GRANGE WIND FARM, FLIXBOROUGH

Archaeological Strip, Map and Record, and Watching Brief

Network Archaeology

for

Grange Wind Farm Ltd

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1 Non-technical summary

Archaeological works during construction of Grange Wind Farm, Flixborough, North Lincolnshire comprised a controlled topsoil strip, map and record of one area, and a watching brief on other ground disturbing activities. Overall, the results suggest that the cultural heritage significance of the surface deposits affected by the development of the wind farm was low. Two pieces of struck flint were recovered, suggesting, along with flint finds previously recorded, that there was some prehistoric activity on the site, concentrated on the area alongside Burton Wood. Evidence for ridge and furrow agriculture, old field boundaries and other agricultural features was also noted. No evidence was found for a possible circular feature (NLHER 20751) tentatively identified from an earlier geophysical survey of the area of the controlled strip.

2 Introduction

This report presents and discusses the findings of archaeological works carried out before and during ground disturbing construction activities necessitated by the installation of six wind turbines at Grange Farm, Flixborough, North Lincolnshire (Figs 1 to 3). A controlled strip of topsoil followed by mapping and sample excavation was carried out on the area which encompassed both the site for the temporary construction compound and the smaller footprint of the permanent switchgear building. Ground disturbing works elsewhere were monitored: these included topsoil removal from turbine foundations, hardstandings and associated access tracks. The work was carried out over 31 days, between 24th February and 14th April 2015. During the course of the construction works, a sedimentological investigation was undertaken by the Wetland Archaeology and Environments Research Centre (WAERC) of the University of Hull. This is the subject of a separate report.

2.1 Planning background

A planning application for construction of seven wind turbines, along with associated works, was originally submitted to North Lincolnshire Council in 2008 (WF/2008/0900) but planning permission was refused and a subsequent appeal dismissed. A re-submitted application (WF/2010/1242) in October 2010 was initially refused but was consented on appeal in 2012 (APP/Y2003/A/11/2156713). The consent included a reduction in the number of turbines to six, omitting the one closest to the village of Burton on Stather.

Conditions were imposed in order to comply with policy HE9 of the North Lincolnshire Local Plan:

> 13. No development shall take place until the applicants, or their agents or successors in title, have secured the implementation of the programme of archaeological work in accordance with the document 'Grange Wind Farm, North Lincolnshire, Written Scheme of Investigation for Archaeological Mitigation' prepared by Peter Cardwell, dated March 2009 (Report 28/4).
>
> 14. The archaeological mitigation strategies shall be carried out in accordance with the approved details and timings, subject to any variations agreed in writing by the local planning authority.
>
> 15. A copy of any analysis, reporting, publication or archiving required as part of the mitigation strategies shall be deposited at the North Lincolnshire Historic Environment Record within one year of the date of completion of the development hereby approved by this permission or such other period as may be agreed in writing by the local planning authority.

The work described in this report was carried out in response to these three planning conditions

The Written Scheme of Investigation (WSI) referenced in Condition 13 refers to that which supported the original application, but which was updated in October 2010 to support the re-submitted planning application.

In addition to the six wind turbines, other elements of the development include associated hard-standings, permanent and temporary access roads into the site and between the wind turbines, an anemometry mast, a switchgear house and underground electricity cabling. A temporary construction compound was also established for the duration of the work on site.

2.2 Archaeological and historical background

This section draws heavily on the WSI (Cardwell 2010). The site numbers quoted are taken from that source and the list of identified sites is reproduced in Table 1 below. The North Lincolnshire Historic Environment Record (NLHER) number is given for those sites listed in that source. Other sites are from historic mapping or from field surveys.

Table 1: Archaeological sites within area of proposed development (Cardwell 2010)

Site	NLHER	Grid	Easting	Northing	Description	Period
5	–	SE	487150	416750	Flint flake	Neolithic
6	19695	SE	486980	414570	Pit (pottery)	Neolithic
7	1974	SE	486470	415470	Flint scraper	Neolithic/BA
8	19349	SE	486510	415710	Flint flake	Neolithic/BA
9	15755	SE	486300	415300	Ditches (cropmarks)	Prehistoric
10	6687	SE	486800	416500	Flint arrowhead	Prehistoric
11	19396	SE	486630	414890	Flint artefacts	Neolithic/BA
12	19350	SE	486720	414620	Flint flake	Neolithic/BA
14	19694	SE	486970	414560	Inhumation burial	Bronze Age
15	19681	SE	487050	414560	Cremation burial	Bronze Age
16	15418	SE	487030	416760	Ring ditch (soilmark)	Prehistoric
17	19690	SE	487160	414600	Occupation site	Iron Age
18	19691	SE	487060	414680	Pits	Iron Age
19	1976	SE	486500	415800	Pottery	Roman
26	1102	SE	487100	416400	Bronze seal box	Roman
27	19645	SE	487000	414800	Coins	Roman
28	1967	SE	487140	414860	Pottery	Roman
30	19693	SE	487050	414610	Cremation pit	Roman
40	70	SE	485000	416600	Settlement (Marae)	Medieval
41	19585	SE	484500	416600	Drainage channel	Medieval
43	–	SE	485470	417000	Warping compartment	19th century
44	20679	SE	485800	415750	Farmstead (Flixborough Grange)	19th century
45	–	SE	485850	415890	Buildings	19th century
46	–	SE	486650	417020	Building	19th century
47	–	SE	486710	416120	Building	19th century
48	–	SE	485380	415810	Buildings (wind pump)	19th century
51	–	SE	485850	416550	Building	20th century
52	–	SE	486500	415950	Building	20th century
53	20673	SE	486650	417500	Sand pit	20th century
54	20752	SE	486650	415860	Gun flint	Post-medieval
55	19730	SE	486890	415940	Well (St Anne's)	Unknown
–	20667	SE	487300	416900	Open field system	Medieval
–	20668	SE	487200	415400	Open field system	Medieval
–	20669	SE	486170	416190	Palaeochannel	Prehistoric
–	20751	SE	486614	415775	Ovoid enclosure	Unknown
–	20796	SE	408631	417150	Warping drain	Post-medieval

Location and topography

The development area is located on the eastern flood plain of the Trent, within a long meander of the river, 8km south of its confluence with the Humber. From the flood bank along the river, much of the area lies below the 5m contour, but rises slightly to the east, to an existing trackway running north to the

village of Burton upon Stather. The southern end of this trackway has been graded and surfaced to form the main access road to the windfarm.

To the east of the trackway, the scarp slope of the Lincoln Edge rises to 60m OD over a distance of 300m. West of Flixborough village, this steep slope is arable land but elsewhere it is covered by Burton Wood. Beyond is agricultural land. At the south end of the development area, a mineral railway, now largely overgrown, served Flixborough Wharf. An industrial estate beyond the railway was developed following the destruction of the Nypro chemical works, with the loss of 28 lives, in the explosion and subsequent fires on 1st June 1974.

The underlying bedrock consists of mudstones of the Mercia Mudstone Group, laid down approximately 200 to 251 million years ago in the Triassic Period (BGS). Beneath Burton Wood and the land to the east, interbedded mudstones and limestones of the Scunthorpe Mudstone Formation, formed around 190 to 204 million years ago in the Jurassic and Triassic Periods. Over most of the development area the superficial deposits are recorded as alluvial clays and silts, but along the eastern fringes blown sand deposits predominate.

Mesolithic and earlier

No sites or finds of Mesolithic date or earlier are recorded within the area of the development, though small quantities of Mesolithic flint artefacts have been recovered on the higher ground of the Lincoln Edge, including to the east of Burton upon Stather (NLHER 20531 and 20463).

Palaeo-environmental surveys in the Trent valley and Humber Wetlands areas suggest a landscape during this period of willow, hazel and perhaps pine on the sandy soils, with oak and elm on the drier margins. Subsequently alder carr developed on the floodplain. Boreholes studies for the Humber Wetland project identified two channels flowing into in the Amcotts area, with sediments of middle Mesolithic date at a depth of around 8m below OD. These sediments suggested that alder-dominated mixed carr woodland was present and continued on the floodplain until about 2000 BC (Lillie 1998a, 51–2). This environment may have been exploited by nomadic hunter-gatherers during the Mesolithic period, but if so, any evidence is likely to be sealed beneath later alluvial deposits.

The sedimentological borehole survey carried out in 2008 in response to planning for the present scheme concluded that there was an unusually long and high quality sequence of peat deposits in the southern part of the development area. More details of this survey are given Section 2.3 below.

Neolithic and Bronze Age

A single flint flake is recorded as having been found at the base of the escarpment to the west of Burton upon Stather (NLHER 1096) and there are other flint artefacts from the higher ground of the Lincoln Edge to the north of the village (NLHER 1098). A number of stone axes of Neolithic date have also been recovered in the wider vicinity, including a site (Site 5) to the east of Burton Wood. These probably indicate some initial clearance of the woodland within the area during this period. The only indication of possible occupation is a pit containing Neolithic pottery located on the edge of the escarpment to the south of Flixborough (Site 6).

