NEW RESERVOIR, GRANGE DE LINGS LINCOLNSHIRE

ARCHAEOLOGICAL DESK-BASED ASSESSMENT AND GEOPHYSICAL SURVEY

NGR: SK 9838 7680
Planning ref.: M04/P/0905

Report prepared for John Roberts Architects Ltd.
on behalf of Hall Farm Partners

by

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September 2004

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EVENTS L15261
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SOURCE L19556

NEGATIVE

Summary

- *This archaeological assessment and geophysical survey has been prepared for John Roberts Architects Ltd. on behalf of Hall Farm Partners, in respect of a proposed water reservoir on land between Grange de Lings and Riseholme.*

- *It has been prepared in accordance with recommendations made by Lincolnshire County Council, and will form the basis for a decision making process that will seek to address the needs of the developer, while ensuring that archaeological resources are not needlessly destroyed as a result of redeveloping the site.*

- *The results of this study suggest that the archaeological potential of the site is limited, as its primary use throughout history has been agricultural. Some evidence of Roman or pre-Roman activity may be present, as may traces of medieval land use, but significant remains are unlikely to be encountered.*

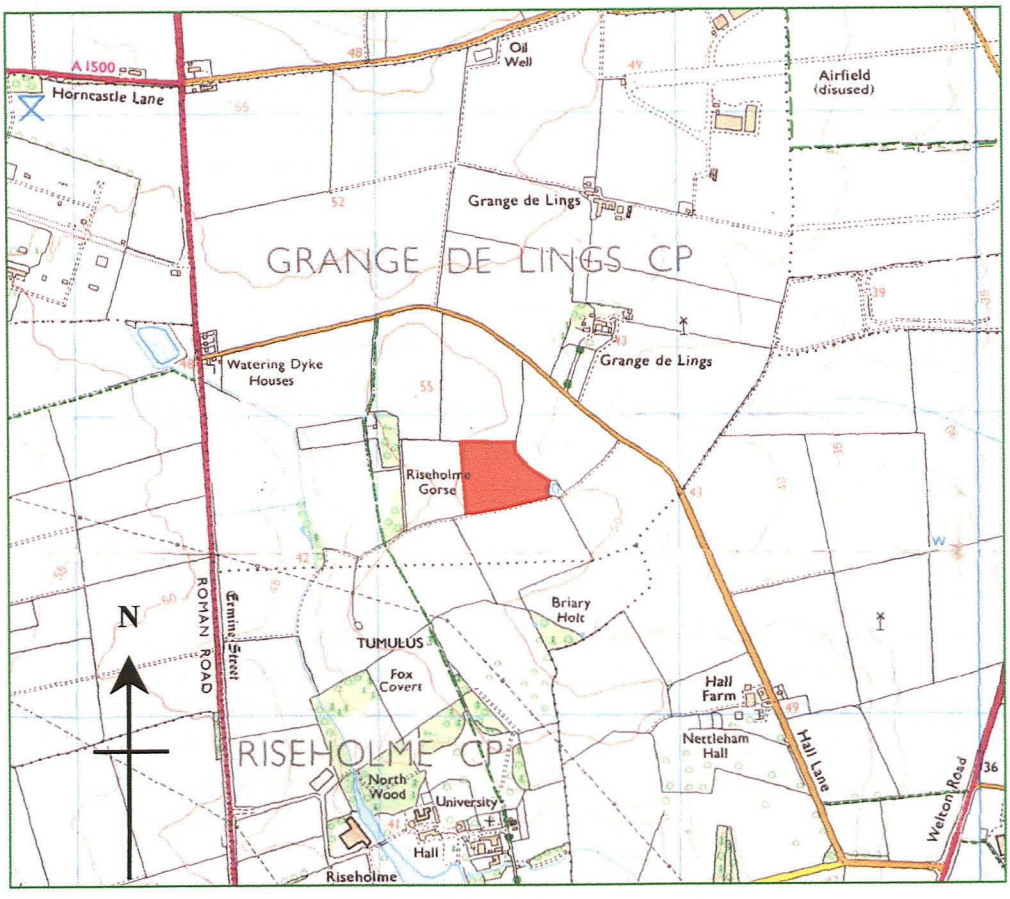

Fig. 1: General location map, showing the position of the development site in red. Scale 1:25 000. (O.S. copyright licence no. AL 515 21 A0001)

1.0 Introduction

This desk-based assessment was commissioned by John Roberts Architects Ltd. on behalf of Hall Farm Partners. Its purpose is to assess, without the use of intrusive methods, the archaeological potential of a site on land situated between Grange de Lings and Riseholme in Lincolnshire, and to calculate the potential impact of a proposed water reservoir. The results of this investigation will assist West Lindsey District Council with the local heritage aspects of its planning decision, and will also inform the client of any archaeological constraints of relevance to the application.

2.0 Location and description (figs. 1 and 2)

The civil parish of Grange de Lings is in the administrative district of West Lindsey, approximately 6km north of central Lincoln and directly south-east of Scampton. It lies on top of the Lincoln Edge, the limestone ridge which carries the major Roman road of Ermine Street northwards towards the Humber Estuary: Ermine Street forms the western boundary of Grange de Lings parish. To the south is the deserted medieval village of Riseholme, and to the west is the Lincolnshire Showground. There is no village, either current or deserted, in the parish: it is now occupied by two discrete clusters of farm buildings and a disused airfield.

The proposed development site lies close to the southern boundary of Grange de Lings parish, approximately 850m east of Ermine Street and 500m south-west of Grange de Lings Farm. It comprises a single irregularly shaped field, and is reached by a metalled farm access track off Hall Lane.

The local solid geology of the area comprises Middle Jurassic Lincolnshire Limestone (British Geological Survey, 1999). The British Geological Survey map indicates that no overlying drift geology is present in this area, but a trial pit survey carried out in and around the proposed development area recorded a deep clay deposit between the subsoil and the limestone bedrock (see Section 6.3).

Central National Grid reference: SK 9838 7680

3.0 Objectives and methods

The purpose of this report is to assess the likelihood of the presence, and also the potential extent and significance, of archaeological remains which may be vulnerable to construction works associated with the proposed development; and, if necessary, to suggest further methods by which the site may be evaluated in advance of the works, or by which construction works can be mitigated to minimise the impact to any archaeological material.

The report is based on information derived from a variety of sources: -

The County Sites and Monuments Record for Lincolnshire (Lincoln)

Records held by the Lincolnshire Archives Office (Lincoln)

A geophysical survey carried out by Pre-Construct Geophysics

A trial pit survey carried out by the Fox Group of Companies in 2001

A site visit by the author

4.0 Planning background

Planning permission is sought for the excavation of a new water reservoir. In consideration of this application, Lincolnshire County Council Conservation Services recommended an archaeological evaluation of the area prior to determination of the application.

Planning application reference no. M04/P/0905.

5.0 General archaeological and historical background (fig. 2)

The area covered by this survey is not far from the prehistoric Jurassic Way, an ancient route parallel to and superseded by Roman Ermine Street. Records held by the Lincolnshire Sites and Monuments Record indicate a low to moderate level of activity local to the development site in the prehistoric period: three isolated finds of single flint artefacts (SMR nos. 50698, 52307 and 54591) and one assemblage of worked flints (SMR no. 54245) are the only definitely datable evidence from this period; all of these finds were within a distance of 500 to 700m from the site. However, the area of study contains a number of landscape features – earthworks and cropmarks, principally observed on aerial photographs – which cannot reliably be dated, and some at least of these seem likely to be prehistoric. The circular hut tentatively identified within cropmark enclosure 52310 suggests a prehistoric date, while cropmark linear boundary 52345 has been more confidently identified as prehistoric, and cropmarks 52330 and 52347 may both represent prehistoric barrow monuments.

The Roman period is better represented in the area of this study, due to its position directly adjacent to the major Roman road of Ermine Street, which ran from London to the Humber ferry crossing via the regional capital of Lincoln, and whose route through the local area is currently followed by the A15. With the rising importance of York as one of Britain's three principal legionary fortresses, a new road was built branching off Ermine Street and travelling to York via Doncaster, allowing major movement of troops without the necessity of bringing them across the River Humber by ferry. The beginning of this road is visible c. 1km NW of the development site, as a linear bank (the Roman *agger*, or raised road bed) running across the Lincolnshire Showground (SMR ref. 50575): it subsequently runs along the course of the modern Tillbridge Lane to the Trent crossing at Littleborough (Margary, 1967).

The Roman round barrow SW of the development site (SMR ref. 54195) appears on the 1st edition Ordnance Survey map (fig. 5), but was not identified until 1935, when a secondary cremation burial was found. An excavation was carried out in 1952, revealing that the barrow was built in the late 1st century AD on the site of a cremation; pottery and glass vessels and fragments of human bone were retrieved.

