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**ARCHAEOLOGICAL EVALUATION OF A
LATE BRONZE AGE-
EARLY IRON AGE SETTLEMENT
ON SLY-MASON FIELDS,
WELLAND BANK QUARRY,
DEEPING ST. JAMES,
LINCOLNSHIRE**



A P S

ARCHAEOLOGICAL
PROJECT
SERVICES

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Work Undertaken For
Ennemix Construction Materials Ltd

Report Compiled by
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Dale Trimble and Gary Taylor

October 1996

APS Report No: 36/96

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- 4 Welland Bank Quarry, Lincolnshire. Preliminary evaluation of soil samples. Report No. 2, by Peter Murphy, Centre of East Anglian Studies, University of East Anglia
- 5 Welland Bank Quarry, The Lithics, by Tom Lane, Archaeological Project Services
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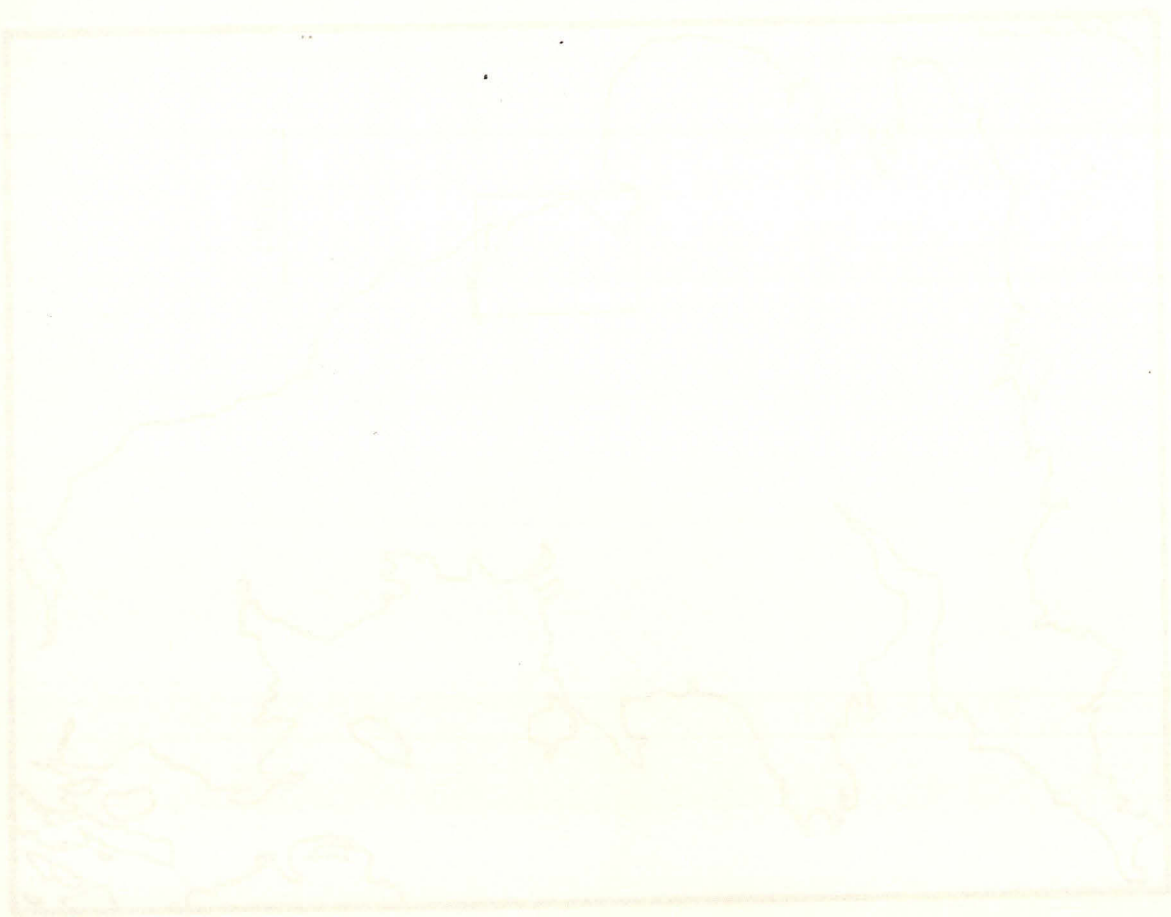
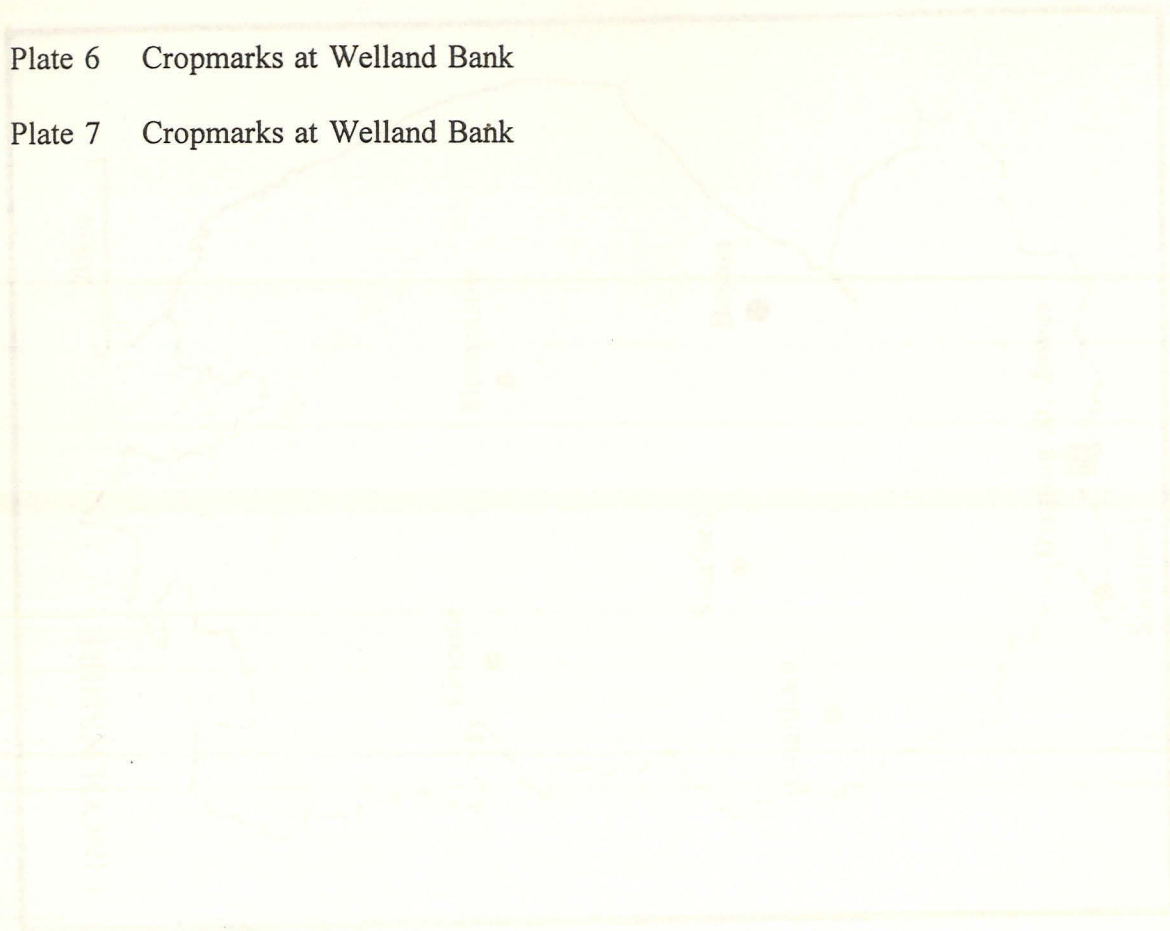
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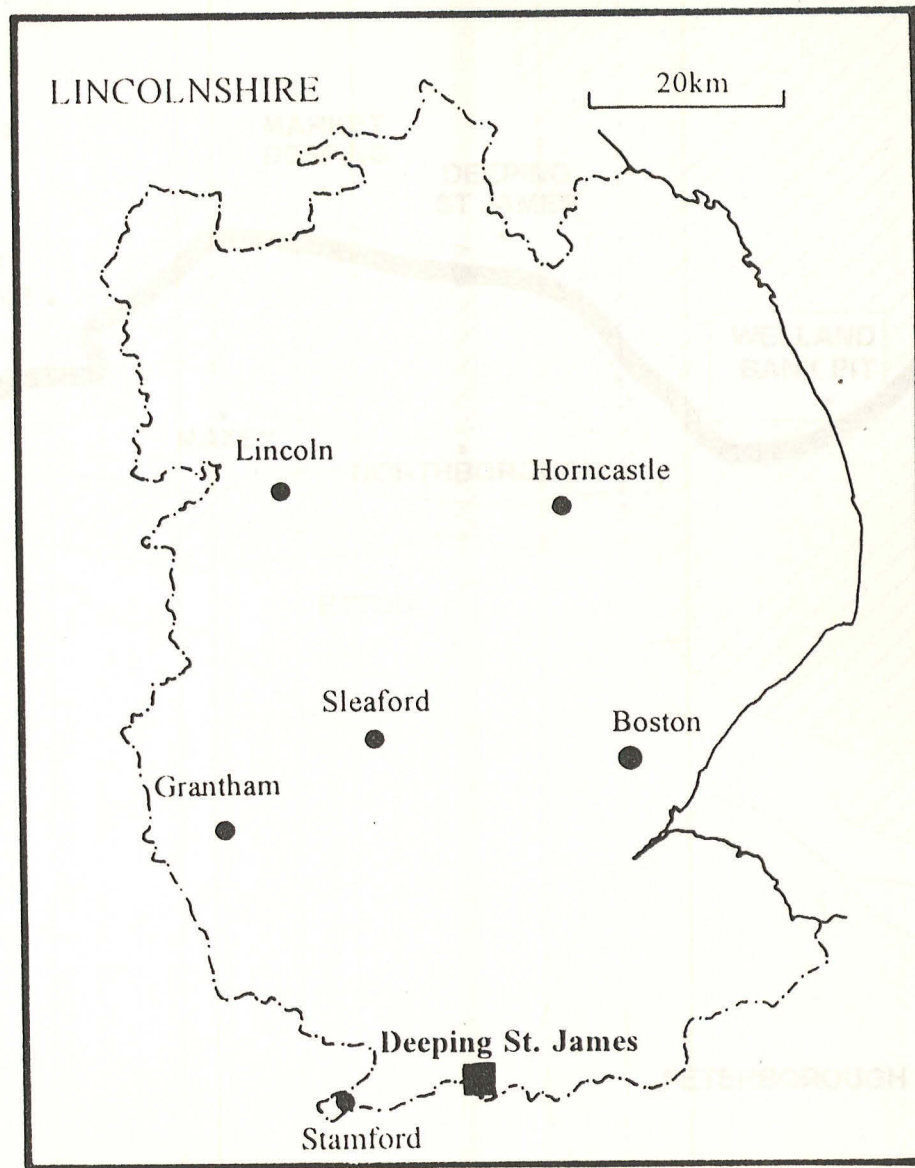
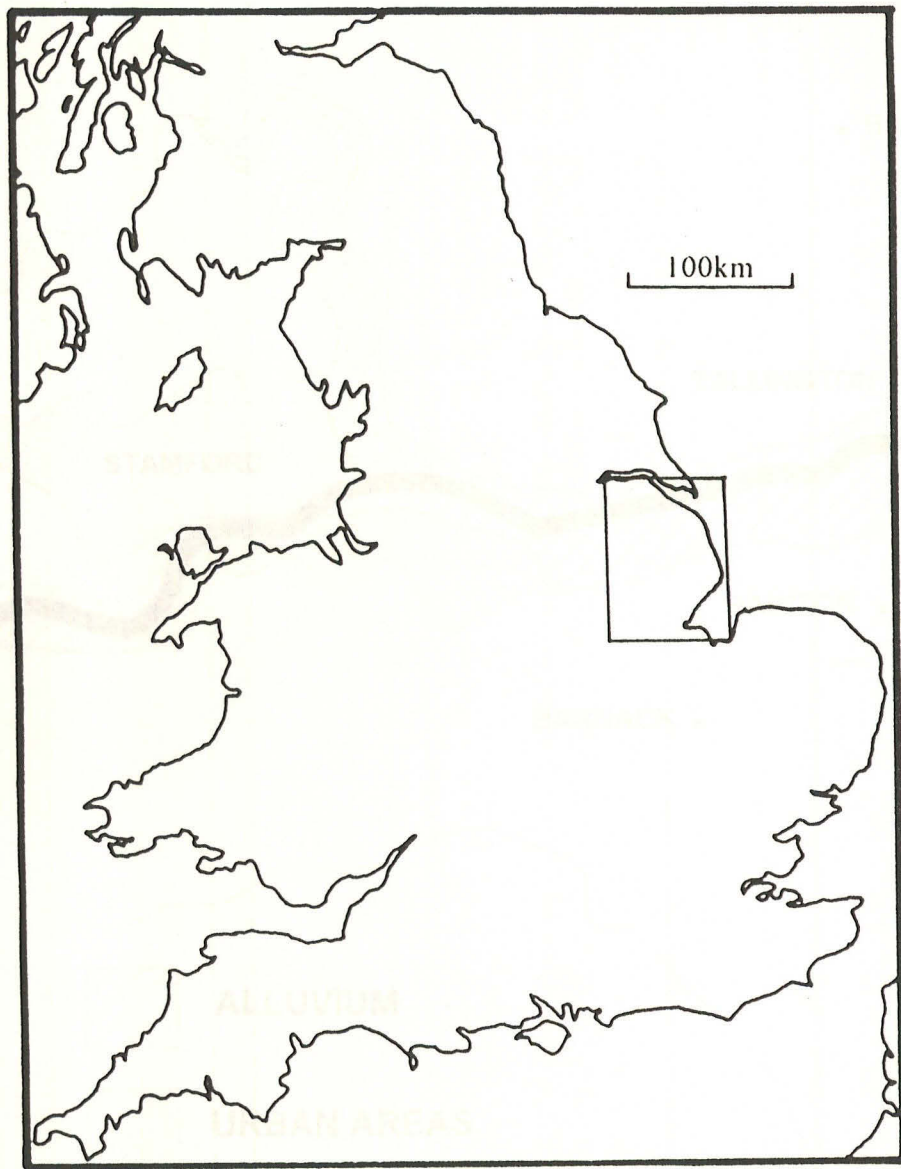


