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PRE-CONSTRUCT
ARCHAEOLOGY
LINCOLN

ARCHAEOLOGICAL DESK-BASED ASSESSMENT
LAND SOUTH-WEST OF STIXWOULD GRANGE, STIXWOULD, LINCOLNSHIRE

Site Code:	STXG 01
NGR:	TF 1680 6370
Planning Ref.	ACW/(E)S170/-/00

EVENTS L11630 L11633
SOURCE L16404
PRN'S 43924 L181278
43925 L181281

further prn's pending

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Report prepared for DDM Agriculture
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February 2001

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- *An archaeological desk top study has been undertaken prior to the determination of a planning application for the construction of an irrigation reservoir, on land to the south-west of Stixwould Grange, Stixwould, Lincolnshire.*

- *The results of this study suggest that the site has some archaeological potential. A series of isolated finds have been made along the eastern bank of the Witham, to the north and south of the site. These include Neolithic stone axes, Bronze Age weaponry, a later prehistoric log boat, an Anglo-Saxon/Danish sword and medieval weapons. The probable locations of two medieval fisheries have also been identified to the north of the site.*

- *Studies of the topography and aerial photographs, as well as the results of a geophysical survey, indicate that the south-western part of the site overlies an in-filled, redundant course of the River Witham.*

- *A number of cropmarks have been identified c. 150m to the east of the site of the site. These indicate the presence of a series of linear and curvilinear features, which together appear to form a relatively irregular field system, possibly being associated with trackways.*

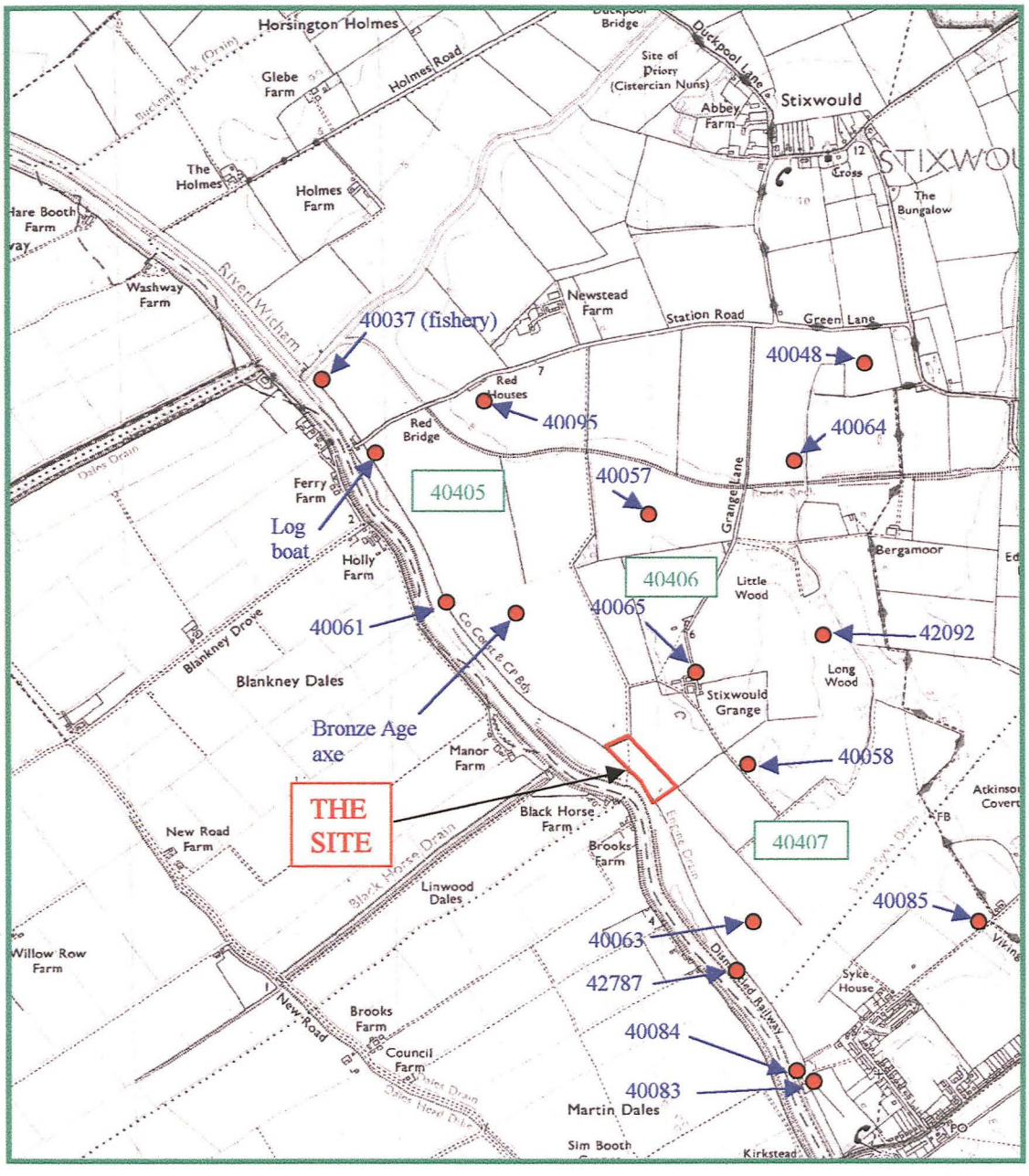

Figure 1: Site location at 1: 25,000. The locations of archaeological features and materials recorded in the County Sites and Monuments Record are also shown, the numbers in green relating to cropmark complexes (see Appendix 12.1 for details).
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1.0 Introduction

DDM Agriculture commissioned Pre-Construct Archaeology (Lincoln) to undertake an archaeological desk top assessment and geophysical survey in advance of the determination of a planning application for the extraction of clay, and the subsequent construction of an irrigation reservoir, on land to the south-west of Stixwould Grange, Stixwould, Lincolnshire.

This report details the results of the desk-based study, which sought to assess the overall archaeological potential of the site, without the use of intrusive fieldwork, and to assess the possible impacts of the development upon this resource.

Research was conducted in accordance with the procedures set out in the Lincolnshire County Council publication *Lincolnshire Archaeological Handbook: A Manual of Archaeological Practice* (LCC, 1998); national guidelines produced by the Institute of Field Archaeologists were also adhered to (IFA, 1994).

2.0 Location and description

Stixwould lies in the Lincoln Clay Vale, on the eastern bank of the River Witham. It is situated within the administrative district of East Lindsey, approximately 20km south-east of Lincoln and 8km south-west of Horncastle.

The site is situated c. 2.3km to the south-south-west of the village core, in an area of mixed agricultural usage, components being variously utilised as either arable or pasture land (fig. 1). The proposed development will be contained within the northern two-thirds of a sub-rectangular unit of land, which extends to approximately 2.6ha; the long axis of this block is orientated from north-west to south-east. This field supports short-cropped grasses, which totally cloak the surface of the topsoil.

A mature, well-maintained hawthorn hedge defines the northern perimeter of the site, dividing it from the ploughed field beyond. At the north-western corner, there is a small pond immediately adjacent to the hedge. In actuality, this is a short section of ditch spurring off the Engine Drain to the west. Cattle have poached the ground around it, presumably in an effort to gain access to the water, the latter being partially restricted by a barbed wire fence following the southern and eastern margins of the feature. The south-western boundary describes a slight arc, as it mirrors the course of the adjacent Engine Drain. The latter curves in response to a pronounced kink in the River Witham, which at this point comes within 50m of the edge of the site. A fence, separated from the drain by c. 3m, forms the boundary itself. The uprights, at c. 2m intervals, are a series of wooden posts, which have the remains of six strands of wire stapled to them. The latter have rusted and been supplemented on at least two occasions by barbed wire. A number of rusting, redundant iron stanchions, with tensioning gears, are also evident in the fence line. This suggests that this boundary was erected and maintained by the railway company responsible for the Lincolnshire Loop Line, which was sandwiched between the Witham and the Engine Drain. Horizontal timbers form one short section of the boundary, around 120m from the north-west corner of the field. This is not a gate, as it does not hinge and the cross-pieces are slotted into the fixed uprights. Rather, it seems likely that this was the site

of a stile. A pair of metal five-bar gates gives access to the Engine Drain at the south-west corner of the site. The south-eastern boundary is formed by two parallel rows of wooden posts supporting wire fencing. There is a c. 0.8m interval between the two rows, the area within forming a slight bank c. 0.2m higher than the edge of the site. At the south-east corner, another metal gate gives access to the field to the south, which has also been recently ploughed. A physical barrier does not define the north-eastern edge of the site, the field continuing for approximately another 250m in this direction. However, the extent of the development area is apparent as the earthwork remains of a redundant boundary, two slight banks bracketing a shallow depression, define it.

The ground surface is relatively level across the site, at c. 2.5 - 3m OD, with the north-eastern half of the plot being quite level excepting the presence of a few linear depressions (see 6.4). However, the southern half of the study area is slightly lower lying and is characterised by a series of gentle undulations. The edge of this depression runs approximately from the site of the putative stile, described above, to the south-eastern corner of the field; the slope is shallow and the gross variation in height does not appear to exceed 0.5m. The entire site appears to be slightly lower, by at least c. 0.2 - 0.3m, than the larger component of the field, lying beyond to the north-east. There are extensive views to the north, east and south, with the river flood defences impeding vision in the other direction.

The uppermost geological strata of the area are exclusively Quaternary drift deposits, which extend across the depression of the Witham Fen Basin. A bed of Glacial Till, a clay rich diamicton, lies directly beneath the soil within the boundaries of the site, but this is overlain by an extensive spread of Upper River Gravel Deposits to the immediate north-east and east (B.G.S., 1995). The latter forms the slightly higher ground upon which Stixwould Grange is located, and marks the eastern edge of the Witham Basin during the Holocene. A further small mound of the Upper River Gravel Deposits survives along the edge of the river, in the field to the south of the site. The upper strata of the underlying solid geology are composed of the Jurassic Kimmeridgian and Oxfordian Clay Formations.

Central National Grid Reference: TF 1680 6370.

3.0 Planning background

DDM Agriculture has applied to East Lindsey District Council for planning permission to extract clay for use in the Lower Witham Flood Defence Improvement Scheme, and construct an irrigation reservoir from the resultant quarry workings (Planning ref. ACW/(E)S170/-/00). That authority, acting on the advice of the Built Environment Team, Highways and Planning directorate, Lincolnshire County Council, has requested that this document be produced to inform the decision making process and enable the application to be determined.