Two late Neolithic or early Bronze Age flint artefacts have previously been recorded within the development area: a scraper (Site 7) and a flake (Site 8), both recovered from the blown sand deposits at the base of the escarpment. Cropmarks in the area, and further south (Site 9) might possibly indicate prehistoric features. A flint arrowhead (Site 10) is recorded from the slope of the escarpment within Burton Wood.

Fieldwalking surveys, especially those carried out for Humber Wetlands Project, produced a range of artefacts (Site 11) within part of the development area and to the south. A scraper and seven flakes collected over a relatively wide area towards the base of the escarpment (Fenwick et al 1998, 165), with a further flint flake (Site 12) found further south.

No specifically Bronze Age sites or finds are recorded within the area of development, the nearest evidence of possible occupation being a single sherd of Bronze Age pottery (NLHER 20464) collected to the east of Burton upon Stather and burials recorded towards the base of the escarpment to the south of Flixborough (Sites 14 and 15). A ring ditch (Site 16) recorded above the escarpment to the east of Burton Wood is probably prehistoric.

This evidence for more permanent occupation may be associated with anthropogenic modification of the floodplain woodland during the period around 2100–1700 BC, as is suggested by a marked decline in lime, and possibly pine, in borehole data from south-west of Flixborough (Lillie 1998a, 35–6). With the exception of finds from the sands along the base of the escarpment there is, however, no evidence for activity of either Neolithic or Bronze Age date from the floodplain within the development area despite both the systematic fieldwalking and the excavation of extensive systems of drains.

Iron Age

There are a number of important Iron Age site along the Lincoln Ridge, but the nearest evidence of Iron Age occupation is the south of Flixborough (Sites 17 and 18). Palaeo-environmental borehole samples, from a transect south-west of Flixborough, suggest the floodplain was an open agricultural landscape by the mid-Iron Age. Within the development area, no evidence for Iron Age activity has been recorded.

Roman

Some sherds of Roman coarseware pottery (Site 19) found towards the base of the escarpment to the west of Burton Wood, but, as is the case for earlier periods, finds of this date are predominantly from the higher ground of the Lincoln Edge. Five coins (NLHER 1088, 1091 and 1092) and a number of sherds of pottery (NLHER 1097 and 20465) have been found to the east of the village of Burton upon Stather and probably indicate that there was a Romano-British settlement on the site of, or near, the existing village. This has been postulated as a likely candidate for the elusive production site of Dales ware pottery. A bronze seal box (Site 26) has been found to the east of Burton Wood. Roman coins (Site 27) and a sherd of pottery (Site 28) have been found on the southern edge of Flixborough village. Pottery (NLHER 19403) and a pit containing a cremation deposit (Site 30) have been recorded further to the south, the cremation probably associated with an area of Romano-British settlement (NLHER 1978) to the south-east near the old Flixborough church.

Medieval

A mid- to late-Saxon settlement and nunnery (NLHER 5018) to the south of Flixborough (Fenwick et al 1998, 159–63; Loveluck and Atkinson 2007) is perhaps the most significant pre-Conquest site within the wider vicinity of the development. Otherwise, the present pattern of villages and hamlets was broadly established by the end of the earlier medieval period, and both Flixborough (NLHER 9594) and Burton upon Stather (NLHER 9563) had been established before the Norman Conquest.

Colonisation and exploitation of the river lowlands during the later medieval period appears to have been limited. The borehole data from palaeo-environmental survey south of Flixborough indicates indicates a mixed woodland and herbaceous heathland habitats at around AD 1100 (Lillie 1998a, 51). The only nearby medieval settlement on the floodplain is located on the far side of the Trent at Marae (Site 40), which had pre-Conquest origins. The outfall of the later Maredyke drainage channel (Site 41) is located adjacent to the hamlet.

The only potential evidence of activity of medieval date within the vicinity of the proposed development is the possible remnants of an area of ancient open strip fields similar to that recorded on the western bank of the River Trent (Miller 1997, 43–6). The fields are rectilinear in form and occupy slightly higher ground adjacent to the river. Historic map sources indicate that some at least had further sub-divisions within the existing boundaries, although the area as a whole has been modified and consolidated by more recent enclosure. In addition, a number of areas of possible former ridge and furrow cultivation (NLHER 20667 and 20668) are located within many of these fields to the west and north of Flixborough Grange. This has been recorded from aerial photographic evidence and LIDAR data (and indicated on Figure 2) within areas of arable cultivation, and none of the ridge and furrow survives as visible earthworks. This could further indicate a medieval origin for the field boundaries within this part of the study area, although the field boundaries are straight rather than curved, possibly suggesting a later date, while some of the cropmarks may be the result of more recent drainage or crop cultivation.

Post-medieval and modern

There is no evidence of permanent settlement within the area of the wind farm until the mid-nineteenth century. The use of the area appears to have been predominantly agricultural during the post-medieval

period, possibly at least in part as open fields before enclosure, and some of the areas of former ridge and furrow cultivation are probably of this date.

The only evidence for post-medieval activity within the area prior to this date is that of a probable gun flint (Site 54) recovered immediately to the west of Burton Wood. This could, of course, be a casual loss from to game shooting, but it is tempting to link it with the attack by Parliamentary troops on the Royalist forces garrisoned at Burton upon Stather in December 1643 (Jarvis 1922, 19).

The development area forms part of the Normanby estate, and estate maps from the eighteenth century onward provide a detailed record of the area. The earliest map, probably from 1724, shows no buildings or structures within the development area and none of the field names suggest any evidence for settlement. The map shows a relatively regular pattern of fields but with notable variations. The fields extend in three or four blocks from the base of the escarpment westwards to the Trent. Because the fields were largely defined by ditches rather than hedges, the enclosure would not have had a great effect on its open aspect. Conversely, the subsequent loss of boundaries in the twentieth century has not greatly affected the visual character of the landscape (Lord and MacIntosh 2011), which still retains a strong rectilinear character while preserving its impression of openness.

Closer to the escarpment, and particularly closer to Burton upon Stather, fields are notably squarer in shape and also in some areas less regular and smaller, suggesting perhaps that these were older enclosures. It seems likely that these enclosures on the lighter, sandier, higher ground would have been favoured for arable or winter grazing while closer to the river, the larger fields could have been hay meadow or summer pasture.

In contrast the fields closest to the Trent are distinctly more rectilinear in form, and also appear to be defined by hedges rather than ditches. The surviving boundaries and distinct nature of this pattern suggests that they were enclosed in a separate phase. Field names on the estate and tithe maps, suggest that most of these fields were either hay meadow or pasture. They probably survived as open fields for some time after the enclosure of the land nearer to Burton village. The estate map of 1778 shows a broadly similar pattern, but with minor changes in the rectilinear fields adjacent to the Trent. Drains had been extended towards the river along some of the field boundaries. St Anne's Well (Site 55) is mapped in Burton Wood towards the summit of the escarpment to the east.

The Flixborough tithe award of 1840 shows the southern half of the development area. Field boundaries largely remain the same as in 1778, although a number of fields have been subdivided and several realigned in the southern part of the area. Within the development area, all of the fields recorded in 1840 tithe award are listed as either pasture or meadow.

Evidence for warping, the deliberate deposition of alluvial deposits in order to increase soil fertility, is limited. Flixborough is considered to be the northern extent of warping within the Trent valley (Lillie 1998b, 102–3), but some warping on the floodplain near Burton Wood is recorded from 1827 (ibid, 110). There is evidence for embankments defining former warping compartments to the north-west of the development area (Site 43). Though shown on the Ordnance Survey map of 1889, these embankments were probably short-lived as they had been cut across by a field boundary by 1869. The southern part of the compartment appears to utilise a former field boundary and is evident as a slight bank surrounding a raised area of ground, as well as being visible as cropmarks on aerial photographs. The ground surface within the surrounding area also appears to be slightly raised in comparison with the fields to the east.

The existing field pattern within the proposed development area had been established by 1869. An estate map of this date, although only of the township of Normanby, the northern part of the area, indicates that the principal change to the field pattern was the replacement of the smaller, less regular fields along the eastern edge of the area and to the south of Burton upon Stather with a regular pattern of fields to either side of a new or extended drainage cut, the Burton and Flixborough Drain. These fields are as mapped on the later Ordnance Survey map of 1889. The rectilinear fields adjacent to the Trent mostly remain as mapped in 1778 and 1840, although there have been some minor subdivisions and realignments. The surviving boundaries in this area are currently mostly defined by drainage ditches, with few surviving lengths of hedge.

Flixborough Grange (Site 44) was probably established at the time that the field boundaries to the north-east were realigned, but the 1869 map does not extend as far as the farm. It was therefore probably

established in the mid-nineteenth century as a farmhouse, with a range of farm buildings to the north, as part of a substantive agricultural improvement of the area. It is shown on the Ordnance Survey map of 1889. A smaller group of buildings (Site 45) to the north no longer survive.