Fig. 1 General Location

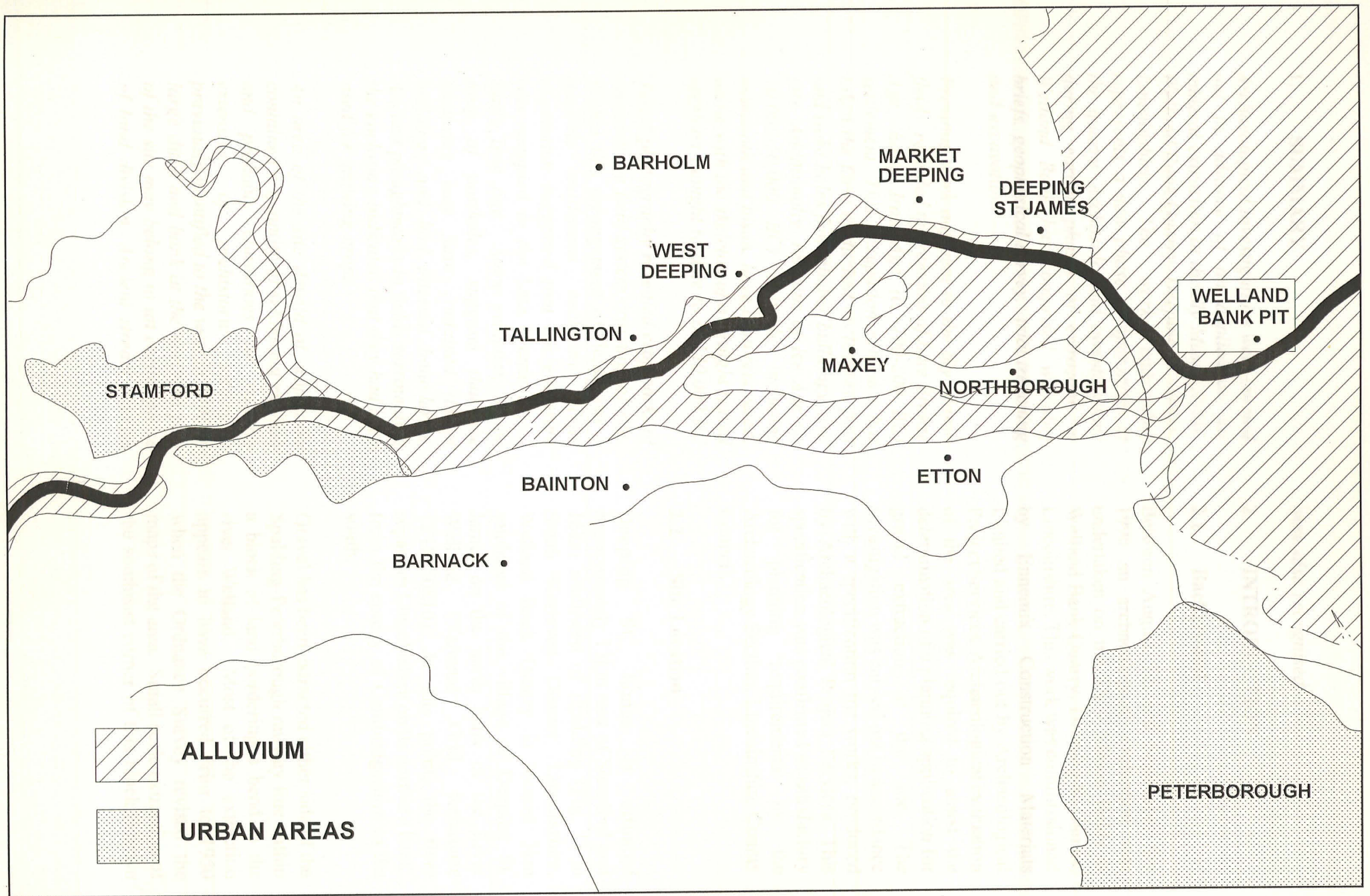


Figure 2 Welland Bank Quarry and the Welland Valley

1. SUMMARY

Archaeological investigations were carried out in advance of an application for mineral extraction at the Sly Mason fields, Welland Bank Quarry, Deeping St. James, Lincolnshire. The work undertaken represents a new phase of operations at the quarry. Archaeological investigations during earlier phases of extraction at Welland Bank has comprised watching briefs, geophysical survey, trial trenching and excavation.

Previous work adjacent to the Sly Mason fields revealed the remains of Late Bronze Age -Early Iron Age (c. 700-500 BC) settlement. This occupation evidence has taken the form of ditched enclosures, post and stake holes from timber buildings, and pits. Additionally, remains of Ice Age (c. 10,000-50,000 BC) animals, including mammoth and bison, have been recovered, along with the skeleton of a straight tusked elephant thought to date to c. 120,000 BC

Aerial photography revealed cropmarks of an extensive field system crossing the site. Within this arrangement of fields was a possible settlement enclosure. Trial excavation suggested that the enclosure was occupied in the Late Bronze Age - Early Iron Age. Some evidence, in the form of postholes, suggests that the enclosure may have contained timber buildings and had internal boundaries. Ancient ploughmarks in fields surrounding the enclosure indicated that they had been used for growing crops.

An area of the site devoid of cropmarks contained a quantity of settlement rubbish and probably constitutes an easterly extension of prehistoric settlement previously identified to the west in 1996. A large ditch and bank at the northern part of the site may belong to an earlier phase of land division. Ancient stream courses

were also recognised.

2. INTRODUCTION

2.1 Background

Between August 5th and September 6th 1996 an archaeological evaluation was undertaken on the Sly - Mason fields at Welland Bank Quarry, Deeping St. James, Lincolnshire. This work was commissioned by Ennemix Construction Materials Limited and carried out by Archaeological Project Services. Archaeological evaluation of the area was required to assist the determination of a planning application for gravel extraction at the site. The investigation was carried out in accordance with a specification for works, produced by Archaeological Project Services. This specification was confirmed as satisfactory for planning requirements by the Archaeology Section, Lincolnshire County Council.

2.2 Site Location

Deeping St. James is situated approximately 13km east of Stamford and 16km southwest of Spalding (Fig. 1) in South Kesteven District, Lincolnshire. Welland Bank Quarry is located 3km southeast of the village of Deeping St. James on the north bank of the River Welland (National Grid Reference TF18350810). At this point, the river separates Lincolnshire on its northern bank, from the county of Cambridgeshire to the south.

Gravel has been extracted either side of the Spalding-Peterborough railway line within a block of land bordering a bend in the river Welland. Most of the extraction appears to have occurred prior to 1950 when the Ordnance Survey revised the maps of the area. Small scale extraction of the southeast corner of this block (known

as Welland Bank Quarry) took place in the 1980s and the present application represents an extension of that work.

2.3 Topography and Geology

The present investigation site, located at a height of *c.* 3m OD on relatively level land to the north of the existing quarry, is approximately 7 hectares in extent (Figs. 3 and 4). Local soils are Fladbury 1 association pelo-alluvial gley soils (Hodge *et al.* 1984, 194) developed on river terrace gravels. To the east the gravels shelf beneath fen deposits, initially a remnant surface peat then brackish marine silts and clays.

2.4 Archaeological Setting

Deeping St. James is located in an area of archaeological remains dating from the Middle Neolithic (*c.* 3500BC) through to recent times (Fig. 5). The area of proposed extraction is located on the northern flood plain of the Lower Welland Valley, recognised as one of the most important archaeological landscapes within the British Isles (Bradley 1984). As in other river valleys, most notably the upper Thames, the well-drained gravel terraces of the Welland have proved attractive for settlement throughout all archaeological periods. With almost exclusive use of the valley as arable land, the near complete pattern of millennia of cropmarks is visible from the air. Moreover, many of the gaps in the cropmarks only occur as a direct result of episodes of flooding of the main and sub-channels of the river, which caused alluvial deposition that has sealed tracts of the landscape. Beneath this alluvium lies archaeology relatively undisturbed by later cultivation or the erosive effects of weathering.

Prehistoric activity in the area surrounding Welland Bank is represented by artefact

scatters recovered from locations 2.5km to the north (South Kesteven District Council sites and monuments record number SK25.37) and *c.* 2.5km to the northwest (Lincolnshire County Council sites and monuments record number SMR33459).

Just southeast of the river, in Cambridgeshire, is a sub-circular enclosure known as the Borough Fen Ringwork. Recent work has demonstrated that the monument was in use during the 3rd-2nd centuries BC but may have been constructed at an earlier date (Malim and McKenna 1993). Just to the west of the monument lies a series of undated north-south aligned parallel ditches. These appear to have either defended or controlled access to the gravel promontory on which the town of Crowland is now situated.