4.0 Objectives and methods

The purpose of this report is to identify and assess the nature of *in-situ* archaeological deposits that may be damaged or destroyed by groundworks associated with the creation of the irrigation reservoir and, if necessary, to suggest further methods by which the site may be evaluated in advance of construction works.

Data for this report was drawn from the following sources:

- Records held by the County Sites and Monuments Record for Lincolnshire (SMR)
- Records held at the Lincolnshire Archives Office
- Aerial photographs held by the National Monuments Record, Swindon
- Published and unpublished sources
- Information supplied by the client
- A detailed inspection of the site

The author visited the site to gather data, on 30th January 2001.

5.0 Archaeological and historical background

Stixwould is a sub-oval parish, with the village being situated only c. 800m from its northern boundary. The site is located c. 2.3km to the south-south-west of this settlement, immediately adjacent to the western perimeter of the parish, and toward its southern tip. Much of the data held by the County SMR in the parish file, or contained within documentary sources, relates to the area of the village. Therefore, it is considered that the spatial separation of Stixwould and the site renders much of this information marginal or irrelevant with respect to this study. As a consequence, references to elements of the village, below, tend to remain brief.

Examination of the data held in the SMR indicates that the oldest recorded artefactual material recovered from the area surrounding the site comprises a series of isolated discoveries of stone axes (fig. 1). This group consists of five Neolithic stone axes and a pebble mace of similar date, as well as an undated biface stone axe. The latter is noted on an old SMR map, but further details were not recorded. Bi-facially flaked stone axes were utilised from the Lower Palaeolithic into the Bronze Age, an interval of around 500,000 years, but lacking any morphological data as a guide, it has not been possible to determine a more specific period when this item was manufactured.

The distribution of these artefacts is interesting. Almost all lie within 1km of the eastern edge of the River Witham, and are relatively evenly spaced, lying both to the north-west/north and the south-east of the site. The example recovered in closest proximity to the latter is a very battered polished stone axe (40058), which was situated c. 250m to the east. The relationship between artefacts and the river is not

likely to be entirely fortuitous. It is probable that the area to the east, between the river basin and the foot of the Wolds, was shrouded by dense climax forest throughout much of post-glacial prehistory, probably well into the Bronze Age; this certainly appears to be true of the northern half of the Lincoln Clay Vale, which is drained by the River Ancholme (Neumann, 1998). Consequently, overland movement would have been easiest along the interface between this woodland and the carr or reed swamp of the esturine fen. Additionally, the faunal resource base is likely to have been richer and more diverse along the margins of the river, with animals being drawn toward the plentiful drinking water.

It is also notable that while many unstratified finds of stone axes are often considered to be almost casual losses, the means of their acquisition is anything but casual and often involves long-distance exchange (Edmonds, 1995). This would suggest that these items had a great deal of implicit value, which contradicts notions that their owners would frequently treat them so carelessly. Research has indicated that wetland environments were foci for the ritual deposition of axes during the Neolithic (*q.v.* Bradley, 1990). Such deliberate social processes may better explain the presence and patterning of the stone axes.

Ritual observance at wetland sites appears to have continued and diversified in later periods, even during the medieval period, with a whole array of weaponry, pottery and, human and animal remains being similarly cast into watery contexts. A Bronze Age spearhead of the peg-hole type (40083), found adjacent to the river, c. 1.2km to the south of the site, is almost certainly one such deposit. The recovery of a Bronze Age axe, c. 600m to the north-west of the site (TF16476418), is also recorded in the SMR parish file, but there is no further data.

The riverine contexts of these finds are generally anaerobic and as such they contain preserved organic materials. One such type of artefact commonly retrieved from the Witham Fen are dug-out log boats. It is recorded that one of these vessels was recovered from land adjacent to the river at Stixwould in 1848. The date and recorded location (TF159648) of the find indicate that it was discovered during the construction of Stixwould Station (White, 1978). No further details appear to survive, but it should be noted that these vessels commonly exceed 10m in length and generally appear to have been constructed during the Bronze or Iron Age.

The SMR does not contain data specifically relating to activity in the vicinity during the Iron Age and Romano-British periods. This is relatively surprising, as Roman pottery is frequently exposed by agricultural activity in most areas of county, and a significant proportion of the fields surrounding the site are utilised for arable production.

There is some archaeological evidence for Anglo-Saxon activity, albeit relatively ephemeral, in the vicinity of the site. A sword of Anglo-Saxon/Danish type (probably of the 9th-11th centuries AD) was found in the river at Kirkstead Wath, 1.1km to the south of the site, in 1788, together with a dagger with a wooden handle and an iron spearhead (40084). The sword blade was inscribed with the Saxon characters +BENEVENTUS+ on one side and +ME FECIT+ on the other. Potentially, these represent further examples of ritual practice at watery contexts, possibly in a form analogous to the events surrounding the disposal of Excalibur in Arthurian legend

(*q.v.* Bradley, 1990). Interestingly, further weaponry recovered from the site of Stixwould Station, in 1848, appears to indicate that such practices continued into a period of universal and unambiguous Christian belief and practice. These items included a mass of chain mail, probably a hauberk, an iron sword, an iron spearhead and a human skull (White, 1979). Typologically they appear to have been manufactured during the 13th or early 14th centuries.

The etymology of the place-name suggests that the origin of the modern settlement of Stixwould lies in the later Anglo-Saxon period. The village appears as *Stigeswalde* in the *Domesday Book*, an appellation utilising an Old Scandinavian personal name, *Stigr* and an Old English suffix referring to woodland, *wald*, which together mean 'forest of a man called *Stigr*' (Mills, 1993).

The *Domesday Book* records three manors in the parish (Morgan & Thorn, 1986). Of the constituents listed in that document, it appears that the largest holding belonged to Ivo Tallboys (or Taillbois), nephew of King William, who owned lands throughout the county. As well as a large quantity of arable land, he also held rights to 40 acres of meadow and 80 acres of woodland pasture. Alfred of Lincoln likewise had jurisdiction over to 20 acres of meadow and 40 acres of woodland pasture, as well as an area of plough land, all of which constituted the manor held by an individual named Siward. The manor of Wulfgeat belonged to Waldin the Breton, and consisted of arable land, quantities of woodland and meadow identical to that held by Ivo Tallboys, and 2 fisheries on the river. In comparison to many of the parishes in Lincolnshire, it is apparent that 11th century Stixwould contained large areas of woodland and meadow. Presumably, much of the latter was located along the margins of the river, on land prone to flooding.

Ivo Tallboys was married to Lucy and after his death, c. AD 1095, she continued to hold his estates during two successive marriages, to Roger Fitzgerold and Earl Ranulph of Chester (Hill, 1965). At some point during the early 12th century, while married to the latter, she founded a Cistercian nunnery dedicated to St Mary ('Stixwould Priory'), immediately to the west of the village core. These relationships help to situate at least part of Ivo's estate as listed in the *Domesday Book*.

The nunnery was intended to be a large establishment from the start, with an establishment of 20-30 nuns, but by the 13th century also had a male contingent of canons and a prior. Initially dissolved in 1536, the buildings were immediately reused by Benedictine nuns transferred from Stainfield. In 1537 Henry VIII refounded the establishment under Premonstratentian rule to pray for the soul of Jane Seymour (Pevsner & Harris, 1989), but finally also suppressed this order in 1539. The structures were demolished and some of the stone was utilised in the complete reconstruction of St Peter's Church (Mee, 1970). The site of the priory, a plethora of earthworks surrounding Abbey Farm, is now a Scheduled Ancient Monument (SAM No. 22606).

There is evidence of medieval activity in the zone surrounding the study area. A quantity of medieval and post-medieval pottery, animal bone, tile and stone were found along a 50m stretch of the riverbank located c. 800m to the north-west of the site (40061). The medieval pottery was manufactured in Potterhanworth, Toynton, Old Bolingbroke and Bourne and the majority dated to 13th-14th centuries. Among this

material was part of a fish dish, which along with the location and, the presence of fish vertebrae and 2 limestone net sinkers, indicates that this was probably the site of a fishery. A second similar site has been discovered to the north-west of Stixwould Station. Structures were erected on a mound constructed for the purpose, limestone rubble, roof tiles and a louver indicating that these were substantial buildings (40037). The associated pottery was comparable to that recovered from the other site, and included material from the 13th to 18th centuries. Again, a limestone net sinker was also recovered.

These sites may represent the two fisheries that Waldin the Breton owned in 1086 (Morgan & Thorn, 1986). Two fisheries in the parish are also mentioned in a 14th century Compotus Roll as belonging to Stixwould Priory. One of these was known as *Chakesgard* and was rented for 12d a year from Tupholme Abbey (information held in SMR parish file). However, some caution should be exercised before accepting a direct correlation, as there may have been more than two fisheries along the river at Stixwould at any one time. A sherd from a medieval fish-smoker was found on the river bank (42787), c. 700m to the south of the site and still within the parish, and may provide circumstantial evidence for the presence of a fishery in this area.

The name Stixwould Grange raises the possibility that the farm situated only 300m to the north-east of the site overlies an earlier medieval monastic grange (40065). There appears to be no documentary support for this proposal, and it should be noted that there was a tradition of post-medieval farms taking the suffix as an affectation to imply long ancestry (Hodges, 1991).

Aerial photographs indicate that there are two other cropmark groups in the area surrounding the site. One is situated c. 1.2km to the north-west, in the fields bisected by Reed's Beck, to the south of Newstead Farm (40405). Central to this group is a large sub-rectangular enclosure, with rounded corners. Although not assigned a provisional date by the RCHME during their National Mapping Programme, this enclosure has morphological characteristics, a 'playing-card' shape, reminiscent of a Roman fort. Superimposed upon this enclosure, and extending into the surrounding area are a range of linear features and smaller sub-rectangular enclosures, which together appear to constitute a relict field system.

The second complex of cropmarks extends across the eastern half of the field to the immediate south and east of the site, and comes to within 250m of the proposed development itself (40407). The relationships of this group of features suggest that they also represent a palimpsest of activity, but several elements can be clearly resolved, including a double-ditched linear feature and a pair of parallel curving ditches. Again, a date was not assigned by the RCHME.

The area of the site was the subject of intense activity during the late 18th and 19th centuries. Work to straighten, widen and scour the river, in order to create a viable commercial waterway, began in earnest after the passing of the Witham Drainage Act in 1762 (White, 1979). The section between Kirkstead and Lincoln was embanked and improved between 1787 and 1788, and it was at this time that many artefacts were observed and recovered. Additional schemes of work were enacted during the first half of the 19th century. A railway was laid alongside the eastern bank of the river in the late 1840s, the section through Stixwould, with its attendant station, being

constructed in 1848. The installation of a 30hp drainage engine in 1846 (White, 1856), probably at the northern end of the Engine Drain (TF15876513), may have been a prerequisite to the provision of a rail link. The Engine Drain runs along the eastern edge of the redundant track bed, separating the latter from the site.

