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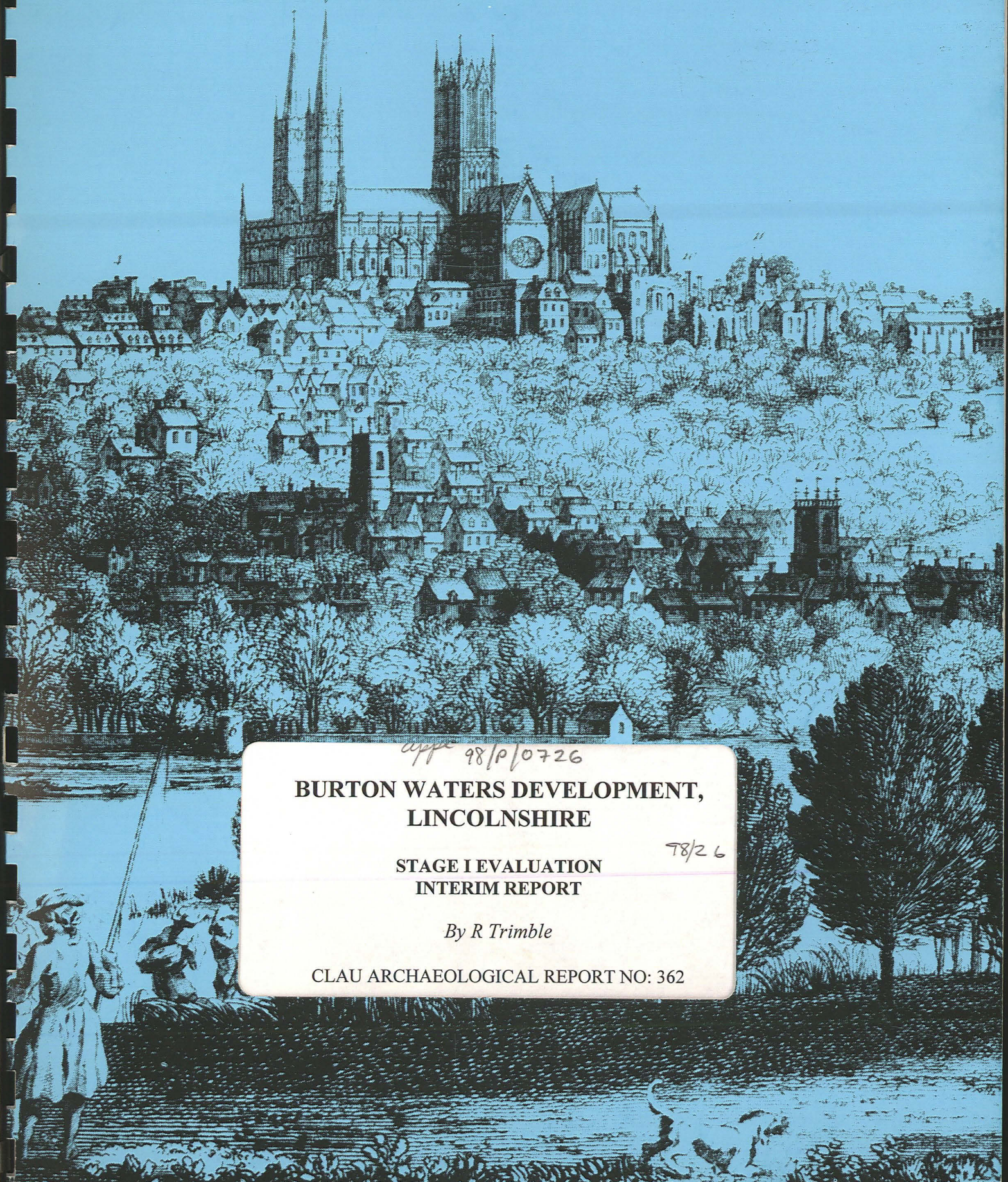
LINCOLN ARCHAEOLOGY
UNIT

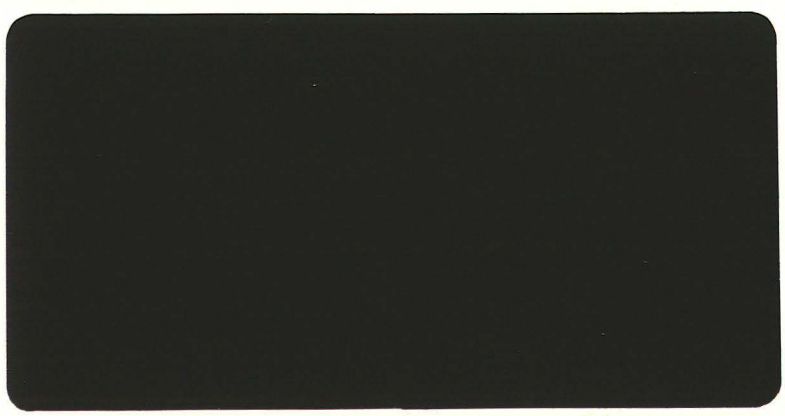


BURTON WATERS DEVELOPMENT, LINCOLNSHIRE

STAGE I EVALUATION INTERIM REPORT

By R Trimble

CLAU ARCHAEOLOGICAL REPORT NO: 362



50617 - Prehist
54518 - Roman
54519 - IA/Sax
54520 - Med - Mod
Event LI1124 - FWS
Event LI1125 - MGS (pilot)
Event LI1127 - WB

A
Report to
Eastman Securities Limited

October 1998

Prepared by

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BURTON WATERS DEVELOPMENT, LINCOLNSHIRE