Several important excavations have been undertaken in the area as part of the English Heritage funded Fenland Management Project. These include the Early Bronze Age round barrow at Deeping St Nicholas (FMP DEN 28) (French 1994), a multi-period prehistoric settlement site in Deeping St. James (FMP DEJ 4) (Lane 1993) and a Middle Iron Age and Roman settlement site in Market Deeping (FMP MAD 2) (Lane 1992). The early prehistoric ceremonial landscape in the Maxey area in Cambridgeshire, only 5km west of the Welland Bank site, is well documented (eg Pryor, *et al* 1985). Large scale excavation in the West Deeping area has revealed Middle and Late Bronze Age field systems, Romano-British and Iron Age settlement remains and a Roman villa. Recent plotting of aerial photographs by Roger Palmer shows the Welland Bank Quarry site to be located within a 1.7km long by 0.4km wide rectilinear field system, probably dating to the Late Bronze Age.

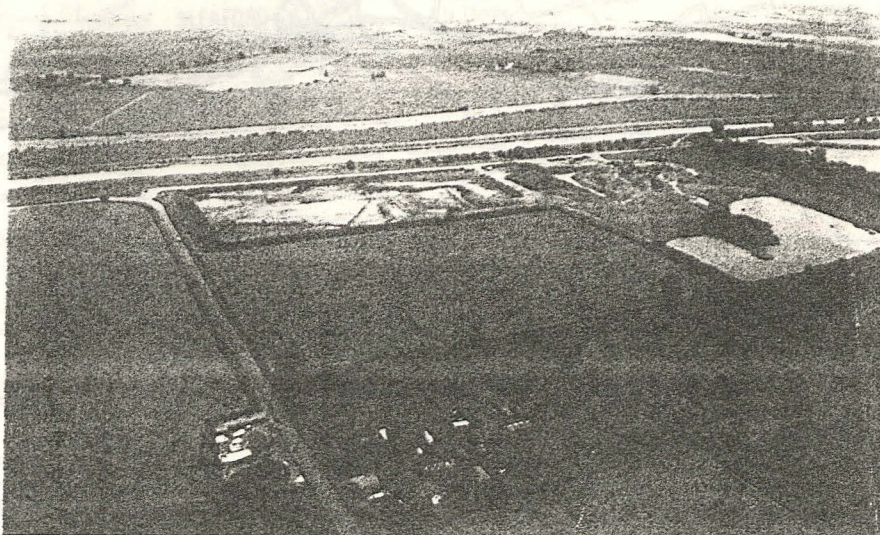


Plate 1

Welland Bank Quarry with adjacent cropmarks



Plate 2

Welland Bank Quarry with adjacent cropmarks

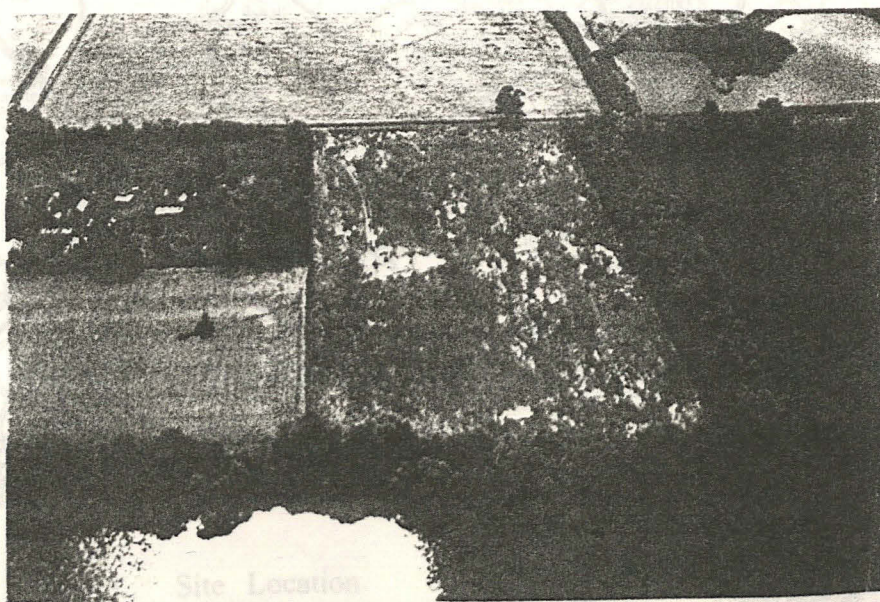


Plate 3

Welland Bank Quarry with adjacent cropmarks



Fig. 3 Site Location

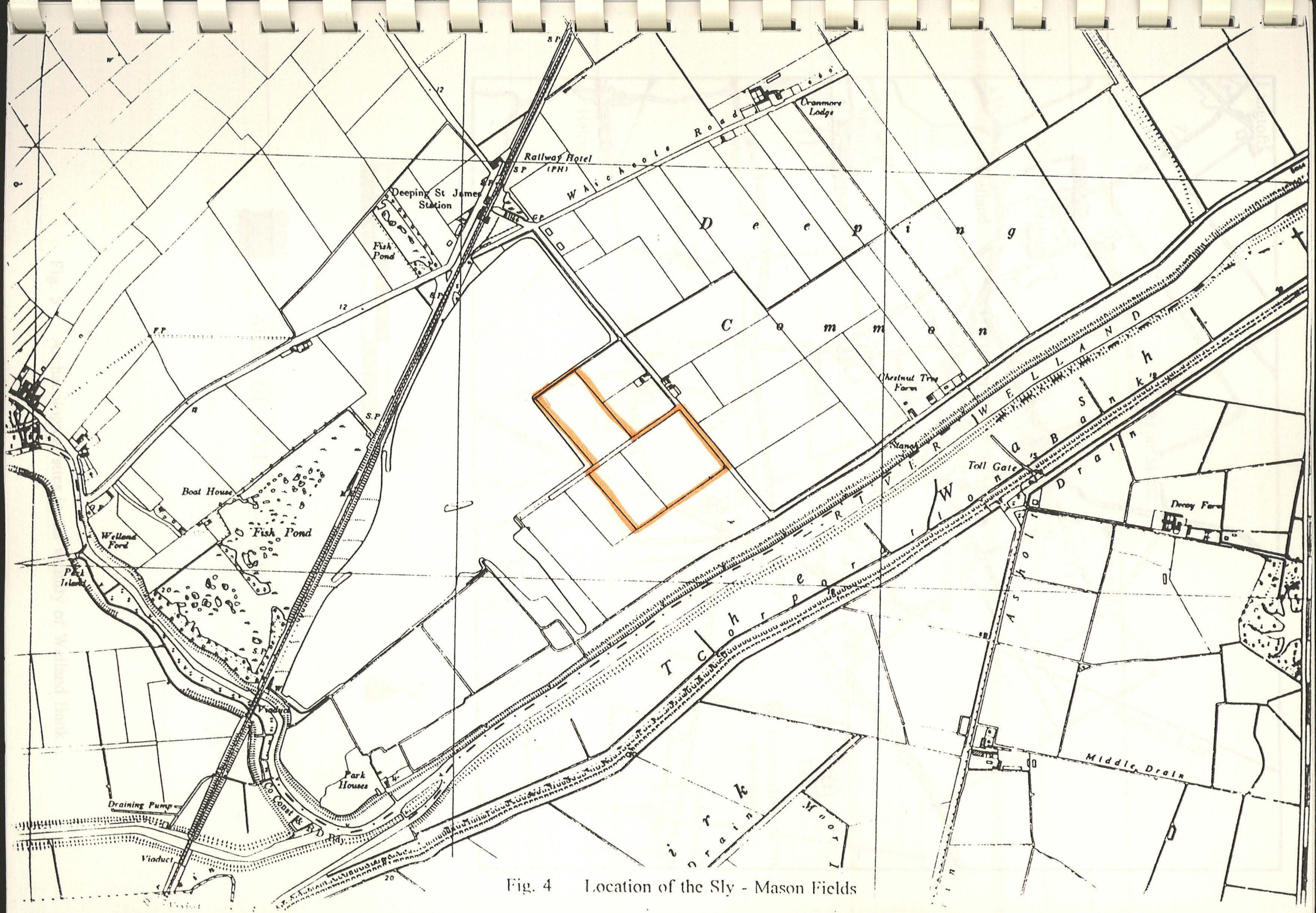
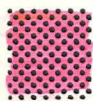
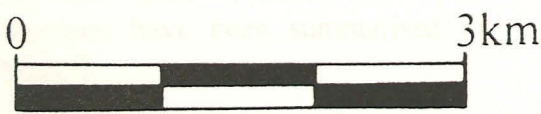
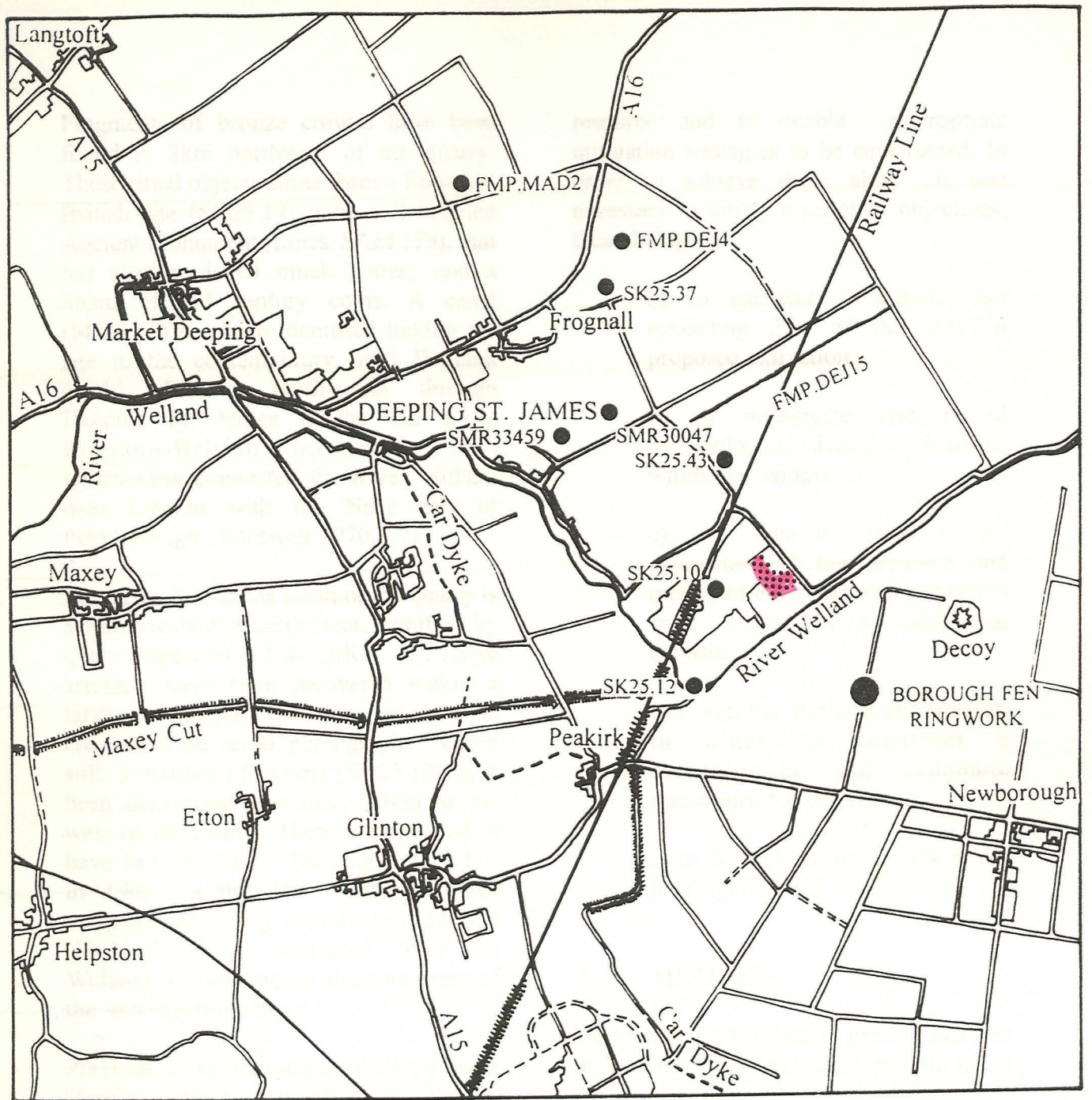


