FIVE ESTUARIES
OFFSHORE WIND FARM

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6.6.7.4 ARCHAEOLOGICAL AND GEOARCHAEOLOGICAL MONITORING OF GROUND INVESTIGATION WORKS - LANDFALL

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Five Estuaries OSWF
Onshore Cable Route

Archaeological and Geoarchaeological Monitoring of Ground Investigation Works

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Summary

Wessex Archaeology was commissioned by GoBe Consultants Ltd on behalf of Five Estuaries Offshore Wind Farm Ltd to undertake geoarchaeological monitoring of Ground Investigation (GI) works for the Five Estuaries Offshore Windfarm (OWSF). The monitoring of the groundworks identified bedrock London Clay, overlain by a sequence of superficial deposits including Kesgrave sands and gravels and Holocene minerogenic alluvial deposits, representing sediment accumulated under the influence of rising post-glacial sea-levels and deposited within an estuarine environment. These sediments were in turn overlain by a modern soil profile.

The deposit modelling in the form of a single transect places the Site in its wider landscape context, with the upper surface of the London Clay bedrock rising to the west. The Holocene estuarine alluvium overlying the London Clay and Kesgrave sands and gravels at the lower elevations is between 7.45m and 8.7m thick, and composed of a tripartite sequence of lower alluvium, peat and upper alluvium overlain by up to 1.5m of re-worked alluvial deposits. The deposit model demonstrates that where the Holocene alluvial deposits were recorded, they were of a fairly uniform level and thickness.

Peat deposits were recorded in all three of the boreholes monitored and are likely to have formed as result of periods of lower relative sea level rise. The upper elevation of the peat ranged in height from -2.0m OD to -3.1m OD.

Depending on the construction design, the development along the proposed onshore cable route may impact upon deposits with palaeoenvironmental and/or archaeological potential overlying the surface of the bedrock at lower elevations. Where these deposits are likely to be impacted by the development, an appropriate programme of archaeological watching brief or trial trenching (where practical) may be required. In addition, purposive geoarchaeological boreholes targeting peat deposits should be considered in order to obtain samples for palaeoenvironmental assessment.

Acknowledgements

Wessex Archaeology thanks GoBe Consultants Ltd for commisioning the work, and Billy Pywell from Socotec, Patrick Moore from Wardell-Armstrong and Caragh Paul for their assistance on Site. The fieldwork and deposit modelling were undertaken by Richard Payne who also compiled the report. The report was approved by Dr Daniel Young. The figures were produced by Rob Goller. The project was managed on behalf of Wessex Archaeology by Marie Kelleher.

Five Estuaries OSWF Onshore cable route

Archaeological and Geoarchaeological Monitoring of Ground Investigation works

1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology was commissioned by GoBe Consultants Ltd on behalf of Five Estuaries Offshore Wind Farm Ltd (hereafter referred to as 'the Client') to undertake a programme of geoarchaeological monitoring of geotechnical Ground Investigation (GI) works for the Five Estuaries OSWF onshore cable route (the 'Site').

1.2 Site location and geology

1.2.1 The evaluation area is located approximately 1km to the southwest of Frinton-on-Sea at Frinton Golf Course, comprising land bounded to the northwest and southwest by fields on reclaimed marshland, and Frinton Beach to the southeast (**Figure 1**).

1.2.2 The Site lies on an estuarine floodplain through which the modern-day course of the Kirby Brook runs. The modern surface elevation of the Site is c. 1m above Ordnance Datum (aOD).

1.2.3 The solid geology underlying the Site is mapped by the British Geological Survey (BGS) as belonging to the Thames Group – described as Clay, Silt and Sand overlain by alluvium. The floodplain edge and north western extent of the alluvial deposits is shown as c. 400m to the north west.

1.3 Scope of document

1.3.1 This report provides a detailed description of the results of the GI monitoring, interpreted within a wider geoarchaeological context, and assesses whether the aims of the survey have been met. The results reported on here will provide information on the sediments underlying the Site, informing on the geoarchaeological resource and the requirement for, and methods of, any further geoarchaeological or archaeological works.

1.3.2 To help frame geoarchaeological investigations of this nature, Wessex Archaeology has developed a five-stage approach, encompassing different levels of investigation appropriate to the results obtained, accompanied by formal reporting of the results at the level achieved. The stages are summarised below (**Table 1**). This report represents Stage 2 of this process.

Table 1 Staged approach to geoarchaeological investigations

Stage 1: WSI / Geoarchaeological Desk-based Assessment	Review of sub-surface data (e.g. mapping, existing GI, BGS logs), and summary of local or regional context. Establish likely presence/ absence/ distribution of archaeologically relevant deposits. May include modelling of existing data, and for larger schemes a fuller landscape characterisation. Present recommendations for fieldwork including type, number, distribution and depth of sampling methods.

