation of the mollusc samples as a further environmental proxy.
- d) Integration of the site sediment stratigraphy with the previous work undertaken at Tydd St Giles (Shennan 1986) and correlation of the sediment stratigraphy with the pottery scatter on the eastern boundary of the site.
- f) If further work is required on sequencing the sediment stratigraphy electrical resistivity survey can be used to provide electro-conductivity cross sections, which can be integrated with previous phases of the borehole data.



## APPENDIX A: ENVIRONMENTAL REMAINS

By Rachel Fosberry

### A.1 Introduction and Methods

- A.1.1 Four bulk samples were taken from features within the evaluated areas of the site in order to assess the quality of preservation of plant remains and their potential to provide useful data as part of any further archaeological investigations.
- A.1.2 Ten litres of each sample were processed by tank flotation for the recovery of charred plant remains, dating evidence and any other artefactual evidence that might be present. The flot was collected in a 0.3mm nylon mesh and the residue was washed through a 0.5mm sieve. Both flot and residue were allowed to air dry. The dried residue was passed through 5mm and 2mm sieves and a magnet was dragged through each resulting fraction prior to sorting for artefacts. Any artefacts present were noted and reintegrated with the hand-excavated finds. The flot was examined under a binocular microscope at x16 magnification and the presence of any plant remains or other artefacts are noted on Table A1. Identification of plant remains is with reference to the Digital Seed Atlas of the Netherlands (Cappers *et al* 2006) and the authors' own reference collection.

### A.2 Quantification

- A.2.1 For the purpose of this initial assessment, items such as seeds, cereal grains and small animal bones have been scanned and recorded qualitatively according to the following categories  
 # = 1-10, ## = 11-50, ### = 51+ specimens
- A.2.2 Items that cannot be easily quantified such as charcoal, magnetic residues and fragmented bone have been scored for abundance  
 + = rare, ++ = moderate, +++ = abundant

### A.3 Results

The results are recorded on Table A1.

Sample No.	Context No.	Feature Type	Flot Contents
1	105	Layer	Peat – organic plant remains (reeds), few insect fragments
2	107	Layer	Organic plant remains (reeds), ostracods, shell fragments, snails
3	303	Layer	Organic plant remains (roots and reeds), ostracodes, duckweed seeds, nettle seeds, egg cases, charcoal
4	408	Ditch	Single charred grain, charred stems, duckweed seeds, charcoal

Table A1. Results

Preservation is predominantly by waterlogging although Samples 3 and 4 contained charred plant remains in the form of charcoal and, in Sample 4, ditch fill 408, a single

charred grain and two charred plant stems. Waterlogged seeds of nettle (*Urtica dioica*) are present in Sample 3 (layer 303).

Ostracods occur in samples 2 (layer 107) and 3. Duckweed (*Lemna* sp.) seeds are present in Samples 3 and 4.

#### **A.4 Discussion**

A.4.1 The samples from the Fenland Wetland Site have produced a limited assemblage of plant remains, predominantly peat and organic plant remains such as reeds and nettle seeds. Ostracods are small bivalve crustaceans that inhabit the bottom of aquatic habitats such as lakes, ponds and streams. Duckweed only produces seeds when the habitat in which it is growing dries out, which could suggest seasonal wet conditions in these features.

#### **A.5 Further Work and Methods Statement**

A.5.1 No further work on this assemblage is required. If further work is planned in this area, environmental sampling should still be considered as these results show that there is potential for the recovery of plant macrofossils.

## APPENDIX B. BIBLIOGRAPHY

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## APPENDIX C. OASIS REPORT FORM

All fields are required unless they are not applicable.