Fig. 4 Location of the Sly - Mason Fields



AREA OF INVESTIGATION

Fig. 5 Archaeological sites in the vicinity of Welland Bank

Fragments of bronze crowns have been found c. 2km northwest of the quarry. These ritual objects come from a Romano-British site (SK25.17), now a Scheduled Ancient Monument (Lincs. SAM 179), that has also produced much pottery and a hoard of 3rd century coins. A canal (SK25.46) has been identified linking the site to the contemporary 'mid Welland creek'. Passing north-south through Deeping St. James is the Car Dyke Romano-British waterway. This watercourse connected the River Witham near Lincoln with the Nene east of Peterborough (Whitwell 1970, 57).

Less than 2km to the north of the quarry is a Romano-British settlement, signified by quern fragments and tile (SK25.43). These artefacts have been recovered within a large rectangular enclosure evident as cropmarks on aerial photographs. Nearer still, a number of querns (SK25.10) have been discovered less than 0.5km to the west of the quarry. These are reported to have been found in 'Deeping Ballast Pit' in 1902. In the 18th century Roman weapons, including swords and daggers (SK25.12) were recovered from the Welland a kilometre to the southwest of the investigation site.

Previous investigations at Welland Bank Quarry have revealed postholes, representing timber structures or fences, ditches and pits. Results of these investigations have been summarised in Appendix 7.

3. AIMS

The aim of the investigation was to evaluate the archaeological resource of the site. The purpose is to provide the Local Planning Authority with the data necessary to make informed decisions on the impact of mineral extraction on the archaeological

resource and to enable appropriate mitigation strategies to be constructed. In order to achieve these aims it was necessary to satisfy a series of objectives, these being:

- a) to excavate a sample, not exceeding 2%, of the area of proposed extraction
- b) to investigate and record archaeological deposits identified within the sample
- c) to recover samples for assessment of the presence and quality of environmental indicators from within the archaeological deposits.
- d) to recover artefacts and ecofacts in order to construct a chronological and economic framework for the site
- c) to disseminate the results of the investigation and assessment.

4. METHODS

Given that the prehistoric ground surfaces at Welland Bank are buried beneath up to 0.5m of alluvium, the techniques of fieldwalking and geophysical survey would have been unlikely to yield information and, therefore, were not used. Normally cropmarks do not form on alluviated landscapes. However, two factors combined to create conditions favourable for cropmark formation in the rape crop on the Sly/Mason fields during the summer months. Added to the exceptionally dry summer the pumping away of ground water from the adjacent quarry further lowered the natural ground water levels in the Sly/Mason fields promoting cropmark formation over cut features.

These cropmarks were photographed from the air as stills in monochrome and colour and with a video recorder. The photographs were plotted at 1:2500 scale (Fig. 6). This enabled the precise targeting of selected features during field evaluation. The new data was added to the plot completed as part of the Royal Commission for Historical Monument's National Mapping Programme (Appendix 2).

Specifically positioned trenches formed only a small part of the evaluation strategy, the majority of the area being 5m by 5m standard test 'boxes' laid out on a 40m axially staggered grid (Fig. 7). This method enabled standardised coverage of 1.8% of the area. Linear trenches targeted on specific features made the area exposed up to the 2% standard recommended for field evaluations.

During excavation by machine of the 5m by 5m boxes (38 in total) the topsoil and alluvial cover was removed along with the buried prehistoric soil horizons over all but the one square metre at the southwest corner of each box. Here the buried soil was left *in situ* for later hand excavation to enable standardisation of finds retrieval. Results of the recovery of finds within the one metre squares appear as Figure 11. One c. 7 litre bag of the buried soil was also retrieved from each southwest corner for assessment of environmental indicators and their distribution across the site. As a system of ditches forming ancient fields was apparent from the aerial photography further samples were taken for phosphate analysis in order to assist in determining an arable or stock use for the fields. These phosphate samples have yet to be processed and are currently stored in the offices of Archaeological Project Services.

Once stripped of overburden the exposed surfaces of the Boxes were hoe cleaned

and a pre-excavation plan prepared at 1:20 scale. Hand excavation of a proportion of each feature-type was undertaken. Each archaeological feature or deposit was allocated a unique reference number (context number) and a *pro-forma* description sheet completed. A photographic record was compiled in both monochrome and colour.

Excavated features were recorded in plan at 1:20 and in section at 1:10. Bulk samples were taken from key deposits for analysis of plant macrofossils and charred plant material. Column samples were removed from the deeper sections for assessment of pollen preservation. A further column sample was taken through the best preserved buried soil horizon for micromorphological analysis. Sections of each box were also recorded at 1:10 to provide a full record of alluvial cover and palaeosol depth over the site.

5. ANALYSIS

Introduction

Finds recovered from the deposits identified during the investigations were examined and a period date assigned where possible. Records of the deposits investigated were also examined. Phasing was assigned based on artefact dating, and the nature of deposits and recognisable relationships between them.

5.1 STRATIGRAPHIC/STRUCTURAL

The Structural/Stratigraphic data from each Box and Trench are set out below:

BOX 1 -12.5/520
No archaeological deposits were present.