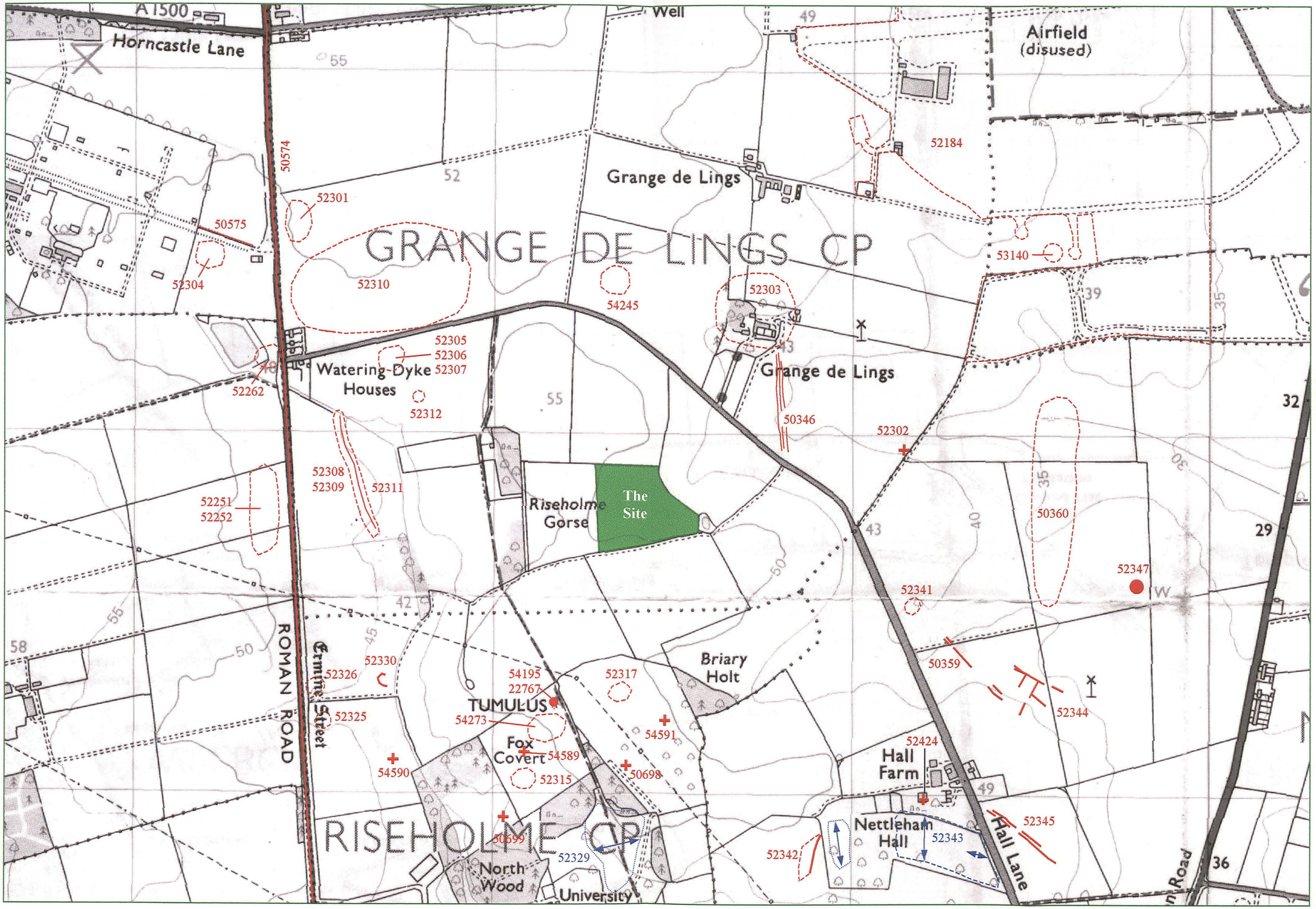

Fig. 2: Map showing information local to the development site held by the Sites and Monuments Record. Areas of ridge-and-furrow are shown in blue, other SMR sites in red. Scale 1:10 000.
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Finds of 3rd and 4th century pottery in the vicinity (SMR ref. 54273) indicate that the area continued to be inhabited throughout the Roman occupation. The site of a Roman building has been identified to SSW of the barrow, approximately 700m from the development site, from a scatter of building material, including roof tiles and roughly worked foundation stones, and pottery (SMR ref. 52315). Three Roman coins have been recorded in the area of study (SMR refs. 52302, 54589 and 54590), and Roman pottery has been found in five locations other than adjacent to the barrow (SMR refs. 50699, 52251, 52304, 52305, and 52308). It should also be borne in mind that some or all of the undated cropmark features may represent Roman landscape use.

The Domesday Survey of 1086AD has no individual entry for Grange de Lings, which appears at this time to have been part of the lands around Riseholme. Riseholme itself was chiefly divided between two secular landholders, Gilbert of Ghent and Kolsveinn, and the Abbey of St. Peter at Peterborough. Although Kolsveinn held land in his own right, he was Gilbert of Ghent's vassal, and managed Gilbert's land in Riseholme (an outlying estate of Gilbert's manor of Scampton); he was also the tenant of the abbey's Riseholme estate, and at the time the Domesday Survey was compiled, Kolsveinn and Abbot Thoraldr were engaged in a lawsuit concerning the ownership of 4 bovates of this land. The only area of Riseholme not under Kolsveinn's management in some form was half a carucate of land belonging to the church of St. Michael (in Lincoln?), which was held by the priest himself. Early medieval Riseholme appears to have been chiefly arable land, supporting two mills, although both meadow and woodland pasture also appear, and it was sparsely populated even then: although the holdings had in general greatly increased in taxable value since the Norman Conquest, only 10 households other than the named landholders and administrators are listed (Morgan and Thorne, 1986).

Riseholme is also listed in the Lindsey Survey, compiled in 1115-1118AD under Henry I. 'The canons of St. Mary' (of Lincoln), Robert de Haia and Walter de Ganto were then the landowners; Robert administered Walter's land and part of that of St. Mary's canons. The Lindsey Survey gives no details of land use (Foster and Longley, 1924).

The first documentary evidence of Grange de Lings as an estate in its own right is in 1325, when it appears as *grangeam super Lynges*, 'the grange on the heather', part of the estates of Barlings Abbey (Cameron, 1998). A grange was an outlying farm, generally on land newly cleared or reclaimed after being gifted to a religious house; it might occupy a single grant of land, or be built up from smaller grants over a period of time, as was the case with Grange de Lings. Although organised as a small religious house in its own right, a grange was occupied solely by lay brothers, under the rule of a lay brother known as a *granger*. The grange buildings stood to the north-east of the proposed development site, in the position occupied by the present farmhouse and outbuildings. There is no evidence of a previously existing or continuing secular settlement in the area (Everson et al, 1991), the land may well have been transferred to the abbey as wilderness, but it was not unknown for the establishment of a grange to infringe the rights of the previous inhabitants, from obstructing the most direct routes between village and fields up to the eviction of villagers from the newly gifted lands (Owen, 1971). The monastic lands in this area originated in a series of grants of land, including pasturage for sheep on the limestone uplands, made by the lords of Riseholme to the abbeys of Barlings and Kirkstead. In

AD 1154, Ralf de la Haye (heir of the Robert de Haia mentioned in the Lindsey Survey) granted property in Riseholme to Barlings Abbey as part of its foundation endowment, and Hugh Bardolf, administering the estate as tenant of the de la Hayes, granted a half carucate of land with pasturage for 500 or 600 sheep to Kirkstead Abbey in 1166, and a carucate, also with pasturage for 500 or 600 sheep, to Barlings Abbey in 1168 (The uncertainty in numbering stems from the medieval use of the 'Lincolnshire long hundred', in which six score sheep were referred to as one hundred (Baker, 1956)). Both grants were subsequently confirmed and extended, including another grant of pasture for 700 sheep to Kirkstead Abbey in the 13th century (Everson, 1988). The wealth of medieval Lincolnshire was founded on sheep-rearing for the wool trade, and the monastic houses of the county were among the leading wool producers: there are indications that Lincolnshire monasteries in the 13th and 14th centuries were exporting wool as far as Italy. Around the turn of the 14th century, the religious houses of Barlings and Sempringham combined are recorded as exporting 25 sacks of wool per annum, fourth on the list of major local producers (Owen, 1971).

In 1253, Barlings Abbey was granted free warren (the right to maintain and exploit a population of wild rabbits) in all their demesne land in Riseholme, beginning a history of rabbit-keeping in the area (Baker, 1956). In 1398 the entire manor of Riseholme, formerly in the de la Haye fee, was granted to Barlings Abbey. Early 16th century documents show that this accumulation of land grants had developed into two granges, Lings and Riseholme, both in the possession of Barlings Abbey: Kirkstead Abbey appears to have transferred its interests to Barlings, but no details of this transaction are known. In 1535, both granges combined were worth £12 per annum, and lay among a group of Barlings Abbey's possessions in the wapentakes of Lawress and Aslacoe (Everson, 1988).

The remains of the monastic buildings of Grange de Lings are embedded in the current farmhouse occupying the site: Pevsner records a single bay of a vaulted chapel and the arch of a large east window within the modern building, and notes that the grange appears to have been rebuilt in the 14th century, at the same time as the mother abbey (Pevsner, 1989). A chamfered window and part of a spiral staircase are visible in the W facing external wall of the farmhouse (plate 4).