### Project Details

OASIS Number	oxfordar3-83186		
Project Name	Archaeological Evaluation and Paleo-Environmental Survey : Treading Wind Farm Site, Sutton St Edmunds, Lincolnshire		
Project Dates (fieldwork) Start	21-09-2010	Finish	23-09-2010
Previous Work (by OA East)	No	Future Work	No

### Project Reference Codes

Site Code	XLITWF10	Planning App. No.	n/a
HER No.	n/a	Related HER/OASIS No.	n/a

### Type of Project/Techniques Used

Prompt	Planning condition
Development Type	Wind Farm

### Please select all techniques used:

<input type="checkbox"/> Aerial Photography - interpretation	<input type="checkbox"/> Grab-Sampling	<input type="checkbox"/> Remote Operated Vehicle Survey
<input type="checkbox"/> Aerial Photography - new	<input type="checkbox"/> Gravity-Core	<input type="checkbox"/> Sample Trenches
<input type="checkbox"/> Annotated Sketch	<input type="checkbox"/> Laser Scanning	<input type="checkbox"/> Survey/Recording Of Fabric/Structure
<input checked="" type="checkbox"/> Augering	<input type="checkbox"/> Measured Survey	<input checked="" type="checkbox"/> Targeted Trenches
<input type="checkbox"/> Dendrochronological Survey	<input type="checkbox"/> Metal Detectors	<input type="checkbox"/> Test Pits
<input type="checkbox"/> Documentary Search	<input type="checkbox"/> Phosphate Survey	<input type="checkbox"/> Topographic Survey
<input checked="" type="checkbox"/> Environmental Sampling	<input type="checkbox"/> Photogrammetric Survey	<input type="checkbox"/> Vibro-core
<input type="checkbox"/> Fieldwalking	<input type="checkbox"/> Photographic Survey	<input type="checkbox"/> Visual Inspection (Initial Site Visit)
<input type="checkbox"/> Geophysical Survey	<input type="checkbox"/> Rectified Photography	

### Monument Types/Significant Finds & Their Periods

List feature types using the [NMR Monument Type Thesaurus](#) and significant finds using the [MDA Object type Thesaurus](#) together with their respective periods. If no features/finds were found, please state "none".

Monument	Period	Object	Period
ditch	Uncertain	none	None
	Select period...		Select period...
	Select period...		Select period...

### Project Location

County	Lincolnshire	Site Address (including postcode if possible)	
District	South Holland	Site located south of Broad Drive, Tydd St Giles Lincolnshire, PE13 5NU	
Parish	Sutton St Edmund		
HER	Lincolnshire		
Study Area	58.5 ha	National Grid Reference	TF 389 130

## Project Originators

Organisation	OA EAST
Project Brief Originator	in discussion with Cambs CC and Lincolnshire CC
Project Design Originator	Niall Hammond, Archaeo-Environment
Project Manager	Aileen Connor
Supervisor	Taleyna Fletcher

## Project Archives

Physical Archive	Digital Archive	Paper Archive
CCC Stores	OA East Offices, Bar Hill	CCC Stores
XLITWF10	XLITWF10	XLITWF10

## Archive Contents/Media

	Physical Contents	Digital Contents	Paper Contents
Animal Bones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ceramics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Environmental	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Glass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Human Bones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Industrial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Digital Media	Paper Media
<input type="checkbox"/> Database	<input type="checkbox"/> Aerial Photos
<input type="checkbox"/> GIS	<input checked="" type="checkbox"/> Context Sheet
<input type="checkbox"/> Geophysics	<input checked="" type="checkbox"/> Correspondence
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<input checked="" type="checkbox"/> Illustrations	<input checked="" type="checkbox"/> Drawing
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<input checked="" type="checkbox"/> Survey	<input checked="" type="checkbox"/> Matrices
<input checked="" type="checkbox"/> Text	<input type="checkbox"/> Microfilm
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	<input checked="" type="checkbox"/> Research/Notes
	<input checked="" type="checkbox"/> Photos
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	<input checked="" type="checkbox"/> Report
	<input checked="" type="checkbox"/> Sections
	<input checked="" type="checkbox"/> Survey