Stage 2: Fieldwork, interpretation and reporting (e.g. Borehole survey)	Fieldwork to investigate deposits and obtain samples, followed by reporting. Reporting will present results (usually including deposit modelling), interpretations and recommendations for further work. Should suitable deposits be present, detailed recommendations for palaeoenvironmental assessment and dating will be made (Stage 3).
Stage 3: Palaeoenvironmental assessment	Assessment of subsamples agreed in Stage 2 (for e.g. pollen, diatoms, plant macrofossils, molluscs, ostracods and foraminifera), together with radiocarbon dating. Reporting will summarise results in the archaeological and palaeoenvironmental context of the local or wider area. Should deposits have the potential for analysis, recommendations will be for Stage 4 work.
Stage 4: Analysis	Full analysis of samples specified in Stage 3, together with a detailed synthesis of the results, in their local, regional or wider archaeological and palaeoenvironmental context as appropriate. Publication would usually follow from a Stage 4 report.
Publication	The scope and location of a publication report will be agreed in consultation with the client and LPA advisor. The publication report may comprise a note in a local journal or a larger publication article or monograph, dependant on the significance of the archaeological work.

2 GEOARCHAEOLOGICAL AND ARCHAEOLOGICAL BACKGROUND

2.1 Introduction

2.1.1 This section provides a background to the geoarchaeology and archaeology within the proposed development area, drawing on relevant sites and studies within the wider landscape.

2.1.2 Where age estimates are available for deposits these are expressed in millions of years (Ma), thousands of years (Ka) and within the Holocene epoch as either year Before Present (BP), Before Christ (BC) and Anno Domini (AD). Where radiocarbon dates are included, they are quoted as calibrated (cal.) BC or AD. These dates are supplemented where relevant with the comparable Marine Isotope Stages (MIS) where odd numbers indicate an interglacial period and even numbers a glacial period.

2.2 Geoarchaeological Background

2.2.1 The solid geology underlying the development site is mapped by the British Geological Survey (BGS) as belonging to the Thames Group – described as Clay, Silt and Sand. This is a sedimentary bedrock formed approximately 34 to 56 million years ago in the Palaeogene Period.

2.2.2 The bedrock at the Site is overlain by superficial deposits of the Kesgrave Catchment Subgroup - formed up to 3 million years ago in the Quaternary Period, when the local environment was previously dominated by a river system.

2.2.3 In East Anglia Pre-Anglian deposits exist in several locations and contain a stratigraphic record of environmental fluctuations indicating alternating temperate and cool episodes. The Kesgrave sands and gravels are associated with the pre-glacial course of the River Thames that had previously flowed from the west Midlands through the Thames Valley into East Anglia prior to the Anglian glaciation. The Kesgrave deposits were identified as

separate from the overlying glacial deposits by a well-developed palaeosol characterized by distinct high quartzite clast lithology (Rose *et al*. 1996; 1999).

2.2.4 The Kesgrave sands and gravels have been identified as comprising at least 10 individual terraces and have been mapped on hillsides in the Cotswolds, and along the slopes of the upper and middle Thames Valley. From the area around Bourne End the occurrence of Kesgrave sands and gravels moves away from the present-day Thames Valley and continues northeast across west and central Essex and a large proportion of Suffolk. In the area of Clacton and Colchester in Essex and coastal southeast Suffolk the Kesgrave sands and gravels are recorded at the surface compared to further west where it is overlain by glaciogenic deposits (Rose *et al*. 1996,1999).

2.2.5 In the vicinity of the Site the Kesgrave sands and gravels are overlain by reclaimed saltmarsh deposits bisected by the southwest to northeast aligned Holland Brook. The saltmarsh deposits are Holocene in date, forming under rising post-glacial sea-level tendencies and largely comprising fine-grained alluvial clays and silts.

2.2.6 The close association at the Site between the wetland and dryland offers the opportunity to understand the long-term patterns of human activity and settlement and associated environmental and landscape change.

2.3 Archaeological background

Palaeolithic (450,000–12,000 BC)

2.3.1 Palaeolithic implements were recovered from excavations that followed the demolition of the Butlins holiday camp at Clacton to the southwest of the Site in 1987. The finds include 3 cores, 4 retouched flakes, 29 flakes and 2 miscellaneous objects. The finds are now held by the British Museum and Colchester Museum (MN1234205). A core, flake, and other worked flints were found in gravels above the cliff at Holland on Sea the southwest (1234206). To the northeast of the Site a collection of Palaeolithic implements were found on the beach at Stone Groin. The finds include 4 handaxes, 4 retouched flakes, 14 flakes and 3 miscellaneous items (MN1234222). Four possibly Azilian points of flint have been identified from material washed out by the sea and scattered on the beach at Walton-on-the-Naze which ranges from Lower and Middle Palaeolithic to the earliest Bronze Age (MN389561). At Sandy Hook a Palaeolithic hand axe was found (MN1234211).