6.0 Archaeological potential

The specification for this desk-based assessment requested a synthesis based on maps, published and unpublished sources and previous archaeological investigations, as well as a site inspection. Additionally, emphasis was placed upon the examination and interpretation of aerial photographs of the site's environs. Study of these sources has resulted in the collection of a body of data, which relates more specifically to the development site. This will be examined in more detail in the sections that follow.

6.1 Cartographic Evidence

The following maps were found to contain data relating specifically to the site:

- Ordnance Survey, 1890 – Sheet LXXX.SE, First Edition, large-scale map 6": 1 mile (1: 10,560), forms the basis for all subsequent maps produced by the survey to the present day (fig. 2). The surveying for this map was actually conducted in 1887.

- Ordnance Survey, 1905 – Sheet LXXX.11, Second Edition, large-scale map 1: 2,500 (fig. 3). The surveying for this map was actually conducted in 1904.

- Ordnance Survey, 1906 – Sheet LXXX.SE, Second Edition, large-scale map 6": 1 mile (1: 10,560). The surveying for this map was actually conducted in 1904.

Any other maps, plans, survey books or terriers held by the LAO were not available for examination, as the Archive store rooms are currently closed to effect repair works.

Both of the Second Edition Ordnance Survey maps show the same information, as they are the product of the same phase of surveying and differ merely in the scale to which this data was reproduced. Comparison of the First and Second Editions, and modern maps indicates that the site has changed relatively little in the last 114 years. The north-western and south-western boundaries are unchanged, the river, railway and Engine Drain all being in place by 1848 (see 5.0). The current south-eastern boundary is shown to be a relatively modern sub-division of what was, in 1887 and 1904, a much larger sub-rectangular field, which extended along the edge of the river for a further 350m. In turn, the hedge separating this southerly extension from the field to its north-east has now been removed to create one large block of land. The north-eastern perimeter of the site is depicted as a solid line indicating that a hedge or other boundary defined it in 1904; this is coincident with the location of the linear earthwork noted during the site visit (see 2.0 and 6.4).

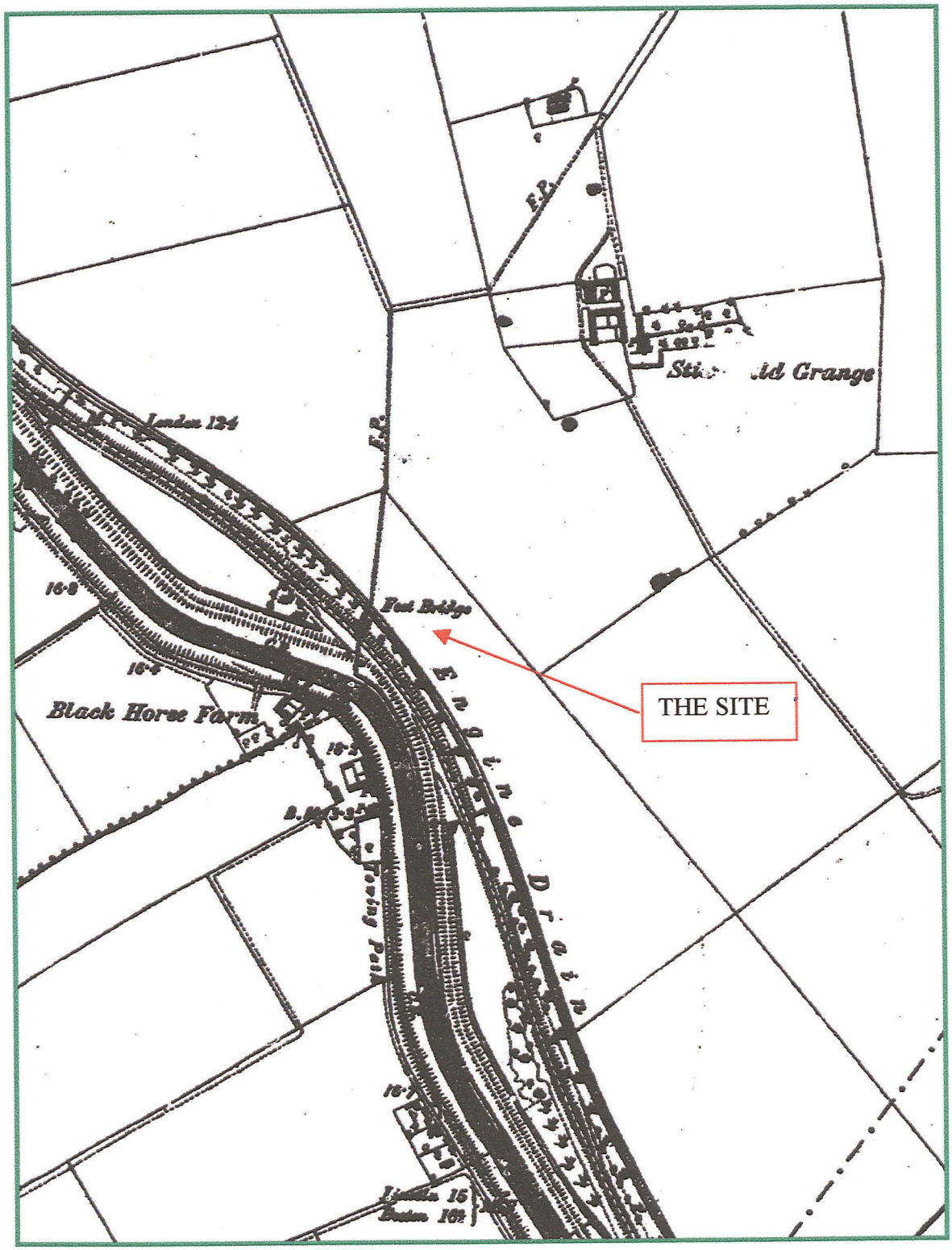

Figure 2: Extract from the First Edition Ordnance Survey map of 1890.

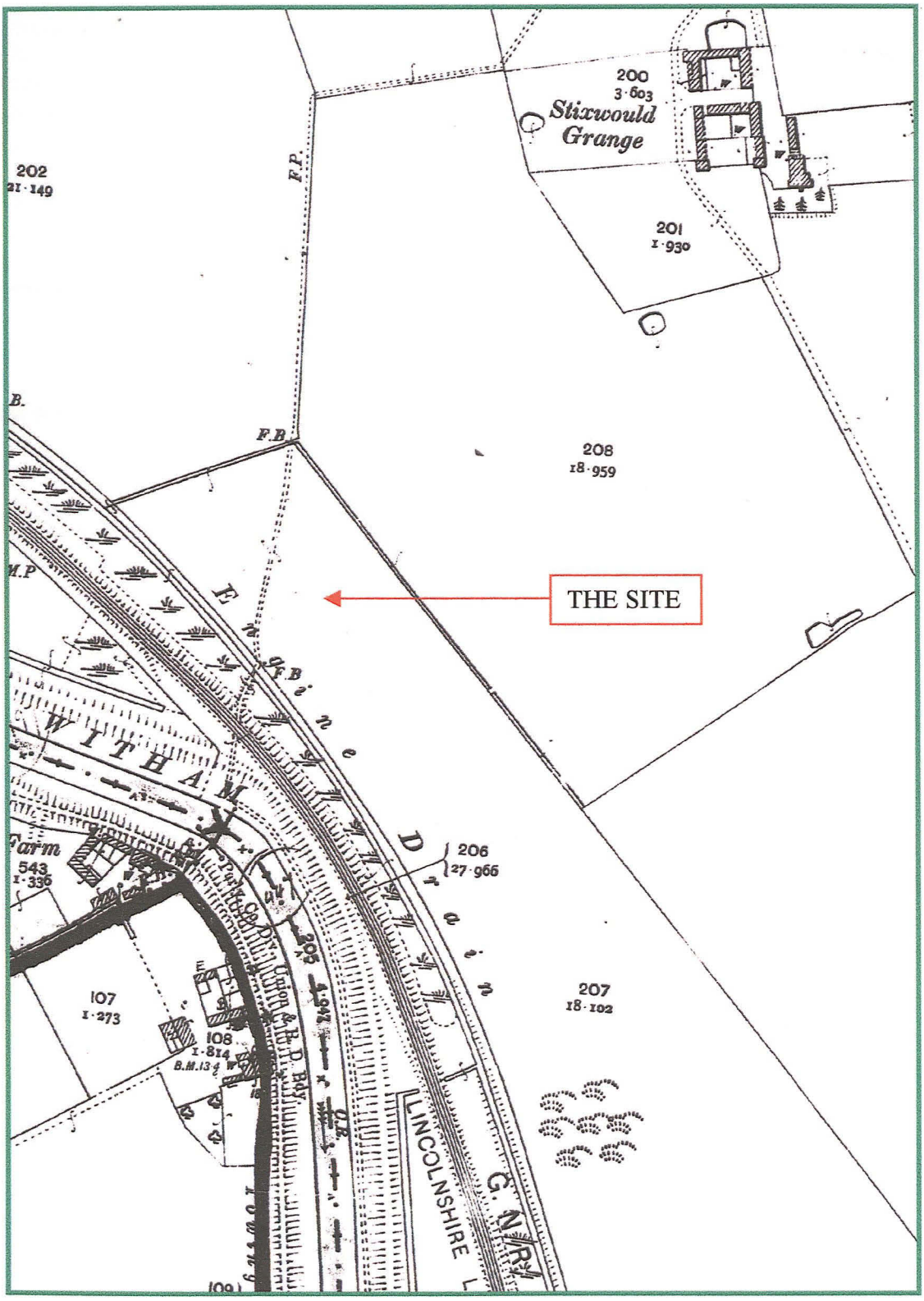

Figure 3: Extract from the Second Edition Ordnance Survey 1: 2,500 map of 1905.

A footpath is shown to diagonally cross the northern half of the site from the vicinity of the putative stile, to the north-eastern corner of the field. It then continues along the eastern boundary of the next field to the north, before skirting Stixwould Grange and heading toward the village. To the south-west, the footpath is shown to cross the Engine Drain by a footbridge, before traversing the railway and eastern flood bank of the river at a point opposite Black Horse Farm. It then continues down the riverbank toward Kirkstead.

Of relevance to this study is the depiction of marshy ground around the centre of the block of land lying to the south of, and subsequently annexed from, the field containing the proposed development. The fact that this particular spot is specifically selected for such differentiation, combined with what appears to be a swampy lagoon sandwiched between the railway and the flood bank to the south of this area, suggests that it marks the location of a redundant river channel. As the latter had obviously not completely dried up in 1887, it is possible that it was active as late as the canalisation of the river in 1787-88.

