



LINDSEY ARCHAEOLOGICAL SERVICES

GD
M1/08

**Highfield Quarry, Welton le Marsh
Proposed Quarry Extension**

*NGR: TF 4520 6935
Site Code: WMHQ 01
LCNCC Museum Accn. No. 2001.105*

Archaeological Desk-Based Assessment

**Report for
Halletec Associates**

by G. Tann

**LAS Report No. 536
June 2001**

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(for geophysics see
report in box M2/34)

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Summary

The application site is situated in an area containing several prehistoric burial mounds and lies close to the prehistoric routeway known as the Bluestone Heath Road. The north-eastern boundary of the application area follows the line of a Roman road and a Roman settlement site has been identified down the slope to the NE of Welton High Wood. In the Saxon period, the wapentake meeting place is suspected to have been at Candlesby Hill, to the SE of the quarry, beside the present course of the Bluestone Heath Road. Burials are recorded from close to that location, but the settlement of Welton le Marsh developed on lower ground away from both the prehistoric and Roman roads. During the medieval period, the site was part of Welton's North Field, close to the parish boundary. There is some air photographic evidence for medieval ploughing of the site. Depopulation of a nearby hamlet, represented by Bassingham Farm, suggests that this peripheral area was not a productive one.

High Field Farm was created during the late eighteenth or early nineteenth centuries, after Enclosure of the parish. The existing field boundaries appear to date from Enclosure or (in the area of the existing quarry) shortly before it. No trace of a quarry on the site has been found before the early twentieth century, probably after 1905. Since then the quarry has developed erratically.

The archaeological implications of an extension of the quarry within the existing IDO limit are apparently limited to features associated with the Roman road, which forms a boundary to the site. A flanking ditch may lie within the proposed quarry extension. There is air photographic evidence for ridge and furrow to the north of the existing quarry, and this may have extended across the site. No other archaeological features are known on the site, and no finds have been reported. Geophysical survey and/or evaluation trenching might locate the road features, and demonstrate whether the remainder of the unworked area is as archaeologically barren as it appears.

Introduction

Lindsey Archaeological Services (LAS) was commissioned in May 2001 by Halletec Associates to prepare an archaeological desk-based assessment of land adjoining the existing Highfield Quarry, Welton le Marsh, Lincs. (Figs. 1 - 3). The site had previously been known as Highfield Farm.

The purpose of this desk-based assessment is to identify the archaeological potential of the application site by collating available existing information. It constitutes the first stage in a programme of evaluation required for an Environmental Statement. Further information will be required before it is appropriate for inclusion within an Environmental Statement. In particular, the results of any

archaeological fieldwork (to be determined by Lincolnshire County Council's Archaeological Officer) need to be included, together with details of the proposed quarry groundworks and access position, and an assessment of the archaeological impact of those groundworks. Minor additional information is also omitted from this version of the report: details of the application reference, and an updated indication of relevant planning policies. For purposes of this draft, monochrome photocopies of the colour plates have been provided.

Methods and Sources

A desk-based assessment of the application site, within a 1km surrounding area, was undertaken in order to identify and assess all archaeological constraints. Research for the assessment was conducted by G. Tann between May 9th - 22nd 2001. The following sources were consulted and available information researched:

- Lincolnshire County Council County Archaeology Office (Sites and Monuments Record),
- Lincolnshire Archives Office (Enclosure map, Ordnance Survey maps, manuscript maps and other documentary and published sources)
- Lincoln Central Library Reference Department, Local Studies Collection
- Site visit

The Application Site

Welton le Marsh is situated 20km SE of Louth, 13km NW of Skegness, and 20km east of Horncastle, in the East Lindsey district of Lincolnshire. Highfield Quarry lies close to the SE limit of the Lincolnshire Wolds, 2km NW of the settlement core and immediately east of the A1028 Bluestone Heath Road. The proposed extension comprises an area of land c.4.4ha in extent which is currently under cultivation.

Topography and Geology

The soils are clays on Ferraby Chalk deposits; the northern limit of the extension application area coincides with the edge of Welton Chalk deposits (BGS 1996). Chalk has been extracted from a pit at the southern side of the application site since the mid-twentieth century. The height of the site is about 70m OD.

Archaeological and Historical Background (Fig. 2)

Previously recorded sites and findspots are listed in the Lincolnshire Sites and Monuments Record. These have been allocated Primary Record Numbers (PRNs) and these are used, in bold, in the text. A summary list of entries in the vicinity is provided in Appendix 1.

Prehistoric

Neolithic long barrows (burial mounds) are known from sites at Claxby and Skendleby. The Giants' Hills barrows at Skendleby were sited on the side of a hill, on a natural shelf along the contour; the

probably later trackway of Bluestone Heath Road is on the crest of the hill (May 1976, 46).

Roman

Part of a Roman road linking settlements at Lincoln with Burgh le Marsh (Margary 27; SMR 42944) passes along the eastern edge of the application site. "Past Skendleby... where the modern road turns off, a lane continues on the line, with distinct traces of the agger, 30ft [9.1m] wide and 1-2ft [0.3 - 0.6m] high, passing the western edge of Welton High Wood (Margary 1973, 238-240). The 'lane' is the rough metalled farm track. In 1999, a machine-dug trench across the northern end of this track was archaeologically monitored (SMR 43817) during installation of a gas main (NAL 1999). The present track surface at this point, of tarmac, covered two thin crushed chalk layers separated by a lens of clay silt. Beneath this was a 0.6m - 1m+ thick layer of subsoil, over bedrock. The report suggests that the earlier of the crushed chalk layers could represent the Roman road metalling; it appears from the accompanying section illustration that the 'subsoil' may be road foundation, or even later material if the 'bedrock' is actually a cambered road surface. Only part of the narrow trench was seen, and the information as to the position of the Roman road and its construction is inconclusive.

A short length of the Roman road was identified from plough-disturbed concentrations of flints (SMR 42163) to the north of Mill Lane, 600m SE of the quarry.

To the NE of Welton High Wood, a scatter of third and fourth century pottery was found in 1948, about 1km NE of the quarry. Air photographs taken in 1968 by the Ordnance Survey show a settlement site a short distance to the east of the pottery scatter, but no finds were made in 1969 during a site inspection (OS record card, TF 47 SE, 9).

Saxon and Medieval

The earliest recorded forms of the place-name are *Waletone* and *Waletune* [both 1086 Domesday Survey], *Waletuna* and *Wellestuna* [early-twelfth century]; the name derives from the Old English elements indicating 'farmstead/village with a spring' (Cameron 1998, 136). The name *Welton in le Marshe* is documented in 1546, indicating the topographical position of the settlement core on boulder-clay deposits at about 20m OD. Until the nineteenth century, the several Welton settlements in Lincolnshire (including two in the former South Riding of Lindsey) were poorly differentiated, and the present village name was introduced to allow easier identification. The village was in Candleshoe wapentake, in the South Riding of Lindsey.

An Anglo-Saxon cemetery (SMR 42181) was disturbed during construction of a reservoir NW of Candlesby Hill in the 1930s, about 0.8km SE of the quarry. The findspot is close to possible archaeological features seen on air photographs (SMR 43745). The proximity of the cemetery to Candlesby Hill reinforces the claim of that hill to have been the meeting point of the wapentake (SMR 43909).

At the time of the Domesday Survey of 1086, land in Welton le Marsh was held by three individuals: Ivo Taillebois, Gilbert de Gand, and Gocelin (son of Lanbert). All the Welton land was sokeland, of Hanby (in Welton le Marsh), Willoughby and Claxby. By 1115, when the Lindsey Survey was produced, landholders were Ranulf Mischin, Richard of Lincoln, and Hugh Pilat, but the lands appear to have remained the same (Foster and Longley 1924).

Basingham (or Bassingham) DMV in Scremby parish, now represented by Bassingham Farm 250m SW of the quarry, is thought to have been depopulated at an early date (SMR 42040). Documentary evidence refers to rent in Basingham in 1246, in the context of the manor of Scremby (Foster and Longley 1924, xlviii).

Post-medieval

Highfield Farm was created as an outlying farm base at some time between survey of the Enclosure Award plan in 1792 and 1824 (LAO 9 Anc 8/3/7; OS 1824). In **1792**, the application site formed part of a large field extending between the edge of Welton High Wood and the existing main road (Bassingham Lane was not marked). It was owned by Sir P. Burrel, partly as 'settled estate', partly as an 'exchange for old enclosure', and (to the west) 'freehold in fee for field land' (Fig. 4). Dotted lines between these divisions could mark the positions of farm tracks, but the plan shows no evidence for buildings or other features on the site. Both divisions equate with existing field boundaries. The present name suggests that it was sited within a field known as High Field, but the Enclosure Award details Field 4 as lying within the North Field. Despite this indication of medieval arable farming, it has been argued that this farm name reflects a post-medieval process of extending the limits of agricultural land (Beastall 1978, 220-1).

The **1824** Ordnance Survey First Edition 1" [1:63,360] map uses information surveyed after 1818 (OS 1824). The map shows the farm site (un-labelled), a track up towards the wood (labelled Orby Wood, perhaps in error), and the plantations (part of a row of five) (Fig. 5). A small group of buildings is shown beside Bassingham Farm.

By **1887**, the sub-division between Burrel's settled estate and exchanged lands had become formalized into a track leading from the Roman road down directly to a cluster of barns and enclosed yards at Highfield Farm, and then deflecting around the farm to join the main road opposite Bassingham Lane (OS 1891). The track is still extant. It could be that the farm developed around small scale quarrying for road materials, but there is no cartographic evidence for a quarry there. The field had been divided into a form of its present arrangement, with a NW-SE continuous boundary embellished with two small diamond-shaped plantations. These appear to have been for game, but as such features are not common in the vicinity, might hide nineteenth century chalk extraction. An earlier archaeological origin (for instance landscaping of burial mounds) is unlikely as nothing is marked on the earlier plan.

In 1890, the information surveyed by the Ordnance Survey in 1887 was revised by J. Woodward on behalf of Lord Willoughby de Eresby (LAO 9Anc 8/3/7). Woodward's detailed plan omits the track past High Field Farm, but gives fieldnames: the application site lies within The Barn Close, and Wood Close (also known as Two Ten Acres) (Fig. 6). None of these fieldnames look earlier than establishment of the farm. With the exception of a new barn at Highfield Farm, close to the main road, the 1904 Ordnance Survey revision was not altered from the 1887 survey (Fig. 7; OS 1906a; OS 1907a).

The origins of the quarry at Highfield Farm are unclear. A lime and stone quarry at Welton le Marsh owned by Lord Willoughby de Eresby was active between 1850 and 1863, but its location is not known (LAO 2Anc 7/58/15-36). The quarry had extended beyond the NW-SE field boundary by 1953, with three buildings marked in the western part of the quarry workings (Fig. 8; OS 1955). By 1974 the quarry had extended further to the NE and SE, effectively doubling in size (Fig. 2; OS 1976a). The small plantation to the NW had been enlarged to the north. The Highfield quarry closed in 1988 after an active life of over 40 years, but in 1998 was reopened, covering a 10ha extent (Mablethorpe Standard 21/8/1998).