2.3.2 In land to the west of the Site at Little Clacton at least 479 worked flints ranging from Palaeolithic to the early Bronze Age were found. The object found included a Palaeolithic flake, a Mesolithic Microlith, a Neolithic petit tranchet derivative arrowhead and Neolithic or early Bronze Age scrapers (MN624706).

Mesolithic, Neolithic, Bronze Age and Iron Age (12,000 BC–AD 43)

2.3.3 At Great Holland to the west a sub-rectangular enclosure was visible as a cropmark on air photographs. Orientated roughly northwest-southeast, it has been suggested to represent a cursus, although with all four sides visible, it would appear to be rather short and broad compared to most known cursus monuments. The long western side also continues south as a field boundary, the latter also partially marked by trees extant on photographs taken in 1976. The whole area is dominated by cropmarks of geological origin, although a few linear features presumably representing field boundaries are also visible (MN1339656). Cropmarks at Walton-on-the-Naze indicate a possible rectangular enclosure and ditched trackway (MN389503).

Romano-British, Saxon and Medieval (AD 43–1485)

2.3.4 At Frinton-on-Sea in 1904, a trench filled with black earth containing Romano British potsherds, was observed in the cliff top nearly opposite Connaught Avenue. It was seen again in 1910, during alterations to Kelvin Lodge, Fourth Avenue. This line running west-southwest coincides with a former farm hedge bank and ditch which can still be traced in the greensward and in private gardens on the west of Fourth Avenue (MN389498).

Post-medieval and Modern (AD 1486–present day)

2.3.5 Three Martello Towers that guarded Holland Marshes were sold and demolished in 1819 (TM 21 NW 13). At Walton-on-the Naze an early 18th century and later navigation tower for Trinity House was used as a radar tower in WWII (MN3576). There are also at least two WW2 pillboxes located along the seawall in the proximity of the Site.

3 AIMS AND OBJECTIVES

3.1.1 The main aim of the geoarchaeological monitoring as highlighted in the WSI (Wessex 2022) was to assess the extent, nature and significance of archaeologically sensitive deposits or remains retrieved during advanced GI works.

3.1.2 The monitored geotechnical investigations comprised three boreholes (BH201, BH202 & BH203). The boreholes were located to provide geotechnical information on subsurface deposits along the route of the onshore cable route.

3.1.3 The aims of the geoarchaeological monitoring of the GI works were as follows:

- To determine, as far as is reasonably possible, the nature of the detectable archaeological resource;
- Refine understanding of the presence, nature and distribution of Quaternary superficial deposits;
- Assess the archaeological and geoarchaeological potential of the deposits across the Site;
- Correlate the results of the GI works to produce a deposit model for the site, mapping the extent of any superficial deposits;
- Inform on the need for and scope of any further archaeological or geoarchaeological investigations at the Site.

4 FIELDWORK METHODS

4.1 Borehole survey

4.1.1 A total of three boreholes were monitored across the Site as part of the scope of the GI works (**Figure 1**), with the drilling of each borehole preceded by a hand dug test pit.

4.1.2 The boreholes were hand excavated to 1.2m below ground level prior to being drilled by a Cable Percussion rig. The deposits were recorded on Site and described by a suitably experienced geoarchaeologist following Hodgson (1997), including information such as:

- *Depth*

- *Texture*
- *Composition*
- *Colour*
- *Inclusions*
- *Structure (bedding, ped characteristics etc.)*
- *Contacts between deposits*

4.1.3 Interpretations were made regarding the probable depositional environments and formation processes of the sampled deposits. This data was then tabulated by borehole and depth (**Appendix 1**).

4.1.4 On completion of the borehole investigations, ground water monitoring piezometers were installed in each borehole location. Where selected boreholes were retained, the exploratory holes were backfilled with bentonite pellets.

4.2 Deposit modelling

4.2.1 The deposit modelling was undertaken following the guidelines in Historic England (2020) and consisted of a single stratigraphic profile (transect) illustrating the key deposits across the Site and the wider area (**Figure 2**). Due to the lack of available data records across the Site and local area, a single transect was the most appropriate method to display the stratigraphy and deposits encountered during the course of the ground works.

4.2.2 The transect is a two-dimensional vertical display of the deposit records along a line drawn across the Site linking locations of boreholes, allowing comparisons to be made between the records and indicate the possible make-up of the deposits between those records.

4.2.3 Five data points were used to generate the transect, three from the latest phase of Ground Investigations and two historic boreholes from the BGS online borehole archive (https://mapapps2.bgs.ac.uk/geoindex/home.html).

4.2.4 The key aims of the modelling were to interpret the data, identifying the probable environments represented, and determine areas of higher and/or lower geoarchaeological potential where further work may be required (e.g. deposits with potential for the recovery of significant archaeological and palaeoenvironmental remains).

5 RESULTS

5.1 Borehole monitoring

5.1.1 Three boreholes (BH201, BH202 & BH203) were drilled to a maximum depth of c. 22m below ground level (bgl). Inspection pits to 1.2m in depth were hand dug at each borehole location. No archaeological remains of any significance were encountered in any of the test pits.