The form of Stixwould Grange is essentially the same in 1887 as it appears on modern Ordnance Survey editions; a few modern farm buildings have been added to the north-west of the Victorian crew-yard, but otherwise it appears to be unchanged.

6.2 Air photographic evidence

The SMR contained eleven oblique air photographs that showed the site or its environs. These can be divided into two geographical groups, which equate to the divisions implemented in the SMR. The northern group is situated around Newstead Farm (40405), and is represented by 7 photographs. The southern group includes the site itself and the fields to its east (40407) (see fig. 4).

40405:

- *5161-15* – Shows the field to the immediate north of Newstead Farm. As well as a range of geological variation, the picture also shows a series of linear cropmarks, which together appear to constitute a large sub- rectangular enclosure or earlier field, c. 300m long from north-west to south-east.

- *5161-17* – Shows the southern end of the second field south of Newstead Farm. A series of very large cropmarks indicate gross geological variation. This appears to represent two roughly parallel relict channels running approximately east-west toward the River Witham.

- *5161-19* – Shows the fields bracketing Reed's Beck to the south of Red Bridge. Centrally placed in the picture is a large sub-rectangular enclosure, with rounded corners. Appearing to respect this are a series of linear features, some of which seem to form a rectilinear field system respecting Station Road. There is also evidence of other more irregular enclosures, especially toward the eastern edge of the picture. Running roughly parallel and to the north-east of Reed's Beck is a large irregular cropmark. This would seem to represent an earlier bed of that watercourse predating canalisation. This hypothesis is supported by the

appearance of other geologically derived entities, namely honeycomb like reticulation toward the northern and southern edges of the picture.

- *5161-21* – Shows the second field south of Newstead Farm also in *5161-17*. At the southern end of the field are the very large dark cropmarks representing relict water channels running toward the Witham. Overlying the latter and continuing up to the northern edge of the field are a series of linear cropmarks, which form a slightly irregular rectilinear field system.

- *2937/23* – Shows the whole area surrounding Newstead Farm. A few diffuse soilmarks are shown in the fields surrounding Reed's Beck, but these provide far less information than is depicted in *5161-19*.

- *TF1664/2* – A much clearer shot of the soilmarks shown in *2937/23*. A broad pale stripe indicates the area between the playing card shaped enclosure and the sub-rectangular enclosure to its south. Other elements of more irregular landscape division are also evident.

- *TF1664/9* – Another shot of the fields bracketing Reed's Beck, showing similar information to that depicted in *5161-19*.

40407:

- *5161-22* – This picture is centred on the eastern half of the field to the south of the site, the southern two-thirds of which is also shown, where there are a series of linear cropmarks. The latter appear to constitute a series of trackways and enclosures. An area of geological reticulation toward the northern edge of the field does not aid differentiation of archaeological entities. The western half of the field is essentially one large dark cropmark, which appears to define a former course of the River Witham.

- *5161-23* – This picture depicts the field to the south of that at the centre of *5161-22*. A series of linear and curvilinear cropmarks seem to form an irregular field system. The former course of the River Witham, as seen in *5161-22*, is shown to continue to the south.

- *TF1763/3* (x2) – Two further shots of the field shown in *5161-23*.

A search of the air photograph collection held at the NMR revealed that they held three oblique air photographs. Additionally, four vertical shots were examined to gather further data.

Obliques:

- *PLE 5161/18* – Showing part of the fields to the north of Stixwould Grange (40406). Components of an irregular field system, a possible sub-oval enclosure and what may be a moated site, are visible. Underlying these more regular entities are relatively extensive areas of geological reticulation.

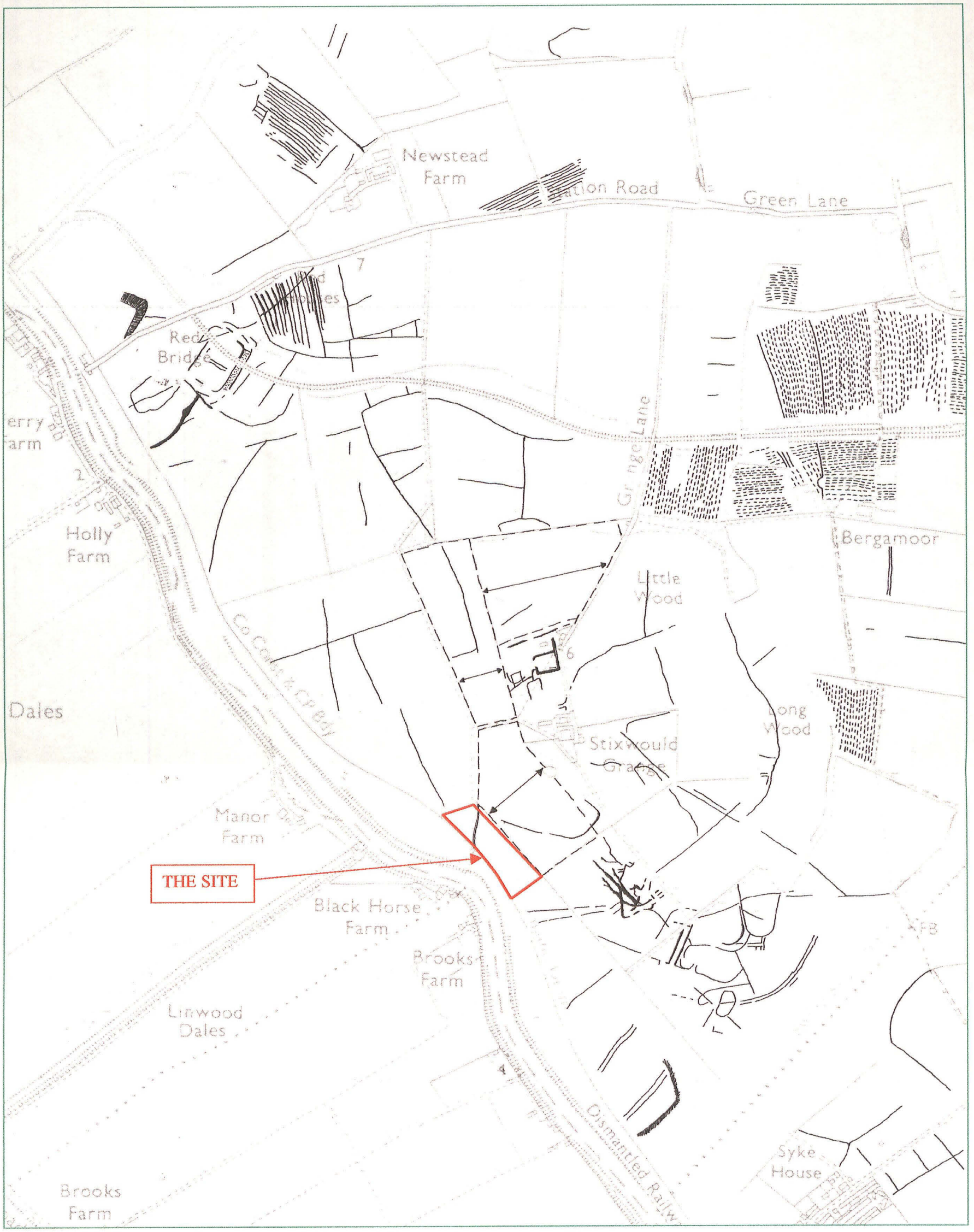

Figure 4: Rectified plot of cropmarks and earthworks surrounding the site, as shown in aerial photographs.

- *NMR 1302/373 & 374* – The site is situated at the centre of the frame on both pictures. It had recently been ploughed, and appeared to contain an immature crop. The footpath bisecting the northern half of the site is clearly visible. Less distinct, but evident, is the redundant river channel occupying the south-western third of the site. A diffuse dark mark running around one third of the way from the eastern boundary may represent another relict channel filled with peaty material. An unkempt hedge is shown to still define the northern two-thirds of the north-eastern edge of the site, with a ditch continuing this line to the south.

Verticals:

- CPE/UK/2009, frame 2285, taken 16 Apr 1947.

- 541/112, frame 3170, taken 28 Jul 1948.

- MAL/76053, frame 238 and 240, taken 30 Jun 1976.

Analysis of the aerial photographic data reveals that there are two forms of archaeological feature evident in the vicinity of the site:

Earthworks - These are fewer in number and are more spatially restricted. There are a number of fields lying to the north, west and south-west of Stixwould Grange, which contain ridge and furrow. The straightness, narrowness and regularity of the ridges provides a strong indication that these were produced by steam ploughing, and consequently, are not indicative of medieval agricultural activity in the area of the site. A second area of ridge and furrow in the fields to the north and west of Bergamoor (TF180648) is more irregular and preserves the slight reverse 'S' plan characteristic of medieval ploughing. There is also evidence of hollow ways traversing the fields in this area.

Cropmarks – There are a whole series of linear cropmarks in the areas to the north, south and east of the site. These have inter-relationships indicating that they represent boundary features defining fields. Some of these form very regular patterns, meeting current boundaries at right angles. Comparison with older maps confirms that these particular cropmarks equate to grubbed out hedges and ditches, which were laid out as components of the rectilinear field system currently dividing the landscape.

However, it is also apparent that a large number of these linear features do not fit into this system. This is especially true in the area to the south of Stixwould Grange (40407). Together, these elements constitute a more irregular field system, which has a more organic nature. These boundaries often curve, with the fields they produce apparently being separated by a series of trackways defined by parallel ditches. The latter are generally orientated to run toward the river. Although no single element has a particular characteristic enabling it to be definitively dated, as a group these features appear to form a system having strong morphological affinities with known elements of the Late Bronze Age, Iron Age, or Romano-British landscape (Winton, 1998). The complexity of the cropmarks c. 150 – 250m to the east-south-east of the site indicates that they represent a concentrated palimpsest of activity, such as would be associated with sustained settlement.

The field to the immediate north of Stixwould Grange contains a concentration of cropmarks, which appear to represent a series of small sub-rectangular enclosures. One of the latter appears to have particularly wide ditches, raising the possibility that it is a moat. Together this group provide the only evidence that there may have been a medieval precursor to the current farm complex.

The area between Stixwould Station and Red Houses is also interesting. The dominant feature is the large sub-rectangular enclosure with rounded corners. Superficially, this has morphological similarity to a Roman fort. However, it is interesting to note that a channel, wide enough to be navigable by a small boat or barge, runs from the south-western boundary to the River Witham. Linear features surround the enclosure, respecting its alignment. Included in this group, to the north-east, is a small area of what appears to be ploughed out ridge and furrow. Consequently, it is tentatively suggested that the large enclosure is of medieval date. It is therefore also interesting to note that this enclosure lies approximately midway between the two locations identified as the probable sites of medieval fisheries (see 5.0).