Two other small nineteenth-century buildings were located to the west of Burton Wood (Site 46) and just within the wood (Site 47). Both were probably barns or similar agricultural buildings. Neither survives, although quantities of brick and tile are visible in the vicinity of Site 46. Two buildings to the west of Flixborough Grange, one of which was recorded as a wind pump in 1906 (Site 48), have also been lost from the landscape.

A pit in Burton Wood, to the east of Flixborough Grange (Site 50), is labelled as 'Old Sand Pit' on the Ordnance Survey map of 1906; the site remains visible. A further sand pit (Site 53) is recorded to the north. The 1906 map also shows two small structures (Sites 51 and 52) to the north and south-east of Flixborough Grange, both presumed to have had an agricultural function. Neither survives.

With the exception farm buildings at Flixborough Grange, no structures were built within the area of the development during the twentieth century. All of the earlier buildings and structures, apart from Flixborough Grange itself, were demolished during this period. A number of small fields were amalgamated or modified by removal of hedges and infilling or drainage ditches, especially during the second half of the century. The principal change to the landscape from the mid-twentieth century was the development of industrial facilities adjacent to Flixborough wharves. Production of fertilisers dated from 1941, with the Nypro plant established in 1964. Following to the disaster of 1974 the site was redeveloped as the existing Industrial Estate.

2.3 Previous archaeological work

Field surveys

Detailed site walkover inspections in December 2007 and February 2008 were undertaken on all areas of that would involve ground disturbance, with the area of the access road being added in December 2008. All areas within the footprint of the proposed development were systematically walked in transects. All areas were under recently sown and sprouted arable crops. Conditions for the recognition of surface artefacts were reasonable to good (Caldwell 2010)

Finds were largely limited to fragments of modern ceramic drainage tile, modern pottery, brick, tile, concrete (or a conglomerate) and some modern rubbish. Fragments of brick and tile, and modern and possibly post-medieval pottery were identified within the location proposed for the construction compound and switchgear building and in the area to the north, while a probable gun flint (Site 54) was also recovered.

Some surface finds were also noted within the area of previously recorded sites. These included a modern brick and roofing tile in the area of Site 46 (nineteenth century agricultural building) and some further tile in the general vicinity of Site 52 (twentieth century agricultural building). No finds were noted in the area of Site 48 (wind pump) or Site 51 (twentieth century agricultural building).

Geophysical survey

A magnetometer survey was undertaken on the proposed site of the 1.2 ha area of the construction compound and switchgear building, taking readings at 0.25 metre intervals on transects one metre apart (GSB 2008). This identified a few linear trends running parallel to the eastern edge of the field at regular intervals (20m) which seem to coincide with deeper ruts and therefore are assumed to be the result of modern ploughing practice. Other trends are weak and also suspected to be due to modern agricultural activity or the result of natural variations within the soil.

Strong ferrous responses were noted in the south-eastern corner of the survey area, corresponding to the corner of the field, and numerous ferrous responses were also seen along the eastern edge of the survey area adjacent to the trackway. None of the responses were identified as potential archaeological features, and they were assumed to be modern in origin because of their correlation with current landscape. Trends within the data seem to belong to past ploughing phases, although some could be due to natural variations within the soil.

Despite the conclusion of the report that 'no responses were identified as potential archaeology', a possible curving trend, consistent with the northern ditch of an ovoid enclosure was subsequently identified within the summary greyscale data included in the GSB report and a NLHER record (20751) was created as a precautionary measure.

Sedimentology study

A sedimentology study was undertaken in 2008 (Smith and Lillie 2008). Twenty boreholes to 5.75m deep were excavated: thirteen in an east-to-west transect across the floodplain area, at 100m intervals, and the remainder at the footprint positions of the proposed wind turbines. The sequences identified in the cores represent a combination of inorganic alluvial deposits associated with channel migration in the floodplain, channel aggradation, and towards the upper part of the sequences a combination of overbank flood deposits and fine-grained alluvium, or deliberate sedimentation produced by 'warping' (cf. Lillie 1998a). On the eastern margins of the floodplain, organic sequences indicative of either channel abandonment and infilling, or floodplain margin deposits (mire) were encountered.

The study concluded that the development 'area has a good potential for the recovery of palaeo-environmental evidence for the Late Mesolithic through to middle Bronze Age periods of landscape development in this region. However, the contained sequences are generally buried beneath c. 3.00-5.00 m of alluvium and warp deposits. The exception to this general trend occurs at WT1'. It was suggested that significant sediment removal or compaction during construction of the wind turbines 'had the potential to compromise this part of the archaeo-environmental resource …The sequences at WT1 have considerable potential in relation to the identification of sea-level change … and the reconstruction of Holocene vegetation change from at least the later Mesolithic onwards. This particular location could represent a rare opportunity for such investigations in the lower reaches of the Trent valley system. … This is an unusually long and high quality sequence from the region, therefore a strong case can be made for more detailed investigation which would at least permit preservation by record in case the sequence was deleteriously affected by dewatering and disturbance of the floodplain'.

Cultural heritage assessment

The results of the surveys were used in the formulation of an updated Environmental Statement in support of the re-submitted planning application and the subsequent appeal (Wind Prospect Developments 2010), which was also supported by the updated WSI (Cardwell 2010).

This WSI outlines the principal elements of the archaeological mitigation strategy:

> Further investigation and analysis of the sedimentological sequences in the area of turbine T1 in advance of construction
>
> A programme of 'strip, map and sample record' in the area of the proposed temporary construction compound and switchgear building
>
> A programme of observation, investigation and recording (or 'watching brief') in the area of the turbine foundations, associated hardstandings and access tracks during construction
>
> A subsequent programme of assessment, analysis, report preparation and archiving

The WSI included details of all the heritage assets within a study area based on the proposed development, summarised in Table 1 above.

3 Methods

3.1 Standards and monitoring

All archaeological work was undertaken in accordance with CIfA standards and guidance (CIfA 2014). Network Archaeology is a CIfA Registered Archaeological Organisation and the standards represented by that designation were adhered to throughout.

3.2 Aims and objectives

The principal aim of the programme of archaeological mitigation was to enable the character, extent and form of past activity within the development area to be established, to better inform an understanding of the history and development of the local area in line with regional and national research objectives.

The main objectives were to:

Establish the nature and extent of any archaeological features within the development area and undertake appropriate investigation and recording.

Establish the presence, nature and sequence of any areas of occupation and, where present, to investigate such areas to determine their form, and record evidence for domestic, agricultural or industrial structures and any associated activities.

Where possible, establish absolute and relative chronologies for the various activities and features represented.

Investigate the nature and pattern of the landuse and environment within the wider landscape through an appropriate sampling strategy.

Produce a report on the results of the work suitable for publication within an appropriate journal, and for deposition within both the North Lincolnshire Historic Environment Record and the National Monuments Record.

Undertake a scheme of works that meets with the professional standards for archaeological work both nationally and within area of the North Lincolnshire Sites and Monuments Record.

Establish the sequence of landscape change and the vegetational history by means of sedimentological investigation within the development area.

The last of these objectives is addressed in a separate report by the Wetlands Archaeology and Environments Research Centre at Hull University.

3.3 Work undertaken

There were two elements of the work undertaken. In the area encompassing the temporary construction compound and switchgear building, a controlled strip of topsoil and subsoil, mapping and sample excavation, as necessary, was carried out.

Elsewhere, topsoil and subsoil removal was monitored in a watching brief. These areas included the six turbine bases with their adjacent temporary 40m by 30m working areas, the access roads to each of the turbines, with a combined length of 3.2km, and the 1.8km-long temporary access road to Flixborough Wharf. The depth of topsoil and subsoil removed varied across the site but was typically between 250 and 400mm. Excavation of trenches to hold the cables from the turbines, generally running alongside the access roads, was also monitored. A pre-existing overhead electricity cable supplying Grange Farm was re-routed underground by the distribution network operator, and the excavation of the trench for this, though not covered by the planning conditions, was also intermittently monitored.

The sites of the turbine bases and their associated working areas have been numbered WT1 to WT6, from south to north (Fig 2). In referring to the access roads, the route from the site entrance to WT6, the most northerly of the wind turbines, has been designated as WT6 access. Branching from this route are WT1, WT2, WT4 and WT5 access roads, while WT3 access refers to the branch from the junction with WT4 access. In site records chainages are used to specify the location of observations. These are measured from the site entrance in the case of WT6 access and, for the others, from their branching point. For the temporary access road from Flixborough Wharf, chainages are measured from the western, wharf end.

3.4 Methods

A qualified and experienced field archaeologist supervised the stripping of topsoil from the compound area, directing the machine operator on the depth of excavation and ensuring that the stripped surface was clean of overburden. Provision was made for groundworks to be halted to allow hand cleaning of exposed surfaces of the deposits where necessary to make an informed initial assessment of their significance.