5.1.2 The results of the borehole survey are tabulated in **Appendix 1,** summarised below and supported by the results of the deposit modelling of the Site and the wider area. The modelling consists of a single transect aligned north west to south east (**Figure 2**).

BH201

5.1.3 A silty clay topsoil overlay a stiff brown-grey reworked silty clay at 0.25m bgl (0.75m OD) over a soft grey silty clay 1.5m bgl (-0.5m OD) over a soft brown peat at 3.0m bgl (-2.0m OD). The peat in turn overlay a soft grey silty clay alluvium at 3.5m bgl (-2.5m OD) over an earlier peat at 4.5m bgl (-3.5m OD) over a soft grey silty clay alluvium that became gravelly towards the base where it overlay the bedrock in the form of London Clay at 8.0m bgl (-7.0 m OD).

BH202

5.1.4 A stiff grey silty clay loam topsoil overlay reworked alluvium at 0.25m (0.75m OD) over a stiff grey silty clay alluvium at 1.2m bgl (-0.2m OD) over a soft brown peat at 4.0m bgl (-3.0m OD). The peat in turn overlay a soft grey silty clay alluvium which became gravelly towards the base at 4.5m bgl (-3.5m OD) over the London Clay bedrock at 7.7m bgl (-6.7m OD).

BH203

5.1.5 A stiff grey-brown silty clay loam topsoil overlay reworked silty clay alluvium at 0.5m bgl (0.5m OD) over a soft grey silty clay at 2.0m bgl (-1.5m OD) over soft brown peat at 4.1m bgl (-3.1m OD). The peat in turn overlay soft grey silty clay at 5.6m bgl (-4.6m OD) over sands and gravels at 9.2m bgl (-8.2m OD) over the London Clay bedrock at 11.5m bgl (-10.5m OD).

5.2 Deposit modelling and stratigraphy

5.2.1 A total of five data points were used to generate the deposit model in the form of a single stratigraphic profile (transect) aligned northwest to southeast for the Site and wider area (**Figure 2**). The transect incorporated three borehole records from the monitoring of the GI works, and two historic borehole records from the British Geological Survey (BGS) online borehole archive.

5.2.2 The deposits recorded at the Site was divided into five main stratigraphic units comprised as follows:

Topsoil

5.2.3 This was the uppermost unit comprised of a grey-brown silty clay loam. The unit ranged in thickness from 0.25m bgl in BH201 (0.75m OD) to 0.5m bgl in BH203 at (0.5m OD) across the wider area. Topsoil was only recorded at 0.3m in thickness at 15.47m OD in TM22SW29.

Reworked alluvium

5.2.4 This unit was recorded in all three of the monitored boreholes and was comprised of disturbed/redeposited silty clay alluvium, and ranged in thickness from 0.95m in BH202 to 1.5m in BH203. The unit contained no anthropogenic material so was probably not brought into the Site but disturbed in-situ.

Upper alluvium

5.2.5 Generally a fine-grained deposit comprised of silt, sand and clay with occasional flint gravels and small organic lenses/inclusions. The unit was recorded in all three boreholes and ranged in thickness from 1.5m in BH201 at -0.5m OD to 2.8m in BH202 at -0.2m OD.

Peat

5.2.6 Peat was recorded in all three monitored boreholes and ranged in thickness from 0.5m in BH202 at -3.0m OD to 1.5m at -3.1m OD in BH203. The peat was recorded as a single layer in BH202 and BH203 but in BH201 the peat was interbedded with a 1m layer of silty clay alluvium at -2.5m OD. These differences between the thicknesses and heights of the peat layers within the Site indicate formation at a time prone to localised change due to channel migrations within an estuarine tidal environment.

Lower alluvium

5.2.7 The lower alluvium was generally a soft grey silty clay with occasional small organic patches (mostly *Phragmites* roots) that became increasingly gravelly towards the base indicating its proximity to the underlying Kesgrave sands and gravels. The lower alluvium ranged in thickness from 3.1m at -3.9m OD in BH201 to 3.6m in BH203 at -4.6m OD.

Sands and gravels

5.2.8 The sands and gravels underlying the Holocene deposits and overlying the Thames Group bedrock were recorded in BH203 as 2.3m thick at -8.2m OD. The increasing gravel content at the base of the lower alluvium in BH201 and BH202 may belong to the same unit. In the wider area 3.96m of sands and gravels were recorded in TM21NW1 at 11.58m OD on higher ground to the north west, potentially part of an earlier terrace of the Kesgrave sands and gravels (see **Figure 2**).

Bedrock

5.2.9 The bedrock was recorded as a Stiff but highly malleable blue clay with bands of small subrounded black flint pebbles and identified as London Clay belonging to the Thames Formation. The London clay was recorded in all three monitored boreholes at depths ranging from 7.7m bgl (-6.7m OD) in BH202 to 11.5m bgl (-10.5m OD) in BH203.