The aerial photographs also provided data indicating the disposition of alluvial deposits. The area to the west of the river lacked any evidence of features of archaeological provenance, but relict channels were visible due to the darker vegetation growing in their fills. This indicates that the current river channel runs along the eastern margin of its basin, the land to the west being reclaimed fen. The area to the east of the river appears rather more complex. Of particular significance is pictorial evidence that a relict river channel cut across the south-western of the site. Elsewhere, areas of darker vegetation extend to the eastern edge of the vertical photographs, over 1km from the river channel. While it is impossible to accurately describe these areas in totality, the overall trend is for the darker vegetation to run from the river in north-west to south-east orientated bands, up to 400m wide. The darker vegetation is likely to be produced by moisture retaining drift deposits such as alluvium or peat. The intermittent nature of the latter suggests that the periglacial landscape consisted of a series of low, gently rolling ridges of till; the low-lying ground between these having subsequently been filled by flood deposits.

6.3 SMR data and documentary sources

The data gathered from the SMR has been synthesised into the general archaeological and historical narrative, 5.0 above, and is presented in summary form in Appendix 12.1. A search through a variety of documentary sources failed to locate any information directly concerning the site. This was to be expected, as it is unusual for a piece of undeveloped land that lies at such distance from the village core to merit any mention in either a published or unpublished source.

Additionally, it was not possible to examine a number of documents held at the LAO, which their indexes record as containing information relating to Stixwould parish. Consequently, it was not determined whether the data they held made specific reference to Stixwould Grange.

6.4 Site visit

A site visit was conducted in order to examine the surface and topography of the site, its boundaries, and landscape context. Examination of the field demonstrated that the ground surface was totally obscured by vegetation, but a large number of molehills exposed numerous small areas of soil. The latter were not evenly distributed across the site, but essentially formed a broad diagonal band running between the north-western and south-eastern corners. A rapid survey of these mounds was conducted, but the only artefactual material observed were a few small fragments of oxidised brick or tile. It was also evident that the soil was moderately to commonly stoney, containing significant quantities of sub-angular flinty gravel and a lower proportion of small, sub-rounded quartzite pebbles. The topsoil was noticeably dark, and close examination demonstrated that this was caused by substantial quantities of comminuted peat. It is reasonable to assume that the inconsistent colour of the molehills across the field reflected variations in the quantities of peat incorporated into, and preserved within, the soil.

Observation of the site's micro-topography was also informative. It was evident that the fence forming the south-western boundary was situated upon a very slight bank, c. 0.25m high. This sloped very gently into the field, terminating c. 4m from the fence. It seems likely that this material represents up cast from the construction of the Engine Drain. The hedge forming the northern perimeter is situated at the base of a similar slight slope, the upper edge of which is situated c. 4m from, and parallel to, the boundary.

The ground surface in the north-eastern half of the study area appeared to be very level, but there were two quite distinct linear depressions. The most pronounced was a slight hollow way, c. 1.5 – 2m wide, which ran from the north-eastern corner of the field toward a point c. 15m to the north of the possible location of a stile. Examination of the First Edition Ordnance Survey map (see 6.1) demonstrated that this feature correlated remarkably well to the indicated position and course of a footpath, even down to the kink toward its south-western end. The other linear depression was only 0.5m wide and ran roughly parallel to the south-western boundary, form which it was separated by c. 18m. It started near the northern boundary and ran to a point roughly opposite to the putative stile. A function or purpose for this feature could not be ascertained.

The gentle undulations in the lower lying south-eastern half of the site have already been described (see 2.0). However, it should also be noted that this change in micro-topography was accompanied by a variation in the colour of the vegetation. The grass in the north-eastern corner of the site is a relatively bright green, with a significant yellow component. In contrast the vegetation cloaking the area of undulations is a darker, more khaki, green. This difference suggests a gross variation in the composition of the soil, or in the quantity or movement of groundwater. Two slight concave depressions, each about 15m across, were also evident toward either end of the south-eastern boundary. The field immediately to the south had just been ploughed and it was apparent that these depressions correlated extremely well with the location of two linear bands of almost black, very peaty topsoil. The latter almost certainly represent the fills of two redundant channels of the River Witham.

Opportunity was taken to examine a 30m wide swathe of the ploughed field, where it abutted the site. The only artefactual material observed in the 300m^2 inspected were a number of fragments of red tile. It was evident that the larger pieces were components of handmade horseshoe land drains.

During the site visit, the opportunity was taken to examine auger samples from a number of locations within the development area. This again demonstrated that the topsoil contained a large peaty component making it extremely friable. In one area toward the south-western corner, a distinct layer of peat was also observed, this being only c. 0.08m deep. While the topsoil varied in depth from 0.3 – 0.45m there did not appear to be a distinct subsoil, the next deposit encountered being a gravely, mottled orangey-brown and pale grey sandy clay, up to 0.2m deep. Beneath this were further clay deposits, predominantly a gravely pale blue-grey gley. The water table was encountered at c. 0.5m below the ground surface, making the immersed clayey deposits extremely sticky.

6.5 Summary of the geophysical survey results

The south-western half of the survey area was characterised by significant magnetic variation, which could be resolved into the changing fills of an extinct river channel. The strongest readings occurred toward the south-west corner, possibly suggesting that over time the channel had migrated toward that area from the centre of the site.

Another group of discrete anomalies located toward the south-eastern corner of the site, may be natural depressions filled by magnetically enhanced, peaty material, or alternatively could indicate the presence of a number of pits located along the edge of the relict channel. Also situated in this area were three strong, parallel linear anomalies, which were probably generated by land drains.

The silted up ditch that formerly divided the site from the field to the north-east produced a strong positive anomaly. Similarly, a spread of discrete anomalies ran along the central area of the south-western boundary. This probably represents material deposited during the construction and maintenance of the adjacent Engine Drain.

The footpath cutting diagonally across the northern half of the site and visible as a slight hollow way also generated a distinct magnetic signature.

6.6 Archaeo-environmental potential

It is considered that the archaeo-environmental potential of the site is very high. It is situated on the river margins and is likely to have been wetland for a considerable period of time. The underlying clay rich Till will have acted as an impermeable membrane, helping to ensure than the soils remained waterlogged. In such anaerobic conditions buried organic remains are unlikely to have degraded. The considerable peat content of the topsoil/ploughsoil, as noted during the site visit (see 6.4), confirms that such conditions pertained in the immediate vicinity of the site.

In the conditions under which peat forms, organic macro- and micro-fossils, wood, leather and pollen are all likely to survive. Additionally, such environments are so deoxygenated that the ferrous components of composite organic and inoganic artefacts are often extremely well preserved. However, contact between the peat and ground water results in the formation of carbonic acid, which is likely to have dissolved any bone contained within these deposits.

7.0 Impacts to the archaeological resource

Examination of the site suggests that it was only cultivated for a relatively limited period of time (see 6.2, NMR oblique *TF1763/6*). Consequently, while ploughing would have impacted upon the archaeological deposits, this destruction and homogenisation should be relatively restricted in comparison to many of the surrounding fields.

The most significant impact upon *in-situ* deposits will have resulted from the effects of the systematic and sustained drainage of the surrounding landscape. The straightening of the river, between 1787 and 1788, will have initiated this process, but the most significant effects undoubtedly relate to the cutting of the Engine Drain and the installation of an associated mechanical pump, in 1846. Prolonged dewatering will have exposed buried organic materials, such as peat deposits, to aerobic bacteria, which will have reinitiated the decay process. Desiccated organics will have completely decomposed, while those that are periodically partially dried will have become fragmentary.

8.0 Conclusions

It is concluded that the site has some archaeological potential, though there is no direct evidence for human activity within its confines prior to the 19th century. Isolated finds of stone axes and metal work to the north and south of the site provide physical evidence that the river has been a focus of activity since the Neolithic. The nature of much of this material suggests that it represents structured, ritual deposits. However, the latter are generally not associated with any man-made landscape features, making it difficult, if not impossible, to predict where further similar deposits may be found. In this respect, it is important to note that a former course of the Witham ran across the south-western half of the site. While it is not possible to determine whether this relict channel contains such 'ritual' deposits, it is very likely to preserve archaeo-environmental materials.

Aerial photographs indicate that there is a complex of cropmarks situated c. 150-250m to the east-south-east of the site. The morphological characteristics of this group suggest that it reflects later prehistoric or Romano-British settlement. Its proximity to the area of the proposed development raises the possibility that peripheral elements extend into the latter.

The field situated between the site and Stixwould Grange contains standing ridge and furrow. While this would appear to lend credence to the notion that the present farm overlies the site of a medieval monastic estate centre, the straightness, narrowness and

regularity of the ridges suggests that they were the product of later steam ploughing. Further fields containing narrow ridges are situated to the north and west of Stixwould Grange. The farm complex itself is comprised of a house and a crew-yard. The latter is essentially symmetrical and constructed in the styling of the 'model farm', a date stone indicating that it was completed in 1852. The model farm utilised architectural attributes, which surpass mere functionality and were intended as a display of wealth; the suffix 'grange' could also be an associated affectation (Hodges, 1991). A landowner involved in such conspicuous exhibitions of status is likely to have had the resources to purchase steam engines to mechanise ploughing.

9.0 Mitigation

It has been deduced from the documentary and physical sources assessed, that the study area has some archaeological potential. However, the exact form of any *in-situ* deposits remains partially unresolved, as the non-intrusive techniques employed could not fully address the site's potential.

While there is no evidence of settlement in the immediate area during the historic period, the residues of prehistoric and proto-historic occupation are often fairly ephemeral and may not have been detected by gradiometer survey. Additionally, artefactual material cast into the river, whether ritually or otherwise, is effectively randomly distributed. This factor nullifies the value of predictive analysis for determining the location of further buried objects in this class. Together, these constraints impede attempts to quantify the impact of the proposed development upon the archaeological resource. It is therefore concluded that a phase of limited intrusive intervention will be necessary to establish fully the nature of the extant resource.

10.0 Acknowledgements

Pre-Construct Archaeology (Lincoln) would like to thank DDM Agriculture for commissioning this desk top study. Additionally, we are extremely grateful to Jim Bonnor, Senior Built Environment Officer, and Mark Bennet, SMR Officer, of Lincolnshire County Council, and to the staff of the Lincolnshire Archives Office and the National Monuments Record, Swindon, for their help and advice. Thanks are also expressed to the landowner, and Dave Bunn for assistance and information.