Removal of topsoil and, where necessary, subsoil was monitored in the other areas of the development, though the machining was not under the direction of the attending archaeologist. Where remains were found and investigated, this was carried out so as to minimise any interruption to construction activities.

In both cases, archaeological deposits were planned and a sufficient sample hand excavated, in a controlled and stratigraphic manner, to allow detailed recording, artefact retrieval, and soil sampling. This was carried out by the attending archaeologist, but had more complex remains been uncovered, provision had been made for mobilisation of a larger excavation team.

Site recording followed normal Network Archaeology practice. All records bear the project code GRA16. A context number series was used to identify all archaeological deposits and pro forma record sheets were used for on-site recording. Any significant features were located either by hand or by dGPS survey equipment, as appropriate. Section drawings were made of significant archaeological deposits. Digital and monochrome 35mm film photographs were take of excavated features as well as overall shots of the site and work in progress.

Finds, if not clearly of modern origin, were retained, cleaned, marked, packaged and stored in accordance with current CI*f*A guidelines. These were subsequently assessed by suitably experienced finds specialists. Provisions were in place for dealing with especially significant or delicate finds, finds covered by the Treasure Act 1996 or the discovery of human remains.

4 Results

4.1 Stratigraphy

Over most of the development area, the topsoil is a dark greyish brown sandy silt-loam. It is generally free of inclusions though there are occasional small angular stones and rounded pebbles. At a depth of around 300 or 350mm this grades into a more homogeneous subsoil layer, siltier and largely devoid of any coarse inclusions (Fig 6). In places, this layer is no more than 60mm thick, although towards the main Burton and Flixborough drain, it is thicker, with a noticeably stickier consistency (Fig 7). Below, there is a fairly clear horizon with the underlying alluvial silts, which are generally a paler sandy buff brown in colour.

Towards the eastern edge of the development area, the topsoil is a paler mid-grey brown colour and has a noticeably sandier composition and a lighter, more friable consistency. The horizon with the subsoil layer is more clearly defined in this area. Towards the east, where the ground begins to visibly rise, the underlying deposits become increasingly sandy, and are mottled buff and sandy orange towards the access road along the eastern edge of the site. Apart from occasional small gravelly stones and chalky flecking, these deposits are free of inclusions.

The topsoil, subsoil and underlying deposits were separately numbered and recorded in the different turbine base and access road areas. There were variations between areas reflecting the complex sedimentational history of the Trent basin, but in the limited window presented by the stripped areas open at any one time, it was not possible to see and record any clear large-scale patterns in these drift deposits. A possible palaeochannel, *022*, was an exception, showing up as an irregular darker band in the access track to WT6.

The earliest clear evidence of human activity was provided by two pieces of worked flint, from context *003* and as unstratified surface finds, *005*. Both pieces were recovered from within the temporary compound area, on the lighter sandy soils below the Burton Wood. Neither of these stray finds is closely datable but a late Neolithic or early Bronze Age date is most likely for both.

One of these pieces of flint was recovered from a roughly circular shallow patch of dark soil *003* located at the southern limit of the temporary compound area. This was up to 6m across, but not more than 220mm deep. Although clearly visible in plan, the dark grey-brown silty deposit was increasingly mixed with sandy deposits, forming lenses and more extensive thin layers, so that the interface with the underlying aeolian sands was very unclear (Figs 4, 8). In addition to the flint, finds included pottery sherds and frequent small fragments of vitrified cindery material. This material does not appear to be characteristic of slag from any common metal-working process and is most likely furnace waste laid down to consolidate a patch of ground around an access to the field, poached by livestock or, more likely, rutted by farm traffic. The finds from the layer range in date from the worked flint to post-medieval pottery.

Remnant infilled furrow bases were visible beneath the topsoil in the stripped surface in a number of places, including WT6 access track. WT4, WT5 (Fig 9) and WT3 (respectively: contexts *052*, *058*, *059,* and *60*). The furrows, showing up most clearly over areas of paler subsoil, were shallow, and typically on a 6m to 7m spacing. They were seen most clearly in the access track to WT6, either side of the junction to the WT4 access, where the east-to-west aligned furrows showed as a regular shallow scalloping in the side baulks. Although there was no dating evidence from any of these features, they are typical of medieval or early post-medieval ridge and furrow land management.

The earliest surviving estate maps show that much of the area was enclosed by the early eighteenth century. Although the extant pattern of land division shows basic similarities to that shown on the early maps, there has been considerable re-alignments and modification, with loss of old boundary and drainage ditches.

Ditch 048 was recorded in WT4 on a north-to-south orientation, as a linear feature with a regular V-shaped profile (Figs 5, 10). Its position corresponds with a field boundary shown on the estate map in 1778 as the western side of a hedged enclosure labelled 'X1', but is not shown on either the earlier estate map, thought to date from 1724 nor the 1840 Normanby tithe map, although its counterpart to the south, labelled 'Y1' on the 1778 map, is shown as still surviving on the tithe map. The lifetime of Ditch 048 can therefore be dated, with a fair degree of confidence, to lie within the period between 1724 and 1840. The fill of the ditch, *047*, was a compact mid-brown homogeneous silty clay, with few inclusions, suggesting that the ditch filled by silting rather than by deliberate infill.

Feature 023 may also have been a remnant drainage ditch, but survived only as a shallow silty band barely, visible in section, running alongside the access road to WT2, on the line of the track to Flixborough Grange.

During the nineteenth and twentieth centuries, it is likely that drainage was installed and maintained throughout the area of the wind farm; land drains were explicitly recorded or noted in a number of locations, where the drains were sufficiently shallow to be exposed by topsoil stripping. North-to-south aligned drains, *057*, were recorded in WT4, and the WT6 access road at NGR's 416706 486059, 416699 486105 and 416701 486114, and east-to-west aligned drains in WT3 and WT5 (Fig 11), *054* and *051*, respectively, and in the compound area, *061*. Towards the west end of the track to the stathe, along the southern edge of the development area, different phases of land drains, *062*, could be seen running eastward towards the Burton and Flixborough drain and south into the drain alongside the railway track (Fig 12). Although only noted in these areas, it is probable that least three phases of land drainage probably extend throughout the development area.

A spread of building bricks and other modern building rubble, *050*, clearly visible in section in the WT6 access track, to the north of WT5, is likely to be the remains of an agricultural building that once stood at this location (Figs 13, 14). A passing informant spoke of a 'Dutch barn' here, 'demolished in the 1950s'.

There were several dumps of late nineteenth- and early twentieth-century bottles and other domestic refuse alongside the track leading from the site entrance westward towards Flixborough Grange. There was a particular concentration, *055*, at the dyke crossing, by the bend in the track, but there were smaller dumps near to the site entrance. A representative mineral water bottle was retained, from topsoil *041* in this area.

Especially in the lighter soils towards the eastern edge of the development area, plough scores were visible in the stripped surface, disturbing the surface of the underlying drift deposits. They were recorded in the compound area as context *004*.

Very occasional post-medieval and modern pottery sherds were found throughout, but it was noted that these were more frequent in the area around and between WT3 and WT4. This very sparse 'spread' of unstratified finds was assigned the context number *053*. Appendix A summarises all the recorded contexts.

4.2 Finds

A catalogue of all the recovered finds is included in Appendix B. Post-excavation assessments of each category of artefact recovered during the fieldwork were compiled. These included recommendations for any further work, a conservation assessment and recommendations for archive retention and storage. A

single 30 litre soil sample from layer *003* was taken. However, as this layer was relatively shallow and is not well dated, its potential for environmental analysis is considered to be low, and it has not been processed.

Flint (David Bonner)

Two pieces of struck flint were recovered from the area of the temporary construction compound (Figs 15a and b), one within layer *003* and the other an unstratified find, *005*, from the subsoil surface at NGR 486649 415832. The unstratified piece has with a small patch of cortication and may have been a rejuvenation or waste flake, but could equally have been intended for use. Though not datable, it is most likely to be of late Neolithic or early Bronze Age provenance. The piece from layer *003* is corticated on one side but otherwise has a very fresh appearance. It is possibly a snapped off flake but appears more likely to be the result of recent plough damage. The two pieces are very different in appearance, the piece from context *005* being speckled with cherty inclusions while that from layer *003* is much more homogeneous.

Flint may occur occasionally in the drift deposits overlying the Lincoln ridge immediately to the east, but both pieces probably reached the site by human agency rather than natural occurrence. They add to a small number of flints previously recorded from the same area (see Table 1 above).

Pottery and other ceramic materials (Jane Young)

An assemblage of fourteen sherds, representing thirteen vessels in total, three fragments of ceramic material and twenty-one pieces of fired clay was submitted for examination. The pottery ranges in date from the post-medieval to the early modern period. The assemblage was quantified by three measures: number of sherds/fragments, weight and vessel count within each context. Fabric identification of the ceramic building material and fired clay was undertaken by x20 binocular microscope. Recording of the assemblage was in accordance with the guidelines laid out in Slowikowski et al. (2001), and complies with the Lincolnshire County Council's Archaeological Handbook (sections 13.4 and 13.5).