In 1536, the heath at Grange de Lings was the location for the muster of the dissidents in the Lincolnshire Rising. The rising was precipitated by the coincidence of three royal commissions arriving in the area at once: one to dissolve the minor religious houses (including Barlings Abbey), one to assess and levy a subsidy granted to Henry VIII by Parliament, and one to enquire into the moral, political and intellectual standing of the parochial clergy (Hodgett, 1975). After the rising was put down, the abbot of Barlings Abbey and six of his canons were executed; when the abbey was suppressed, some twelve surviving canons were turned out with no means of support (Knowles and Hadcock, 1971).

Barlings Abbey was dissolved in 1538, and its possessions were granted to Charles Brandon, Duke of Suffolk. Large parts of the Suffolk lands in Riseholme parish were bought by the family of St. Paul of Snarford in 1544 (Grange de Lings changed hands at this time) and in 1560; further purchases at the beginning of the 17th century consolidated these lands into a complete estate comprising the present parishes of

Riseholme and Grange de Lings (fig. 3). The estate passed through the hands of several county families as a coherent entity, and was eventually broken up for sale in 1839 (fig. 4), when Grange de Lings was acquired by Robert Swan (Everson, 1988).

In the 17th century, Grange de Lings was let as a warren: a document from 1659 records its being let for £36 pa *'to maintain the warren and leave 100 cupple of rabbits'* (Everson, 1988). Rabbit-keeping on a commercial scale was widespread in the 17th and 18th centuries, particularly on heathland with little agricultural value: artificial mounds were often constructed to encourage wild rabbits to make their homes in a warren area. The long-standing association of Grange de Lings with rabbiting continued into recent times: the cremation burial in the Roman barrow was discovered by a man pursuing a ferret lost down a burrow (Baker, 1956).

A survey carried out in 1988 identified a bank to the west of Grange de Lings farmhouse as the western and north-western boundary of the property on the 18th and 19th century maps, and suggested that it might also represent the boundary of the court of the medieval grange. The survey also noted well-preserved ridge-and-furrow earthworks (the remnants of medieval strip ploughing) in the field north-west of the farmstead (Everson, 1988).

6.0 Site-specific search/investigation results

Information relating to the immediate area of the proposed development was researched and collated from several sources, and is summarised below.

6.1 Documentary information (figs. 3-5)

As was agreed with the Built Environment Officer for Lincolnshire County Council, no search for aerial photographs was made at the National Monuments Records Office, as constraints of time did not permit it.

The earliest document pertaining to the development site held by the Lindsey Archive Office is a map dating from 1796, showing the estate of T. Chaplin Esquire, which comprised the entire parish of Riseholme with Grange de Lings (fig. 3). The estate is completely enclosed, divided into named fields: the frequency of the term 'close' in the field names indicates that this division was extensive and recent. The proposed development site lies across two fields jointly named 'Hundred Acres', with a belt of trees on the south side. The body of water to SW of Riseholme Hall is marked as 'Fish Pond', possibly indicating continuation of use from the monastic grange, although it is at some distance from the grange buildings.

No tithe award map exists for Riseholme parish, with or without Grange de Lings, as neither parish paid tithes. Riseholme was a sinecure whose church had been a ruin since the reign of Elizabeth I, and the church lands had been taken over by the manor at an agreed payment of £15 per annum in lieu of rents and tithes (Baker, 1956), while the status of Grange de Lings was disputed in court in 1769: the court ruled that, as ancient monastic land, it was not formally part of a parish, and was not liable for tithes (Everson, 1988). Nor does the Lindsey Archive Office have any record of an enclosure award having been made for Riseholme, although neighbouring Nettleham

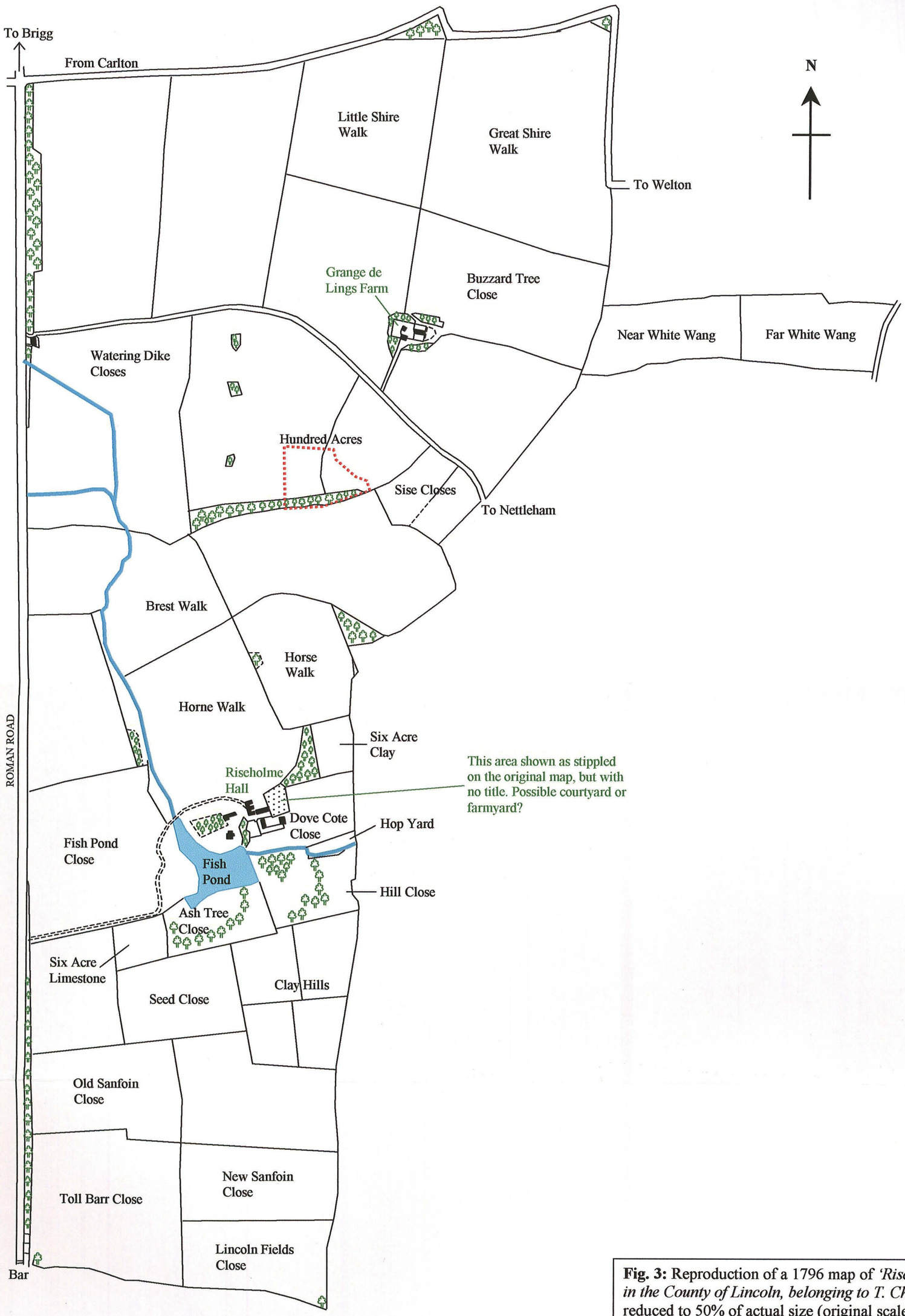

Fig. 3: Reproduction of a 1796 map of *'Riseholm* (sic.) *in the County of Lincoln, belonging to T. Chaplin Esqr.'*, reduced to 50% of actual size (original scale 8 chains to the inch). Apart from 'Hundred Acres', which contains the present development site, field names referring only to the acreage of the field have been omitted. Original text is shown in black, author's additions in green; the approximate location of the site is outlined in red.