6 DISCUSSION

6.1 Introduction

6.1.1 A programme of geoarchaeological monitoring of GI works and deposit modelling was undertaken at the potential Five Estuaries OSWF landfall site. The main aims of the geoarchaeological monitoring were to gain information about the superficial deposits within the proposed area of the onshore cable route, and to inform requirements for and scope of further archaeological and geoarchaeological investigations, where appropriate.

6.1.2 In order to address these aims three boreholes (BH201, BH202 & BH203) drilled as part of the ground investigation programme were monitored by a geoarchaeologist. The sequence of deposits recorded within the boreholes was broadly consistent across the Site, with topsoil sealing a layer of disturbed alluvium of in-situ Holocene alluvium, interbedded with peat, over Pleistocene sands and gravels and London Clay bedrock.

6.1.3 The three boreholes were incorporated with two historic BGS archive boreholes in order to produce a deposit model in the form of a single stratigraphic profile (transect) aligned northwest to southeast across the and the wider area (**Figure 2**).

6.2 Sedimentary sequence and depositional environment

Sands and gravels

6.2.1 Sands and gravels, underlying the Holocene deposits in BH203 at -8.2m OD, are interpreted as the Kesgrave sands and gravels, deposited in the early to mid-Pleistocene along the

course of pre-diversionary River Thames from Chelmsford to Colchester (Whiteman & Rose 1992). The Kesgrave sands and gravels were not present in boreholes BH201 or BH202 but were recorded in BGS borehole TM21NW1 to the north of the Site at a higher elevation of 11.58m OD, likely representing an earlier terrace of the Kesgrave system (see **Figure 2**).

6.2.2 The Kesgrave sands and gravels have been identified as comprising at least 10 individual terraces and have been mapped on hillsides in the Cotswolds, along the slopes of the upper and middle Thames Valley. From the area around Bourne End the occurrence of Kesgrave sands and gravels moves away from the present-day Thames Valley and continues northeast across west and central Essex and a large proportion of Suffolk. In the area of Clacton and Colchester in Essex and coastal southeast Suffolk, the Kesgrave sands and gravels are recorded at the surface compared to further west where it is overlain by glaciogenic deposits (Rose *et al*. 1996,1999).

Holocene alluvium

6.2.3 The overlying Holocene estuarine alluvium is between 7.45m and 8.7m thick and composed of a tripartite sequence of lower alluvium, peat and upper alluvium overlain by up to 1.5m of re-worked alluvial deposits. The transect in **Figure 2** demonstrates that where the Holocene alluvial deposits were recorded they were of a fairly uniform level and thickness, recorded up to a level of c. 0 to -1m OD.

6.2.4 Prior to the period of peat formation at the Site, a phase of relative sea level rise led to the accumulation of minerogenic grey silty clay with occasional small organic inclusions. The alluvium was recorded across the Site as two distinct units: an upper and lower alluvium, separated by peat (see below). The alluvium ranged in thickness from 1.0m in BH201 at -2.5m OD to 3.6m in BH203 at -8.2m OD.

Peat

6.2.5 Interbedded within the alluvial deposits, peat was recorded in all three monitored boreholes ranging in thickness from 0.5m in BH202 at -3.0m OD to 1.5m at -3.1m OD in BH203. The peat was recorded as a single layer in BH202 and BH203 but in BH201 the peat was interbedded with a 1m layer of silty clay alluvium at -2.5m OD. A single peat sample was taken from each peat layer with the peat layer in BH203 having a sample taken from the top and base of the unit.

6.2.6 The peat recorded within the alluvial sequence at the Five Estuaries OSWF onshore cable route may be of Mesolithic through to Bronze Age date, and is of both high palaeoenvironmental and archaeological significance. These deposits have high palaeoenvironmental potential and may preserve biological remains that provide a detailed reconstruction of prehistoric environments and human activity on both the wetland and dryland. These organic-rich deposits therefore represent important archives of information on past climate and environmental change, and the impact of human communities on the landscape.

7 CONCLUSION

7.1 Summary

7.1.1 The key results of the geoarchaeological investigations, and the geoarchaeological and archaeological potential of the revealed deposits, are summarised below;

- **Pleistocene deposits** equivalent to the Kesgrave sands and gravels were encountered at the Site. These Pleistocene deposits provide the topographic template

upon which Holocene alluvial sediments have been deposited. Prior to widespread alluviation during the later Holocene, the surface of the gravel would have included areas of higher, drier ground adjacent to the wetland areas and its associated channels, and as such there is potential for the preservation of prehistoric archaeology on the surface of the gravels.

- The surface of the gravel is considered to be medium geoarchaeological potential, but the coarse-grained (gravel-rich) deposits of the gravel body itself are considered to be low geoarchaeological potential. The gravel deposits are deeply buried, and conventional archaeological evaluation of this buried land surface is unlikely to be practical.