98/26

STAGE I EVALUATION INTERIM REPORT

By R Trimble

CLAU ARCHAEOLOGICAL REPORT NO: 362

BURTON WATERS DEVELOPMENT, LINCOLNSHIRE

STAGE I EVALUATION - INTERIM REPORT

1.0 INTRODUCTION

This interim report has been prepared by the City of Lincoln Archaeology Unit (CLAU) to summarise findings from a STAGE I evaluation of the Burton Waters development scheme. This consisted of visual inspection, rapid scan and intensive fieldwalking, ditch section assessment, observations made during geotechnical test pitting, and a geophysical pilot study by GSB Prospection. The information obtained from this work is intended to form the basis for further phases of evaluation, the detailed specifications for which will be submitted to the Lincolnshire County Archaeological Officer for approval. It is anticipated that STAGE II of the evaluation will consist of a programme of geophysical survey, to be followed by trial trench evaluation, ditch section recording and deposit sampling for palaeoenvironmental assessment.

The 53 hectare site lies approximately 4km to the west of Lincoln in the parish of Burton and is bounded to the SW by the embanked Fossdyke Navigation, and to the NE by the A57 Lincoln to Worksop road. The Woodcocks complex is contained within the boundaries of the site together with a section of the former route of the A57 (now by-passed).

The STAGE I evaluation was commissioned by Eastman Securities Limited and commenced with fieldwalking on 5 October 1998. STAGE I fieldwork was completed on 19/10/98.

2.0 TOPOGRAPHICAL DESCRIPTION OF THE SITE

For ease of discussion the Site has been divided into four areas (Fields 1,2,3 and 4 as shown on attached plan).

The Site can be separated into two distinct topographical zones, namely a flat and relatively low-lying zone (at a fairly uniform height of 4.30m OD) occupied by a silty clay topsoil which extended throughout the majority of Field 1 and the SW part of Field 2, and a zone of slightly higher, gently undulating sandy topsoils rising from the the lower lying areas in Fields 1 and 2 to the line of the old A57 and extending throughout Fields 3 and 4.

3.0 FIELDWALKING

The most noteworthy apsect of the fieldwalking as a whole was the discovery of 43 worked flints ranging in date between the Later Mesolithic period and the Late Neolithic/Early Bronze Age. A preliminary assessment of the material has been carried out by David Bonner of Network Archaeology Ltd. The assemblage is predominately Late Mesolithic/Early Neolithic in date and includes blades, utilised blades and tools which may relate to settlement rather than core procurement/roughing out given the relative absence of cores for the early period. The flint is fresh and relatively unabraded which may indicate only very recent incorporation into the ploughsoil.

An assessment of the ceramic material collected during fieldwalking has been carried out by Jane Young of CLAU. Sherd numbers by period are detailed in the following table.

Iron Age?	Roman?	Roman	Medieval	Post Medieval	Post Med./ Roman	Early Modern
1	1	2	2	2	1	24

3.1 Rapid scan walkover

The rapid scan walkover was carried out along 50m transects across Fields 1,2,3 and 4 following ploughing and a two-week period to allow for weathering of the soils. Any noticeable concentrations of archaeological material were later fieldwalked more intensively (see below). In order to cater for the recovery of otherwise unassociated but possibly significant artefacts, a policy of collection on a judgmental basis was followed with plotting to an accuracy of an estimated +/- 15m in relation to the pre-determined transects. This methodology was slightly altered for the walkover in Field 4 to the south-east of the Woodcocks complex where all retained finds were located by EDM total station.

The rapid scan walkover resulted in the location of two concentrations of prehistoric worked flint (See attached plan – scatter A and B) and several individual examples of worked flint at the NW end of field 3 and in Field 2.

A single sherd of probable Iron Age (but possibly Early Saxon) pottery was recovered from the area of the flint scatter in Field 3 while later periods – Roman, Medieval and Post Medieval were represented only by a very low incidence of primarily ceramic material across the Site with no obvious concentrations of activity indicative of human settlement. This distribution pattern probably reflects the low-lying and wet nature of the Site (see below).

3.2 Intensive Fieldwalking in Fields 3 and 4

The two areas containing concentrations of worked flint were selected for a programme of intensive fieldwalking. This was carried out on a total area survey basis with all finds marked and plotted by EDM total station to provide an accurate plot of the distribution of the scatters.

The intensive survey in Field 4 (Scatter A) resulted in a lower than expected yield of new finds possibly due to unfavourable weather conditions at the time of walking - primarily the spreading across the area of fine, wind blown sands.

In Field 3 (Scatter B) the intensive survey was more successful, producing sufficient material to allow further definition of the scatter. A total of 24 worked flints were found (combined with flints recovered during the rapid scan survey) together with a fragment of probable late prehistoric pottery.

4.0 DITCH SECTION ASSESSMENT

There are several deep ditches within the boundaries of the Site. These comprise a 3-4m deep ditch running NW from the Woodcocks complex along the SW boundary with the Fossdyke Navigation to the NW extremity of the Site (Ditch A, see plan), a 1.5m deep ditch between Fields 1 and 2 (Ditch B), a c.4.00m deep ditch along the NE boundary of Field 3 (Ditch C), and a similarly deep ditch running NW-SE across the centre of Field 4 (Ditch D)to meet a ditch forming the SE Site boundary (Ditch E).

At the time of inspection all of these ditches were dry with only occasional shallow water at the very base. All were covered by light vegetation (grass, nettles, and occasional small bushes) which would not for the most part present any obstacle to machine based cleaning.