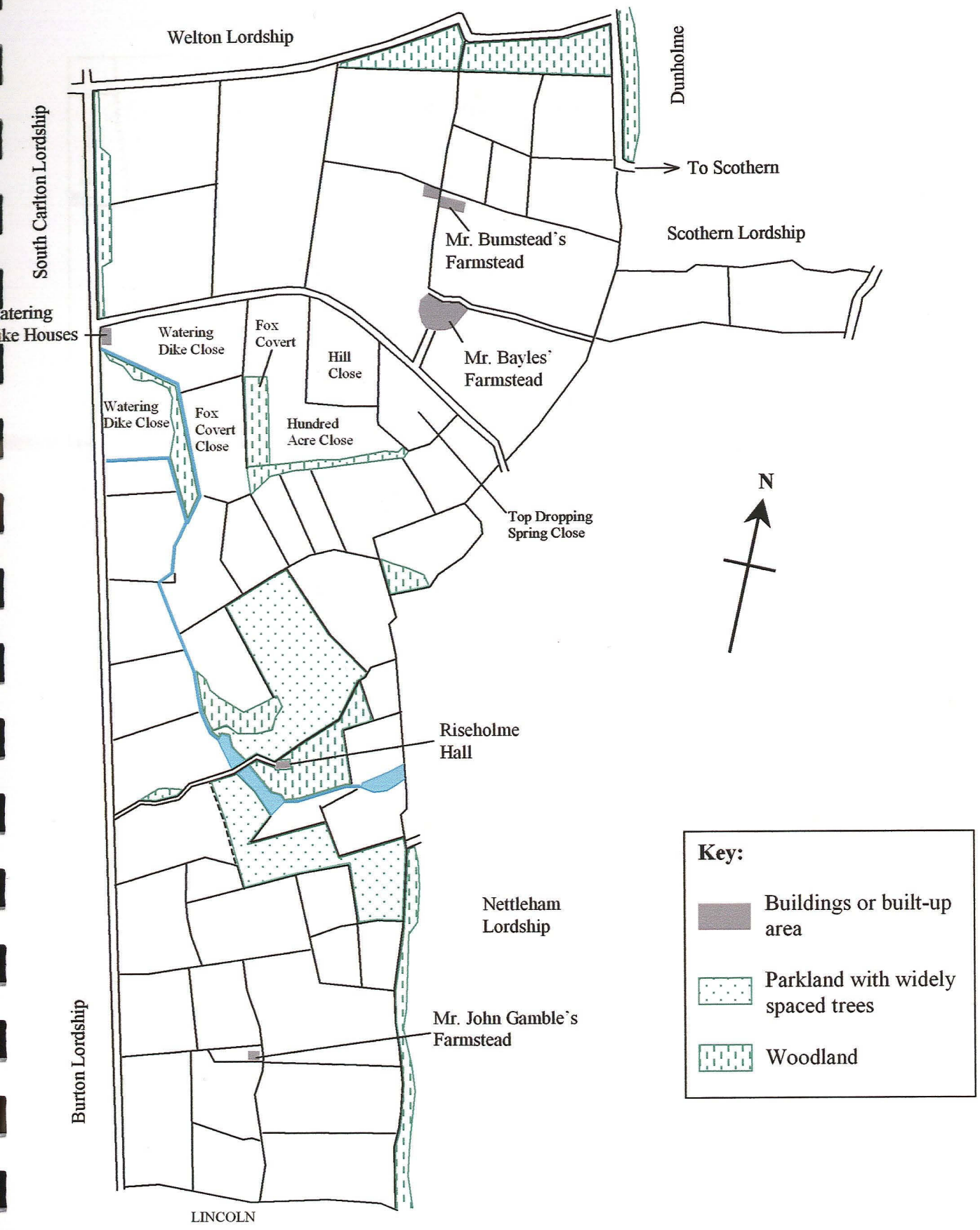

Fig. 4: Reproduction of a map of Riseholme parish drawn up in 1839 to accompany the sale of the estate. Not to scale.

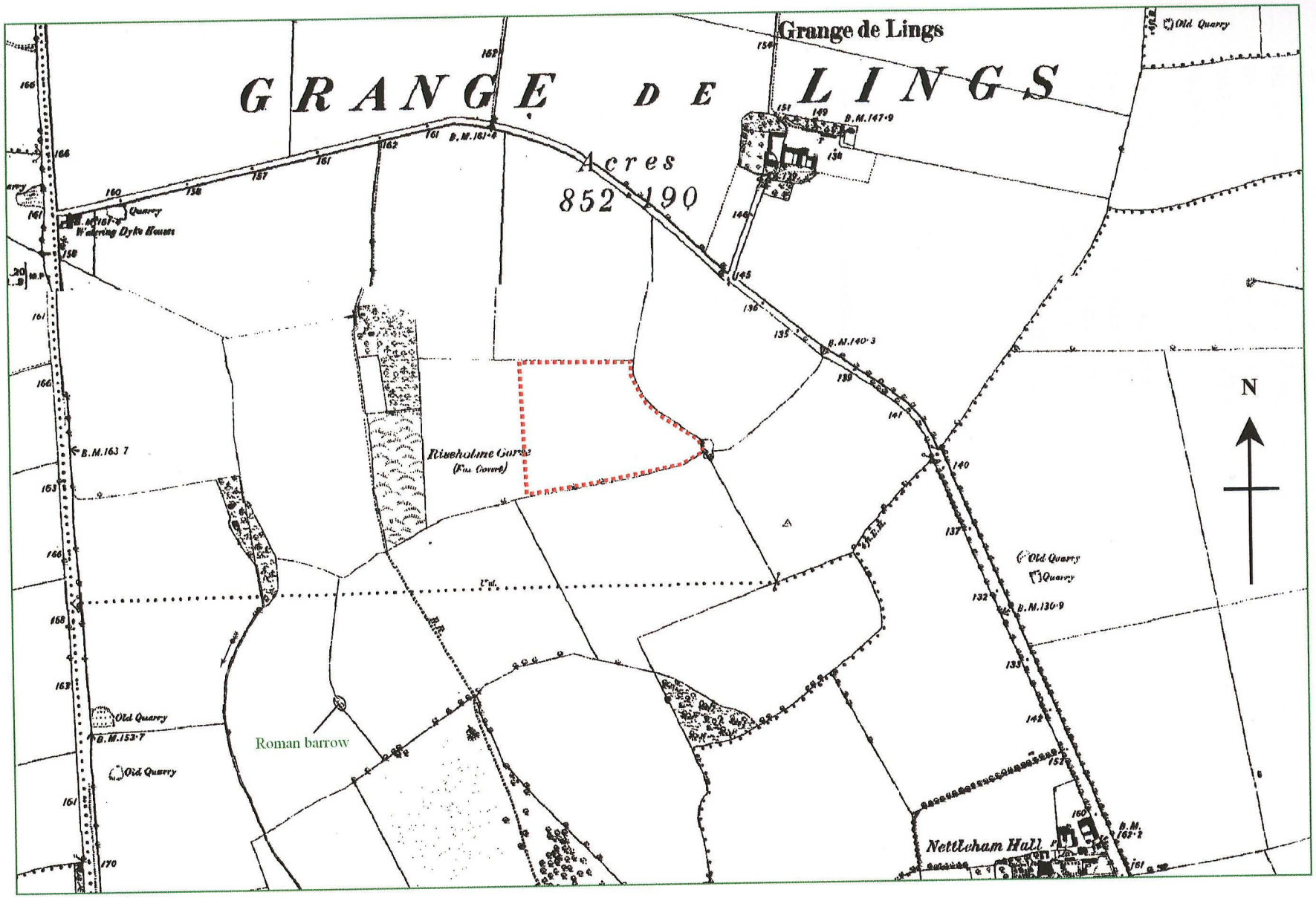

Fig. 5: Extract from the 1890 1st edition Ordnance Survey map, rescaled to 1:10 000. The approximate position of the development site is outlined in red. (O.S. copyright licence no. AL 515 21 A0001)

was enclosed in 1776-78, and the enclosure award with accompanying map is extant (Russell and Russell, 1987). It seems most likely that the Grange de Lings court case, the year after the enclosure of Nettleham, was associated with the procedures of enclosure, and that, since the whole parish was in the control of a single landowner, and none of it proved liable for tithe payments, no formal enclosure award was required.

The Riseholme parish estate was broken up and sold by auction in 1839: a plan of the estate drawn up to accompany the sale is reproduced in Fig. 4. The fields shown in the 1796 map (fig. 3) have been subdivided in the intervening 40 years, while the parkland around Riseholme Hall has been greatly extended. The field containing the present development site – Hundred Acres on the earlier map – has been divided into Hundred Acre Close and Hill Close, and the fox covert has been planted which is still standing to W of the site.

The 1st edition Ordnance Survey map of 1890-91 (fig. 5) shows the layout of the field boundaries to have settled into the pattern of modern usage, although the field containing the development site has not yet been subdivided N-S. A pond, also still extant, has been constructed at its SE corner. The Roman barrow mound (SMR no. 54195) is shown, but not labelled, as it had not then been identified or excavated. A number of quarry pits, two of which, labelled 'Quarry' rather than 'Old Quarry', may have been in active use, are shown to E and W: in the light of the recent geotechnical survey (section 6.3), it seems probable that these lie on the exposed limestone at the edges of a clay cap which covers the centre of the Lincoln Edge in this area.

6.2 The County Sites and Monuments Record

A search was carried out at the Lincolnshire SMR for findspots, known archaeological sites including cropmarks and earthworks, and buildings of historical significance within approximately 1km of the development area. Those which may be relevant to the proposed development scheme are tabulated below.