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Appendix 12.1: Catalogue of material derived from the County Sites and Monuments Record at Lincolnshire County Council

NGR	SMR Code	Description
TF17556470	40064	Biface axe, find recorded on old SMR map, but no further details.
TF18216297	40085	Two Neolithic stone axes, one partly polished flint. Found 30m apart by Mr Pell while ditching in 1961.
TF17306360	40058	Neolithic polished stone axe, very battered, limestone cortex over hard purple cortex. Found in 1976 by Mr Hogg, now in LCC Museum.
TF16406500	40095	Neolithic flint axe, flaked and retouched to create tapering butt and splayed blade, shape similar to early bronze axes. Found on land off Station road by Mr N. Hogg.
TF17006460	40057	Neolithic stone axe in banded greenstone, probably Group VI, with facetted sides and a sharp blade. Found c. 9m from Reeds Beck.
TF17366294	40063	Neolithic pebble mace noted on old SMR map.
TF17526237	40083	Bronze Age spearhead of the peg-hole type, found c. 300m north of Kirkstead Bridge by Mr Thimking.
TF17466242	40084	Anglo-Saxon/Danish sword (9^{th}-11^{th} centuries), dagger with wooden handle and iron spearhead. Found in river at Kirkstead Wath in 1788. The sword blade is inscribed with the Saxon characters +BENEVENTUS+ on one side and +ME FECIT+ on the other.
TF16216420	40061	Scatter of medieval/post-medieval pottery, animal bone, tile and stone found along 50m of the erosion face of the riverbank, by Mr Hoyes of Newstead Farm. Most dated to 13^{th}-14^{th} centuries, deposited in LCC Museum. Probably the site of a fishery.
TF17246286	42787	Sherd from a medieval fish-smoker.
TF17706510	40048	Silver seal ring found during beet hoeing, probably medieval - possibly depicts crowned, reversed 'I R'.
TF17126390	40065	Stixwould Grange, place-name evidence for possible existence of a medieval monastic grange.

TF18556300	43137	Geophysical survey on land off Witham Road, Woodhall Spa detected some linear anomalies, possibly ridge and furrow, but during excavation no archaeological features detected.
TF18406297	43137	Geophysical survey on land off Green Lane, Woodhall Spa detected some linear anomalies. Excavation revealed that these were post-medieval drainage channels.
TF16464800	40405	Large rectangular enclosure with rounded corners, showing as a soilmark. Surrounding area contains a range of linear features and sub-rectangular enclosures.
TF17056410	40406	Enclosure and linear earthworks seen on APs, possibly includes a moated site, to north of Stixwould Grange.
TF17406335	40407	Complex of cropmarks, including double-ditched linear feature and curving double ditches, with associated linears.
TF17706400	42092	Long and Little Woods, 2ha of woodland (classified as semi-natural) listed in the Nature Conservancy Council's inventory of ancient woodland. Ancient woodland status considered probable.

APPENDIX: 12.2

FLUXGATE GRADIOMETER SURVEY: LAND SOUTH-WEST OF GRANGE FARM, STIXWOULD, LINCOLNSHIRE

Site Code:	STXG 01
NGR:	TF 1680 6370
Planning Ref.	ACW/(E)S170/-/NGR

Report prepared for DDM Agriculture
by Jim Rylatt & David Bunn
February 2001

PRE-CONSTRUCT GEOPHYSICS

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Contents

Illustrations

Summary

- *A fluxgate gradiometer survey was undertaken on 2.0 hectare of land at Stixwould, Lincolnshire. This identified magnetic variation over much of the site, and most of this appears to reflect natural processes and modern activity*

- *Much of the variation in the southern part of the survey appears to reflect the buried remains of an extinct river channel*

- *A group of positively enhanced anomalies was detected in the south-eastern part of the site. It is possible that some of these reflect natural depressions or buried pits, although auger sampling could not clarify this*

- *A series of land drains, a disused track and a backfilled ditch were detected, as was a dense scatter of randomly distributed discrete anomalies in the mid and south-western part of the site. Some of the latter could be associated with the construction and maintenance of the Engine Drain*

- *Other small, randomly distributed discrete anomalies probably result from agricultural activity (e.g. loss of equipment and midden spreading)*

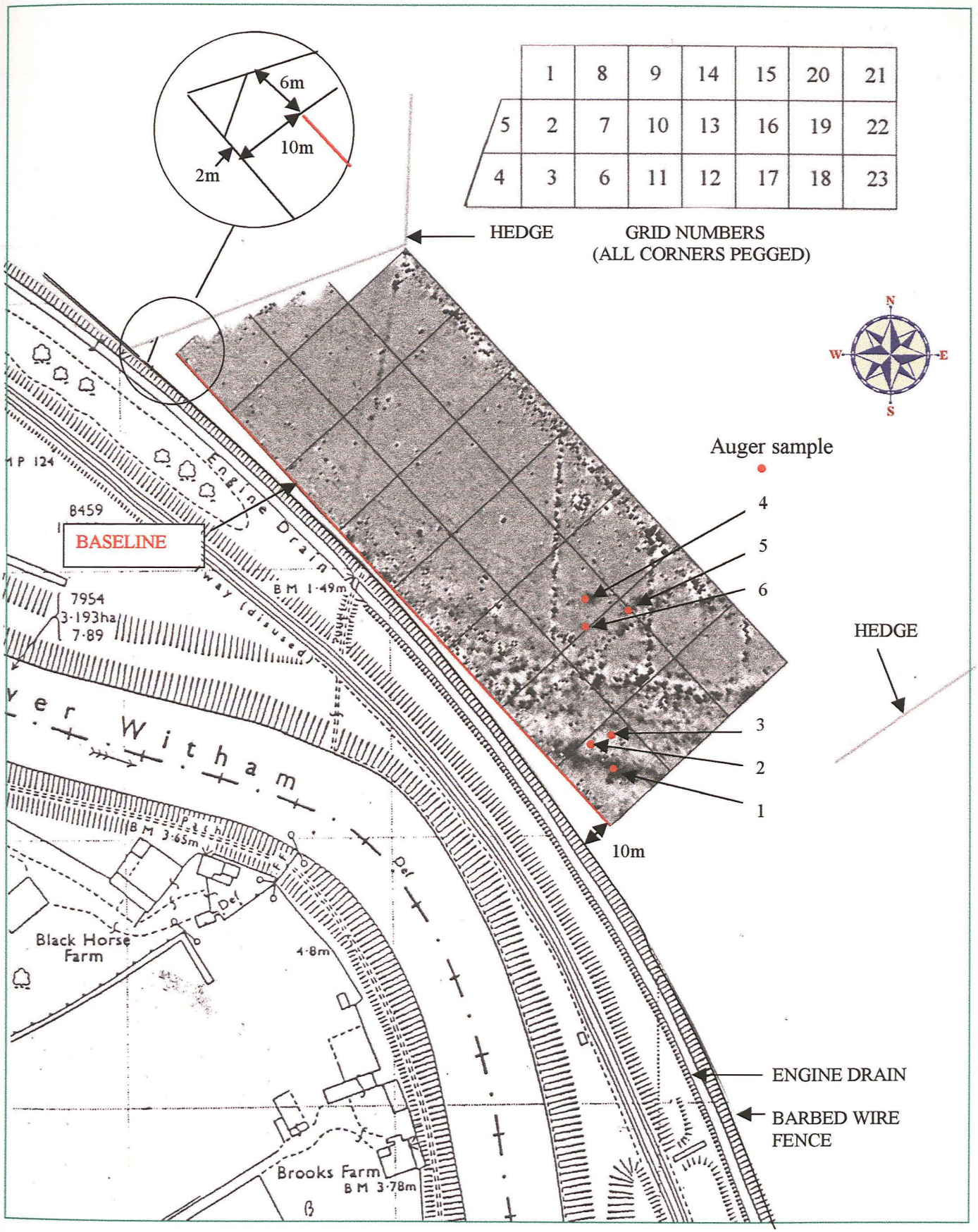


Fig.1: Location of survey Scale 1:2000

1.0 Introduction

DDM Agriculture commissioned Pre-Construct Archaeology (Lincoln) to undertake an archaeological desk top assessment and field evaluation as part of a planning application for the construction of an irrigation reservoir on land at Grange Farm, Grange Lane, Stixwould and Woodhall.

Part of the field evaluation comprised a fluxgate gradiometer survey and Pre-Construct Geophysics undertook this work in accordance with a specification prepared by Pre-Construct Archaeology (Palmer-Brown, 2000).

The gradiometer survey methodology was based upon guidelines set out in the English Heritage document *'Geophysical Survey in Archaeological Field Evaluation'* (David, 1995).

2.0 Location, description and geology: see Part 1.

3.0 Methodology

Detailed area survey using a fluxgate gradiometer is a non-intrusive method of evaluating the archaeological potential of a site. The fluxgate gradiometer detects magnetic anomalies created by areas of high or low magnetic susceptibility. These areas are caused by changes in the composition of the subsoil or the underlying geology. Archaeological features result from man-made changes to the soil and the introduction of intrusive materials such as brick and stone. These features can create detectable magnetic anomalies. In addition, activities that involve heating and burning will create magnetic anomalies, as will the presence of ferrous metal objects.

The anomalies detected by a fluxgate gradiometer survey can often be resolved into entities sharing morphological characteristics with features of known archaeological provenance. This enables the formulation of an informed, but subjective interpretation.

Magnetic variation between archaeological or naturally occurring features and natural geological strata can result from:

- Their relative depth or density of fill
- the magnetic properties of materials introduced as a result of human activity (e.g. rubble, stone, brick/tile, ferrous metal etc.) in contrast to those within surrounding natural deposits
- magnetic enhancement associated with areas of burning

- the magnetic properties of localised, naturally deposited, minerals, such as those occurring in the fills of palaeo-channels.

The area survey was conducted using a *Geoscan Research* fluxgate gradiometer (model FM36) with an electronic sample trigger set to take four readings per metre (a sample interval of 0.25m). The zigzag traverse method of survey was used, with 1m wide traverses across 30m x 30m grids. The sensitivity of the machine was set to detect magnetic variation in the order of 0.1 nanoTesla. The base line was established along the south-western edge of the survey area (Fig.1). Pegs were placed in all the grid corners to facilitate relocation of the survey.

The data from the survey was processed using *Geoplot* (*v. 3.0*). It was desloped (a means of compensating for sensor drift during the survey) and clipped to reduce the distorting effect of extremely high or low readings caused by discrete pieces of ferrous metal. The results are plotted as greyscale and trace images.