### Notes:









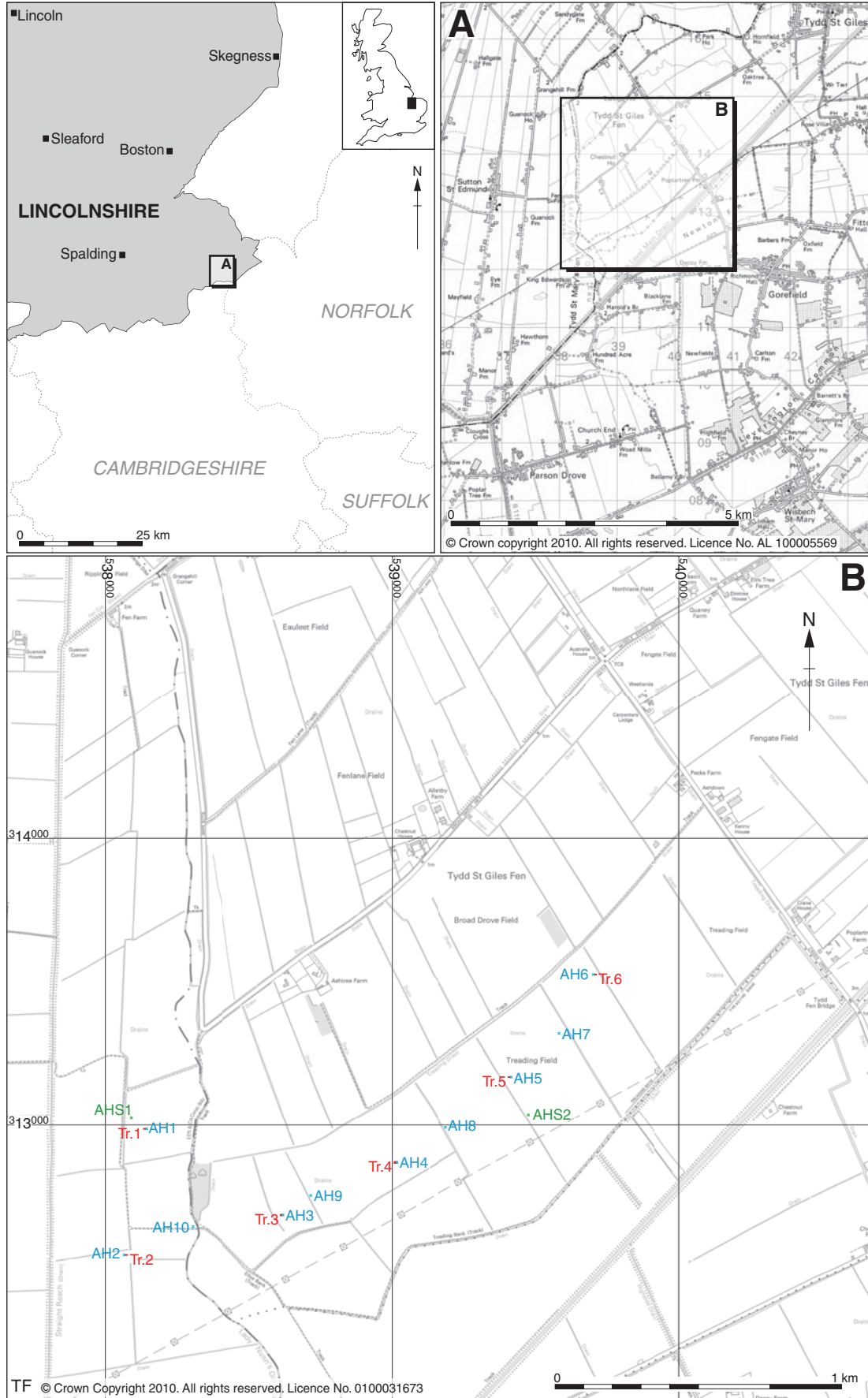


Figure 1: Location of site with trenches (red), auger holes (blue) and sampled auger holes (green)