5.0 WATCHING BRIEF IN CONJUNCTION WITH GEOTECHNICAL TEST PITTING

An archaeological watching brief was maintained during the excavation of geotechnical test pits. The majority of these pits were excavated to a depth of c.2.00m with plan dimensions of 2.00m x 0.50m. The principal findings of this work are detailed below. Further work including borehole drilling and the excavation of more extensive trial ponds is ongoing. Commencing in late October 1998, CLAU will be monitoring the excavation of 5 trial ponds of 10m diameter in Field 4. A methodology has been agreed with the contractor whereby removal of the topsoil and any subsequent horizons will be carried out in spits using a toothless ditching blade to facilitate examination of the exposed surface for archaeologically significant features. Further ponds may be excavated in other areas at a later stage.

5.1 Fields 1 and 2

Test pit (F)3 in Field 2 (see attached plan) and Test pit 6 in Field 1 revealed a sequence of thick clays (c.0.80m - 1.00m) overlying sands towards the centre of the flat zone of silty clay topsoil. It is thought that these clays might represent a final phase of alluviation across a floodplain defined by the limits of the silty clay. Test pits along the SW boundary of Field 1 (1,2 and 5) revealed uniform stratigraphy of orange-brown and grey sands over blue grey clay containing very occasional small organic fragments. It was not clear how this sequence relates to that observed in Test pits (F)3 and 6.

5.2 Field 3

Test pit 8 (see attached plan) which was sited on lower lying ground between the worked flint concentration to the SE and a further area of higher ground to the NW, revealed a buried soil horizon (at 5.05m OD) beneath a residual 0.20m depth of clay alluvium. The buried soil had developed on a thick deposit of sand (c.0.70m).

Test pit 10 (see attached plan), in the SE part of the field also revealed a possible (much lighter) soil horizon beneath a shallow possibly alluvial, cover. The 'buried' soil in this case overlay a thick clay layer.

5.3 Field 4

Field 4 was intensively examined through test pits positioned along the proposed routes of new access roads. These revealed a near uniform stratigraphy across the area of c.0.35m - 0.50m depths of silty sand topsoil overlying light yellow-brown sands of varying thickness, with underlying variations of gravel and clay. The area appears to be devoid of more recent alluvium - the worked flint scatter (as in field 3) occurring above the sand horizon. The only archaeologically significant variation to the sequence as outlined above was noted in Test pit 31 (on lower lying ground immediately to the SE of Woodcocks) where a reddish brown silty sand separated the topsoil and the underlying sands. It is thought that the deposit may represent a buried soil or an organic alluvium.

6.0 GEOPHYSICAL PILOT STUDY

See attached report by GSB Prospection.

7.0 ASSESSMENT OF POTENTIAL FOR STAGE II EVALUATION

Later Mesolithic to Late Neolithic/Early Bronze Age activity, as represented by an assemblage of 44 worked flints, has been identified at several locations across the site with distinct concentrations to the centre of Field 3 (Scatter B) and to the NW of Field 4 (Scatter A). In general, the flints derive from areas of higher ground within a topography of gently undulating sands on the edge of a probable floodplain which may contain an earlier course of the River Till (see below).

The distribution of flints across Field 3 may at least in part be determined by the presence or absence of the clay alluvium recorded in TP8 and possibly in TP10. The buried soil observed in TP8 was not dated but may well represent a land surface in existence at the same time as prehistoric activity in the area. Evidence from other river valley locations across the region (such as the Trent and the Welland) indicates flooding and the deposition of fine grained alluvial sediments from the Neolithic period onwards (probably due to land clearance for agriculture and consequent increased runoff levels) with a marked acceleration during the Iron Age and Romano-British periods. Earlier settlement remains are commonly buried below or interleaved within such alluvial horizons. Field 3 may, therefore, offer the potential for excellent preservation of even comparatively fragile structural, artefactual and environmental evidence.

Although a trace of possible buried soil or alluvium was recorded in Field 4 in the area of TP31, most of the superficial strata throughout the area appear to have been thoroughly denuded through plough action. As a consequence, the potential for well preserved archaeological deposits is poor in comparison with Field 3. Despite this there is the potential for negative features (features cut into the

underying geology and since deliberately or naturally infilled) in the area of flint scatter A in particular.

Evidence for Romano-British activity was sparse and is represented only by the very abraded sherds of pottery collected during the rapid scan walkover in Field 1 which may indicate activity relating to this period across the higher ground at the NW extremity of the Site, and a single sherd in Field 3. The Fossdyke has traditionally been accepted as having been constructed during the Romano-British period, or possibly Late Saxon/Norman. However, it is interesting to note that the former route of the A57 between Woodcocks and the NW corner of the site follows the edge of higher ground around a low-lying alluviated area interpreted as a floodplain (as seen in TP(F)3 and TP6). This floodplain could contain a more sinuous watercourse since diverted along the straight section of the Fossdyke Navigation which passes to the SW of the Site. A soil mark indicating a possible channel crossing the 'floodplain area' has previously been identified from aerial photographic plots (See Burton Waters Marina, Archaeological and Historical Study - CLAU Report No. 38, Part 2). Following visual examination of this feature, it is considered that the soil mark may instead consist of a distinctly darker ribbon of topsoil representing colluviation at the edge of the floodplain, and that the channel, if present within the boundaries of the Site, lies further to the SW. However, no conclusive evidence for a channel was found during the geotechnical test pit survey or as a result of the auguring and magnetometry survey carried out along transect A as part of the Geophysical Pilot Study.

The STAGE I evaluation produced no evidence for medieval or post-medieval settlement. This probably reflects the low-lying flood prone nature of the land.

8.0 SUGGESTED STRATEGY FOR STAGE II EVALUATION

This section is intended to serve as a basis for discussion concerning topics for further investigation and the development of appropriate evaluation strategies, the detailed specification for which will be agreed with the County Archaeological Officer. Some of the aims and objectives set out below may be partially achieved during monitoring of the excavations for a series of trial ponds commencing 26/10/98 (see section 5.0 above) and may obviate the need for further investigation in some locations.