The material is almost entirely in poor and abraded to very abraded condition. Sherd size falls into the small to medium size range (below 50g). Only one vessel is represented by more than a single sherd. Eight different pottery ware types were recognised including local, regional and imported types. The material mostly spans the period between the nineteenth and mid-twentieth centuries. The catalogue (Appendix C) gives further details.

Five sherds representing four vessels are of post-medieval type. These include earthenwares (BL), slipwares (SLIP) and stonewares (FREC and LONS). A sherd from a Black-glazed ware (BL) vessel is in an orange fine-medium sandy fabric that may have been produced in the Humber area during the eighteenth century. A small sherd in a light orange fabric comes from a decorated Slipware (SLIP) press-moulded dish. The eighteenth century dish is decorated with joggled yellow, tan and dark brown glazing. A small sherd comes from a German Frechen-type stoneware (FREC) drinking jug of late sixteenth- to seventeenth-century date. Two other stoneware sherds come from a larger London-type bottle or Bartmann (LONS) of eighteenth century date.

Nine sherds are from early modern industrially produced vessels. The earliest sherd is probably a tiny Pearlware (PEARL) flake of late eighteenth- to mid-nineteenth-century date. The sherd is too small to identify the original form but has blue-panted decoration. A small Whiteware (WHITE) sherd with cornflower blue sprigged decoration is of mid-nineteenth-century date. Three of the four Transfer-printed whiteware sherds (TPW) come from vessels of general nineteenth- to mid-twentieth-century date. The other sherd is from a nineteenth-century bowl with printed black floral decoration. Three stone ware sherds are of early modern English-type (ENGS). They include a flat lid of nineteenth- to mid-twentieth-century date and a fluted jam or lard jar of late nineteenth to mid-twentieth-century date.

High-temperature residues

A representative sample of approximately twenty-five fragments of the slaggy material from context *003* were collected by hand during excavation. These weighed 45g in total. The material is frangible with some pieces within the assemblage re-fitting. The pieces generally have a pale buff-brown external surface with occasional small patches of oxidised brick-red coloration. Areas of vitrification indicate exposure to high temperatures.

Where broken, the internal surfaces show a mid- to dark grey colour, indicating reducing conditions. The material has a fine vesicular texture, and is of very low density. It shows no magnetic response. It does not have the characteristic appearance and colour of the fayalitic slags produced in ferrous metal processing.

Temperatures high enough to produce vitrification were rarely achieved [in non-metallurgical processes] in antiquity, although occasionally pottery, brick and tile kilns became too hot and the ceramics inside were overfired (Bayley et al 2001, 21). It is therefore likely that this material is furnace clinker resulting from a relatively modern industrial process. Its occurrence in a layer in the corner of a field is perhaps best explained as its use to improve drainage around an access-way. Another possible interpretation is that it could be residue of a refractory layer from the base of a farrier's forge, temporarily set up on the track-side while shoeing horses.

Glass

A mineral water bottle from context *041* has had the neck broken off but is otherwise complete. The moulded design includes the wording 'SLACK'S MINERAL WATER CO. DONCASTER'. This bottle could have dated from the late nineteenth to first half of twentieth century. The history of Slack's Mineral Water Company of Balby would need far more research than is warranted here but it was clearly flourishing in 1925 when it was authorised by the Home Secretary to employ women to wash bottles (London Gazette 2 Aug 1925, 5278 https://www.thegazette.co.uk/London/issue/33073/page/5278/data.pdf)

One other piece of glass, from layer *005* is not readily identifiable. It is cleanly broken into two re-fitting pieces, and forms a segment of an arc with a radius of around 250mm. It has overall maximum dimensions of 55mm by 16mm by 7mm and is in a pale green hard glass with a slightly delaminating surface giving it an opaque but lustrous surface (Fig 16). The outer side of the curve has a slightly roughened surface and a rounded profile. Part of the inner side has a similar finish, but the rest has circumferential striations where it has been ground out, to meet the outer surface at an acute angle. The lack of finish would tend to preclude anything but a strictly utilitarian function, perhaps as glass pipework or a vessel for carrying corrosive liquids. A connection with the chemical works to the south of the site is not implausible.

Ceramic Building Material (Jane Young)

Layer *003* in the compound area produced three very abraded fragments of ceramic building material (RTMISC). The pieces are too abraded to identify with any certainty but at least one fragment may come from an early modern handmade brick.

Nineteen pieces of very abraded and friable fired clay were recovered from the fill of a hollow (deposit *022*). The material is mainly small sintered inner flakes of which some have a glassy slag, possibly fuel-ash, adhering. Topsoil layer *034* produced two joining formless lumps of very abraded fired clay. The pieces are in a micaceous fabric that contains some vegetal voids suggesting the use of dung. These fragments could come from structural remains or an object of prehistoric to early modern date.

Clay tobacco pipe

Two pieces of clay pipe were recovered. A fragment of stem from context *036*, the topsoil from WT3, is 35.8mm long and 7.7mm in diameter, with a 2.2mm hole. A fragment of the side of a bowl, from context *031* is 14.6mm high and 14.1mm wide, with a thickness of 2.2mm. Neither piece has any pattern or other distinguishing features. Apart from dating from the period when clay tobacco pipes were in use, these pieces are not datable.

4.3 Archive summary

The documentary archive for the project consists of three context index sheets, sixty-two context sheets, one drawing index sheet, four permatrace drawings sheets, seven photographic index sheet and copies of the WSI and this report.

Along with any retained finds, this will be deposited with North Lincolnshire Museum.

5 Interpretation

The archaeological works described above provide little or no evidence of any use of the land apart from agriculture within the immediate area of the development. The interpretation for the lack of early remains is complicated by the accretion of alluvial deposits, by flooding or deliberate warping, that is known to have taken place in this area. The possibility of buried archaeological deposits surviving at depth the alluvium cannot be discounted. The sedimentology study (Smith and Lillie 2008) found that deposits dating to the early prehistoric period were sealed beneath three to five metres of alluvium or warp.

The palaeo-environmental suggests that this part of the lower Trent valley is likely to have been, in later prehistoric periods, poorly drained land with alder or willow carr and areas of wet acid heathland vegetation. Open areas may have been used for summer grazing and hay meadows, and it is likely that, over time, areas of the flood-plain would have been cleared to expand these uses. The slightly higher eastern areas with lighter soils may have been used for arable cultivation or for winter pasture.

The recovery of two pieces of struck flint, adding to a small assemblage previously recorded from the site, demonstrates that there was some prehistoric activity in the area.

Furrows from ridge and furrow cultivation were recorded in four widely dispersed locations: the compound area, WT3, WT4 and WT5, and it is probable that in the later medieval or earlier post-medieval period much of the land was ploughed. Ploughing in ridges would have facilitated water run-off and allowed an expansion of arable production with use as pasture in periods of fallow. Similar agricultural regimes were probably in use in both Flixborough and Normanby parishes.

There was no indication of the possible circular feature tentatively identified in the geophysical survey of the area of the temporary works compound and recorded as NLHER 20751.

Overall, the sparcity of finds is particularly notable and suggests the development area has not seen any sustained activity, other than agriculture, at least in more recent historic periods. Archaeological scrutiny of the site during the course of this project, amounted to around 200 hours of monitoring, and covered a total area of nearly 3 hectares of topsoil stripping: it is surprising that only thirteen sherds of pottery were recovered, all but one sixteenth- to seventeenth-century piece dating to the eighteenth century or later. There is little evidence here of the incorporation of domestic waste from the spreading of manure. The relative remoteness from the small settlements of Flixborough, Burton upon Stather and Normanby along with the probable reliance on winter flooding and warping to improve soil fertility could be invoked to account for this. Dumps of more recent rubbish, from the mid-nineteenth century or later, were noted, though, with the exception of the glass finds, not sampled. It is likely that these were associated with the establishment and occupation of Grange Farm.

6 Conclusion

The controlled strip and watching brief confirmed that that the cultural heritage significance of the surface and immediate sub-surface deposits directly affected by the development of the wind farm was low. The installation of the wind turbines and ancillary structures had a negligible impact on these deposits.

The archaeological work provided evidence, in the form of two pieces of struck flint, for a low level of prehistoric activity near the base of the slope of Burton Wood, adding to the stray flint finds recovered from the immediate environs of the development site during the pre-construction surveys and recorded on the HER.