- **Alluvium** was recorded across the Site as two distinct units: an upper and lower alluvium, separated by peat (see below). The alluvium ranged in thickness from 1.0m in BH201 at -2.5m OD to 3.6m in BH203 at -8.2m OD.

- The inorganic alluvial sediments have the potential to preserve microfossil remains (ostracods, foraminifera, diatoms) that are useful in establishing the marine or freshwater origin of deposits, and as such where these directly overlie organic units, they are of medium geoarchaeological potential. Elsewhere, they are considered to be low geoarchaeological potential given the uncertain source area of any biological remains.

- The archaeological potential of the alluvium is low, except where it directly overlies the Gravel or peat, and may therefore have the potential to contain preserved archaeology.

- **Peat** was recorded in all three boreholes ranging in thickness from 0.5m in BH202 at -3.0m OD to 1.5m at -3.1m OD in BH203. Peat is of high geoarchaeological and archaeological potential due to the likely good preservation of biological material (pollen, wood and seeds) and waterlogged archaeological remains.

7.1.2 Depending on the construction design the onshore cable route may impact deposits of geoarchaeological potential within the peat or on the surface of the gravels. The surface of the gravels where encountered was located at a depth of 9.2m below ground level (bgl) in BH203. The impact of the development proposals upon these deposits will be assessed in full as part of the Environmental Statement.

7.1.3 The peat offers the best opportunity for reconstructing past environments, human activity and land-use within both the wetland and dryland landscapes. Pollen will preserve a record of both regional and local trends in human activity, providing an opportunity to test and refine models of human activity within the wetland and adjoining dryland environments. Conventional archaeological evaluation of the buried land surface associated with the surface of the gravels is unlikely to be practical at the depths at which it is preserved.

7.1.4 The need for, scale and scope of any further archaeological assessment and mitigation works will be in consultation with the archaeological advisor to Essex County Council.

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APPENDIX

Borehole records

Site Code: 231912	**Site Name:** Five Estuaries OSWF Onshore cable route	**Borehole ID: BH201**
Coordinates (NGR) X: 622496.8	**Coordinates (NGR) Y: 218184.8**	**Level (top):** c. 1m OD
Length:	**Width:**	**Depth:**