8.1 Geophysical Survey

Preliminary indications as outlined in the Geophysical Pilot Study Interim Statement suggest that the immediate subsoil geology of fine sands which predominates across much of the Site may offer only a low potential for the identification of archaeological deposits by rapid scan magnetometry. For this reason, it is proposed that the definition of areas for further detailed geophysical survey is made in the light of information acquired through field walking, geo-technical test pitting, and visual examination of the topography. Suitable areas for magnetometry and/or magnetic susceptibility survey may include the flint scatters A and B together with their wider contexts to encompass areas of potential buried soil, the immediate floodplain margins in Fields 1 and 2, and selected parts of Field 4. It would appear from the Pilot study results that magnetometry might not be effective for the location of the possible palaeochannel.

8.2 Trial Trenching

It is proposed that trial trenching take place directly over flint scatters A and B to establish the potential for 'negative' archaeological features. Careful examination should also take place in adjacent alluviated areas to establish whether associated deposits or artefact distributions extend into these areas of potentially good preservation and to determine the date of alluviation. It is possible that prehistoric activity extends on to the very edge of the floodplain in Field 2. Trial trenching in this area might allow inferences to be made about the relationship between prehistoric activity and alluviation across the floodplain. Of particular archaeological interest would be the potential for well preserved remains below the possible colluvial horizon in Fields 1 and 2.

Trial trench evaluation on the possible floodplain with the aim of locating any palaeochannels may present logistical problems in terms of the depth of excavation and the potential for flooding.

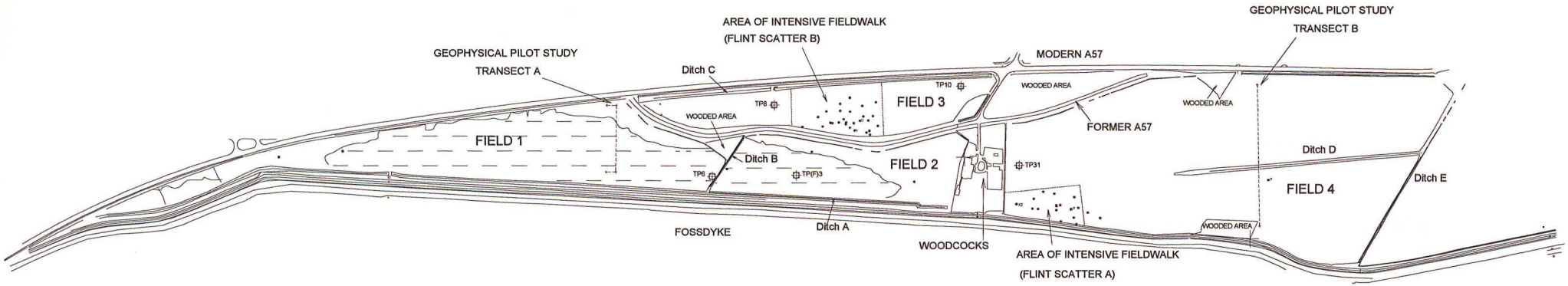
A programme of palaeoenvironmental sampling should be carried out during trial trenching. The STAGE I evaluation has already identified the area of buried soil in Field 3 as a priority for this work.

8.3 Ditch Section Recording

Some selective ditch section recording may be appropriate in Field 3 (Ditch C) with a view to modelling the buried land surface. Such recording may also be usefully carried in Fields 1 and 2 along the SW boundary with the Fossdyke to determine depths of alluvium and the location of possible palaeochannels. Ditch recording in Field 4 would probably result in little new information since any archaeology would lie at shallow depth.

R. Trimble

27/10/98



KEY

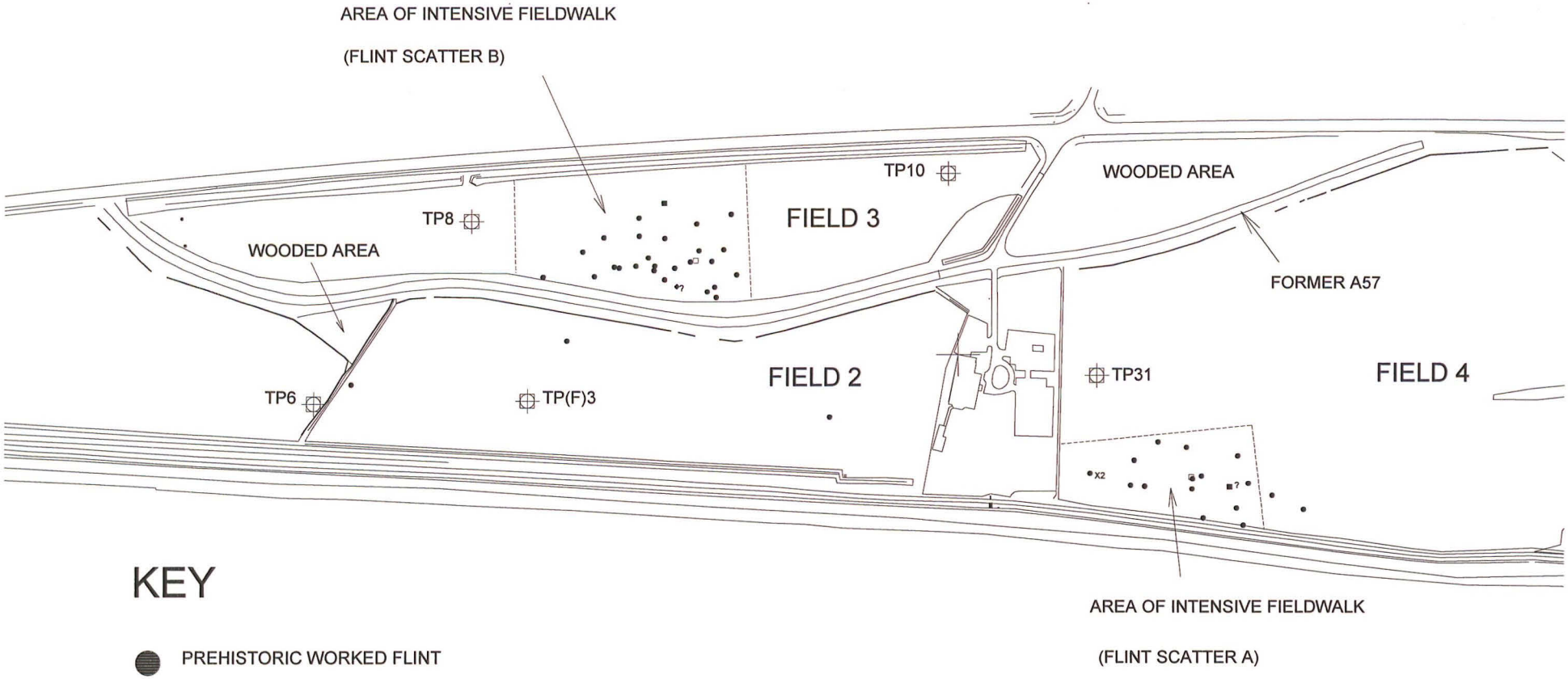
- PREHISTORIC WORKED FLINT
- PREHISTORIC POTTERY
- ROMAN POTTERY
- MEDIEVAL POTTERY