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Jane Young, post-Roman ceramic specialist

Appendix A: Summary of recorded contexts

Context	Type	Interpretation	Description	Central NGR	
1	Layer	Topsoil in compound area	Mid-grey brown, sandy loam	486640	415820
2	Layer	Natural in compound area	Buff-brown, silty sand	486640	415820
3	Layer	Dark layer in compound area	Dark grey mottled sandy buff, silty sand	486639	415771
4	Cut	Modern plough scores in compound aera	Parallel shallow linear features, showing darker in stripped surface	486640	415820
5		Unstrat finds, compound area		486640	415820
6		NOT USED			
7		NOT USED			
8		NOT USED			
9		NOT USED			
10	Layer	Topsoil west section wharf road	Dark grey-brown sandy silt loam, occ small stones, 300-350mm thick	485880	414910
11	Layer	Subsoil west section wharf road	Dark grey-brown stick clay silt loam, few inclusions, 60-70mm thick	485880	414910
12	Layer	Natural west section wharf road	Yellowish sandy buff sandy silt	485880	414910
13	Layer	Topsoil central section wharf road	Mid- to dark buff brown, sticky silty clay loam, to 400mm thick	486100	415040
14	Layer	Subsoil central section wharf road	Sticky, plastic, dark yellowish buff silty clay, to 100mm thick	486100	415040
15	Layer	Natural central section wharf road	Mottled sandy yellow and buff brown clay silt	486100	415040
16	Layer	Topsoil east section wharf road	Mid-grey-brown friable sandy silt loam, to 400mm, few inclusions	486340	415025
17	Layer	Subsoil east section wharf road	Mid-grey-brown clay silt, few if any inclusions, to 120mm thick	486340	415025
18	Layer	Natural east section wharf road	Mottled buff and sandy orange sandy silt, sandier to west	486340	415025
19		NOT USED			
20	Layer	Topsoil WT6	Mid-brownish grey silty loam, friable where not wet, to 180mm thick	485910	416900
21	Layer	Subsoil WT6	Mid-buff brown, cohering clay silt, v. occ small stones. grading into natural clay below	485910	416900
22	Fill	Fill of natural hollows, WT6 access track	Dark grey silty clay to 80mm, amorphous patches in paler sandy natural	486135	416695
23	Cut	Linear feature, old field boundary or drain	Shallow linear, ~1m wide, 130mm deep, vis for 5.5m+	486334	415779
24	Layer	Topsoil WT6 access (1350m upwards)	Mid-brownish grey silty loam, cohering but friable where not wet, to 180mm thick	486100	416700
25	Layer	Subsoil WT6 access (1350m upwards)	Mid-buff brown, cohering clay silt, v. occ small stones	486100	416700
26	Layer	Natural WT6 access (1350m upwards)	Mid-brownish grey silty loam, friable where not wet, to 180mm thick	486100	416700
27	Layer	Topsoil WT6 access (1000 -1350m)	Mid-buff brown, cohering clay silt, v. occ small stones. grading into natural clay below	486330	416320

Context	Type	Interpretation	Description	Central NGR	
28	Layer	Subsoil WT6 access (1000 upwards)	Mid-buff brown, cohering clay silt, v. occ small stones	486330	416320
29	Layer	Topsoil WT5	Mid-brown, sandy-silt clay	486265	416545
30	Layer	Subsoil WT5	Mid-grey brown silty clay	486265	416545
31	Layer	Topsoil WT4 access	Mid-brownish grey silty loam, friable where not wet, to 180mm thick	486050	416375
32	Layer	Subsoil WT4 access	Mid-buff brown, cohering clay silt, v. occ small stones. grading into natural clay below	486050	416375
33	Layer	Natural WT4 access	Mid-brownish grey silty loam, friable where not wet, to 180mm thick	486050	416375
34	Layer	Topsoil WT4	Mid-brownish grey silty loam, friable where not wet, to 180mm thick	485830	416440
35	Layer	Subsoil WT4	Mid-buff brown, cohering clay silt, v. occ small stones. grading into natural clay below	485830	416440
36	Layer	Topsoil WT3	Mid- to dark buff brown, sticky silty clay loam, to 400mm thick	485950	416190
37	Layer	Subsoil WT3	Sticky, plastic, dark yellowish buff silty clay, to 100mm thick	485950	416190
38	Layer	Topsoil WT6 access (400-1000m)	Mid-grey brown, sandy loam	486270	416100
39	Layer	Subsoil WT6 access (400-1000m)	Mid-grey brown silty clay	486270	416100
40	Layer	Natural WT6 access (0-1000m)	Buff-brown, silty sand	486200	415790
41	Layer	Topsoil WT6 access (0-400m)	Mid-grey brown, sandy loam	486430	415780
42	Layer	Subsoil WT6 access (0-400m)	Buff-brown sandy silt	486430	415780
43	Layer	Topsoil WT1	Mid-grey brown, sandy loam	186130	415510
44	Layer	Subsoil WT1	Mid-grey-brown, sandy silt clay	186130	415510
45	Layer	Topsoil WT2	Mid-greyish brown, sandy loam	486200	415910
46	Layer	Subsoil WT2	Mid-grey-brown, sandy silt clay	486200	415910
47	Fill	Fill of linear feature 48	Dense, compact plastic mid-brown silty clay, few inclusions	485817	416444
48	Cut	Linear feature, modern field boundary	Linear, v-shaped profile, ~1m wide, 600mm deep, N-S, 25m visible	485817	416444
49	Fill	Fill of linear feature 23	Dark grey sandy clay silt, no inclusions noted	486334	415779
50	Layer	Spread of demolition rubble WT6 access Ch 1370	Two disrupted courses of red house-bricks within topsoil, not apparently mortared	486320	416680
51	Cut	Land drains WT5		486265	416535
52	Layer	Remnant R+F WT6 access Ch 1000	E-W shallow furrows showing in trench side as undulating base of topsoil	486295	416535
53		Finds: modern pottery concentration	Diffuse spread of mod pottery in area around WT3 and WT4 bases	485900	416300
54	Cut	Land drains WT3	Land drains, E-W following alignment of earlier R+F	485955	416170
55	Layer	Bottle dump WT6 access Ch 200	Large dump of ash, glass bottles, other domestic rubbish in side of drain	486460	416770
56		Location of soil sample Hull univ.	Machined trench to peat deposit at ~1.4m depth		

Context	Type	Interpretation	Description	Central NGR	
57	Cut	Land drains WT4	Ceramic land drains, aligning with earlier furrow	485820	416950
58	Layer	Remnant R+F WT4	E-W furrows showing in stipped surface	485820	416950
59	Layer	Remnant R+F WT5	E-W furrows, showing as darker grey bands between truncated ridges	486270	416550
60	Layer	Remnant R+F WT3	E-W furrows, showing as dark bands, approx 6-7m spacing	485955	416170
61		Land drains compound area	Ceramic drains: E-W shallow round	486270	416550
62		Land drains, Flixborough Wharf access	Land drains; ceramic: N-S shallow, flat topped, E-W shallow round; plastic E-W deep	485930	415970

Appendix B: Catalogue of finds

Context	Material Type	Provisional date	Description
002	Flint	?Prehistoric	Located GPS: 486649E 415832N
003	Flint	?Prehistoric or ploughstruck	
003	C.B.M	?	May include daub, but most probably post-med or mod.
003	Slag/clinker	?Modern	
003	Pottery	Modern	Fragment of plate
004	Pottery	Post-med	Glazed stoneware
005	Glass	Post-med/mod	
013	Pottery	Post-med	Combed-glazed
022	Burnt clay	?	
024	Pottery	Post-med	Stoneware
024	Pottery	Modern	Willow pattern
024	Pottery	Modern	White glaze; green floral pattern
024	Pottery	Modern	Willow pattern
031	Pottery	Modern	Blue and white glaze
031	Pottery	Post-med/mod	Black glazed
031	Pottery	Post-med/mod	Glazed stoneware
031	Pottery	Post-med/mod	White glazed with blue-glazed embossed dec.
031	Clay pipe	Post-med	Fragment of bowl
031	Clay pigeon	Modern	
034	Burnt clay	?	Two pieces of fired clay
036	Pottery	Modern	Glazed stoneware
036	Clay pipe	Post-med	Stem fragment
041	Glass	Modern	Mineral water bottle

Pottery archive: Jane Young

Context	Cname	Sub fabric	Form type	Sherds	Vessels	Weight	Decoration	Part	Action	Description	Date
003	PEARL		?	1	1	1	blue painted	BS	discard	tiny flake	late 18th to mid 19th
004	FREC		drinking jug	1	1	7		BS			late 16th to 17th
013	SLIP	light orange	press mould dish	1	1	14	joggled yellow tan & dark brown	BS			18th
024	LONS		large Bartmann/bottle	2	1	63		BS			18th
024	TPW		bowl ?	1	1	7	black printed floral design	BS	discard		19th
024	TPW		cup ?	1	1	1	blue printed	BS	discard		19th to 20th
031	BL	light orange fine-med sandy	hollow	1	1	3		BS		ext glaze	18th
031	WHITE		?	1	1	1	cornflower blue sprigged	BS	discard		mid 19th
031	TPW		cup ?	1	1	3	blue floral printed	BS	discard		19th to mid 20th
031	TPW		?	1	1	7	blue printed	base	discard		19th to mid 20th
031	ENGS	buff	?	1	1	10		BS	discard		19th to mid 20th
031	ENGS	light grey	lid	1	1	19		rim	discard	flat lid	19th to mid 20th
036	ENGS	buff	jam/lard jar	1	1	11		BS	discard	fluted	late 19th to mid 20th