Site Visit (Fig. 3)

The application site was visited by G. Tann on May 10th 2001 in dry, bright conditions. Access to the existing quarry area is from Bluestone Heath Road via a broad entrance with weighbridge and reception office (Pl. 1). The proposed extension area is inaccessible through the quarry, but can be reached from Bluestone Heath Road via either a farm track from the NE or NW, or through the former farm yard to the SW of the quarry.

The Existing Quarry

Quarrying is at present occurring at the southern end of the workings, outside the defined IDO consent limit. To the NW of this, on the level of the quarry entrance, hardcore and soil has been imported as landfill (Pl. 2). Amidst this material is a clump of bushes, which may represent the last vegetation from a post-medieval game plantation.

The oldest visible quarry face is to the NW of the farm buildings, possibly contemporary with the face beside the wheel washing plant (Pl. 3). More recently abandoned workings are further to the NE, and around the face alongside Welton High Wood. No buildings or features of archaeological interest were seen within the existing quarry area.

Area of the Proposed Extension

This area is part of a large field which now extends from Bluestone Heath Road to Welton High Wood (Pl. 4). The application area coincides approximately with boundaries of field divisions in the 1930s, but no trace of removed boundaries was evident. The site slopes downwards towards the NE; to the west of the site the field slopes down towards the west, with Highfield Farm lying in a hollow (Pl. 5).

The SW boundary of the site coincides with the limit of the Rivers Witham and Steeping catchment areas (OS 1907b).

The field is at present agricultural set-aside, with stubble from a past cereal crop surrounded by a narrow belt of maize stubble. A game feeder is beside a spread of rotted chaff near the eastern corner. Within the stubble, little of the ground surface is visible (except at the top of the slope), but more is exposed where the maize was grown. During the walkover no archaeological finds were seen but conditions are not suitable for fieldwalking survey. Abundant unworked pieces of flint litter the field surface.

A Roman road is thought to underlie the rough track which forms the NE boundary to the application site and part of the quarry. Between Welton High Wood and the existing quarry's bund, the track is up to 10m wide (including verges) with a slight camber to the east but no obvious ditches. The projected alignment to the SE has been ploughed but no metalling is visible in the clay soil. To the NW of the wood, the track is narrower and stands proud of the adjacent fields. At the eastern edge of the track, just within the application site, is a 2.5m wide shallow linear depression which may mark a backfilled ditch, but this appears more likely to have been a medieval or post-medieval feature rather than a Roman flanking ditch. Another shallow linear depression, up to 0.75m deep, was identified in the field surface 13m from the track edge, and this may represent traces of a broader ditch.

Safety and Other Constraints

Topsoil and the soil sequence above undisturbed chalk is visible at the upper part of the disused face but access to the NW quarry edge is difficult. Overhead electric cables and transformer boxes serve the quarry and farm buildings (EMEB ref. nos. 3076 and 3077), and the cables are aligned along the NE and SE sides of the application site. An air valve from a water main was seen beside the track outside the northern corner of the existing quarry, but the position of the main was not established for this assessment.

Scheduled Ancient Monuments and Listed Buildings

There are no Scheduled Ancient Monuments on the application site or in its vicinity.

Ancient Woodland

Welton High Wood, adjacent to part of the proposed extension, and Welton Low Wood (to the east) have been classified as of Ancient Woodland status (SMR 43033 and 43042). The present extent is not all of ancient origin, and some former woodland was taken into cultivation during the twentieth century. Ancient Woodlands are defined as those which are believed to have had a continuous woodland cover since at least 1600 AD until the present day, and have only been cleared for underwood or timber production. The start date is used because plantation forestry became common after that date, and few estate plans are available before then. Some ancient woodland represents the remains of post-glacial natural tree cover, while other sites had been cleared by the medieval

period but became rewooded by 1600 AD. Many sites in Lincolnshire are thought to have been cleared and farmed during the Neolithic and Bronze Age periods (Hughes 1988, 3).

Archaeological Potential of the Application Site

Prehistoric and Roman

The original course of the Bluestone Heath Road is believed to have been a prehistoric, long-distance trackway leading from a Humber crossing near Barton on Humber towards the prehistoric sea edge near Skegness. That course is understood to share the alignment of the farm track SW of Welton High Wood. Close to the road are Neolithic and Bronze Age burial monuments, including burial mounds at Skendleby and Claxby, although the road is suspected to be later than the Neolithic period (May 1976). There is high potential for worked flint tools on the application site, but no evidence of occupation on or close to it. The naturally occurring flint is of a white hue and is not ideal for knapping into tools, but its abundance means that prehistoric communities may have made some implements from it. Only one fragment of black flint (naturally frost-shattered) was seen during the walkover, and identification of flint artefacts will be less easy than on a site with little flint.

The trackway is assumed to have remained in use through the Iron Age and Roman periods, when salt-making sites are known to have been active on the Lincolnshire Marsh, as at Burgh le Marsh, Orby and Ingoldmells. No Iron Age sites are known close to Highfield Quarry.

To the SE of the quarry, flint metalling of a Roman road has been identified on the projected straight course of the trackway, and it is assumed that an engineered Roman road lies beneath the present farm track at the NW edge of the application site. If the modern track uses the Roman carriageway position, flanking drainage ditches and borrow pits can be expected to either side (including within the proposed extension area). The immediate proximity of a significant Roman road increases the potential for a Roman occupation site within the application area, although no pottery was seen during the site visit.

Saxon and Medieval

Saxon occupation is often encountered away from Roman roads, suggesting either a reluctance to site settlements in such defensively exposed positions, or abandonment of the roads because of dereliction. Skendleby, Candlesby, Grebby, Scremby, Welton le Marsh and the deserted village of Bassingham are all sited off the Roman road and (apart from Bassingham) are documented in the 1086 Domesday Survey. Even allowing for any rearrangement of parish boundaries after the desertion of Bassingham hamlet, the application site is likely to have always been close to the parish limits and remote from the settlement core. There is no reason to anticipate Saxon or medieval occupation in this location, although a scatter of pottery introduced by manuring is probable. The Roman road course acted as a parish boundary, and the SW extent of Welton High Wood is unlikely to have been different from its present position (although in other directions reclamation has probably occurred). Associated woodland management features are not likely to be present within the

proposed quarry extension area.

Post-medieval

The Highfield Farm site and the former diamond-shaped post-medieval plantation (now extended to its NE) lie outside the proposed quarry extension. Within the present quarry complex may be the identifiable remains of part of another diamond-shaped plantation surrounded by soil heaps, but no archaeological features were seen. The oldest visible quarry faces are not obviously of archaeological interest or associated with features of industrial archaeological interest.

Potential Archaeological Impact of the Proposed Development

The archaeological implications of an extension of the quarry within the existing IDO limit are apparently limited to features associated with the Roman road, and these may be protected beneath the perimeter soil bund. The proposed extension of Highfield Quarry may affect the southern flanking ditch of the Lincoln to Burgh le Marsh Roman road, although the precise position of this feature is not known. No other archaeological features are known within the application area, and reported archaeological sites from the vicinity are not thought likely to extend into it.

Geophysical survey and/or evaluation trenching might locate the road features, and demonstrate whether the remainder of the unworked area is as archaeologically barren as it appears.

Extension of the quarry will entail the construction of soil bunds around the revised perimeter. Topsoil bunds may not require preliminary topsoil stripping, but topsoil may be stripped if other material is to be used. Depending on the extent, these bunds could preserve any ditches flanking the Roman road, but any organic material remaining in the ditches will be affected by any drop in local water table produced by more extensive quarrying. Within any quarried extension, all archaeological remains will be destroyed. Unless the track alongside Welton High Wood is abandoned, the assumed course of the prehistoric and Roman road will remain in its present condition. Any revised quarry access from the north could affect the Roman road.

Options for Further Investigation

The only areas of the proposed extension where archaeological remains could be present is in the unworked area, north of the existing quarry, and around the face of the partly worked quarry. The unworked area is at present agricultural set-aside, and not in a suitable condition for fieldwalking. Geophysical survey could be undertaken across all or part of the unworked area as an option for testing for the presence of below-ground archaeological remains.

Following any non-intrusive investigation, evaluation trenching may be required to identify and examine any possible features and confirm their date. Open area excavation of part of the Roman road might be requested, if it were found to lie within the application site rather than in its assumed position.

The results of any evaluation work which may comprise some or all of the above stages outlined will be required for inclusion in the Environmental Statement.

Acknowledgements

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Illustrations were produced by Mick McDaid, and the report was collated and produced by Jane Frost.

Geoff Tann
Lindsey Archaeological Services
5th June 2001

References and Background Sources

- Alford Standard 10/7/1998 *Dust flies over plan for quarry.*
- Beastall, T.W. 1978 *The Agricultural Revolution in Lincolnshire.* History of Lincolnshire 8. Lincoln.
- BGS 1996 *Geological Map: Skegness Sheet 116 Solid and Drift Edition.*
- Cameron, K. 1998 *A Dictionary of Lincolnshire Place-Names.*
- Foster, C.W. and Longley, T. 1924 *Lincolnshire Domesday and the Lindsey Survey.* Lincoln Record Society 19 (1921), reprinted 1976.
- Hughes, D.P. 1988 *Lincolnshire Inventory of Ancient Woodlands (Provisional).* Nature Conservancy Council, September 1988.
- LAO Lind Award 93 *Enclosure Award (1795) and Plan of the Lordship of Welton and the hamlets of Boothby and Hanby (surveyed by W. Thistlewood, 1792).* Lincolnshire Archives.
- LAO Lind Dep Plans 4/3 *Map of the Brackenbury Estate, Welton le Marsh, 1865.* Lincolnshire Archives.
- LAO 2Anc 7/58/15-36 *Welton le Marsh lime kilns and quarries accounts and correspondence, 1851-69.* Lincolnshire Archives.
- LAO 9Anc 8/3/7 *Plan of the Welby Estate in the parish of Welton le Marsh, belonging to Lord Willoughby de Eresby, 1890.* Lincolnshire Archives.
- May, J. 1976 *Prehistoric Lincolnshire.* History of Lincolnshire 1. Lincoln.
- NAL 1999 *Candlesby to Trusthorpe Hall Gas Pipeline: Archaeological Watching Brief.* Network Archaeology Ltd Report No. 146, December 1999.
- Oldfield, E. 1829 *A Topographical and Historical Account of Wainfleet and the wapentake of Candleshoe.* London.
- OS 1824 *Ordnance Survey 1:63,360 First edition map. Sheet 84. Surveyed 1818-24.*
- OS 1891 *Ordnance Survey 1:2,500 First edition map. Sheet Lincs. 75 SW. Surveyed 1887.*
- OS 1906a *Ordnance Survey 1:2,500 map. Sheet Lincs. 75.14. Surveyed 1887, revised 1904.*
- OS 1906b *Ordnance Survey 1:2,500 map. Sheet Lincs. 75.15. Surveyed 1887, revised 1905.*
- OS 1907a *Ordnance Survey 1:10,560 map. Sheet Lincs. 75 SW. Surveyed 1887, revised 1904.*
- OS 1907b *Ordnance Survey 1:10,560 map. Sheet Lincs. 75 SE. Surveyed 1887, revised 1905.*
- OS 1956 *Ordnance Survey 1:10,560 map. Sheet TF 46 NE. Revised before 1930.*
- OS 1976a *Ordnance Survey 1:10,000 map. Sheet TF 46 NE. Surveyed 1970, revised 1974.*
- OS 1976b *Ordnance Survey 1:10,000 map. Sheet TF 46 NW. Surveyed 1966-70, revised 1975.*