FLOODPLAIN?

N

Burton Waters Development, Lincolnshire

Plan showing find, test pit and Geophysical Pilot Study transect locations, and probable extent of floodplain - Not to Scale



KEY

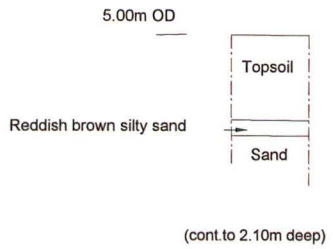
- PREHISTORIC WORKED FLINT
- PREHISTORIC POTTERY
- ROMAN POTTERY
- MEDIEVAL POTTERY

N

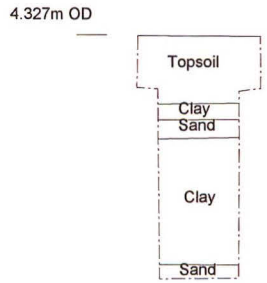
Plan showing Flint Scatters A and B - Scale 1:500

Burton Waters Development, Lincolnshire

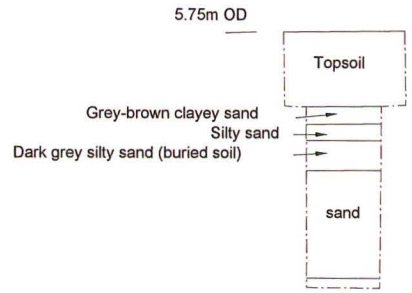
TP31



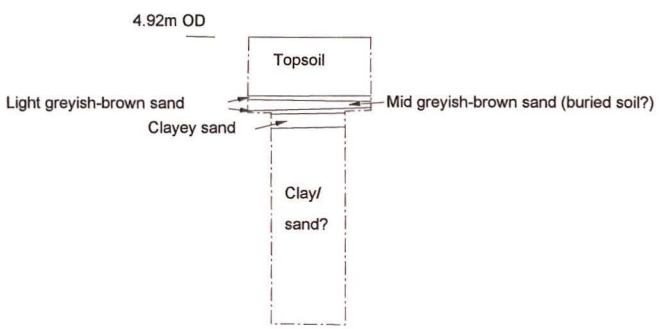
TP6



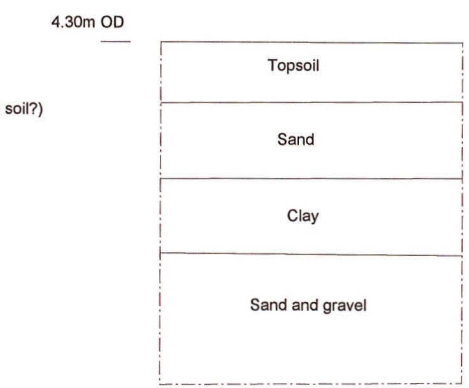
TP8



TP10



TP(F)3



Burton Waters Development, Lincolnshire

Geotechnical Test Pit Sections - Scale 1:50

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GEOPHYSICAL SURVEY
REPORT 98/112

BURTON WATERS MARINA
Lincoln

Pilot Study

Cleint:

LINCOLN archaeology

SITE SUMMARY SHEET

98 / 112 Burton Waters Marina
Pilot Study

NGR: SK 935 737 (approx. centre)

Location and topography

The site lies approximately 5km northwest of Lincoln city centre. The application area covers approximately 40ha and is limited by the Foss Dyke to the southwest and the A57 road to the northeast. The proposed development area occupies several adjoining fields all of which are generally level and were ploughed or rolled at the time of survey.

Aims of Survey

This survey is a pilot geophysical scheme, based on gradiometry and soil sampling, designed to answer three questions:

1) Does the depth of alluvium preclude the use of geophysics?
2) Is there sufficient magnetic susceptibility contrast between the topsoil and subsoil to allow detection by gradiometry?
3) Can gradiometry locate a presumed former river channel?