Ceramic building material and fired clay archive: Jane Young

Context	Cname	Fabric	Frags	Weight	Action	Description	Date
003	RTMISC	fine orange sandy	1	1	discard	very abraded flake	Roman to early modern
003	RTMISC	fine orange sandy	1	1	discard	very abraded flake	Roman to early modern
003	RTMISC	coarse orange	1	10	discard	very abraded inner flake; prob late post med to emod brick	Roman to early modern
022	FIRED CLAY	oxid & part reduced micaceous	19	19	discard	very abraded crumbling inner flakes; fabric contains common fine quartz & mod to comm vegetal voids	-
034	FIRED CLAY	OX/R/OX micaceous	2	41		joining frags; very abraded lump c.44mm thick; some vegetal voids	-

Appendix D: OASIS form

OASIS DATA COLLECTION FORM: England

List of Projects | Manage Projects | Search Projects | New project | Change your details | HER coverage | Change country | Log out

Grange Wind Farm, Flixborough - Network Archaeology Ltd

OASIS ID - networka2-225868

Versions

View	Version	Completed by	Email	Date
View 1	1	Richard Moore	richardm@netarch.co.uk	7 October 2015
View 2	2	Richard Moore	richardm@netarch.co.uk	8 October 2015

Completed sections in current version

Details	Location	Creators	Archive	Publications
Yes	Yes	Yes	Yes	1/1

Validated sections in current version

Details	Location	Creators	Archive	Publications
No	No	No	No	0/1

File submission and form progress

Grey literature report submitted?	No	Grey literature report filename/s	
Boundary file submitted?	No	Boundary filename	
HER signed off?		NMR signed off?	

Grey literature | Upload images | Upload boundary file | Request record re-opened | Printable version

Email North Lincolnshire SMR about this OASIS record

OASIS: Please e-mail Historic England for OASIS help and advice
© ADS 1996-2015 Created by Jo Gilham and Jen Mitcham, email Last modified Thursday 13 August 2015
Cite only: http://www.oasis.ac.uk/form/formctl.cfm?oid=networka2-225868 for this page

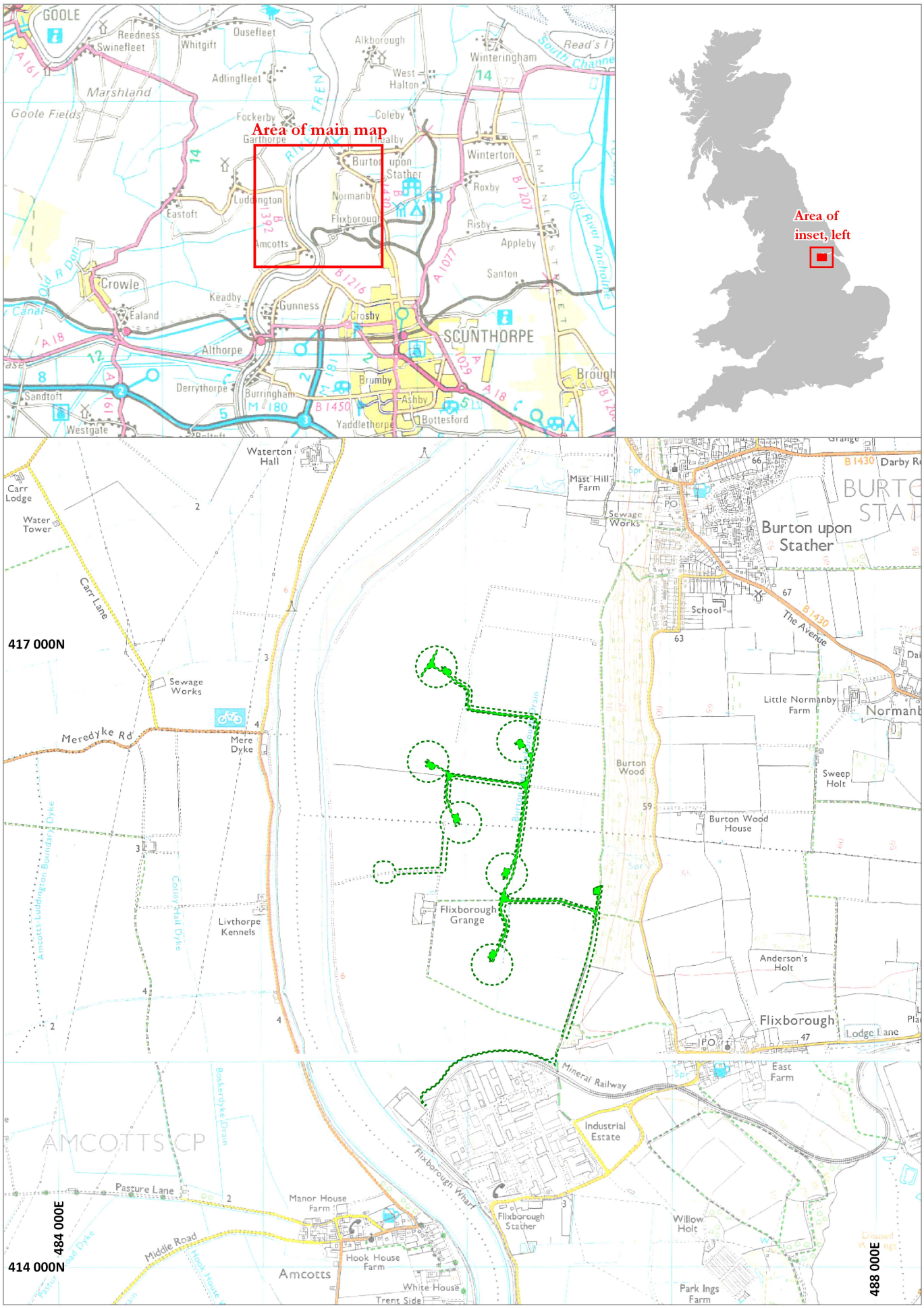

Figure 1: Location of Grange Wind Farm, scale (main map) 1:25000 (at A4); inset, top left 1: 200 000

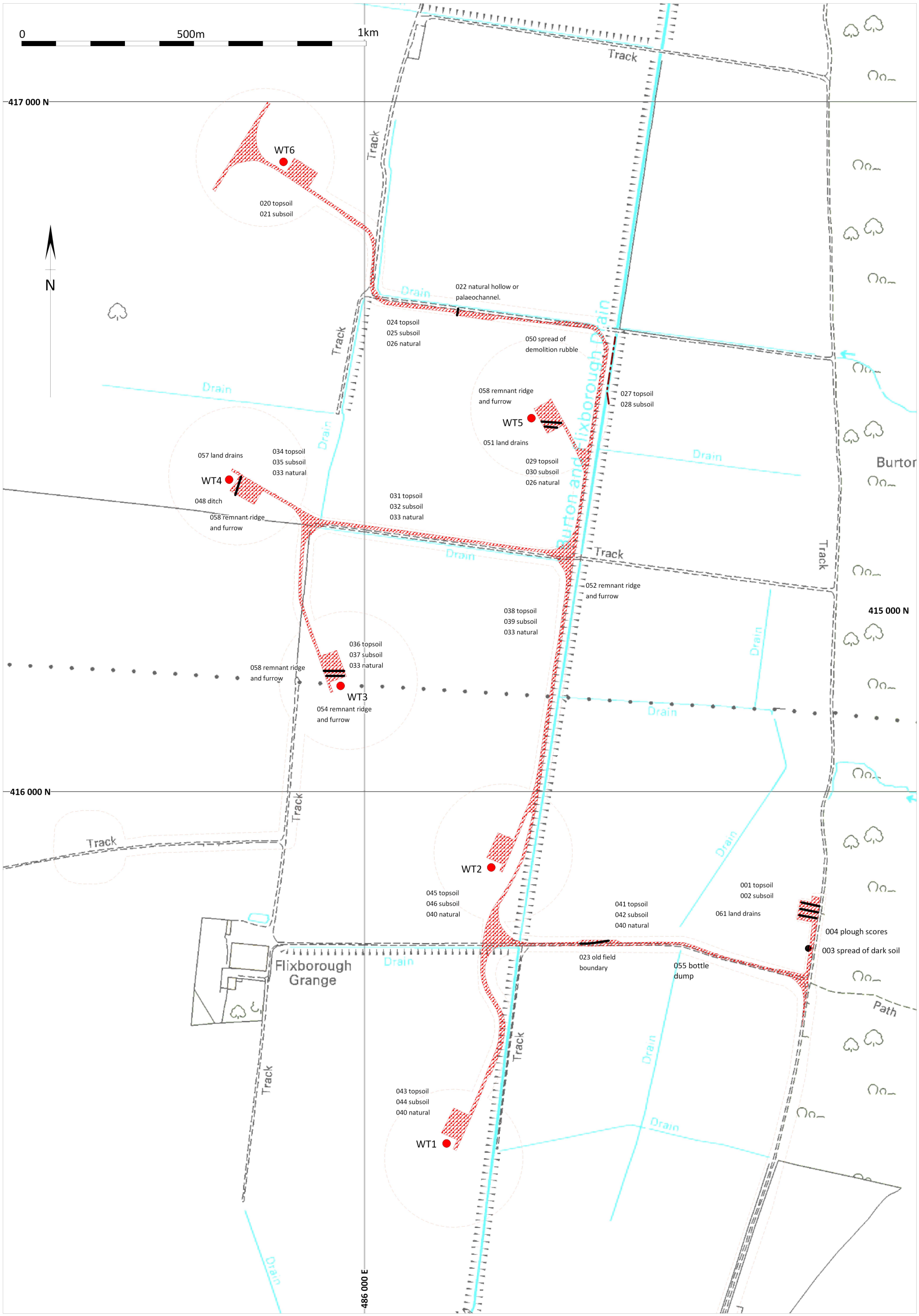

Figure 2: Grange Wind Farm: Location of the monitored areas and of recorded features, north part of site, scale 1:500 (at A3)