Archive Summary

Correspondence

Copies of developer's site plans

Field notes

Photographs: colour prints, LAS film no. 01/29/21-36; 01/30/0-11 (including those used in this report)

Summary List of Recorded Archaeological Sites and Monuments in the vicinity of Highfield Quarry, Welton le Marsh

(source: Lincolnshire County Sites and Monuments Record)

SMR No.	NGR (all TF)	Description
43033	4570 6980	Welton High Wood, ancient woodland
42040	4480 6890	Extinct hamlet of Bassingham, Scremby
43909	458 684	Possible Saxon meeting point of Candleshoe wapentake, Candlesby Hill, Welton le Marsh
43817	4484 6975	Section across line of Roman road, 1999
43745	4568 6866	Undated features seen on air photographs, 1998
43042	4670 7010	Welton Low Wood, ancient woodland
42944	5000 6520	Roman road from Lincoln to Burgh le Marsh
42177	4660 6978	Thwaite Hall, possibly on site of Augustinian cell (extant 1536). Medieval pottery present.
42163	4580 6890	Flints, thought to be disturbed from Roman road metalling
42181	4576 6869	Human remains and metalwork from site of reservoir, Candlesby Hill, Welton le Marsh
42050	4390 6880	Site of lime and stone pits, Scremby

The Figures and the Plates

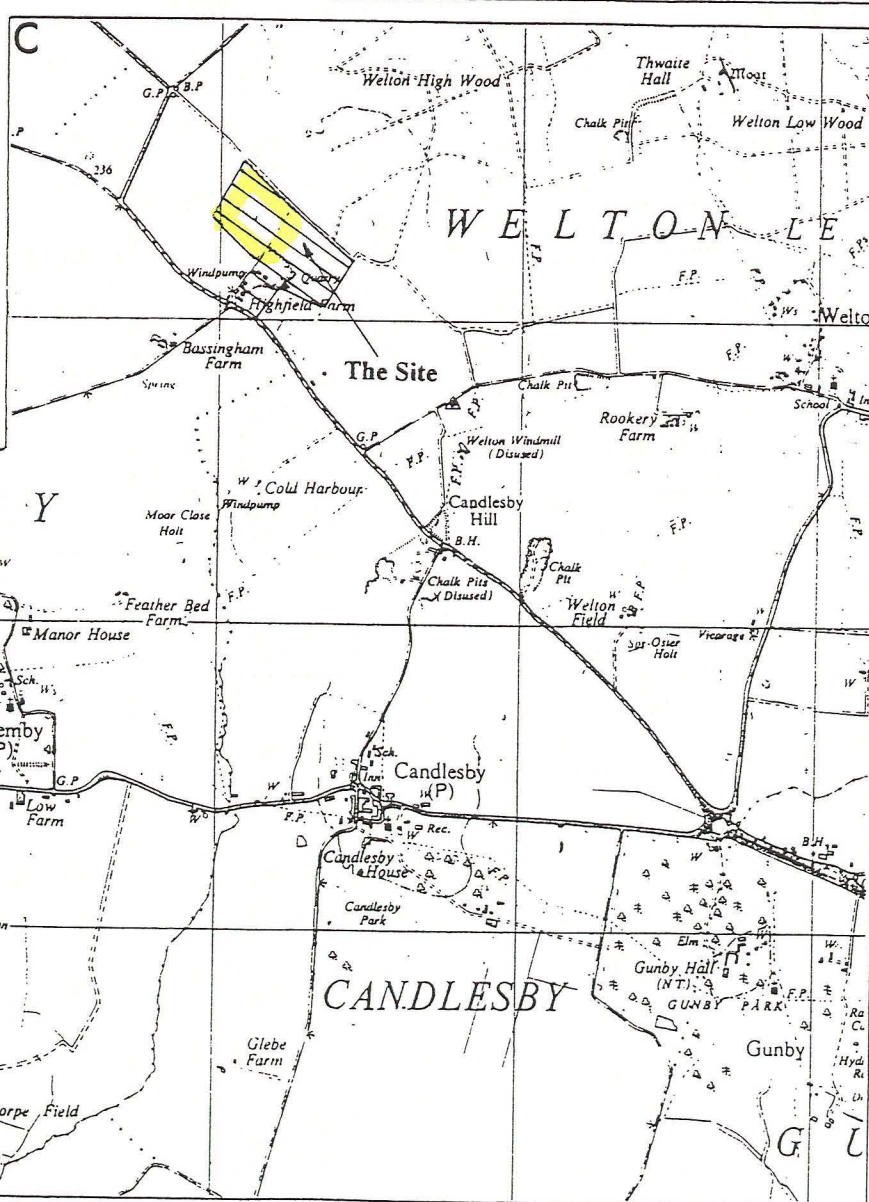
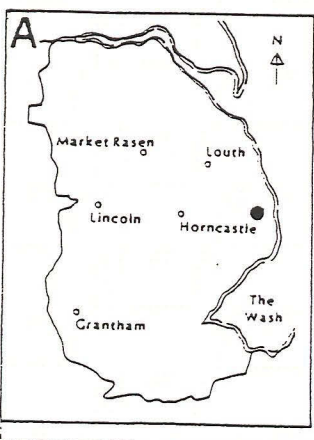
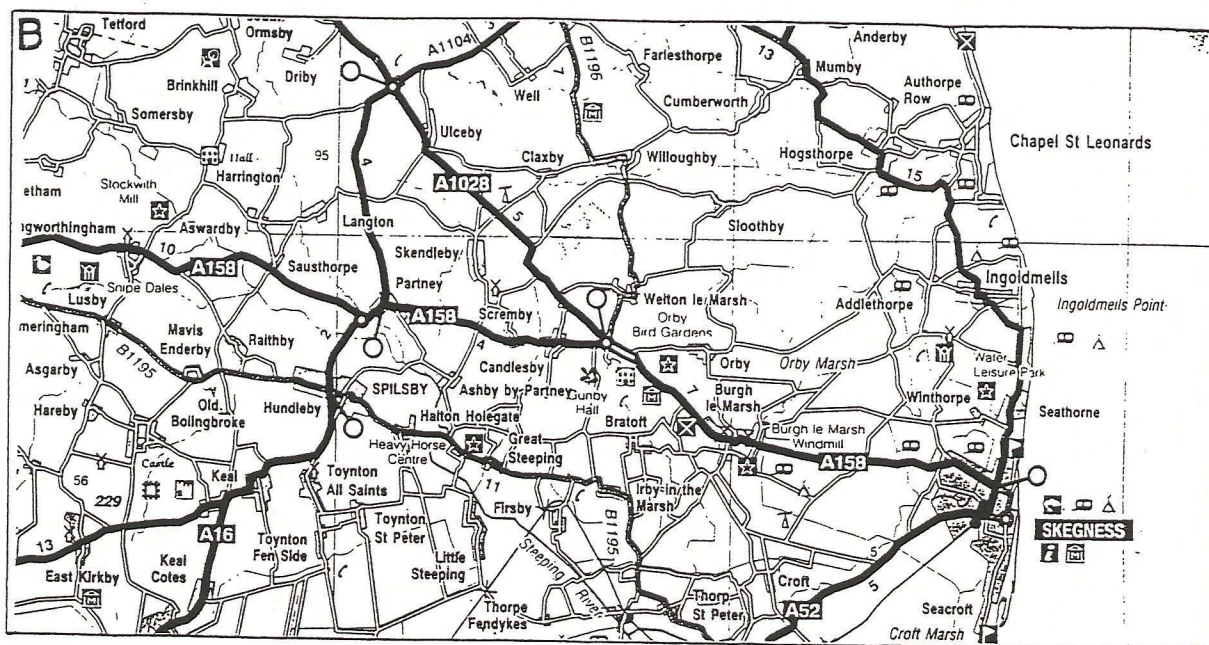


Fig. 1 Location of Welton le Marsh (C based on the 1955 Ordnance Survey 1:25,000 map Sheet TF46, with the permission of the Controller of HMSO, © Crown copyright. LAS Licence No. AL 10002165.