Summary of Results *

The results from the auger survey suggest a substantial depth of sandy deposits. However, on the basis of their clastic inclusions, these deposits appear to be predominantly fluvioglacial. There was no evidence of a significant cover of recent alluvium at the points sampled. However, the level of magnetic susceptibilities recorded from the soil samples is very low and there is minimal contrast between the topsoil and subsoil. This suggests that these soils have not developed magnetic enhancement under ongoing pedological processes. As such, buried archaeological cut-features are likely to produce very weak signals which may not be detectable by the gradiometer unless they contain magnetically enhanced occupational debris.

Gradiometry has failed to locate the presumed palaeochannel. The soil auger survey does not indicate the possible palaeochannel, although there are suggestions of a possible channel further to the southwest and/or northeast.

*** It is essential that this summary is read in conjunction with the detailed results of the survey.**

SURVEY RESULTS

98 / 112 Burton Waters Marina
Pilot Study

1. Survey Area

1.1 Two transects were investigated as indicated on Figure 1 at a scale of 1:1000. Transect A, approximately 150m in length, lies in the northwest of the application area while Transect B crosses the eastern half of the application area and is approximately 300m long.

1.2 Soil auger samples were taken at 50m intervals along both transects.

1.3 A gradiometer survey was carried out along Transect A. This survey covers an area of 140m by 20m over the presumed palaeochannel.

1.4 Both transects and the gradiometer survey area were tied in by the client.

2. Display

2.1 The results from the gradiometer survey are displayed as an XY trace, dot density plot and an interpretation diagram (Figure 2) at a scale of 1:500. These display formats are discussed in the *Technical Information* section at the end of the text.

3. General Considerations

3.1 The topography was flat and free of ground cover and, as such, presented no obstacles to survey.

4. Soil Auger Survey

Transect A

4.1 The typical soil profile along this transect is 0-*c.*30cm plough soil (7.5 YR 3.5/3) of loamy sands; these overlie deep sands down to *c.*80-90 cm which, in some areas, overlie a thin horizon of stiff silt clays, which in turn overlie further sandy deposits.

4.2 This transect found no evidence for a palaeochannel. However, variations in the height of the stiff red silt clay deposits would support the view that any palaeochannel lay further to the northeast and/or southwest of the area surveyed.

Transect B

4.3 The typical soil profile along Transect B is: 0-*c.*35 cm plough soil; coarse sands (7.5 YR 5/7) of *c.* 20-30 cm thick; and pale sands (7.5 Y/R 7/2) > *c.*30 cm thick.

Discussion

4.4 There were few clastic inclusions in the ploughsoil. However, those present were predominantly subangular. This suggests the plough soils predominantly comprise fluvioglacial deposits rather than recent alluvium. Close to the Foss Dyke, the plough soils do contain a slightly higher proportion of silts (silt sand loams rather than sand loams), which may reflect minor inputs of recent alluvial materials.

4.5 However, the lack of horizonal differentiation, described in paragraphs 4.1 - 4.3, tends to present problems to gradiometer survey. This is because the technique depends upon there being a magnetic gradient caused by the contrast in susceptibilities between two bodies of soil, such as a cut-feature and the surrounding soil. Within deep homogeneous soils, unless a feature contains magnetically distinct materials - such as burnt or imported materials associated with occupation, it will tend to infill with the magnetically indistinguishable soils of the soil profile. It is for this reason that the magnetic susceptibility of the soils has also been determined. This indicated that, at the points sampled, there is very little variation in susceptibility within the soils and little contrast between the topsoil and subsoil.

5. Results of Gradiometer Survey

5.1 Gradiometry was carried out along a short transect (140 x 20 m) with the aim of locating a possible palaeochannel. Past surveys in similar landscapes and over similar pedologies have proved successful in detecting the anomaly produced by such gross landscape features.

5.2 The data indicate a quiet level of background response typical of such soils. Although several weak isolated responses are discernible in the data these are most likely to reflect pedological variations. A few weak linear trends are also visible in the data. While an archaeological origin for these cannot be dismissed, an agricultural origin is probable.

5.3 The gradiometer data shows no evidence for the existence of a palaeochannel. The soil survey does not indicate a palaeochannel in this area.

6. Conclusions

6.1 The results from the auger survey suggest a substantial depth of sandy alluvial deposits. However, these sands, including the present plough soil, appear, on the basis of their subangular clastic inclusions, to be fluvioglacial. Along the sample transect, therefore, there was no sign of a significant overburden of recent alluvium.

6.2 The level of magnetic susceptibilities recorded from the soil samples is very low and there is minimal contrast with the topsoil. This suggests that these soils have tended not to develop magnetic enhancement under natural processes. As such, any buried archaeological features are, unless they contain occupational debris, likely to produce very weak signals which may not be detectable by the gradiometer. The response is also likely to be highly dependent on the varying depth of any recent alluvial cover which may be present locally within the rest of the proposed development area. Given the weak nature of the likely responses from any archaeological features, gradiometer scanning or volume magnetic susceptibility measurement across the site are unlikely to provide useful information.

6.3 Gradiometry has failed to locate the presumed palaeochannel. However, the soil auger survey suggests that any palaeochannels may lie further to the southwest or northeast.

6.4 If geophysics is to be used the best approach would be to initially target areas on the basis of other information, for example fieldwalking data. Detailed recorded survey over an area should be able to locate weak anomalies which would not be detectable by scanning. If such small target surveys produced positive results the remaining area could be investigated by a series of random sample blocks.