SMR No.	Description	NGR ref.
50346	Linear cropmark: triple ditch, undated boundary	SK 9877 7710
50359	Linear cropmark: undated boundary	SK 9940 7625
50360	Linear cropmark: undated boundary	SK 9960 7700
50575	Tillbridge Lane: course of Roman road	SK 9738 7747- SK 8265 8247
50698	Early Neolithic to Late Bronze Age flint scraper	SK 9837 7609
50699	Extensive scatter of Romano-British pottery, chiefly grey ware	SK 9803 7595
52184	Dunholme Lodge airfield: in use 1943-1964	SK 9999 7850
52251	Scatter of Romano-British pottery running parallel to Ermine Street	SK 9730 7680
52252	Scatter of medieval pottery running parallel to Ermine Street	SK 9730 7680
52262	Old quarry shown on 1st edition OS map	SK 9740 7723
52301	Quarries, undated, identified from aerial photographs	SK 9745 7755

52302	Findspot of a Roman coin: illegible 3rd century AD antoninianus	SK 9912 7697
52303	Remains of the monastic building of Grange de Lings: earthworks and building fragments	SK 9870 7730
52304	Light scatter of Romano-British pottery	SK 9720 7750
52305	Scatter of Romano-British pottery, including colour-coated ware	SK 9770 7720
52306	Scatter of medieval pottery	SK 9770 7720
52307	Single flint flake, Early Neolithic to Late Bronze Age	SK 9760 7690
52308	Single Romano-British rim sherd	SK 9760 7690
52309	Medieval pottery handle	SK 9760 7690
52310	Cropmark: possible rectangular ditched enclosure with internal circular hut	SK 9770 7730
52311	Cropmark: potential trackway	SK 9760 7690
52312	Cropmark: enclosure of unknown date	SK 9778 7709
52315	Site of Roman building, identified by building material, roof tile and pottery fragments	SK 9809 7602
52317	Evidence of roadway, date uncertain	SK 9835 7524
52325	Old quarry shown on 1st edition OS map	SK 9753 7616
52326	Old quarry shown on 1st edition OS map	SK 9751 7625
52329	Possible earthwork ridge-and-furrow	SK 9834 7586
52330	Cropmark, possibly a prehistoric round barrow	SK 9769 7630
52341	Old quarry shown on 1st edition OS map	SK 9920 7652
52342	Cropmark trackway	SK 9889 7583
52343	Earthwork ridge-and-furrow, possible medieval field system	SK 9920 7586
52344	Cropmark enclosures and/or linear features possibly associated with boundary ditch 50359	SK 9950 7630
52345	Cropmark: prehistoric double linear boundary	SK 9945 7590
52347	Cropmark: possible Bronze Age round barrow	SK 9977 7658
52424	Nettleham Hall: Georgian, now ruined	SK 9920 7600
53140	Old quarry shown on 1st edition OS map	SK 9940 7753
54195	Roman round barrow, late 1st century AD: Scheduled Ancient Monument no. 22767	SK 9817 7624
54245	Bronze Age flint scatter, including 2 barbed and tanged arrowheads and a possible spearpoint	SK 983 774
54273	Scatter of Roman pottery south of barrow 54195	SK 9815 7615
54589	Bronze Roman coin: Constans, 344-348 AD	SK 981 761
54590	Possible Roman coin – illegible	SK 977 761
54591	Early Neolithic-early Bronze Age flint arrowhead	SK 985 762

The SMR information is discussed as part of the general archaeological and historical background, section 4.0.

6.3 Trial pit survey

A survey consisting of 6 trial pits was carried out by Fox Plant in August 2001: trial pits 5 and 6 lay outside the present development site and are not included in this

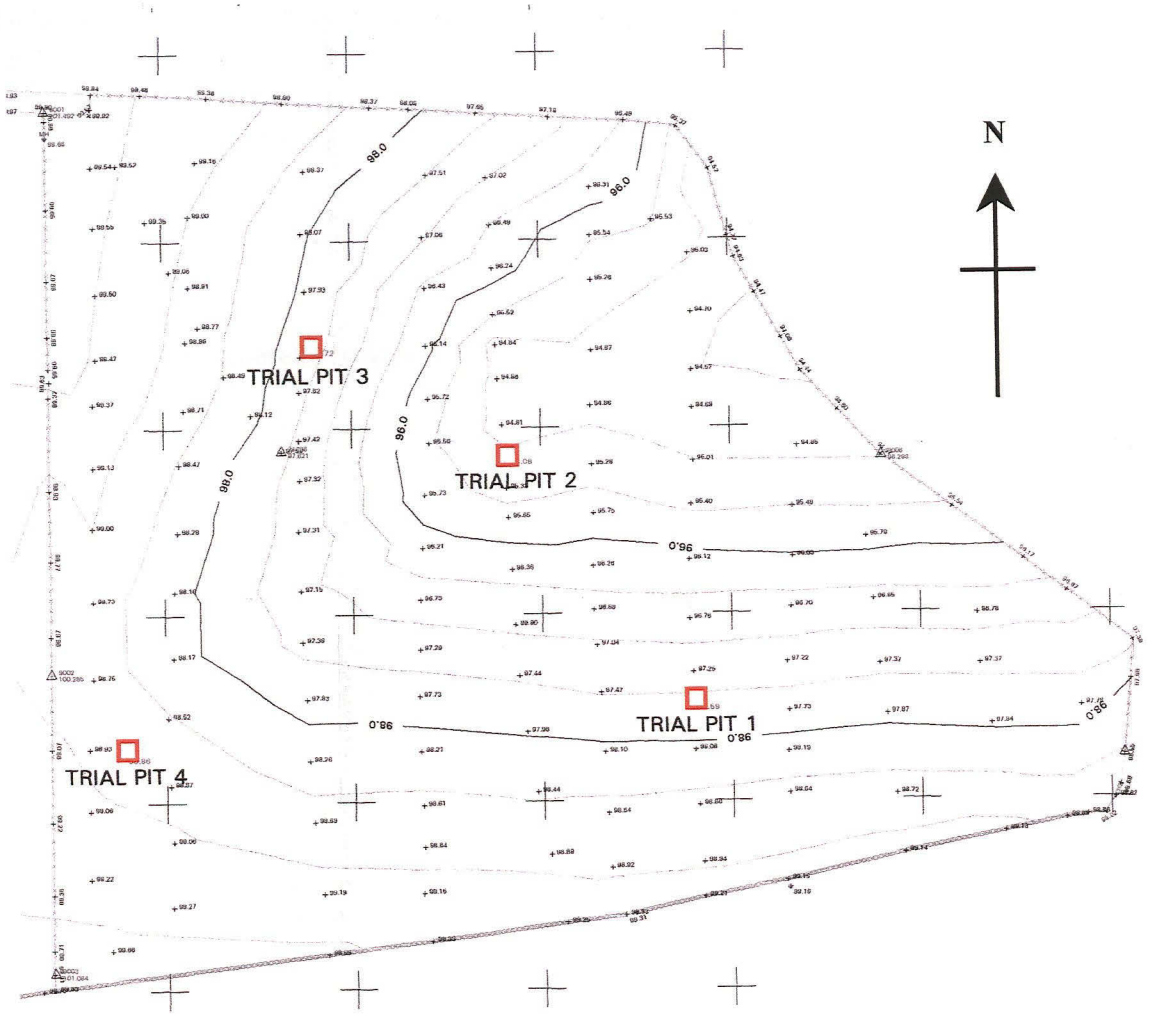

Fig. 6: Location of the trial pits excavated in the 2001 geotechnical survey within the proposed development area. Scale 1:2000.
Plan supplied by the Fox Group of Companies.

report. The survey was for geotechnical purposes only, and did not involve archaeological supervision.

All pits recorded a uniform depth of topsoil, 0.30m, over a sandy subsoil between 0.50m and 0.60m deep. Below the subsoil were varying depths of clay, sometimes overlying mudstone, to a total depth of 1.15m-3.20m before reaching the surface of the limestone bedrock. No groundwater was encountered in any of the pits. The results of the individual trial pits are tabulated below.

	Description	**Depth (total)**	**Thickness**
Trial pit 1	Topsoil		300
	Cohesive sandy subsoil	900	600
	Firm grey-brown clay with occasional sand pockets	2200	1300
	Moist grey mudstone	4000	1800
	Weathered brown limestone	4300	300 (pit base)
Trial pit 2	Topsoil		300
	Cohesive sandy subsoil	850	550
	Brown clay with sand veins and occasional boulders	1500	650
	Grey weathered mudstone	2000	500
	Brown weathered limestone	2450	400 (pit base)
Trial pit 3	Topsoil		300
	Cohesive sandy subsoil	900	600
	Grey-brown clay with sand lenses	2200	1300
	Grey-brown moist weathered mudstone	3400	1200
	Brown weathered limestone		Pit base
Trial pit 4	Topsoil		300
	Sandy subsoil	800	500
	Light grey clay with large sand pockets	1800	1000
	Grey firm clay	2500	700
	Brown broken limestone with clay bands	3100	600
	Dark grey mudstone, becoming shaley with hard slabs	4000	900
	Friable grey limestone, becoming hard light grey-brown	5000	1000 (pit base)

6.4 Site visit

A site visit was made by the author on 15/9/04, for the purpose of recording the present appearance and environs of the proposed development site. This included a colour slide photographic record, extracts from which are reproduced in Appendix 1.