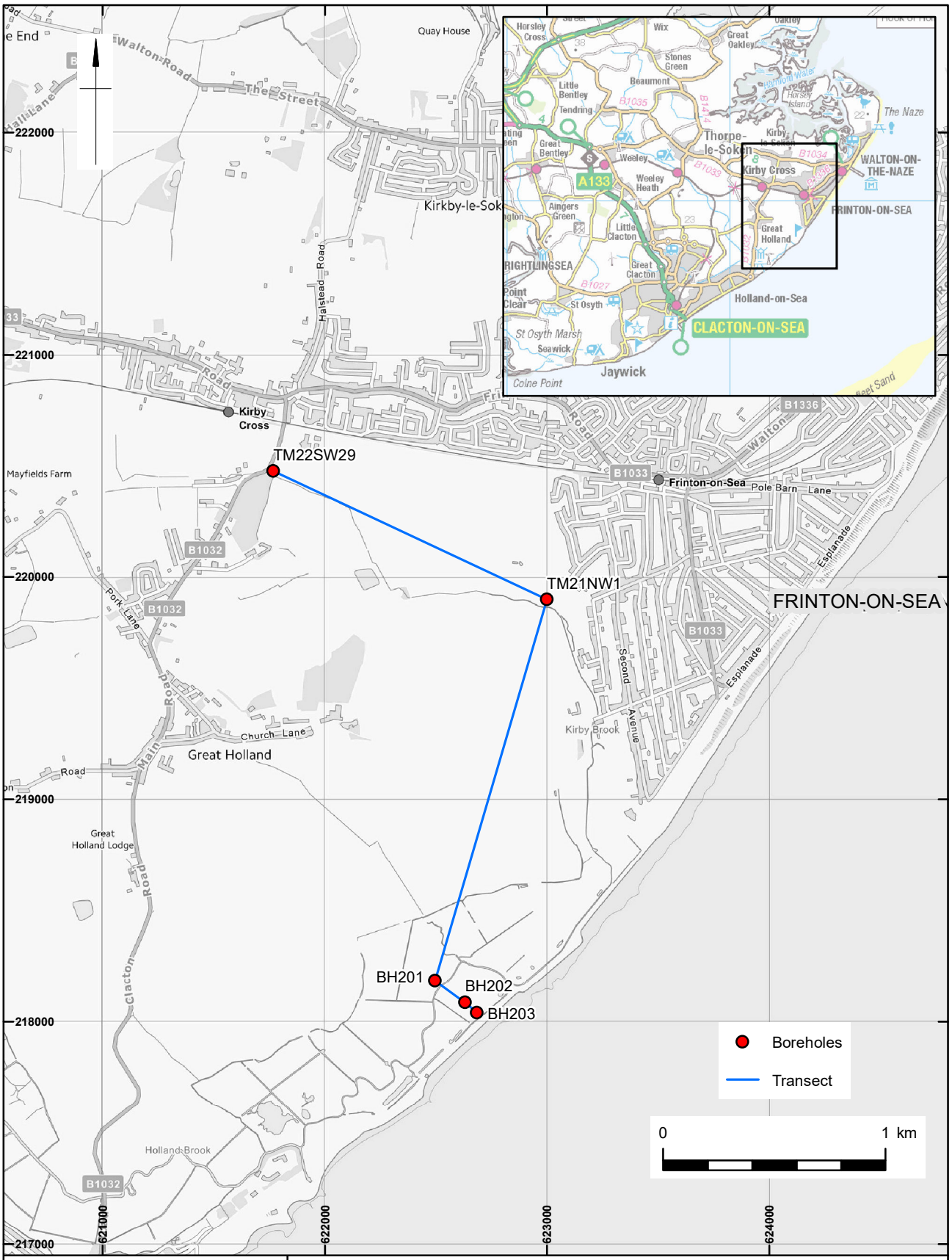
Context Number	**Description**	**Interpretation**	**Depth m BGL**	**Depth m OD**	**Samples**
20101	Stiff grey brown silt clay loam with a granular blocky structure. Very occasional small<0.02m SA/SR stone inclusions, orange mottled towards base of unit, gradual lower boundary	Topsoil	0 – 0.25	1.0 – 0.75	
20102	Stiff brown mottled grey silty clay, evidence of disturbance	Reworked alluvium	0.25 – 1.5	0.75 – -0.5	
20103	Soft grey silty clay with occasional small <0.02m peaty organic patches (phragmites)	Alluvium – marine inundation	1.5 – 3.0	-0.5 – -2.0	
20104	Soft brown herbaceous clayey peat, moderately humified.	Peat/stabilisation	3.0 – 3.5	-2.0 – -2.5	3.10-3.20 <2011>
20105	Soft grey silty clay with occasional small <0.02m peaty organic patches (phragmites) Fragments of wood at 4.0m	Alluvium – marine inundation	3.5 – 4.5	-2.5 - -3.5	
20106	Soft brown herbaceous clayey peat, moderately humified	Peat/stabilisation	4.5 – 4.9	-3.5 - -3.9	4.5-4.6 <2012>
20107	Soft grey silty clay with occasional small <0.02m peaty organic patches (phragmites) Increasing amounts of gravel (flint) towards base	Alluvium – marine inundation over Kesgrave sand and gravel	4.9 – 8.0	-3.9 – -7.0	
20108	Stiff but highly malleable blue clay with bands of small subrounded black flint pebbles	London Clay (Thames Formation)	8.0 – 20.0	-7.0 – -19..0	

Site Code: 231912	**Site Name:** Five Estuaries OSWF Onshore cable route	**Borehole ID: BH202**
Coordinates (NGR) X: 622631.3	**Coordinates (NGR) Y:** 218086.4	**Level (top):** c. 1m OD
Length:	**Width:**	**Depth:**

Context Number	**Description**	**Interpretation**	**Depth m BGL**	**Depth m OD**	**Samples**
20201	Stiff grey brown silt clay loam with a granular blocky structure. Very occasional small<0.02m SA/SR stone inclusions, orange mottled towards base of unit, gradual lower boundary	Topsoil	0 – 0.25	1.0 – 0.75	
20202	Stiff brown mottled grey silty clay, evidence of disturbance	Reworked alluvium	0.25 – 1.2	0.75 – -0.2	
20203	Soft grey silty clay with occasional small <0.02m peaty organic patches (phragmites)	Alluvium – marine inundation	1.2 – 4.0	-0.2 – -3.0	
20204	Soft brown herbaceous clayey peat, moderately humified	Peat/stabilisation	4.0 – 4.5	-3.0 – -3.5	4.2 – 4.3 <2021>
20205	Soft grey silty clay with occasional small <0.02m peaty organic patches (phragmites) Increasing amounts of gravel (flint) towards base	Alluvium – marine inundation	4.5 – 7.7	-3.5 – -6.7	
20206	Stiff but highly malleable blue clay with bands of small subrounded black flint pebbles	London Clay (Thames Formation)	7.7 – 22.0	-6.7 – -21.0	

Site Code: 231912	**Site Name:** Five Estuaries OSWF Onshore cable route	**Borehole ID: BH203**
Coordinates (NGR) X: 621769.0	**Coordinates (NGR) Y:** 220477.0	**Level (top):** c. 1m OD
Length:	**Width:**	**Depth:**