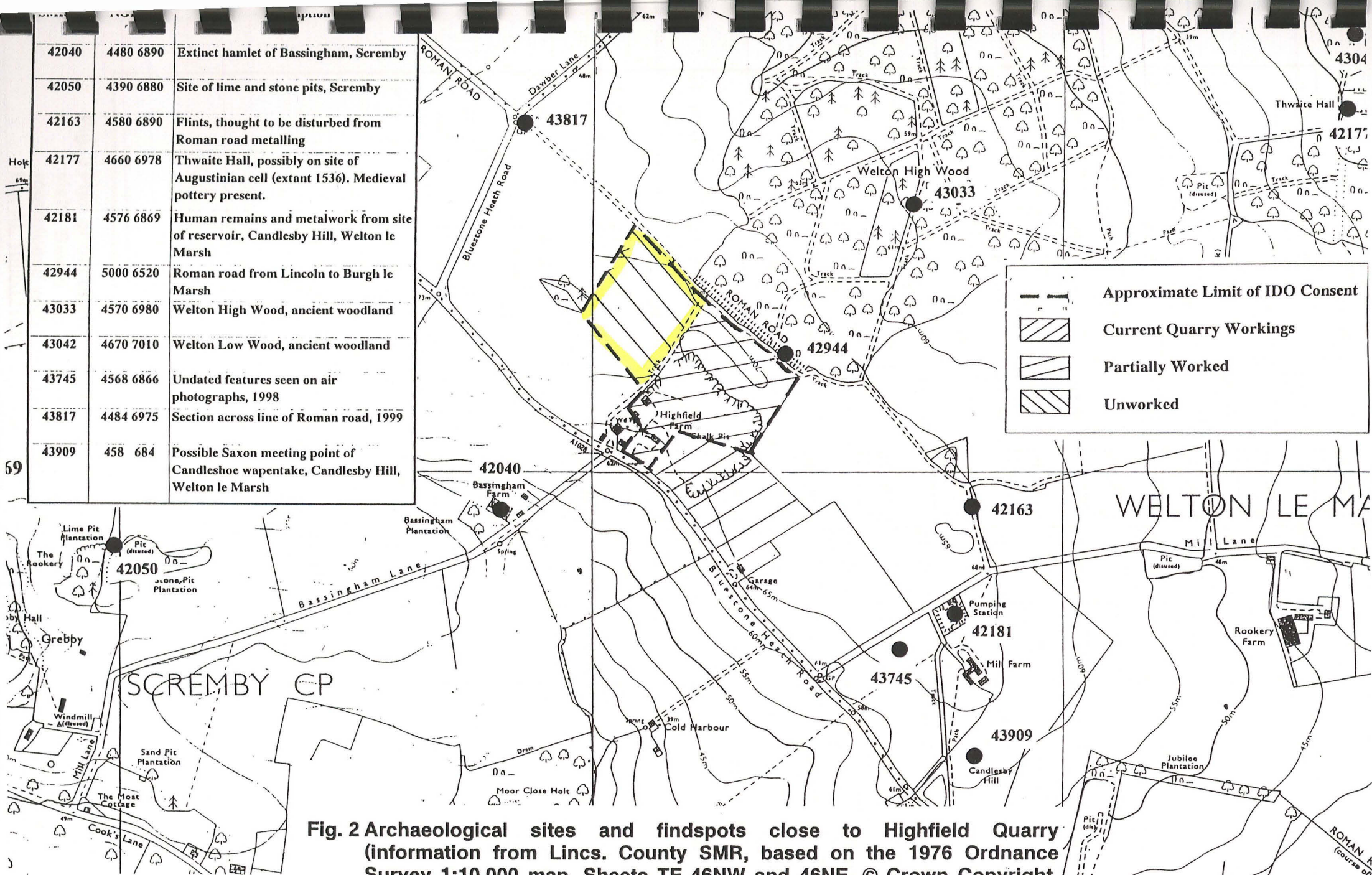


Fig. 2 Archaeological sites and findspots close to Highfield Quarry (information from Lincs. County SMR, based on the 1976 Ordnance Survey 1:10,000 map, Sheets TF 46NW and 46NE. © Crown Copyright, reproduced with the permission of the Controller of HMSO. LAS Licence No. AL 10002165).

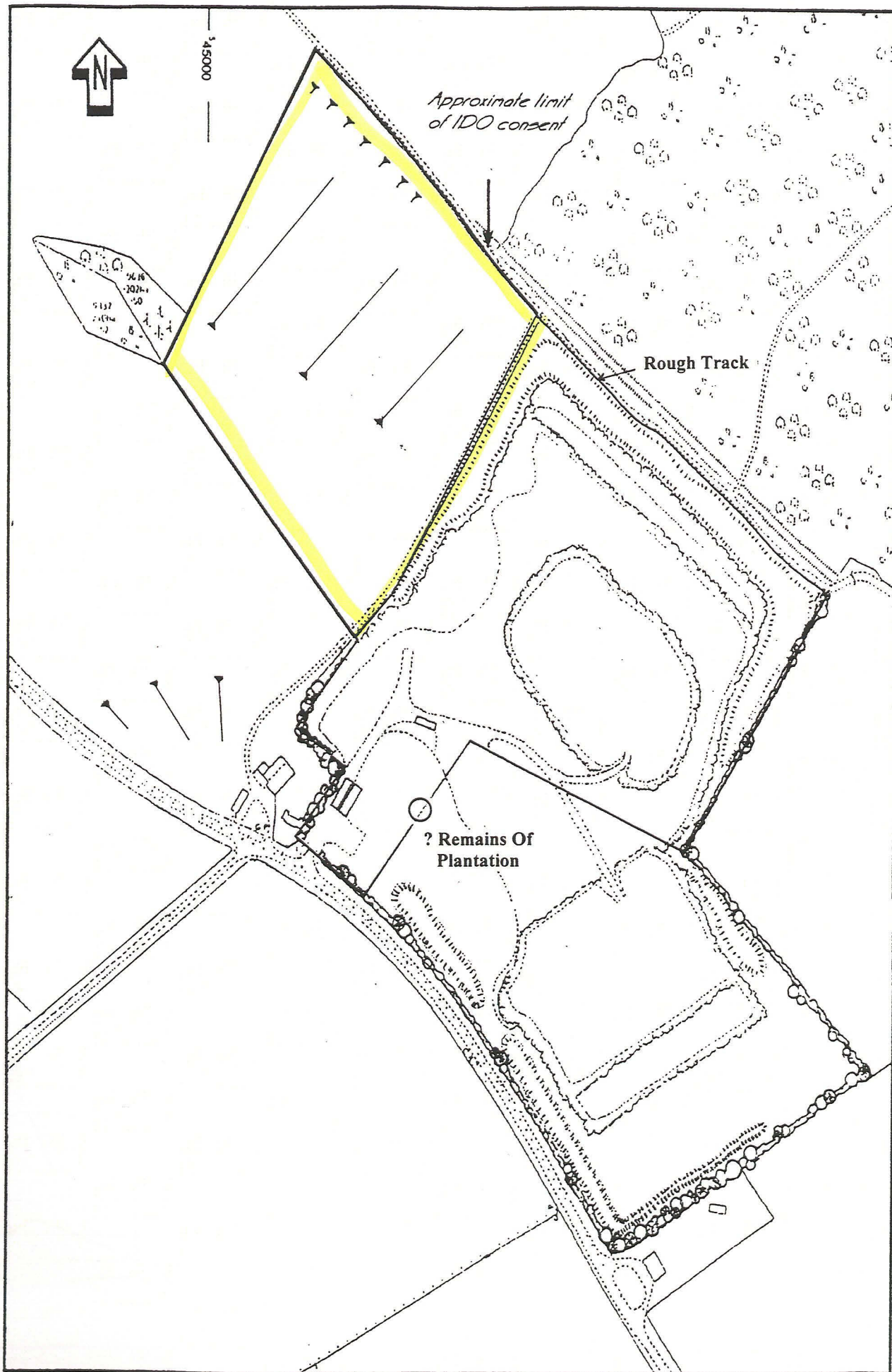


Fig. 3 Plan of the application site, showing selected observations from the site visit. Based on a plan supplied by the client. © Crown Copyright, reproduced with the permission of the Controller of HMSO. LAS Licence No. AL 100002165).

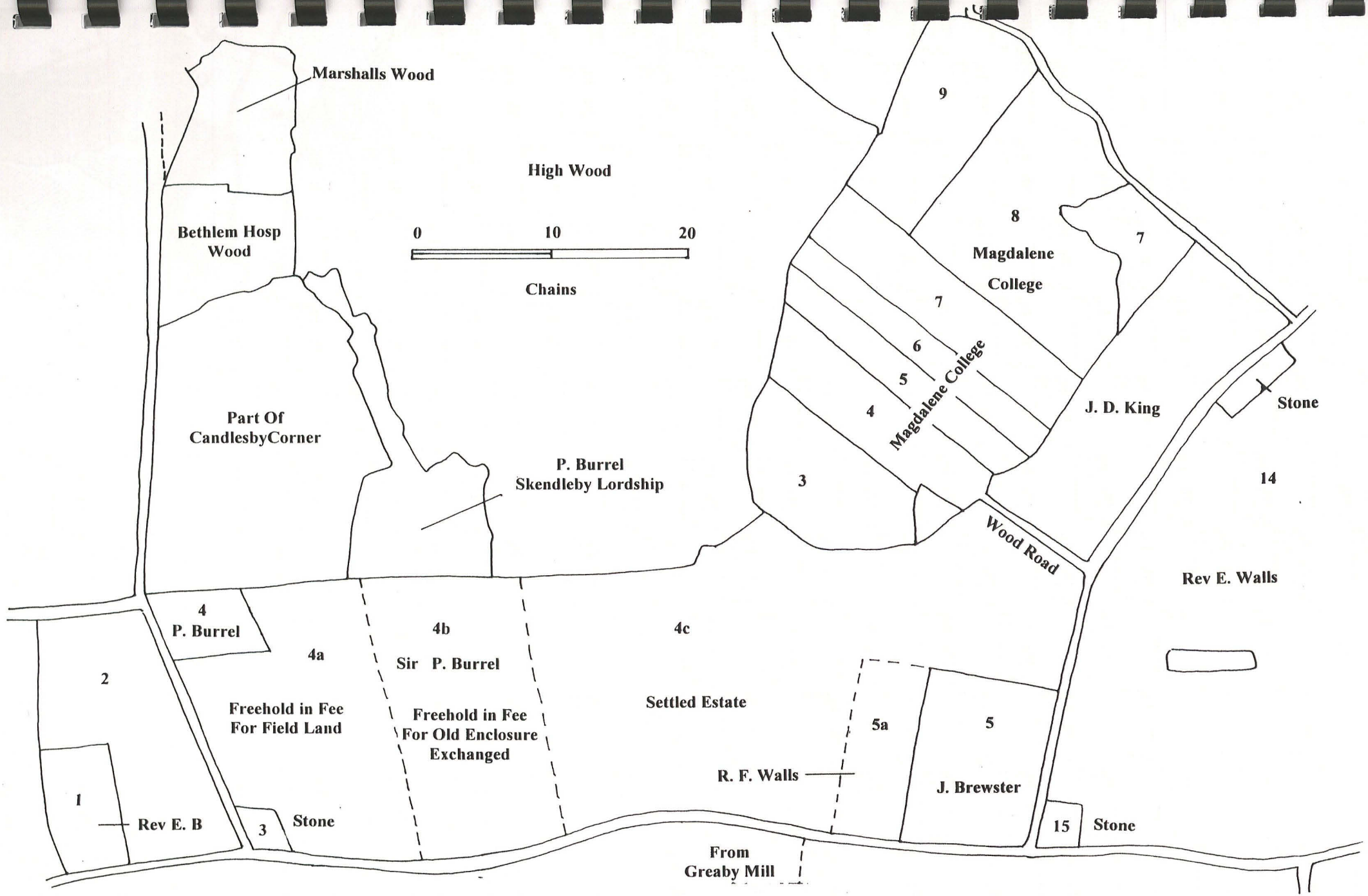


Fig. 4 Traced extract from *Plan of the Lordship of Welton and the hamlets of Boothby and Hanby*. Surveyed 1792 by W. Thistlewood. Lincolnshire Archives Lind Award 93. (McDaid, after Tann)

From Candlesby



Fig. 5 Extract from the Ordnance Survey First Edition One Inch map, Sheet 84 (1818-24).