The field comprising the development site is reached by a track off the SW side of Hall Lane, which runs along the S edge of the field. It has been under grass for some ten years, being cut for hay and silage, and also used to pasture cattle, but was

previously in arable cultivation (Mr. A. Buckley, Lockwood Estates, *pers. comm.*). The W edge of the field is divided by a barbed-wire fence and a set of timber stock control gates from another meadow field, which backs on to Riseholme Gorse fox covert; the other field edges are bounded by a hawthorn hedge and are surrounded by arable land (plate 1). At the SE corner of the field is a pond, whose northern and western sides are embanked above the surrounding ground level: it is artificially constructed but naturally fed, and has never been known to dry up (Mr. A. Buckley, *pers. comm.*). The pond is surrounded by a copse of trees, including poplar, Scots pine, Norway spruce and Leyland cypress as well as local species such as oak and ash (plate 2). The 1839 parish map shows this point as being on the boundary between Hundred Acre Close and Top Dropping Spring Close, indicating that a previously known water source in the adjacent field has been diverted to feed the pond.

The topology of the field is almost bowl-shaped, sloping down from the raised corners, of which the NW corner is highest, with a gentle convex slope to a depression in the E half of the field whose lowest point is on the E field edge; this formation does not continue into the next field to E, which also slopes down to Hall Lane (contours are shown in detail in Fig. 6). The upper edge of the depression is marked by a variation in colour (plate 3), caused by the partial replacement of the grasses on the higher slopes with a taller, coarser variety associated with wet ground; this area holds standing water in wet weather (Mr. A. Buckley, *pers. comm.*). The positions of the 2001 trial pits cannot be distinguished, but a small area of subsidence at the lowest point of the field indicates that the ground here is unstable. Adjacent to the gate in the SE field corner is a roughly oblong stand of stinging nettles, some 10m x 6m, which is notable as nettles and other weed plants are otherwise almost absent. Stinging nettles are known to colonise disturbed ground and rubble, but also to favour ground which has been heavily trampled and manured by crowded or intensively kept animals: consequently, this may be the site of a demolished building, or simply of a feed or water trough around which cattle regularly congregated.

7.0 Geophysical survey

Pre-Construct Geophysics was sub-contracted by Pre-Construct Archaeology (Lincoln) to undertake a fluxgate gradiometer survey of the entire field.

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

7.1 Methodology

Gradiometry is a non-intrusive scientific prospecting technique that is used to determine the presence/absence of some classes of sub-surface archaeological features (eg pits, ditches, kilns, and occasionally stone walls). By scanning the soil surface, geophysicists identify areas of varying magnetic susceptibility and can interpret such variation by presenting data in various graphical formats and identifying images that share morphological affinities with diagnostic archaeological remains.

The use of gradiometry is used to establish the presence/absence of buried magnetic anomalies, which may reflect sub-surface archaeological features.

The area survey was conducted using a Bartington Grad – 01 – 1000 dual fluxgate gradiometer with DL601 data logger set to take 4 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 data was processed using *ArcheoSurveyor 0.28.4.6*. It was clipped to reduce the distorting effect of extremely high or low readings caused by discrete pieces of ferrous metal on the site. The results are plotted as greyscale and trace images.

David Bunn, aided by Sean Jackson and Joe Horton, undertook the survey on 14th-15th September 2004.

Instrument	Bartington Grad-601
Grid size	30m x30m
Sample interval	0.25
Traverse interval	1.0m
Traverse method	Zigzag
Sensitivity	0.1nT
Processing software	Archeosurveyor v.28.4.6
Weather conditions	Cool, sunny, windy
Area surveyed	c.5ha

Table 1: Summary of survey parameters

7.2 Results and discussion

The survey results are presented graphically as figures 7-10:

- Fig.7: Location of survey (1:2500)
- Fig.8: Trace plot of the unclipped data (1:1000)
- Fig.9: Greyscale image of the processed data (1:1000)
- Fig.10: Interpretive plan (1:1000)

The survey recorded a range of magnetic variation. The highest readings correspond to a stock pen (1) and a zone of what may be hidden rubble (2) at the northwest and southeast corners of the field, respectively. Strong magnetic variation was also recorded at various points around the perimeter of the field, in close proximity to wire fencing.

The survey identified a series of strongly magnetic discrete anomalies; randomly spread across much of the survey area (Figs. 8 and 10, examples circled in pink). These probably indicate miscellaneous ferrous objects, such as ploughshares and ceramic materials (for example, brick and tile fragments). In this context, it is unlikely that any are archaeologically significant.

The results include a series of regularly spaced north-south aligned linear anomalies (orange lines). These probably reflect modern land drains, although this has not been confirmed by the landowner. It is interesting that few were detected in the lowest area, which exists as a large hollow in the mid north-eastern corner of the field (approximate area outlined in green). There are probably no modern drains within this zone, but this is where they ultimately outlet (see below, anomalies 5-8).

A number of c. east-west linear anomalies were detected. The northernmost example (3) represents a drain flowing towards the northeast corner of the field, where it feeds a natural swallow hole, 4 (*pers comm.* C Hood, landowner). Linear 5 could be another such drain (see below). Others (examples shown as yellow lines) are more likely to indicate traces of cultivation or tramlines.

It would seem reasonable to assume that the suggested drain 5 would flow eastwards toward the low ground. This hollow appears to be a natural feature, although it may have been exploited for drainage and/or (possibly) quarrying in the past: weakly magnetic anomalies in this area could be interpreted as quarry pits (red, largest annotated as 6, 7, 8). However, where excavated, test pits have indicated an average overburden (above the solid limestone geology) of c.4m in most parts of the field (Fig 6), decreasing to c.2m in the lower zone. Given this depth of overburden, even the hollow area would not appear to be an obvious site for its quarrying potential. Traces of limestone quarrying are known in the general area, although none are recorded within 600m of the site (Fig.5). It is possible, despite a lack of recorded drift on the site, that it (and the surrounding area) is situated on a pocket of clay. This would discourage attempts to quarry for limestone. Therefore, it is hypothesised that 'pit-like' features in this area of the site may be of natural origin, probably swallow holes.

Ditch-like anomalies appear to radiate from 6 and 7 (red lines). These are almost certainly archaeological, albeit probably of limited significance. The current use of the known swallow hole as a sump may be a clue to their function: that of drains or ditches that exploited natural depressions in the landscape. It should be noted that traces of anomaly 8 appear to have survived as a slight depression on the flanks of the larger hollow. Its elevated position (and presumably its limited potential as a drain sump) may account for the absence of co-joined drainage ditches.

7.3 Conclusions

The survey has identified probable land drains and traces of modern cultivation. Other anomalies could indicate natural sinkholes that have been exploited in the past as drain sumps. Ditch-like anomalies appear to connect to the putative sumps. These almost certainly pre-date a series of regularly spaced north to south-aligned drains.

The survey has not established the period that relates to the earlier drains/ditches or, indeed if and when the 'sinkholes' were visible or identifiable to cartographers (there is no reference to such features on any O.S. maps).

With reference to the geophysical survey results alone, it is concluded that the site has limited archaeological potential.