Project Co-ordinators:	D Weston
Project Assistants:	Dr S Ovenden-Wilson and A Shields
Date of Survey:	12th & 13th October 1998
Date of Preliminary Report:	26th October 1998

TECHNICAL INFORMATION

The following is a description of the equipment and display formats used in **GSB Prospection (GSB)** reports. It should be emphasised that whilst all of the display options are regularly used, the diagrams produced in the final reports are the most suitable to illustrate the data from each site. The choice of diagrams results from the experience and knowledge of the staff of **GSB.**

All survey reports are prepared and submitted on the basis that whilst they are based on a thorough survey of the site, no responsibility is accepted for any errors or omissions.

Instrumentation

(a) Fluxgate Gradiometer - Geoscan FM36

This instrument comprises of two fluxgates mounted vertically apart, at a distance of 500mm. The gradiometer is carried by hand, with the bottom sensor approximately 100-300mm from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is conventionally measured in nanoTesla (nT), or gamma. The fluxgate gradiometer suppresses any diurnal or regional effects. Generally features up to one metre deep may be detected by this method. Readings are normally logged at 0.5m intervals along traverses 1.0m apart.

(b) Resistance Meter - Geoscan RM4 or RM15

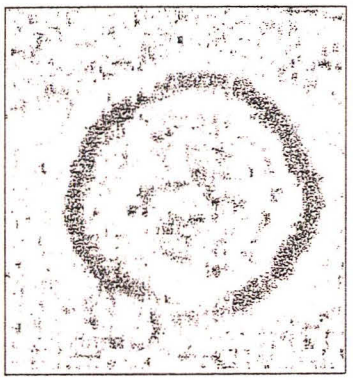
This measures the electrical resistance of the earth, using a system of four electrodes (two current and two potential.) Depending on the arrangement of these electrodes an exact measurement of a specific volume of earth may be acquired. This resistance value may then be used to calculate the earth resistivity. The "Twin Probe" arrangement involves the paring of electrodes (one current and one potential) with one pair remaining in a fixed position, whilst the other measures the resistance variations across a fixed grid. The resistance is measured in Ohms and the calculated resistivity is in Ohm-metres. The resistance method as used for area survey has a depth resolution of approximately 0.75m, although the nature of the overburden and underlying geology will cause variations in this generality. The technique can be adapted to sample greater depths of earth and can therefore be used to produce vertical "pseudo sections". In area survey readings are typically logged at 1.0m x 1.0m intervals.

(c) Magnetic Susceptibility

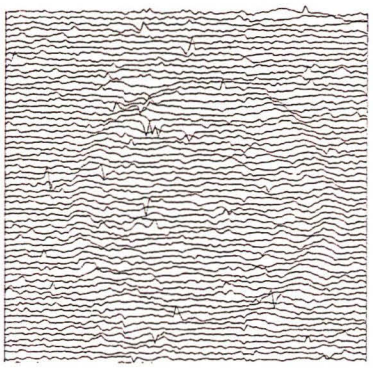
Variations in the magnetic susceptibility of subsoils and topsoils occur naturally, but greater enhanced susceptibility can also be a product of increased human/anthropogenic activity. This phenomenon of susceptibility enhancement can therefore be used to provide information about the "level of archaeological activity" associated with a site. It can also be used in a predictive manner to ascertain the suitability of a site for a magnetic survey. The instrument employed for measuring this phenomenon is either a field coil or a laboratory based susceptibility bridge. For the latter 50g soil samples are collected in the field. Sampling intervals vary widely but are often at the 10m or 20m level.

Display Options

The following is a description of the display options used. Unless specifically mentioned in the text, it may be assumed that no filtering or smoothing has been used to enhance the data. For any particular report a limited number of display modes may be used.

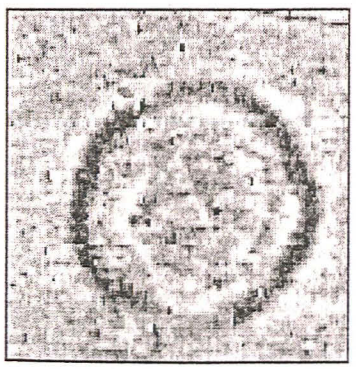


(a) **Dot-Density** In this display, minimum and maximum cut-off levels are chosen. Any value that is below the minimum will appear white, whilst any value above the maximum will be black. Any value that lies between these two cut-off levels will have a specified number of dots depending on the relative position between the two levels. The focus of the display may be changed using different levels and a contrast factor (C.F.). Usually the C.F. = 1, producing a linear scale between the cut-off levels. Assessing a lower than normal reading involves the use of an inverse plot, This plot simply reverses the minimum and maximum values, resulting in the lower values being presented by more dots. In either representation, each reading is allocated a unique area dependent on its position on the survey grid, within which numbers of dots are randomly placed. The main limitation of this display method is that multiple plots have to be produced in order to view the whole range of the data. It is also difficult to gauge the true strength of any anomaly without looking at the raw data values. This display is much favoured for producing plans of sites, where positioning of the anomalies and features is important.



(b) **X-Y Plot** This involves a line representation of the data. Each successive row of data is equally incremented in the Y axis, to produce a stacked profile effect. This display may incorporate a hidden-line removal algorithm, which blocks out lines behind the major peaks and can aid interpretation. Advantages of this type of display are that it allows the full range of the data to be viewed and shows the shape of the indiviual anomalies. Results are produced on a flatbed plotter.

This display joins the data values in both the X and Y axis. The display may be changed by altering the horizontal viewing angle and the angle above the plane. The output may be either colour or black and white.



(c) Grey-Scale

This format divides a given range of readings into a set number of classes. These classes have a predefined arrangement of dots or shade of grey, the intensity increasing with value. This gives an appearance of a toned or grey scale.

Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. While colour plots can look impressive and can be used to highlight certain anomalies, grey-scales tend to be more informative.