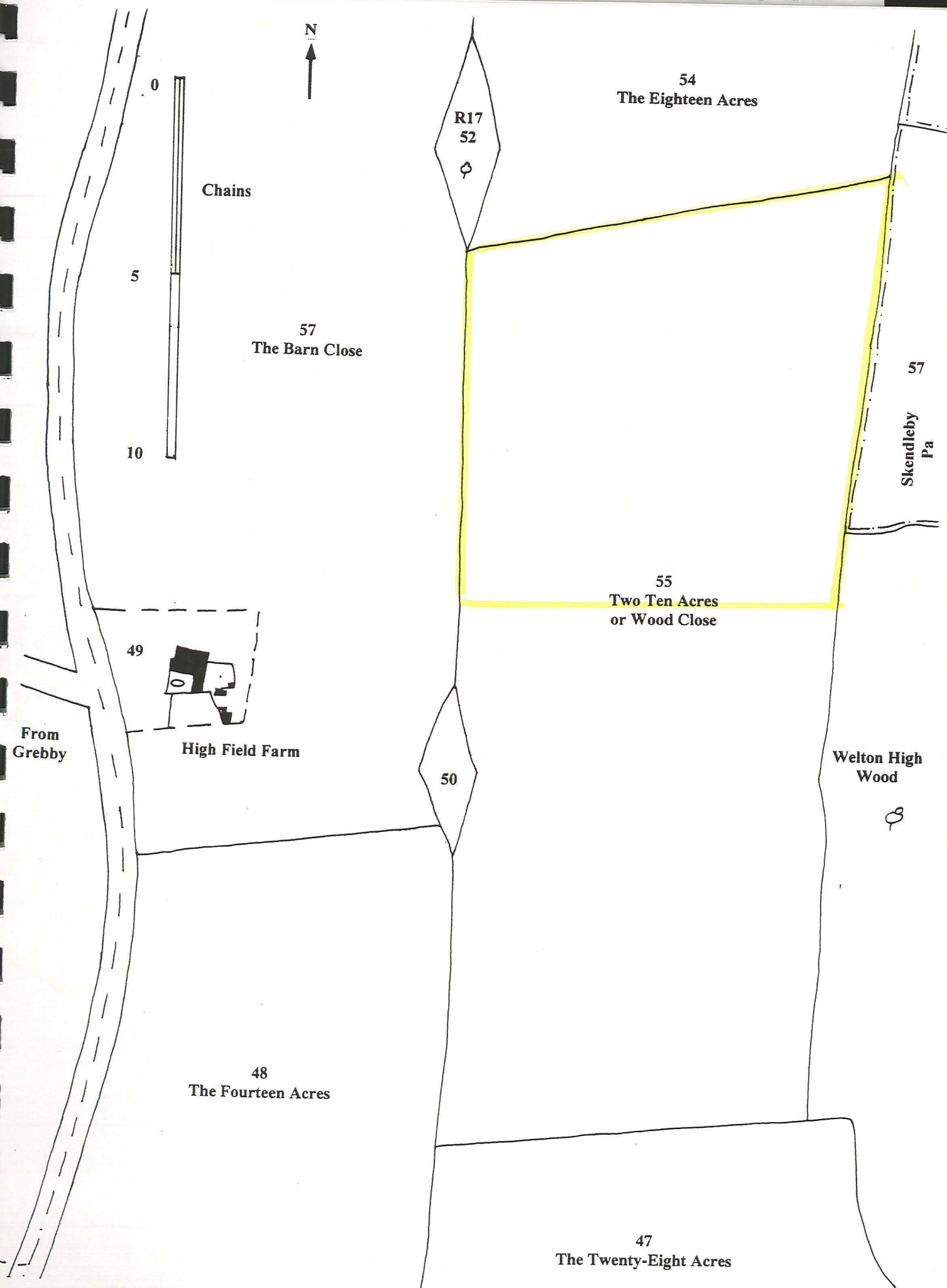


Fig. 6 Traced extract from *A Plan of an Estate in Welton le Marsh belonging to Lord Willoughby de Eresby 1890*. Revised from the Ordnance Survey plan by J. Woodward. (Lincolnshire Archives 9Anc 8/3/7). (McDaid, after Torr)

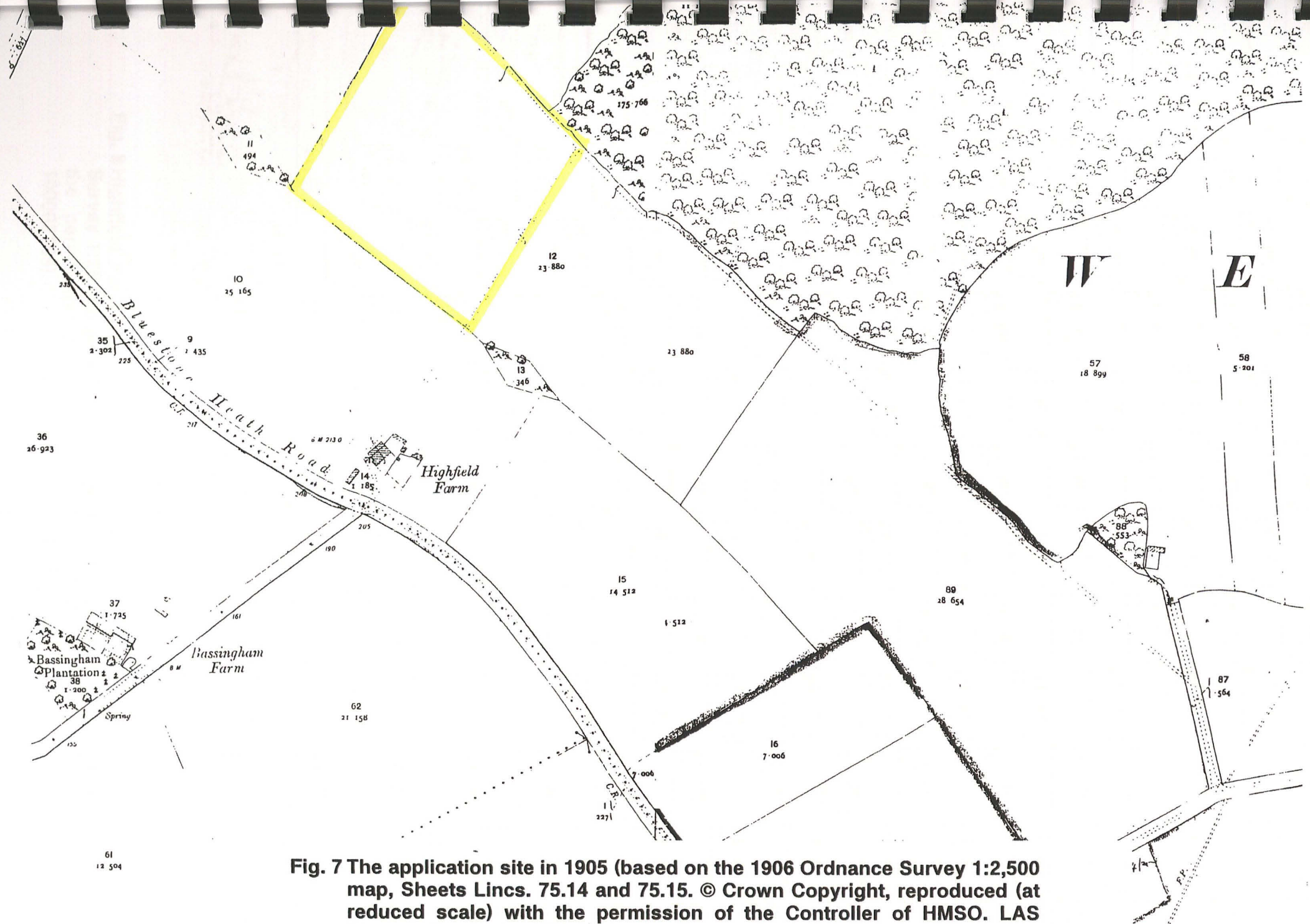


Fig. 7 The application site in 1905 (based on the 1906 Ordnance Survey 1:2,500 map, Sheets Lincs. 75.14 and 75.15. © Crown Copyright, reproduced (at reduced scale) with the permission of the Controller of HMSO. LAS Licence No. AL 100002165).

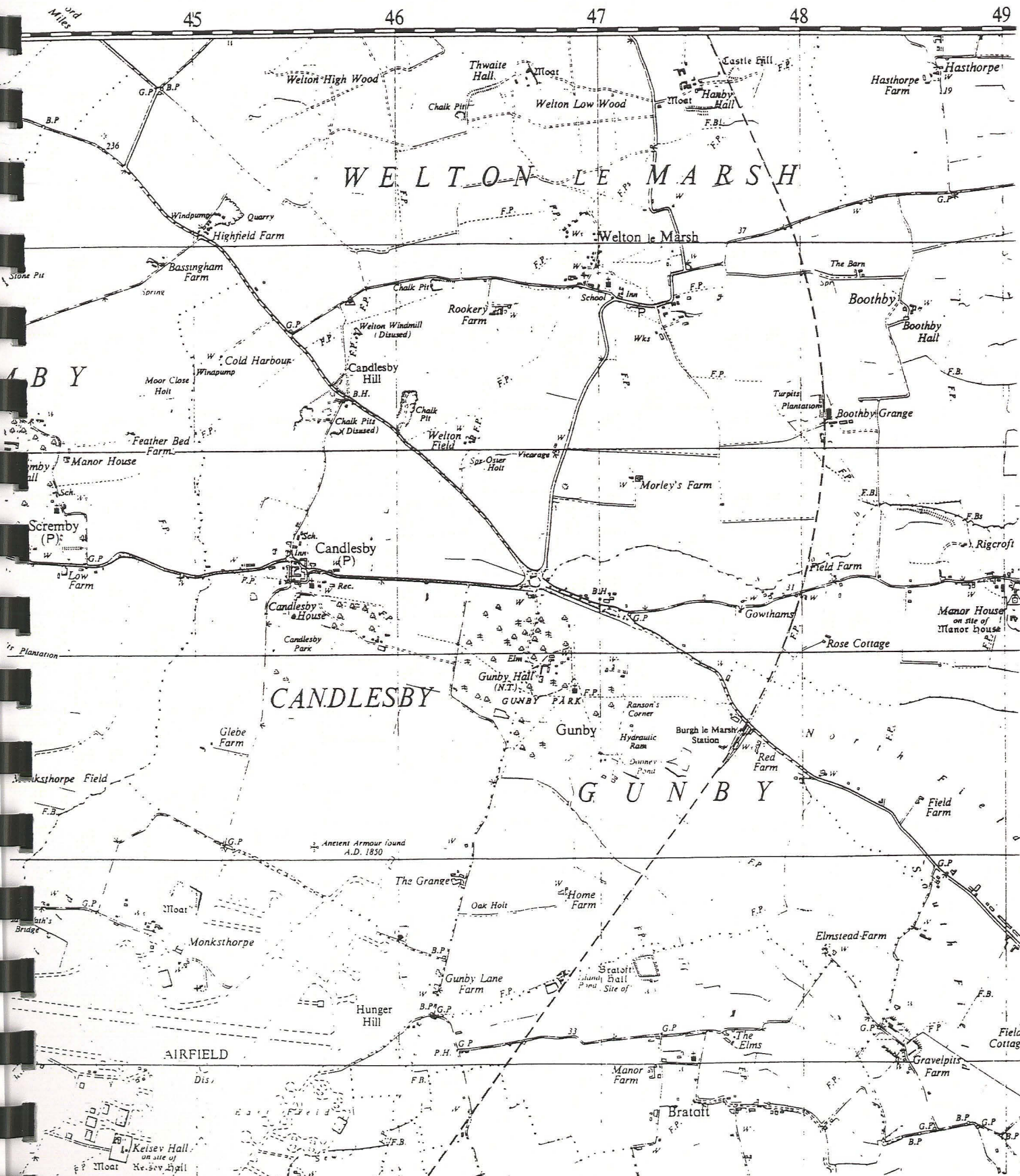
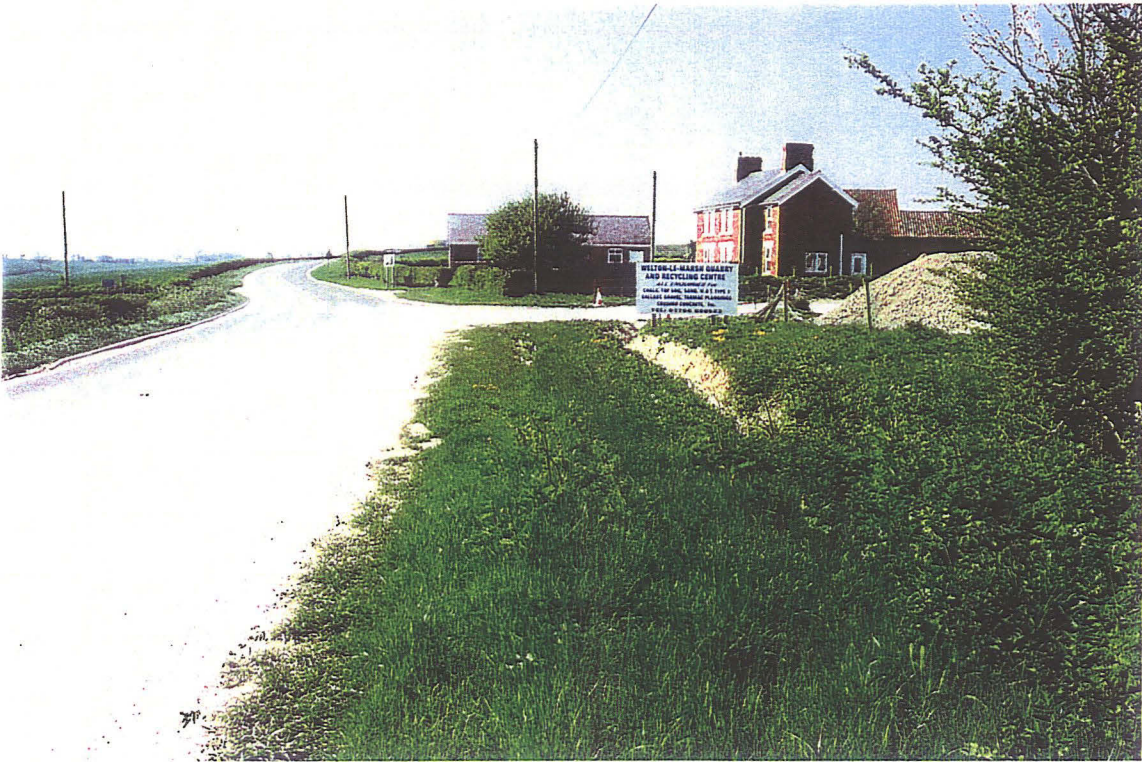