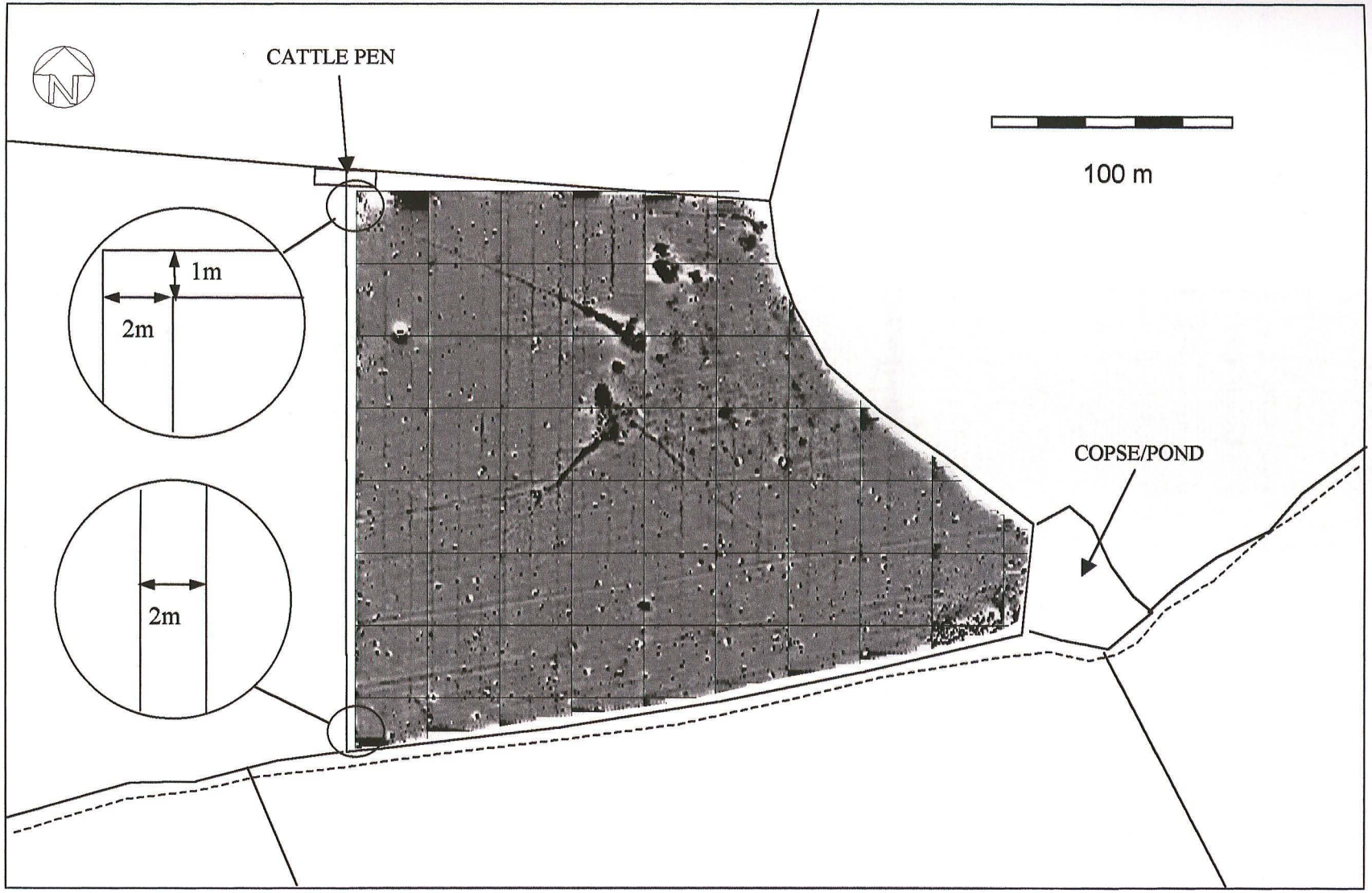

Fig.7: Location of survey Scale 1:2500

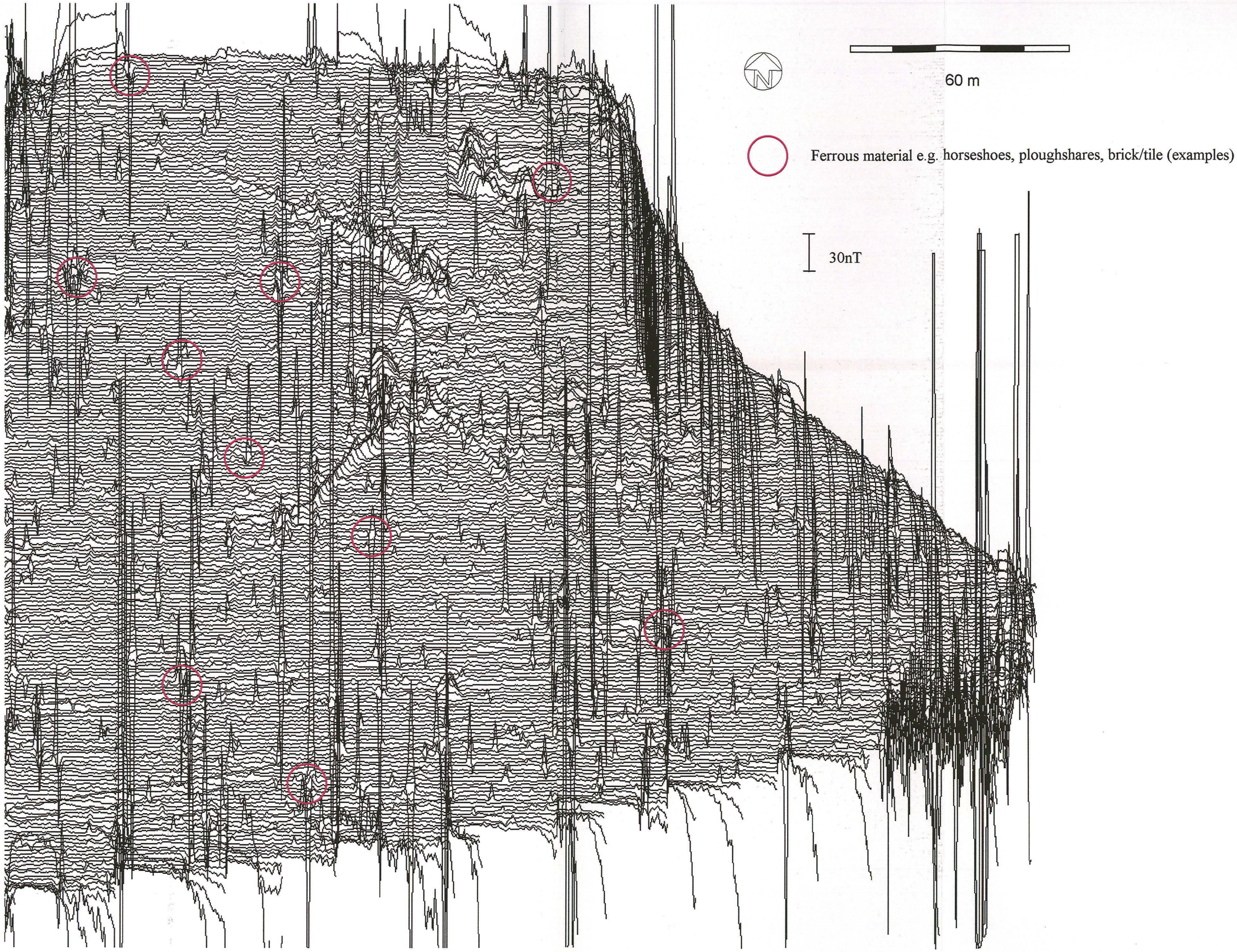

Fig. 8: Trace plot of the raw data Scale 1:1000

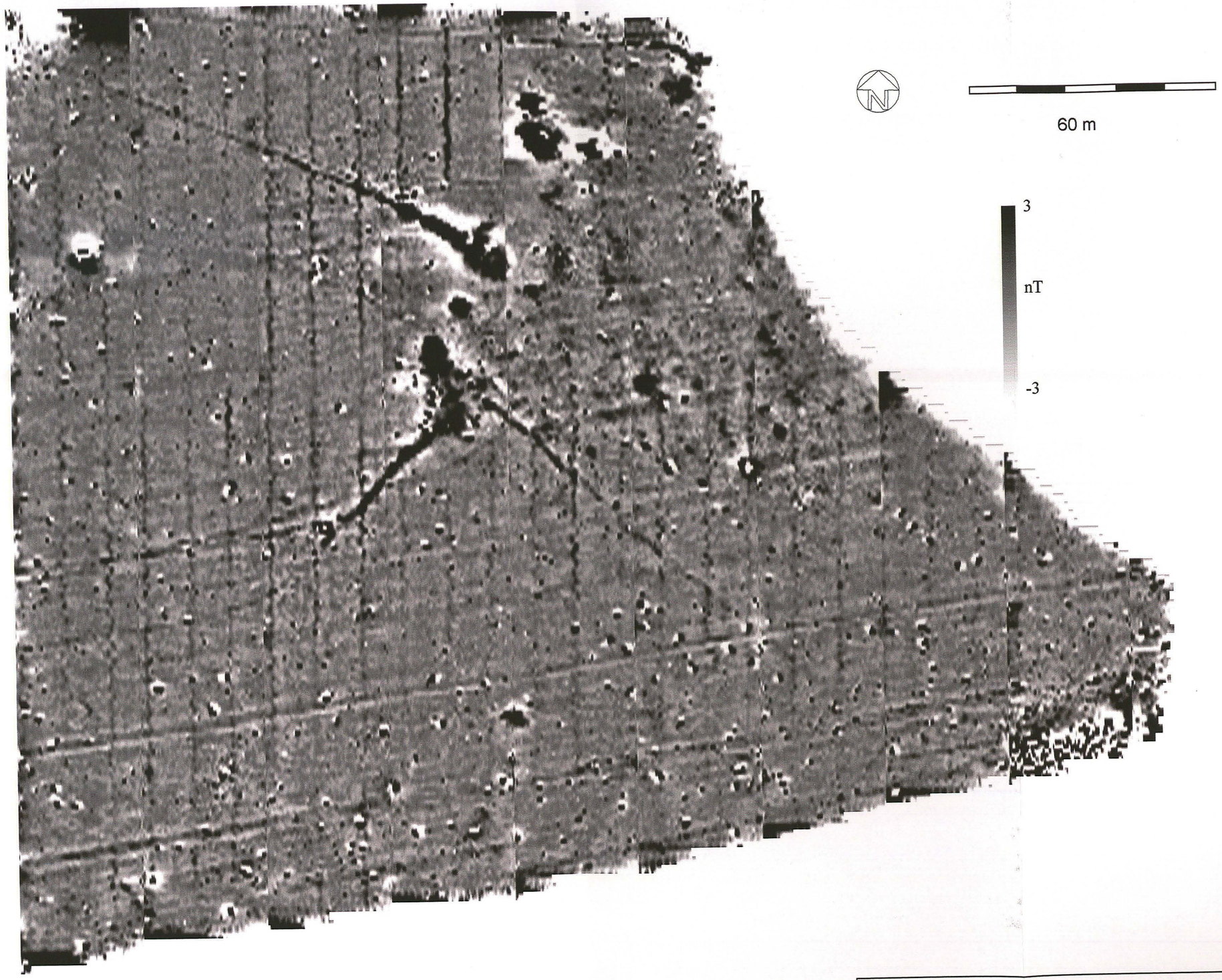

Fig. 9: Greyscale image of the processed data Scale 1:1000

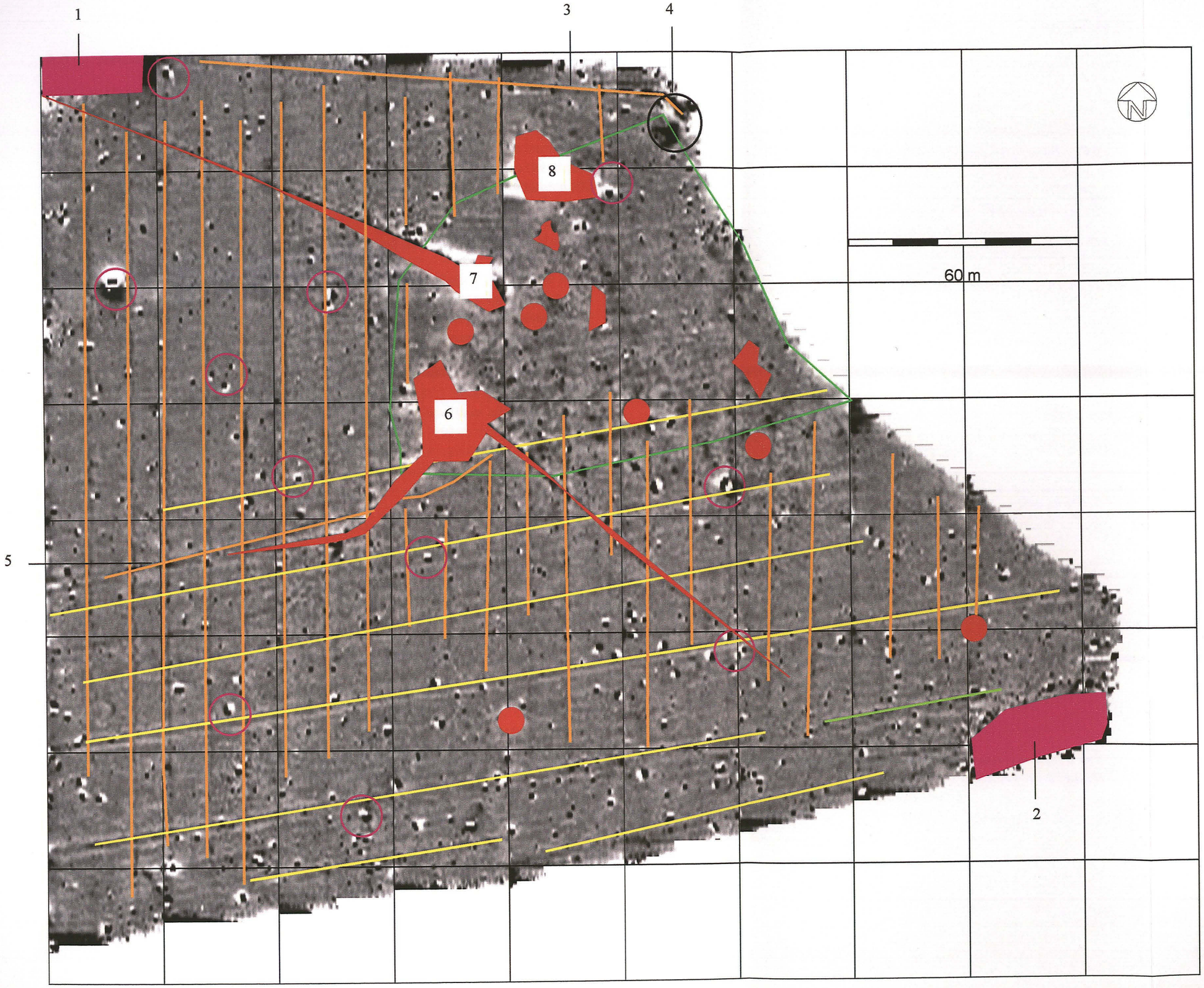

Fig. 10: Interpretative image. Scale 1:1000

8.0 Assessment of archaeological potential

In the light of the information collated, a more specific estimate of the archaeological potential of the proposed development area may be obtained.

Roman and pre-Roman activity in the area of this survey appears to have been widespread but sparse: the only hard evidence of permanent habitation in the area up to the end of Roman imperial rule is a single building to SW of the development site. None of the known cropmark or earthwork landscapes intersect the site, and the possibility of further previously unsuspected buildings, or barrow burials no longer visible even as cropmarks, appears to have been ruled out by the geophysical survey.

Although Grange de Lings was occasionally of significance during the Middle Ages, medieval activity is unlikely to have left many traces on the archaeological record. Areas of ridge-and-furrow earthworks, left by the strip ploughing of communally worked medieval fields and preserved by their subsequent conversion to pasture, can be seen to NW of Grange de Lings farm, to N of Riseholme Hall and to S of Nettleton Hall, but none are recorded in the vicinity of the development site: if this area was ever part of a field system, the ephemeral surface earthworks have been obliterated by more recent ploughing. The muster of the Lincolnshire Rising may have passed over the development site itself, but no battle took place there, and an army of farmers and villagers with makeshift weapons is unlikely to have left recognisable traces of its presence.

9.0 Impact on archaeological resources

The excavation of a reservoir would certainly destroy archaeological remains within the proposed development footprint, if present. However, it seems unlikely that significant remains of any period occur within the principal area of study.

10.0 Conclusions

The information collected during the compilation of this desk-based assessment and geophysical survey suggests that the likelihood of occupation deposits or structures of any period lying within the proposed development area is negligible, while the possibility of significant artificial landscape features occurring within it is limited. The collated Sites and Monuments Record information (fig. 2) shows the development site to lie at the centre of a blank space in an otherwise moderately active archaeological landscape, while all