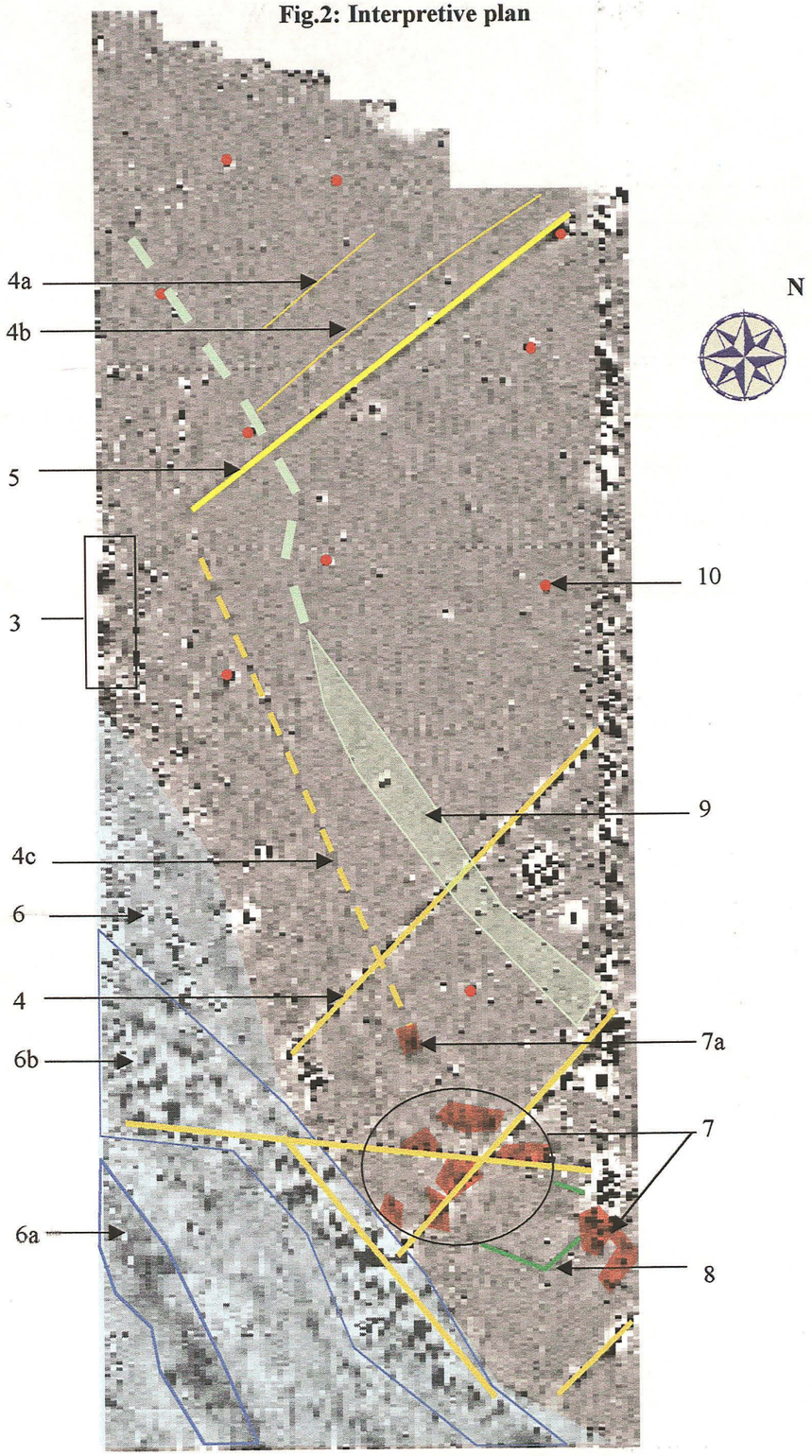
The area survey was carried out by David Bunn on the 19th and 21st of January 2001.

Instrument	Geoscan Research fluxgate gradiometer FM36 Sample trigger ST1
Grid size	30m x 30m
Sample interval	0.25m
Traverse interval	1.0m
Traverse method	Zigzag
Sensitivity	0.1nT
Processing software	Geoplot (*v. 3.0*)
Weather conditions	Cold, scattered snow/rain showers
Area surveyed	2.0ha

Table 1: Summary of survey parameters

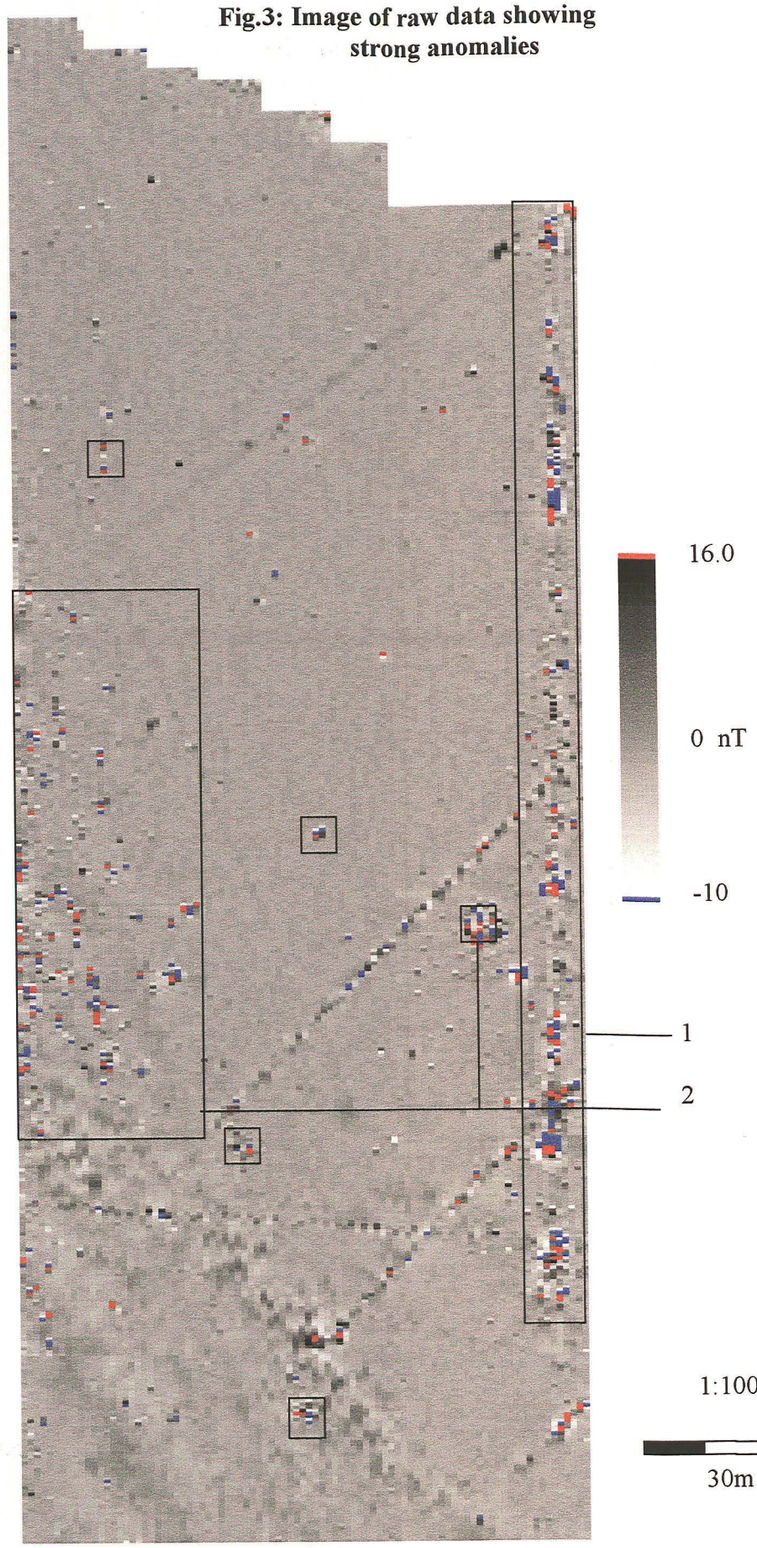
Central National Grid Reference: TF 1680 6370.

Fig.2: Interpretive plan



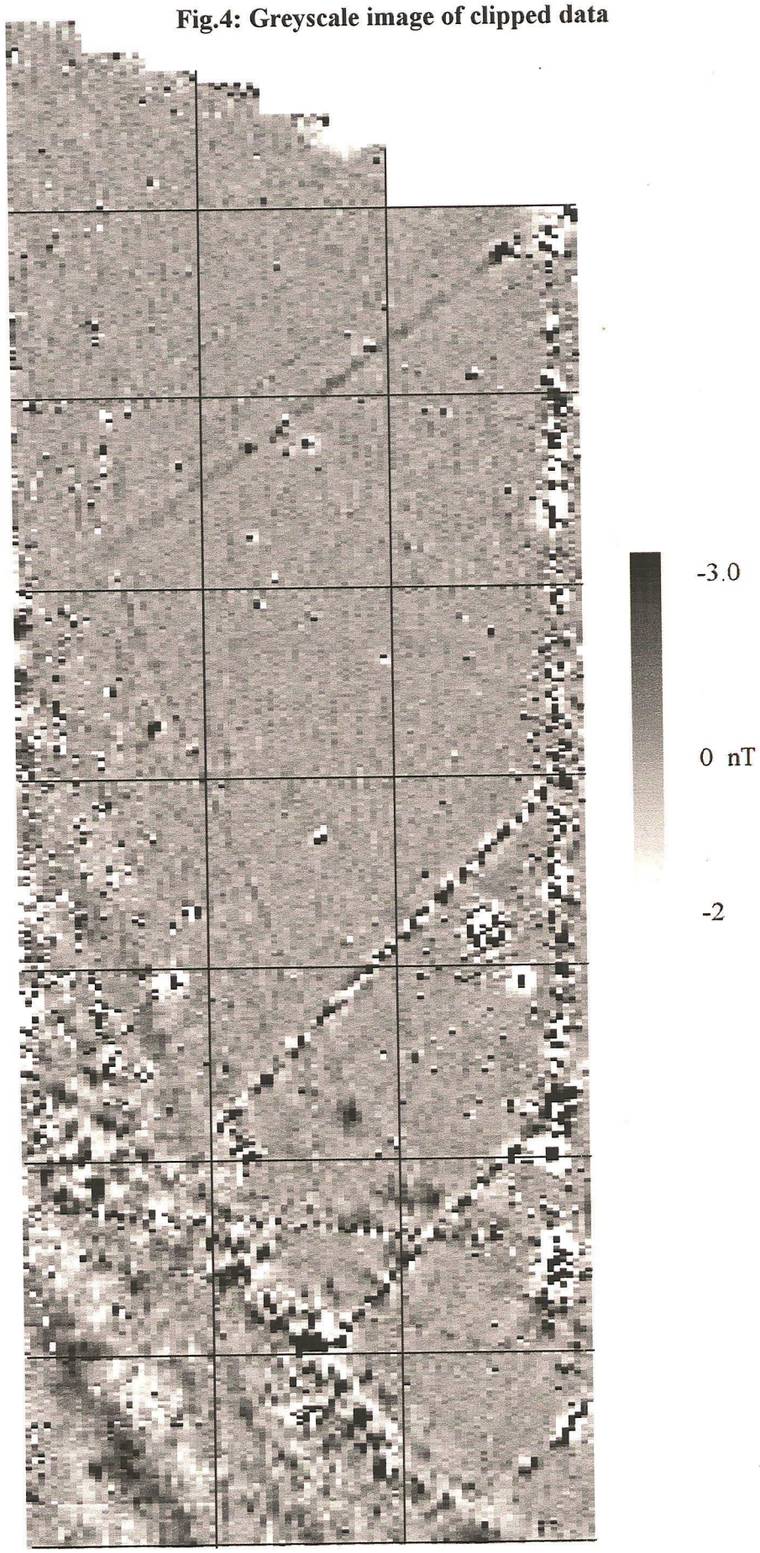
1: Location of earlier boundary
2: Rubble/ ferrous debris
3: Area of magnetic disturbance close to wire fence