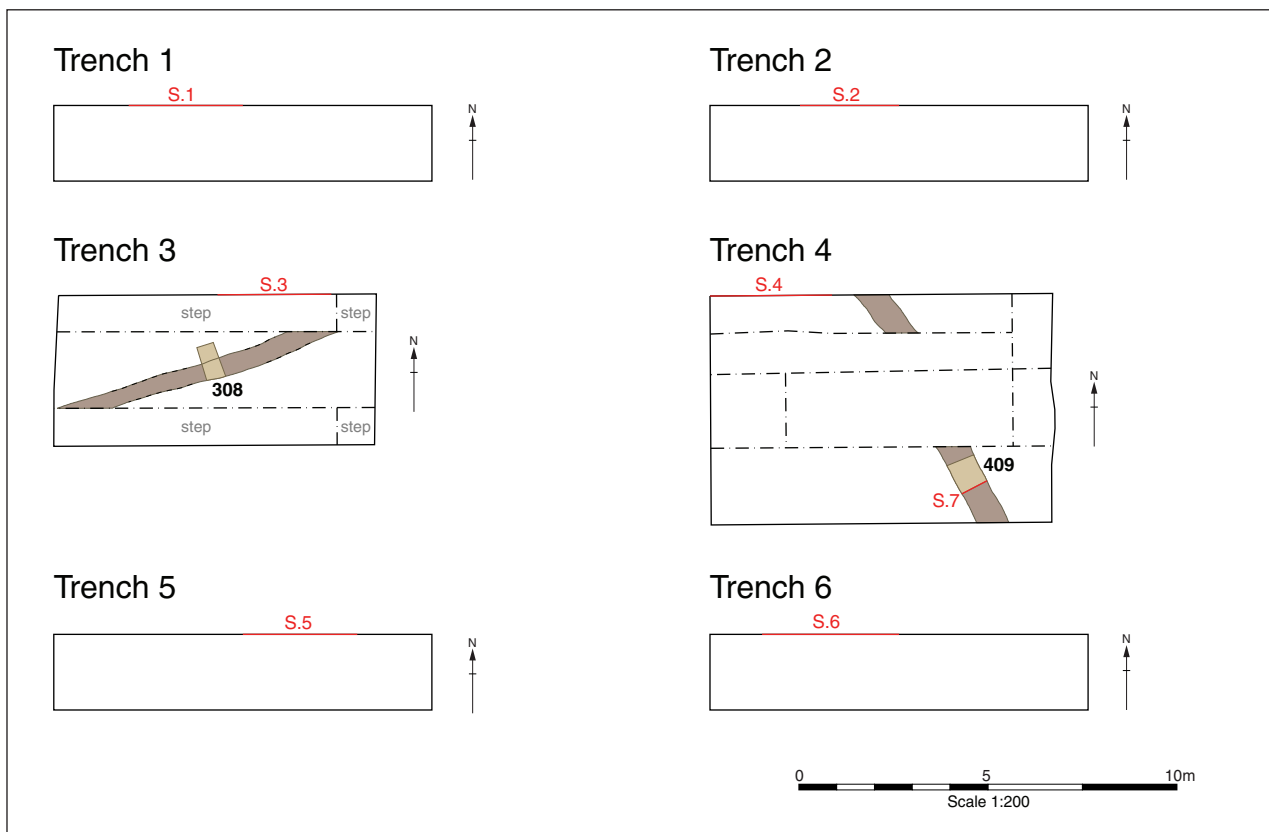


Figure 2: Trench plans



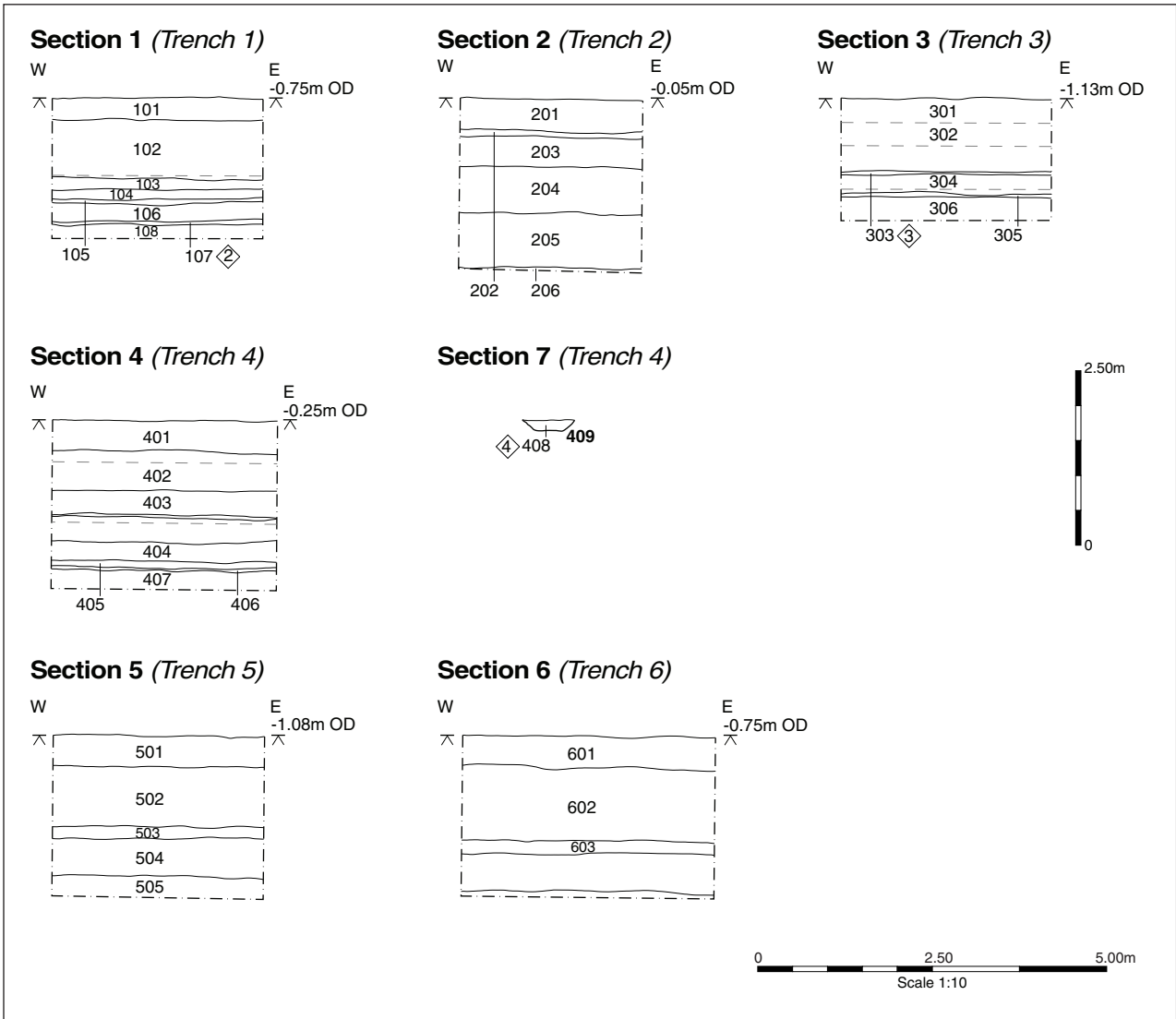


Figure 3: Section drawings