available documentary and historical evidence would seem to confirm this impression. However, the results of the geophysical survey indicate that some landscape management may have taken place on the low-lying eastern edge of the site: if so, this may be of considerable age, as monasteries in Lincolnshire frequently undertook landscape and drainage projects on a scale that would now be described as civil engineering.

11.0 Mitigation

Since the geotechnical trial pit survey did not intersect the area of the development site shown by the geophysical survey to be of possible archaeological interest (and was carried out without archaeological scrutiny), there would seem to be at least some potential for a further, limited, trial pit survey in this area, to ascertain whether the geophysical anomalies detected represent wholly natural features, or whether the underlying geology has been exploited for drainage purposes, and if so, at what period.

12.0 Acknowledgements

Pre-Construct Archaeology (Lincoln) and Pre-Construct Geophysics would like to thank Hall Farm Partners for this commission and for their co-operation during the survey. Thanks are also due to the staff of the Sites and Monuments Records Office in Lincoln and the Lindsey Archive Office, to the Fox Group of Companies for the geotechnical survey results, and to Mr. Charles Hood for permission to photograph the medieval stonework of Grange de Lings farmhouse.

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Appendix 1: Colour plates

Plate 1 (right): General shot of the development site, looking NW from the field gate in the SE corner. Part of the Riseholme Gorse fox covert is visible on the far left; the clump of nettles to near left may indicate the site of a building or simply the position of a cattle feed trough.

Plate 2 (left): General shot of the development site, looking SE from the NW corner of the field. The raised position of the pond is clear: the poplar trees on the edge of the pond can be seen on the skyline. The geophysical survey is in progress: the object partially visible in the dip in the field is the roof of the geophysicists' car.

Plate 3 (right): General shot of the development site, looking WNW toward Riseholme Gorse fox covert, from the centre of the depression at the E edge of the field. The colour change in the field grass at the edge of the depression is clearly visible: the geophysicists' car is parked at its edge.

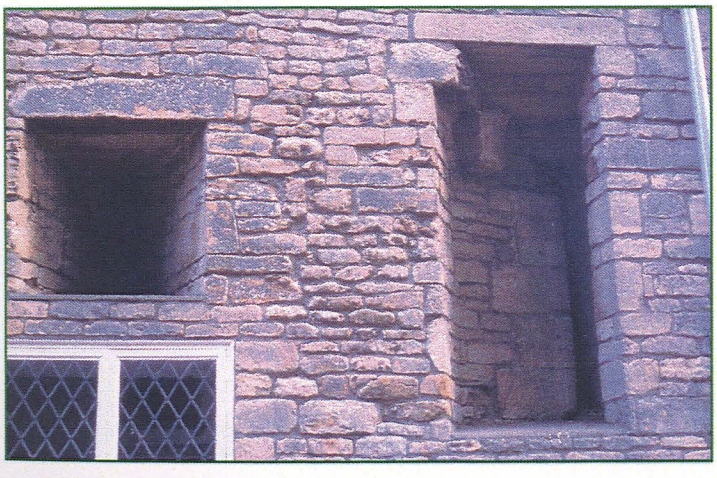

Plate 4 (left): Remnants of the medieval masonry of the monastic grange, preserved in the external wall of the current farmhouse. The newel-post of a spiral staircase is visible within the doorway on the right.
Photograph by permission of Mr. C. Hood.