Fig.3: Image of raw data showing strong anomalies



4,4a, 4b: Land drain
4c: ? land drain/ boundary
5: Track
6, 6a, 6b: Braded channel

Fig.4: Greyscale image of clipped data



7, 7a: ? Natural deposits
8: ? Partial enclosure (tentatively flagged)
9: Diffuse curvilinear, probably natural
10: Discrete anomaly (examples)

4.0 Results

The survey results are represented graphically in the greyscale and trace images (Figs. 2-5).

Figure 3 represents the raw data, with the strongest anomalies shown in red and blue. *Figure 5* displays the same data as a trace plot.

1: A group of strong dipolar anomalies that probably reflect miscellaneous ceramic and ferrous debris contained within a ditch (see Part 1), the remains of which are visible as a slight depression that extends along the north-east edge of the site.

2: A random distribution of discrete anomalies that were detected in the mid-south-western part of the site. The orientation of the baseline in comparison to the site boundary, which is curvilinear (Fig.1), may account for less densely scattered examples to the north and south of **2**. The majority of these anomalies probably represent magnetically susceptible materials extracted during the maintenance and/or construction of the Engine Drain. As such, the potential archaeological significance of these anomalies should not be discounted.

Others may reflect agricultural activity, for example, thrown horseshoes, drainage tiles, or rubble pits etc.

Figure 2 represents the interpretation of magnetically weak anomalies, which have been enhanced by further processing (Fig. 4).

3: This magnetic disturbance was detected within 3m of a barbed wire fence (Fig.1).

4: A series of linear anomalies, primarily orientated north-south, some of which contain magnetically stronger elements (see anomaly **2**, above). These anomalies are typical of those produced by ceramic land drains. Consultation with the landowners has confirmed that the site is drained, although the exact location of any pipes was not known (*pers. comm.*, D and P Hoyes). The diffuse nature of the northerly examples (**4a**, **4b**) possibly indicates that the latter are deeper, or are comprised of magnetically weaker materials. The uniformity of anomaly **4c** suggests that this also is a drain, possibly of a different phase, although the survey results are unable to confirm this. It is possible that **4c** is a former property boundary.

5: A linear anomaly that is parallel to **4a/b.** It appears to mark the position of an unmade track, which ran from the northern corner of the site to a footbridge over Engine Drain (see Part 1). A slight hollow, which corresponds to this anomaly, and a timber gate at the south-western edge of the site, are visible remains of this access.

6: The southernmost corner of the survey area displays a distinct magnetic signature. The delineation of this area corresponds to a significant topographic change, with the land to the south being lower than the northern component. Subtle

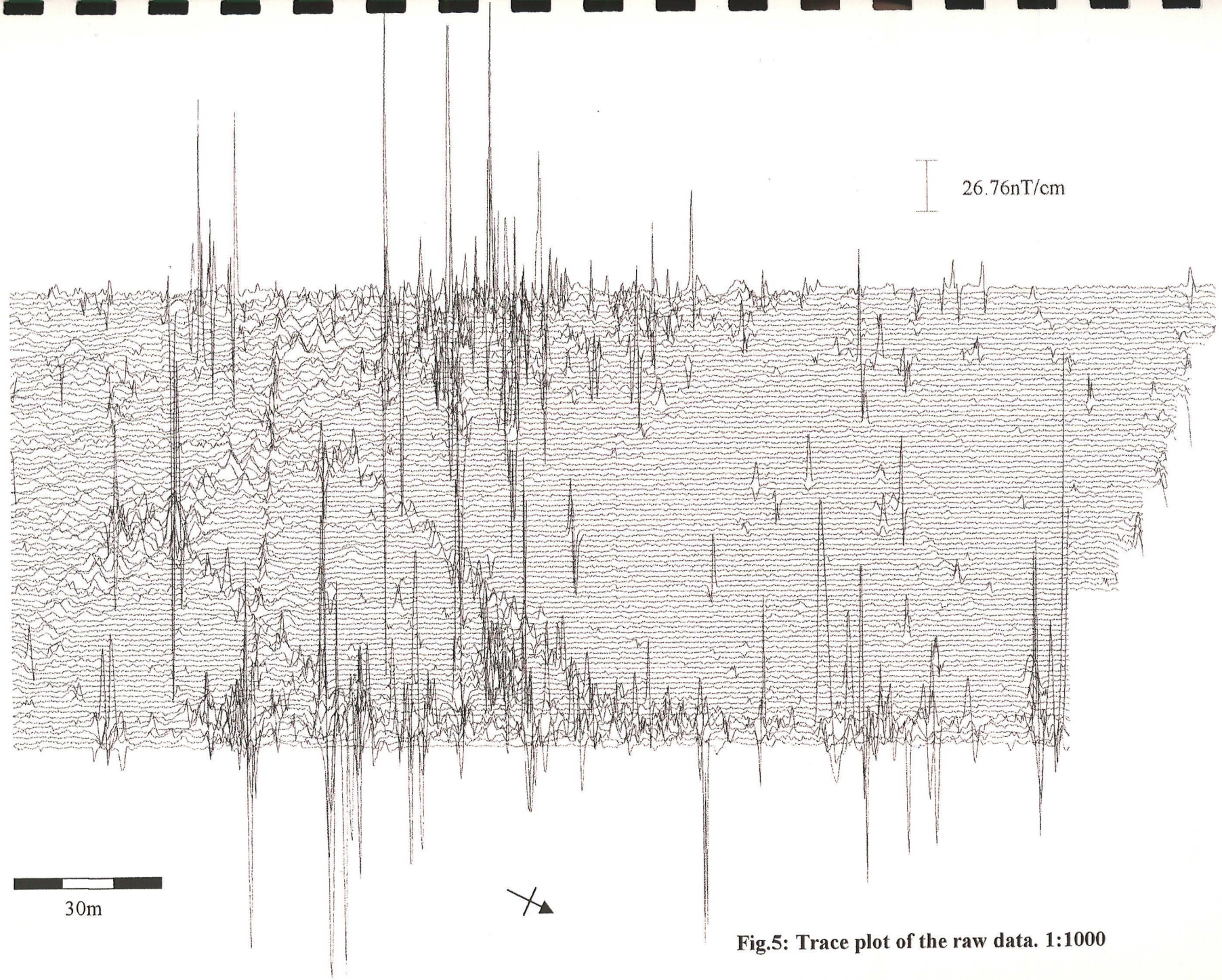


Fig.5: Trace plot of the raw data. 1:1000

topographical variations were noted within this area; anomaly **6a** appears to complement a low point.

It is likely that the magnetic and topographical variation of this area reflects the remains of an earlier channel of the River Witham, which currently lies to the west of the site. This was probably in the form of a braded channel. An augered sample (Fig.1: 1) from **6a** contained greater quantities of dark peaty soil than those from adjacent land (Fig.1: 2, 3).

The mottled area of magnetic variation, **6b**, almost certainly results from the leaching of iron rich minerals from overlying deposits, a phenomenon noted elsewhere in fluvial/alluvial environments (Lyall, 1995, Snee and Bunn, 1999, Rylatt and Bunn, 2000).

7: A number of amorphous positive anomalies were detected on the higher ground to the east of anomaly **6**. Three areas were augered: two from within the anomaly group (Fig.1: 5, 6), and one from a magnetically neutral adjacent area (Fig. 1: 4). Greater topsoil depth and differences in the upper subsoil appear to account for the magnetic variation. No inclusions of obvious archaeological significance were noted in the samples, and it is likely that these anomalies reflect natural depressions or tree boles. The possibility that some of the anomalies reflect buried pits should not be discounted.

8: The diffuse nature of this anomaly group, and the strong characteristics of **1** renders any interpretation tenuous. However, the apparent sub-rectangular nature of the associated components suggests that they may represent traces of a partial enclosure.

9: A faint curvilinear anomaly, broader toward its southern end, that extends north-west to south-east across the site. Roughly parallel to the northern edge of anomaly group **6**, this feature may be the result of natural processes, such as river terracing. Alluvial masking may account for the diffuse nature of this anomaly.

10: The random distribution of small, discrete anomalies probably reflect agricultural activities on the site such as burning, land drainage and midden spreading.

5.0 Conclusions

The survey area appears to contain anomalies that are predominantly of natural origin and/or reflect modern human activity (drains, boundary features, agricultural discard etc).

The site appears to incorporate the remains of an earlier channel of the River Witham. Core samples taken from **6a** contained greater quantities of peat than those taken from adjacent areas, and this could reflect the latest bed in a series of southerly migrations.

Samples taken from other magnetically enhanced areas (7) suggested that disparities in soil depths could account for this variation, although this could not be clarified. Other areas of magnetic variation possibly result from soil processes such as leaching.

This part of the Witham Fen is known to contain significant archaeological remains (see Part1) and it is possible that such remains are incorporated within the present study area. However, this survey has not identified anomalies that can be resolved into discrete archaeological types or classifications. The possibility that some remains have been masked by later alluvial and other activity should not be discounted.

6.0 Acknowledgements

Pre-Construct Geophysics would like to thank DDM Agriculture and Pre-Construct Archaeology for this commission. Messrs. D and P Hoyes are thanked for providing information during the survey.

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