Context Number	**Description**	**Interpretation**	**Depth m BGL**	**Depth m OD**	**Samples**
20301	Stiff grey brown silt clay loam with a granular blocky structure. Very occasional small<0.02m SA/SR stone inclusions, orange mottled towards base of unit, gradual lower boundary	Topsoil	0 – 0.5	1.0 – 0.5	
20302	Stiff brown mottled grey silty clay, evidence of disturbance	Reworked alluvium	0.5 – 2.0	0.5 – -1.5	
20303	Soft grey silty clay with occasional small <0.02m peaty organic patches (phragmites)	Alluvium – marine inundation	2.0 – 4.1	-1.5 – -3.1	
20304	Soft brown herbaceous clayey peat, moderately humified	Peat/stabilisation	4.1 – 5.6	-3.1 – -4.6	4.2 – 4.3 <2031> 5.4 – 5.5 <2032>
20305	Soft grey silty clay with occasional small <0.02m peaty organic patches (phragmites)	Alluvium – marine inundation	5.6 – 9.2	-4.6 – -8.2	
20306	Light grey slightly gravelly sandy clay becoming sandy clay gravel, gravel becomes coarser with depth	Kesgrave sand and gravel	9.2 – 11.5	-8.2 – -10.5	
20307	Stiff but highly malleable blue clay with bands of small subrounded black flint pebbles	London Clay (Thames Formation)	11.5 – 20.0	-10.5 – -19.0	



Coordinate system: OSGB36

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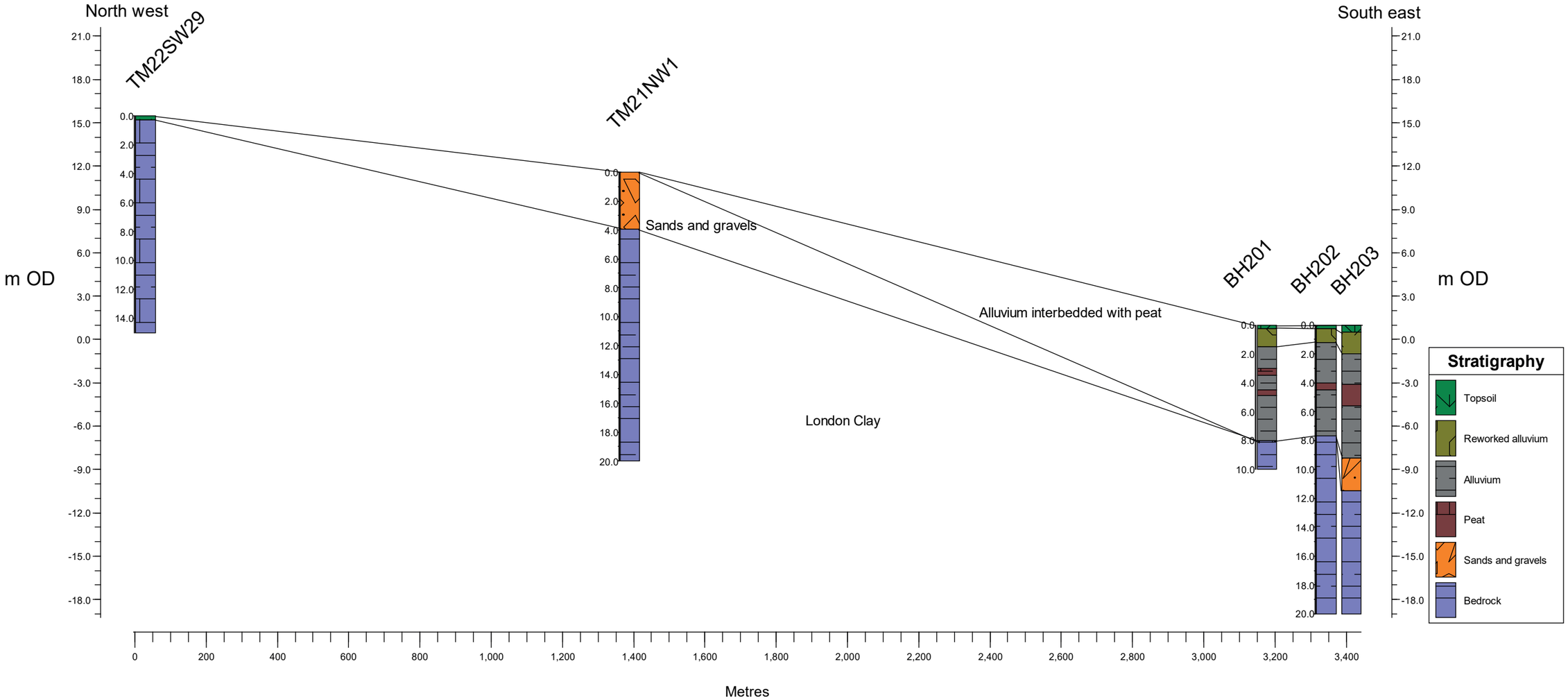
Location of Site and boreholes

Figure 1



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Transect

Figure 2

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