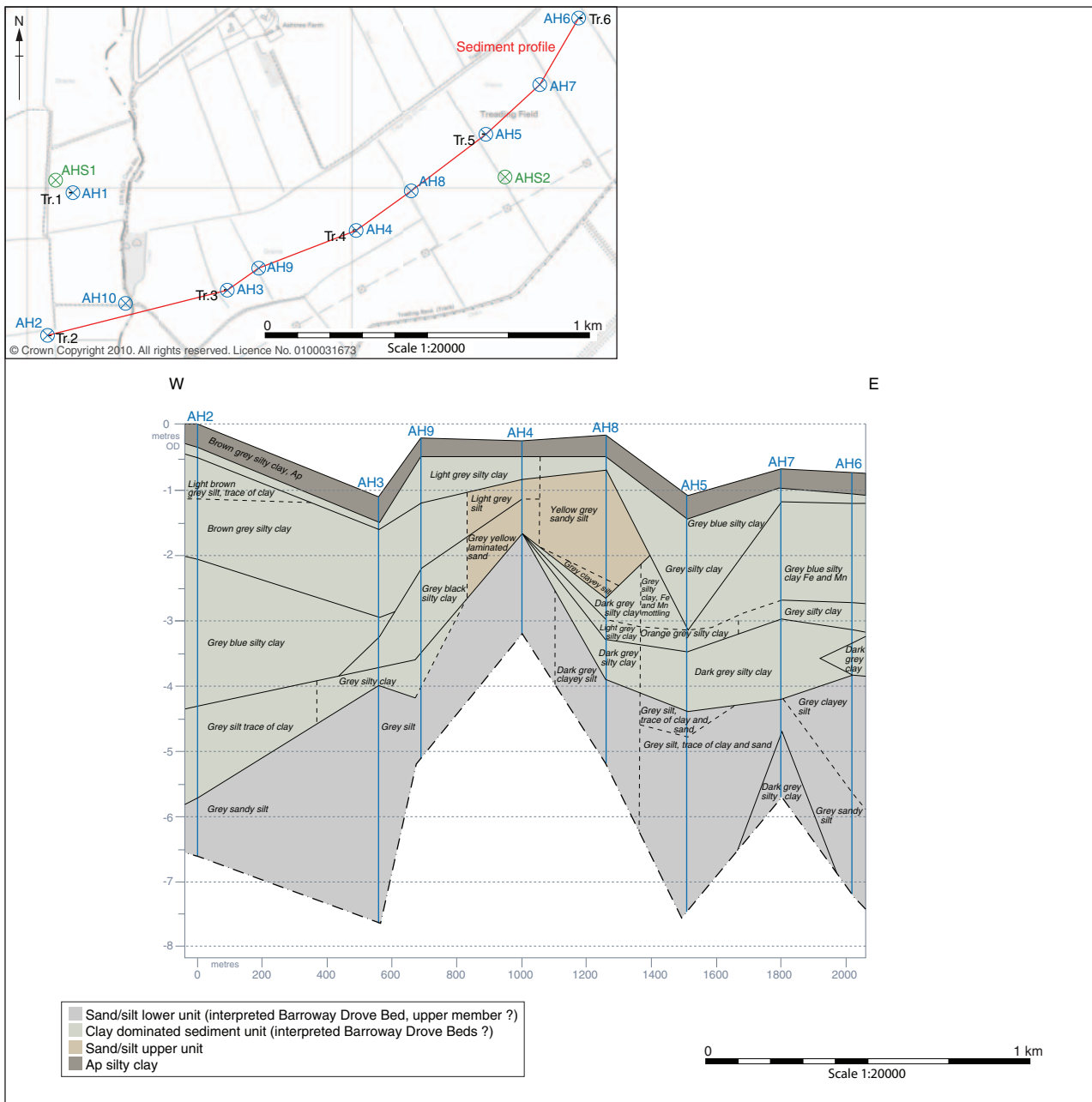


Figure 4: Sediment profile from auger survey







Plate 1: Trench 1