Fig. 8 Highfield Farm and the quarry, pre 1953 (based on the 1955 Ordnance Survey 1:25,000 map, Sheet TF 46. © Crown Copyright, reproduced with the permission of the Controller of HMSO. LAS Licence No. AL 10002165).



Pl. 1 Highfield Farm and the quarry entrance (looking NW along Bluestone Heath Road).



Pl. 2 The existing quarry area within the IDO consent limit (looking north; the clump of bushes in the centre foreground may be the remains of a nineteenth century plantation).



PI. 3 Earliest visible quarry face, north of the farm. Looking SW.



Pl. 4 Chalk-metalled farm track, marking alignment of Roman road past Welton High Wood (left) and the application site (brown field with quarry embankment in background). Looking SE.



Pl. 5 Highfield Farm buildings (looking south).

Appendix 6

FLUXGATE GRADIOMETER SURVEY:
HIGHFIELD QUARRY,
WELTON LE MARSH,
LINCOLNSHIRE

NGR TF 4520 6935
SITE CODE WM8701
LCNCC MUSEUM ACCN NO 2001 183

Report prepared for Lindsey Archaeological Services
By David Bunn & Colin Palmer-Brown

March 2002



61, High Street
Newton-on-Trent
Lincoln
LN1 2JP

Tel: 01777228129/155

**FLUXGATE GRADIOMETER SURVEY:
HIGHFIELD QUARRY,
WELTON LE MARSH,
LINCOLNSHIRE**

NGR	TF 4520 6935
SITE CODE	WMHQ 01
LCNCC MUSEUM ACCN. NO.	2001.105

Report prepared for Lindsey Archaeological Services
By David Bunn & Colin Palmer-Brown

March 2002



61, High Street
Newton on Trent
Lincoln
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Fig.1 Location of site. Scale 1:25000/1:5000.

Fig.2 Location of survey. Scale 1:1000.

Fig.3 Trace plot. Scale 1:1000.

Fig.4 Image of the unclipped data (Strongest anomalies shown in colour).
Scale 1:1000.

Fig.5 Greyscale image of the clipped data. Scale 1:1000.

Fig.6 Interpretive plan. Scale. 1:1000.

Table 1 Summary of survey parameters.

Summary

- *A fluxgate gradiometer survey was undertaken on land adjacent to Highfield Quarry, Welton le Marsh, Lincolnshire*
- *This survey was undertaken due to the proximity of a known Roman road and nearby settlement remains of the same date. Earlier (prehistoric) remains are known from the general vicinity of the proposed development*
- *A high degree of magnetic variation was detected across the survey area, although natural geological processes probably account for some of this (eg ice wedges)*
- *The survey identified areas of discrete and seemingly non-random magnetic variation, some of which appears to resolve as enclosures and the remains of the known Roman road.*

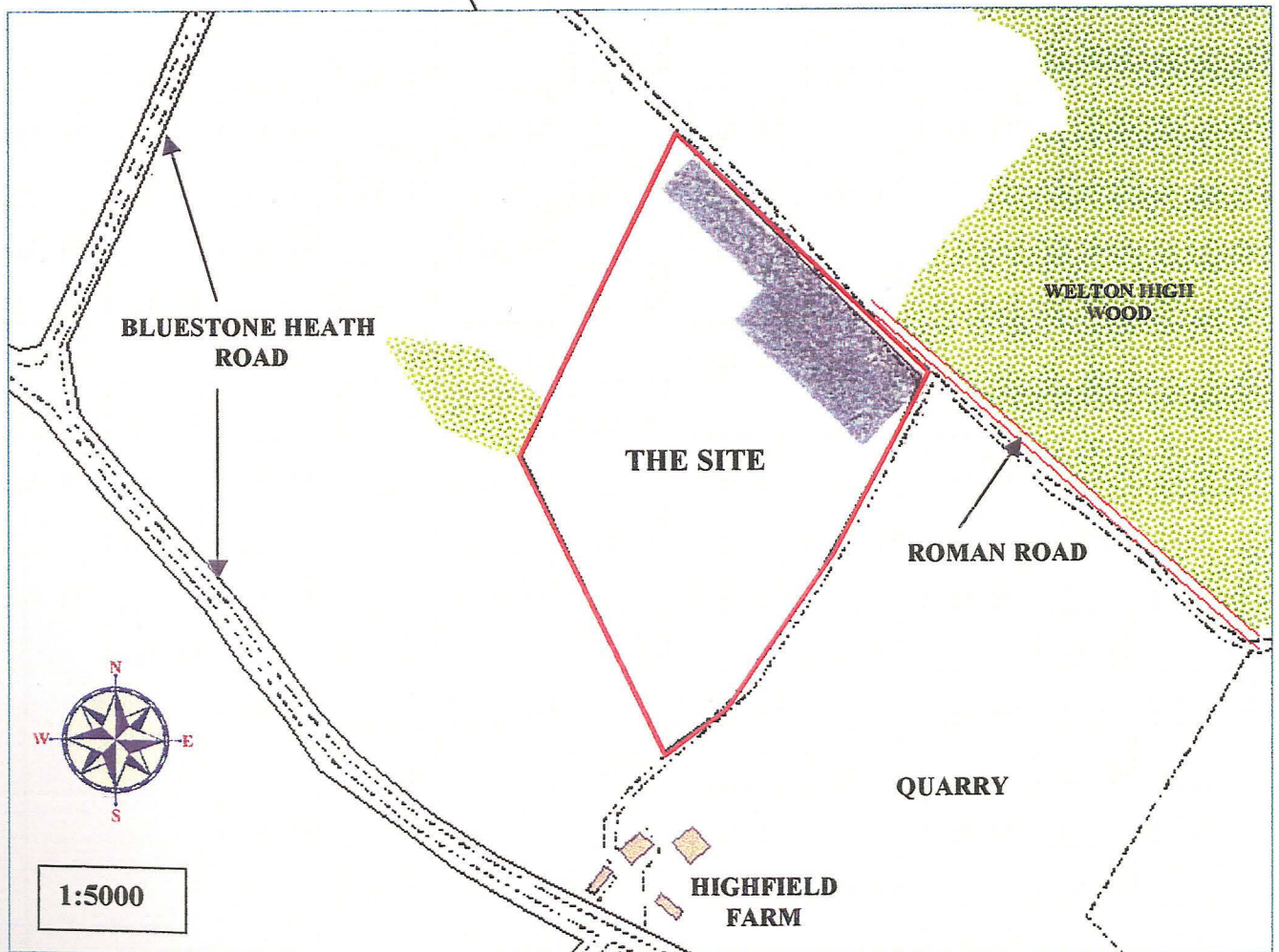
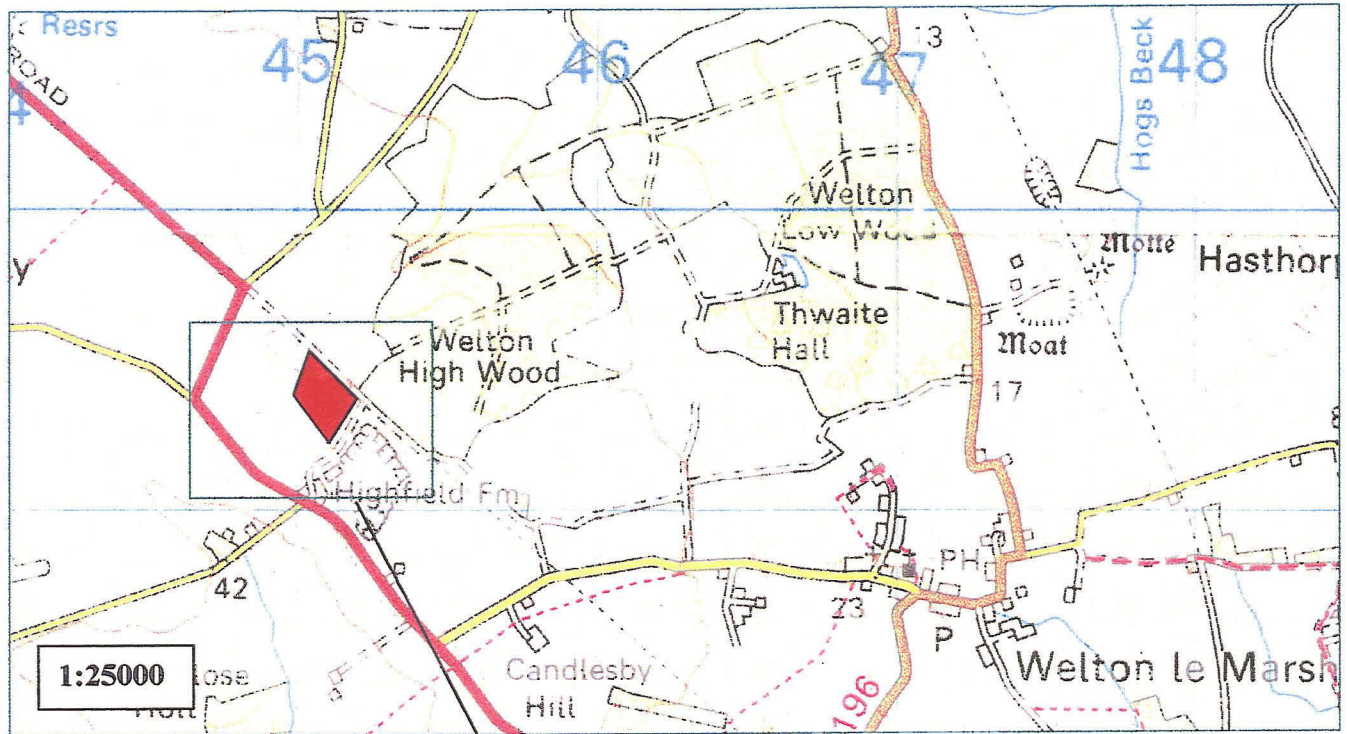