Terms commonly used in the graphical interpretation of gradiometer data

Ditch / Pit

This category is used only when other evidence is available that supports a clear archaeological interpretation e.g. cropmarks or excavation.

Archaeology

This term is used when the form, nature and pattern of the response is clearly archaeological but where no supporting evidence exists. These anomalies, whilst considered anthropogenic, could be of any age. If a more precise archaeological interpretation is possible then it will be indicated in the accompanying text.

? Archaeology

The interpretation of such anomalies is often tentative, with the anomalies exhibiting either weak signal strength or forming incomplete archaeological patterns. They may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.

Natural

These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions e.g. palaeochannels or magnetic gravels.

? Natural

These are anomalies that are likely to be natural in origin i.e geological or pedological.

Areas of Magnetic Disturbance

These responses are commonly found in places where modern ferrous or fired materials are present e.g. fencelines, pylons or brick rubble. They are presumed to be modern.

Areas of Increased Magnetic Response

These responses show no visual indications on the ground surface and are considered to have some archaeological potential.

Ferrous Response

This type of response is associated with ferrous material and may result from small items in the topsoil or larger buried objects such as pipes. Ferrous responses are usually regarded as modern. Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.

Ridge and Furrow

These are regular and broad linear anomalies that are presumed to be the result of ancient cultivation. In some cases the response may be the result of modern activity.

Ploughing Trend

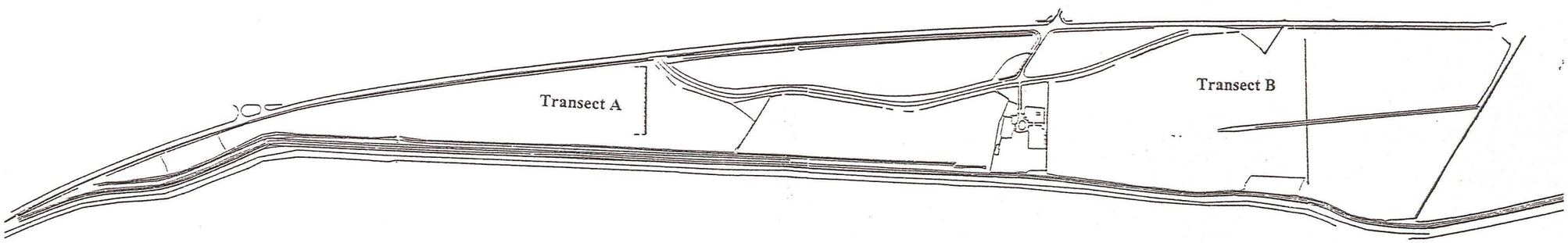
These are isolated or grouped linear responses. They are normally narrow and are presumed modern when aligned to current field boundaries or following present ploughing.

Linear Trend

This is usually a weak isolated linear anomaly of unknown cause or date.

List of Figures

BURTON WATERS MARINA
Location of Pilot Study Transect



Based on a plan supplied by
Lincoln Archaeology

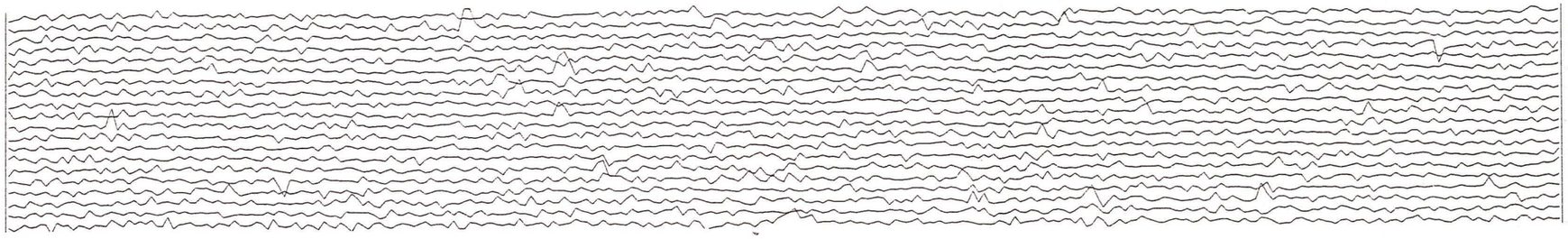
1:10 000

GSB Prospection 98/112

Figure 1

BURTON WATERS MARINA

Gradiometer Data

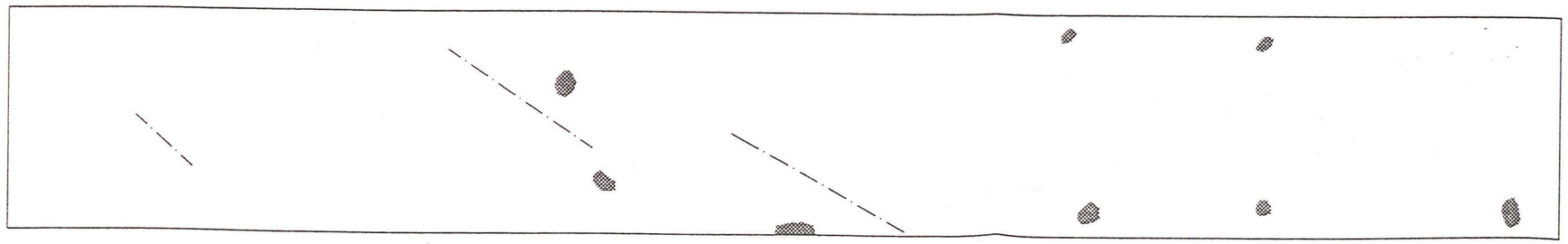


15 nT

1.0

nT

0.1



Linear Trend

?Natural

0 m 20

GSB Prospection 98/112

Figure 2