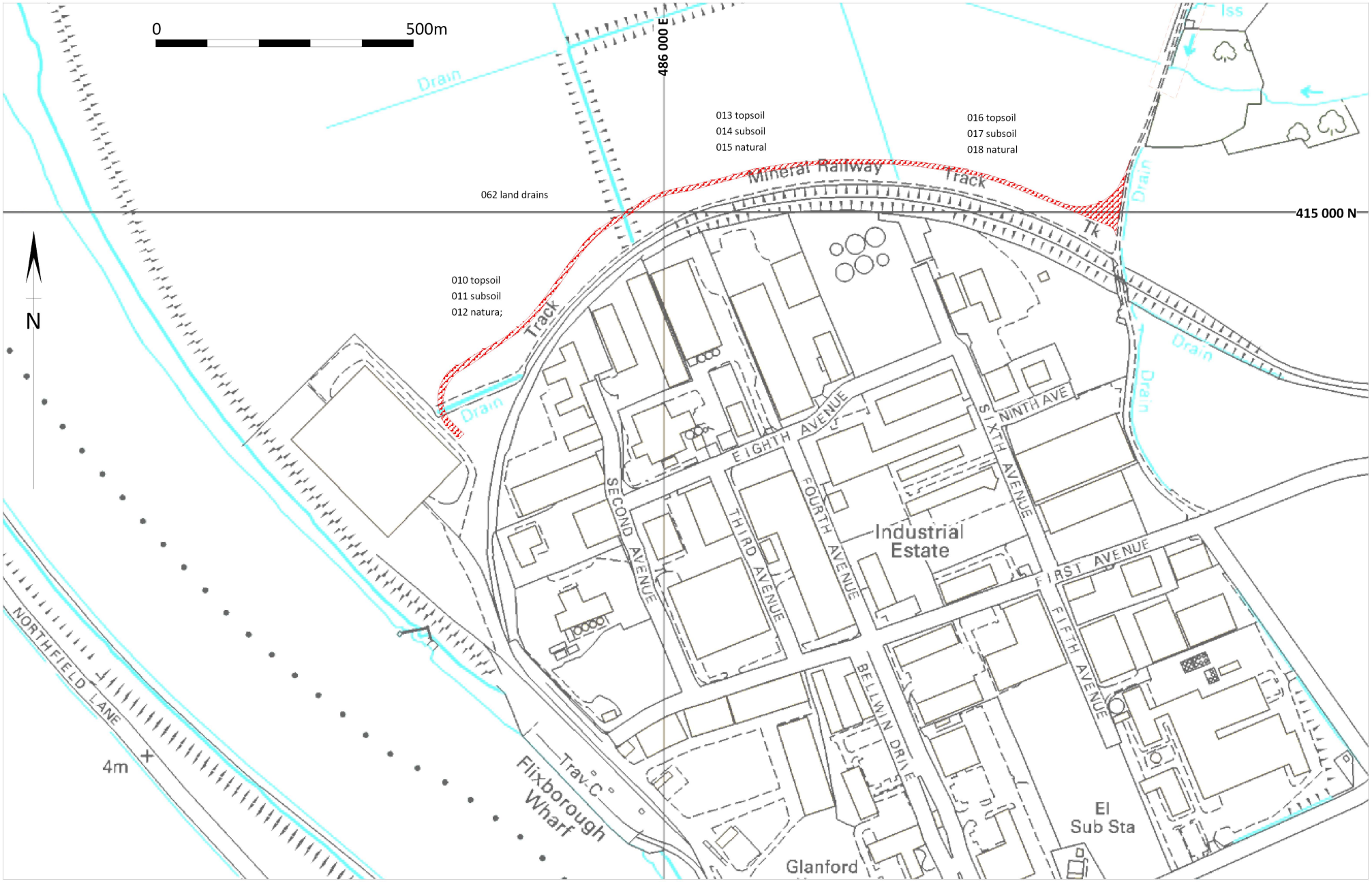

Figure 3: Grange Wind Farm: Location of the monitored areas and of recorded features, south part of site, scale 1:500 (at A4)

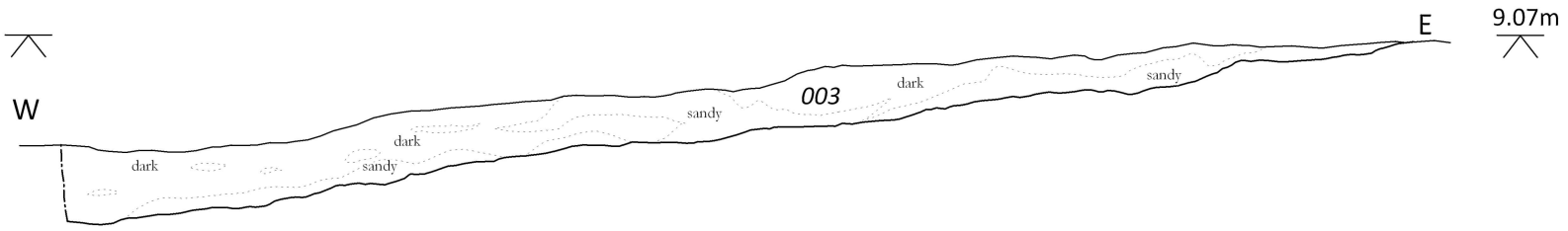

Figure 4: South-facing section through deposit 003, scale 1:20 (at A4)

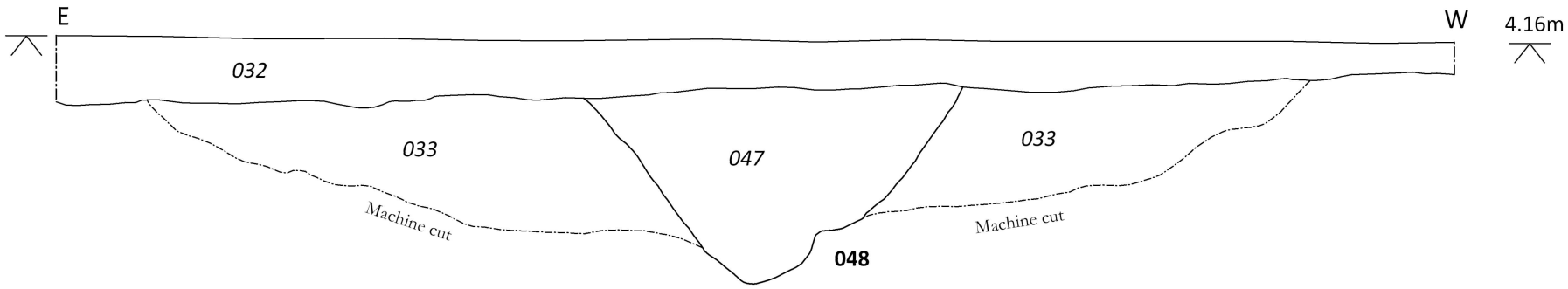

Figure 5: North-facing section through ditch 048, scale 1:20 (at A4)

Figure 6: General soil profile in east side of site, eastern end of access track from Flixborough Wharf

Figure 7: General soil profile west of Burton and Flixborough Drain, WT6

Figure 8: Layer 003, south facing section

Figure 9: Infilled east-to-west aligned furrows and truncated ridges, in WT5 working area, looking north-west

Figure 10: North-facing section through ditch 048, in WT5 working area

Figure 11: Ceramic land drain in WT5, looking west

Figure 12: Distinctive flat-topped ceramic drain, western end of track to Flixborough Wharf, looking south

Figure 13: Spread of building rubble 050, from 'Dutch Barn', looking north-east

Figure 14: Rubble spread 050, close-up looking north

Figures 15a and 15b: Flints from context 005 (left) and 003 (right), dorsal and ventral views

Figures 16a and 16b: Glass vessel fragment from context 005, outer (above) and inner views, 5p coin for scale