Fig.1: Location of site

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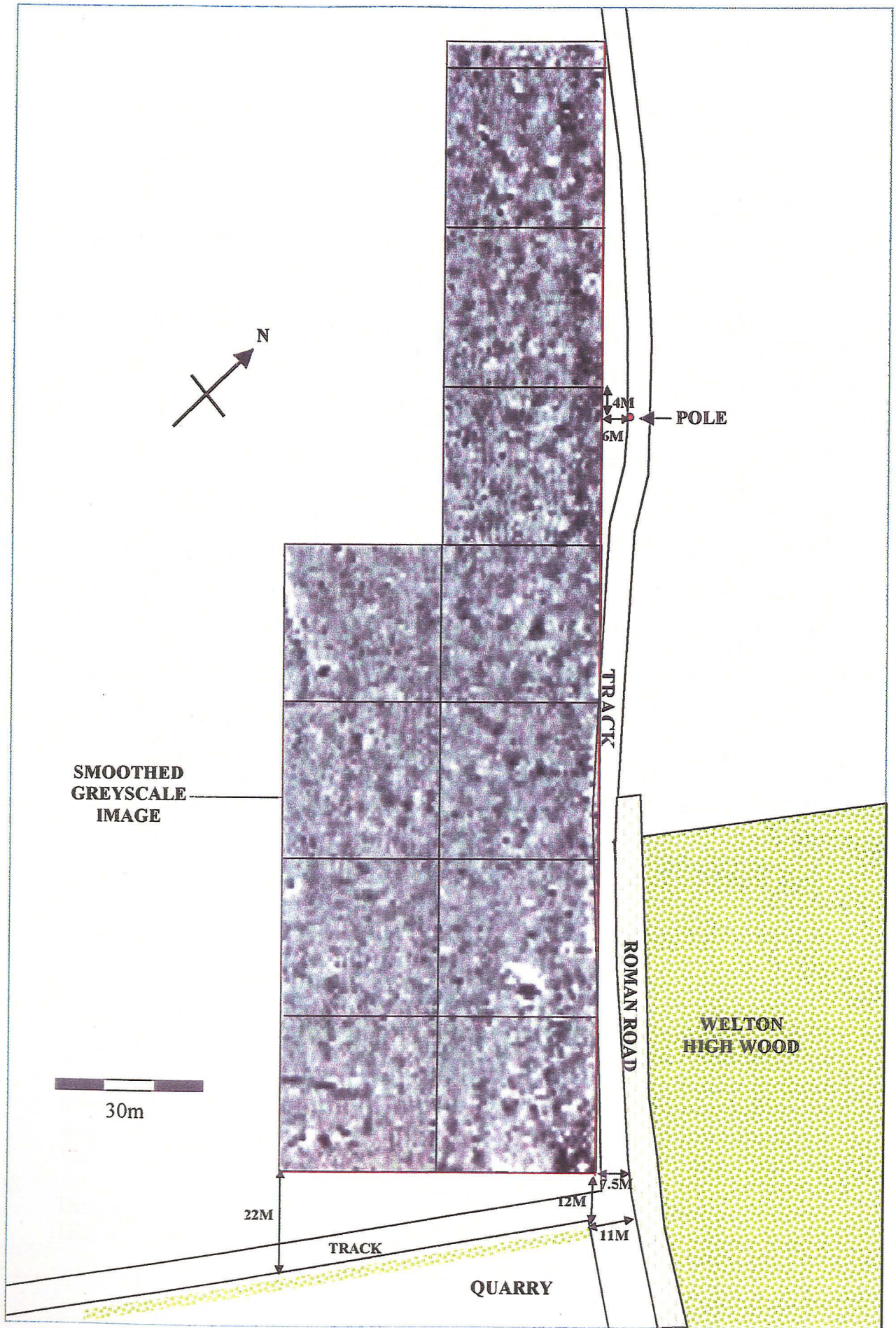


Fig.2: Location of survey 1:1000

1.0 Introduction

Lindsey Archaeological Services, on behalf Halletec Associates, commissioned Pre-Construct Geophysics to undertake a fluxgate gradiometer survey of land at Welton le Marsh, Lincolnshire. This work was carried out to fulfil part of a recommendation by East Lindsey District Council for an archaeological evaluation of the site. Full planning permission is sought for the extension of an existing chalk quarry.

The survey methodology that is described in this report was based on the guidelines set out in the English Heritage document '*Geophysical Survey in Archaeological Field Evaluation*' (David, 1995).

2.0 Location and description

Welton le Marsh lies approximately 10km west of Skegness.

The site is situated to the east of the village on land adjacent to Highfield Quarry, which was formerly known as Highfield farm.

The area of the proposed quarry extends to approximately 4ha, and comprises a sub-rectangular unit of agricultural land (which currently supports a young cereal crop) on a north-east facing slope. An area of 1.08ha was surveyed in the north-eastern part of the site (Fig.2).

The site is bounded to the south-east by a tack and hedge, beyond which lies an existing quarry. Welton High Wood lies to the east of the site, alongside a track, which forms the immediate north-eastern boundary. The western edge of the survey area is unbounded.

The geology of the area comprises Cretaceous deposits of Welton and Ferriby Chalk. (B.G.S., 1996).

3.0 Archaeological and historical background

Several prehistoric burial mounds have been recorded within the general area, and the site lies close to the prehistoric Bluestone Heath Road (L.A.S., 2001). The track that forms the north-east edge of the site follows the line of a Roman Road that extended from Lincoln to Burgh le Marsh. It is anticipated that elements of this road may lie within the site. Traces of a Roman settlement have been identified to the north-east of Welton High Wood.

During the Saxon period, the wapentake meeting place may have been at Candlesby Hill, which lies to the south-east of the site, and alongside the Bluestone Heath Road.

4.0 Methodology

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

An area of 1.08 hectare was surveyed.

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. Base lines were established along the north-eastern and south-eastern edges of the survey area.

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 presented as greyscale and colour images, a trace plot, and an interpretive plan (Figures 3-6).

The site was surveyed by David Bunn on 20th September 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	Generally fair and sunny, with occasional showers
Area surveyed	1.08 ha

Table 1: Summary of survey parameters

Central National Grid Reference TF 4520 6935.

5.0 Results (Figs. 3-6)

For the most part, the survey recorded moderate levels of magnetic variation, the strongest of which occurred toward the eastern part of the site, close to existing tracks and the projected alignment of a known Roman road (Fig. 2). Elements of this variation, for example anomaly groups 1 and 2 (Figs. 3,4, 6), may reflect areas of burning and/or ceramic deposits (e.g. brick rubble). Modern activity may account for this disturbance. However, it is possible that these relate to a series of diffuse and potentially significant linear anomalies, 3. Despite their poor resolution, several of the latter appear to represent potential land divisions, such as small enclosures. However, the preponderance of weak positive variation across the survey (Fig. 6: example area 4) may, to the greater extent, be the result of natural processes: the soil backfill of fissures produced by periglacial 'ice-wedging' of underlying chalk deposits would be detected as positive anomalies. A slight reticulation of these features is discernable, and it is possible that elements of 3 reflect these processes.

A clearer example of a possible enclosure, 5, was detected in the extreme south-east part of the survey.

A small positive anomaly 6, to the immediate north of 5, may reflect the fill of a pit or traces of burning. Similar examples to 6 occur across the survey (Fig. 4: circled in black).

Other discrete anomalies may reflect miscellaneous objects and features, such as horseshoes and ploughshares in the topsoil (circled in red/blue); chalk boulders contained within the topsoils (circled in blue); ceramic fragments, burnt areas or small pits (circled in red). Possible quarrying activities and/or natural processes (4) could account for some of the pit-like anomalies.

A diffuse linear anomaly (7) may reflect traces of the known Roman road. Linear anomaly 8 appears to be related.

A relatively short linear, 9, to the south of 7, may be a stronger example of 4, although an archaeological origin should not be discounted.

6.0 Conclusions

Periglacial ice wedging could account for much of the weaker magnetic variation that is common to almost the entire survey area and, where features of this type occur, differentiating between these and features of purely archaeological origin can be problematic. However, it would appear likely that several linear and curvilinear anomalies, if investigated further, would resolve as archaeological cut features. These include the northern extent of a possible enclosure (5), a series of land divisions in the eastern part of the site (3), and possible traces of the Roman road (7).

7.0 Acknowledgements

Pre-Construct Geophysics would like to thank Lindsey Archaeological Services and Hallectec Associates for this commission.

8.0 References

- B.G.S. 1996 *Skegness, Sheet 116*. Solid and Drift Edition. 1:50,000 Series. Keyworth, British Geological Survey.
- Clark, A. J. 1990 *Seeing Beneath the Soil*. London, Batsford.
- David, A. 1995 *Geophysical Survey in Archaeological Field Evaluation*. London, English Heritage: Research & Professional Guidelines No.1.
- Gaffney, C., Gater, J. & Ovendon, S. 1991 *The Use of Geophysical Techniques in Archaeological Field Evaluation*. London, English Heritage: Technical Paper No. 9.
- Lindsey Archaeological Services 2001. *Highfield Quarry, Welton le Marsh: Proposed Quarry Extension. Archaeological Desk Based Assessment*. L.A.S. (Unpublished Report).