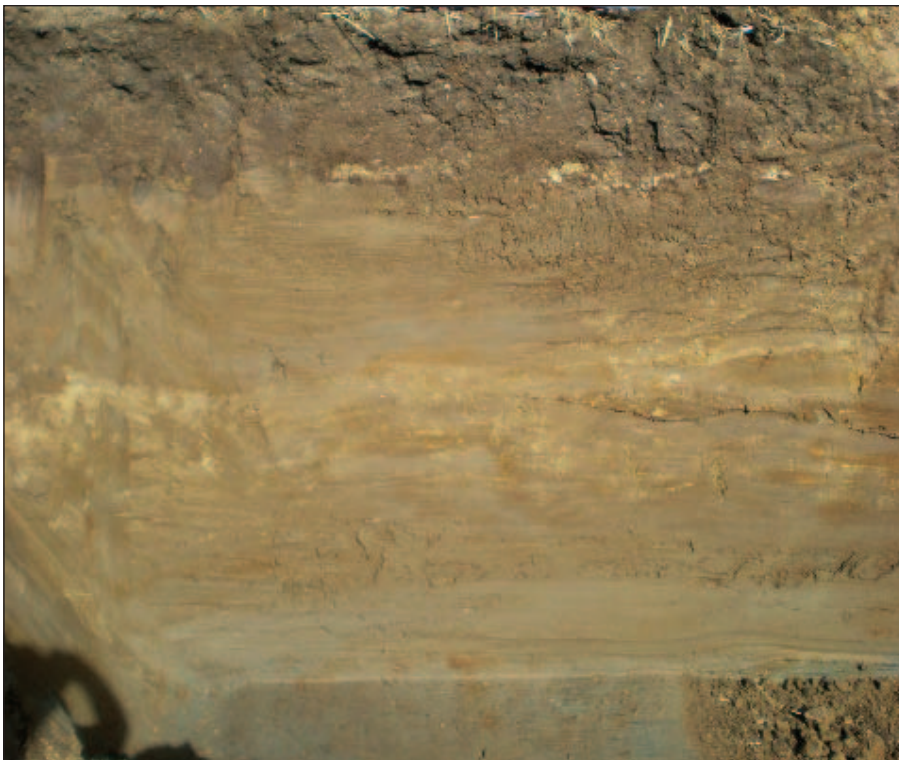


Plate 2: Trench 2



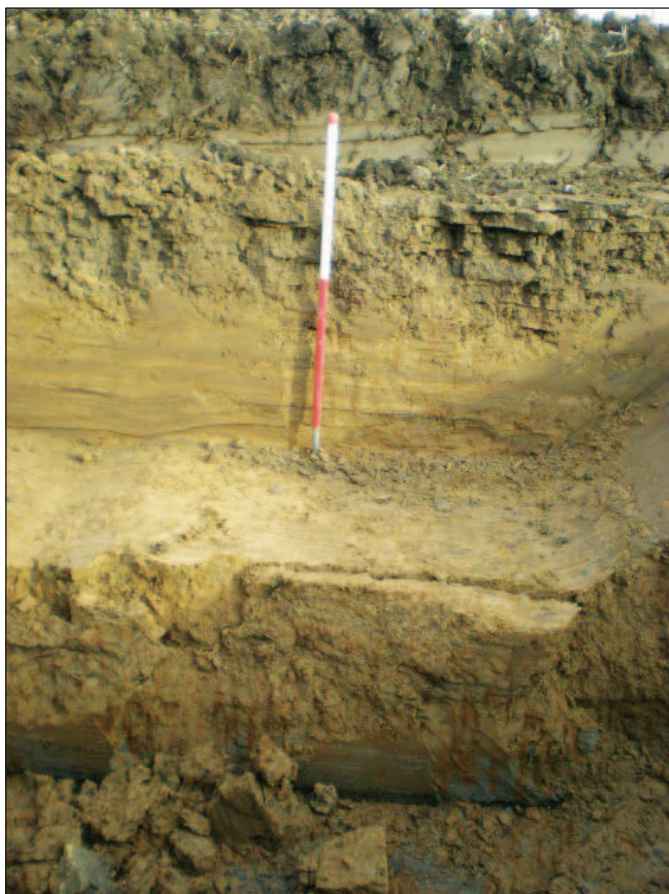


Plate 3: Trench 4



Plate 4: Ditch 409, Trench 4







Plate 5: Trench 6



Plate 6: Working shot







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