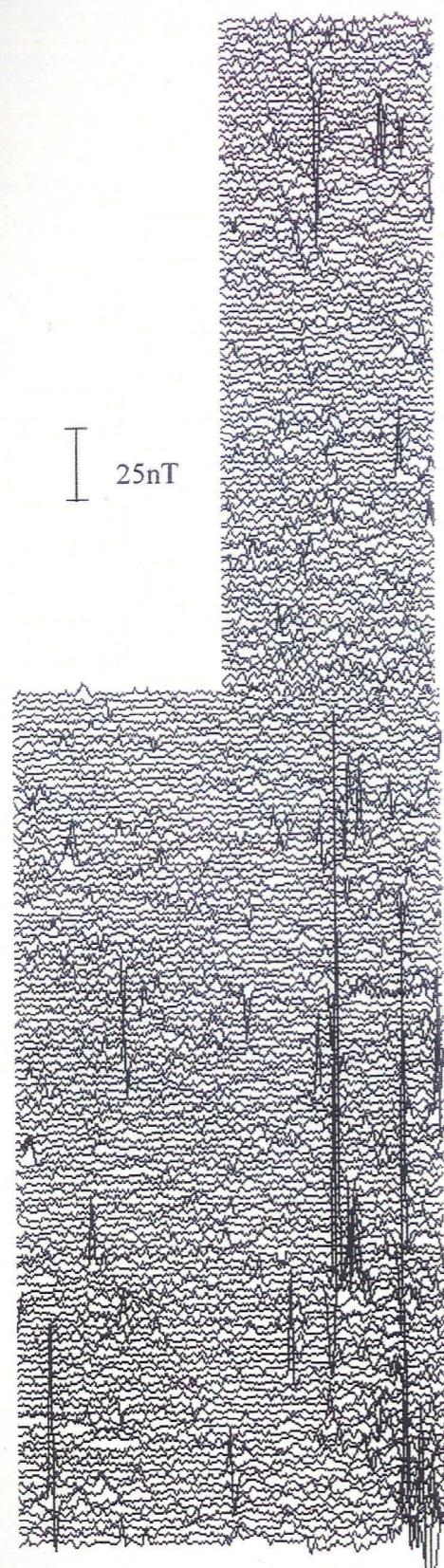


Fig.3: Trace Plot

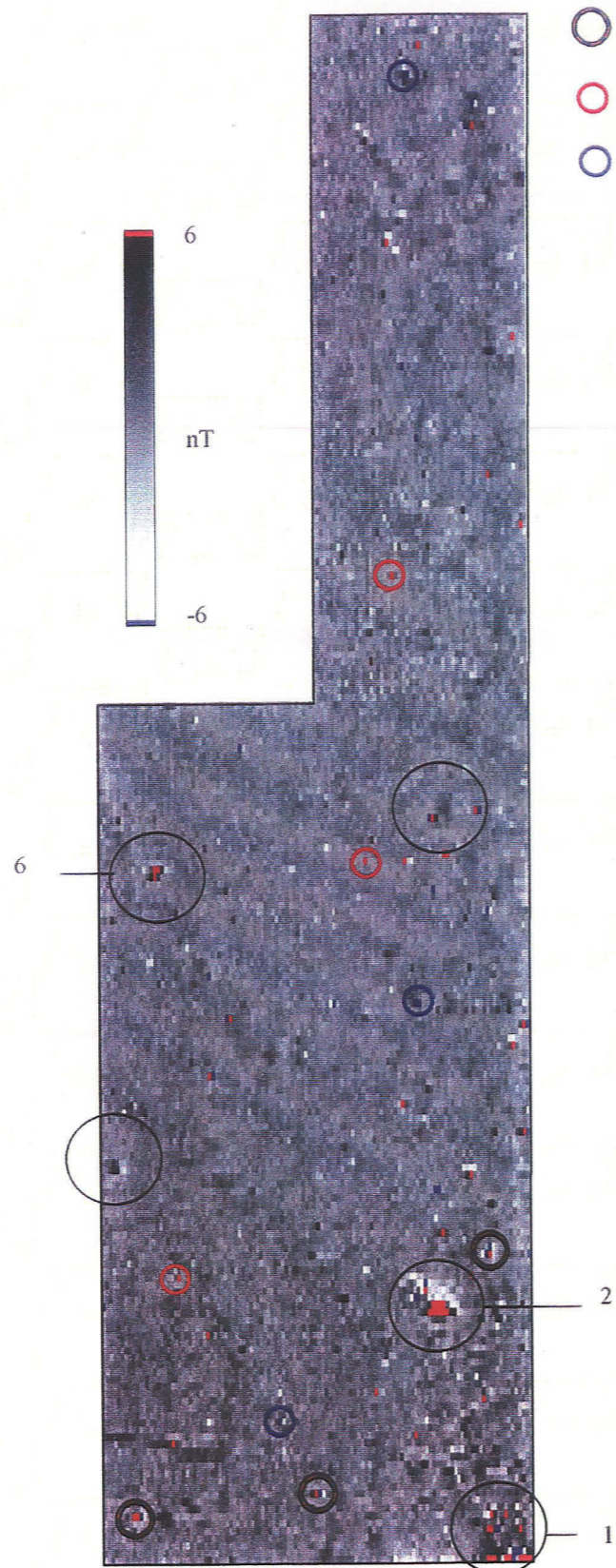


Fig.4: Image of unclipped data (Strongest anomalies in colour)

1:1000

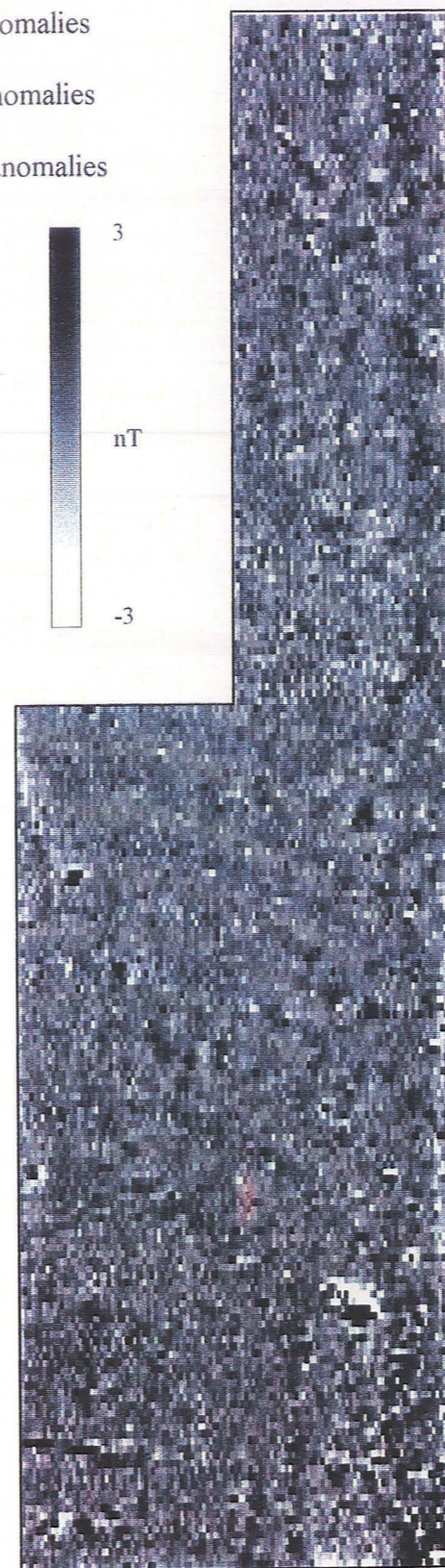


Fig.5: Greyscale image of clipped data

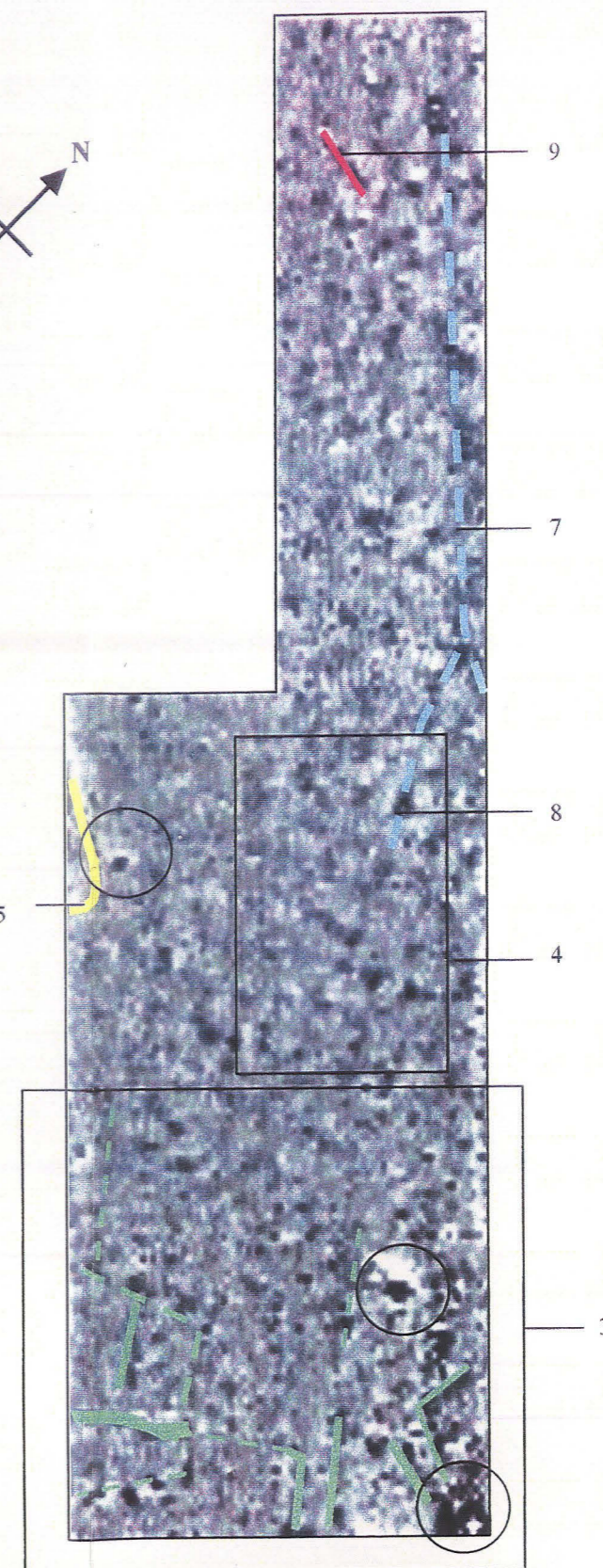
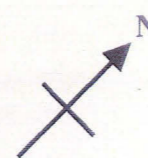
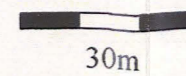


Fig 6: Interpretive plan



Appendix 7