BOX 2 -35/480
A deposit of brownish grey clayey silt

(2039) was located at the northwest corner of the box. Extension of the trench established that the deposit was in a small pit or posthole (2075), 0.28m in diameter and 0.40m deep. This posthole/pit cut the south edge of an irregular east-west natural infilled creek (2129). The creek was also truncated by a 0.70m deep east-west ditch (2070).

BOX 3 010/480
No archaeological deposits were present.

BOX 4 -52.5/440
No archaeological deposits were present.

BOX 5 -12.5/440
No archaeological deposits were present.

BOX 6 -32.5/440 (Figs. 8 and 9)
The lower fills of a northeast-southwest aligned, flat-bottomed ditch (2062), 5m wide and 1.05m deep, consisted of coarse silty sand and silty clays. Above these, two silty clays with frequent wood and root fragments (2050, 2051) had formed and were sealed by a light grey-blue silty clay containing a fragment of pottery dated to the earlier part of the second millennium BC. The ditch truncated a natural channel (2190), 1.50m wide and 0.50m deep.

Parallel to the southern edge of the ditch was a gravel bank (2058), 0.35m high and 3m wide. Sealed beneath the bank was a palaeosol, 0.3m thick, and truncated by a northeast-southwest ditch (2189), 1.7m wide and 0.8m deep. The ditch was recut (2198). In turn, this ditch was cut by a northeast-south linear feature (2219), 0.35m deep and over 2m wide.

BOX 7 -35/400
An apparent continuation of the main ditch in Box 6 was recorded. Two palaeosol horizons (2086) and (2087), each 0.1m thick were sealed beneath bank deposits (2088 and 2094). These latter deposits

were truncated by a northeast-southwest ditch (2105), 1.70m wide and 0.80m deep. The palaeosols were truncated by a ditch (2106) that was not fully exposed within the Box but was at least 0.7m deep. Abutting the south edge of bank 2094 were three gravel deposits (20095, 2096 and 2099), 0.3m thick. Separating laterally gravel deposits (2095) and (2099) was a possible posthole (2108), 0.20m wide and 0.30m deep (Fig. 9). It is assumed from the pattern of deposition of the upcast gravel that the possible posthole formed some kind of revetment.

BOX 8 010/400
Two circular features (2029, 2223), both 0.22m diameter, were present. Neither were excavated but both have the appearance of postholes.

BOX 9 -12.5/360
No archaeological deposits were present.

BOX 10 32.5/360
No archaeological deposits were present.

BOX 11 -35/320
Three subcircular postholes formed a north-south alignment, 3m long. Posthole (2017) was 0.20m wide and 0.33m deep and contained dark reddish grey-black sandy clay with frequent charcoal (2018). Posthole (2019), 1.2m southwest of (2017), was 0.12m across and 0.14m deep. A further 1.40m to the south posthole (2021), 0.25m across, remained unexcavated.

BOX 12 010/320
An east-west, 0.4m wide gully (2041) was recorded in plan only. To the south, a second east-west gully (2046), 0.2m wide, terminated to the east. Near the terminal of 2056 was a possible posthole (2044), 0.3m by 0.2m, unexcavated. Two amorphous areas of charcoal-flecked grey-brown sandy

PLATE 4 WESTERN SIDE OF ENCLOSURE DITCH 2219 (looking south)



PLATE 5 LINEAR DITCH 2025 (looking south)



clay (2042, 2043) were also present, along with three ploughmarks, aligned northeast-southwest and northwest-southeast, cut into the gravels.

BOX 13 55/320

An east-west gully (2047), 0.40m wide, ran parallel to, and north of, the modern field access road. The feature was cut into the alluvium and was probably of recent origin.

BOX 14 100/320

An east-west gully (2064), 0.40m wide, 0.38m deep had been cut through the alluvium south of and parallel to the modern field access road. Probably modern.

BOX 15 145/320

Cutting into the gravel was a series of ploughmarks, 20mm wide and of various lengths. Most were aligned northeast-southwest but some northwest-southeast and north-south.

BOX 16 193/20

Cutting into the gravel was a series of ploughmarks, aligned northeast-southwest.

BOX 17 -12.5/280

Cutting into the gravel was a series of ploughmarks, aligned northwest-southeast. Only present in the eastern part of trench.

BOX 18 32.5/280

No archaeological features were identified.

BOX 19 77.5/280

Several north-south ploughmarks, cut into the gravel.

BOX 20 122.5/280

Four northwest-southeast ploughmarks, cut into the gravel.

BOX 21 167.5/280

No archaeological features were identified.

BOX 22 190/240

No archaeological features were identified.

BOX 23 145/240

Three possible postholes (2232, 2238, 2239) were recorded on a general northeast-southwest alignment, 1.8m long. The postholes, 0.2m - 0.3m across, are all unexcavated. The most southerly posthole (2239) is truncated by a northwest-southeast linear feature (2240), 0.7m wide, recorded only in plan. Also present were several ploughmarks.

BOX 24 110/220

Seven probable postholes, ranging in diameter between 0.12m and 0.31m, were recorded in plan. No distinct pattern was discerned but most were concentrated in the western part of the trench. Additionally, cutting the gravel, were several ploughmarks, average width 50mm and aligned mainly northwest-southeast.

BOX 25 055/240

A circular pit-like feature (2224), 1.80m in diameter, was recorded only in plan. Several amorphous deposits were observed but none excavated. Also, four north-south and two east-west ploughmarks, 20-40mm wide, cut the gravel.

BOX 26 10/240

Six northwest-southeast ploughmarks, cutting the gravel, along with a possible posthole (2241), 0.5m across, unexcavated.

BOX 27 -35/241

Several north-south and northeast-southwest ploughmarks, cut the gravel. Also one northwest-southeast ploughmark.

BOX 28 -125/200

An apparently circular feature (2234), 1.8m wide and possibly a pit or ditch terminal, remained unexcavated.

BOX 29 32.5/200

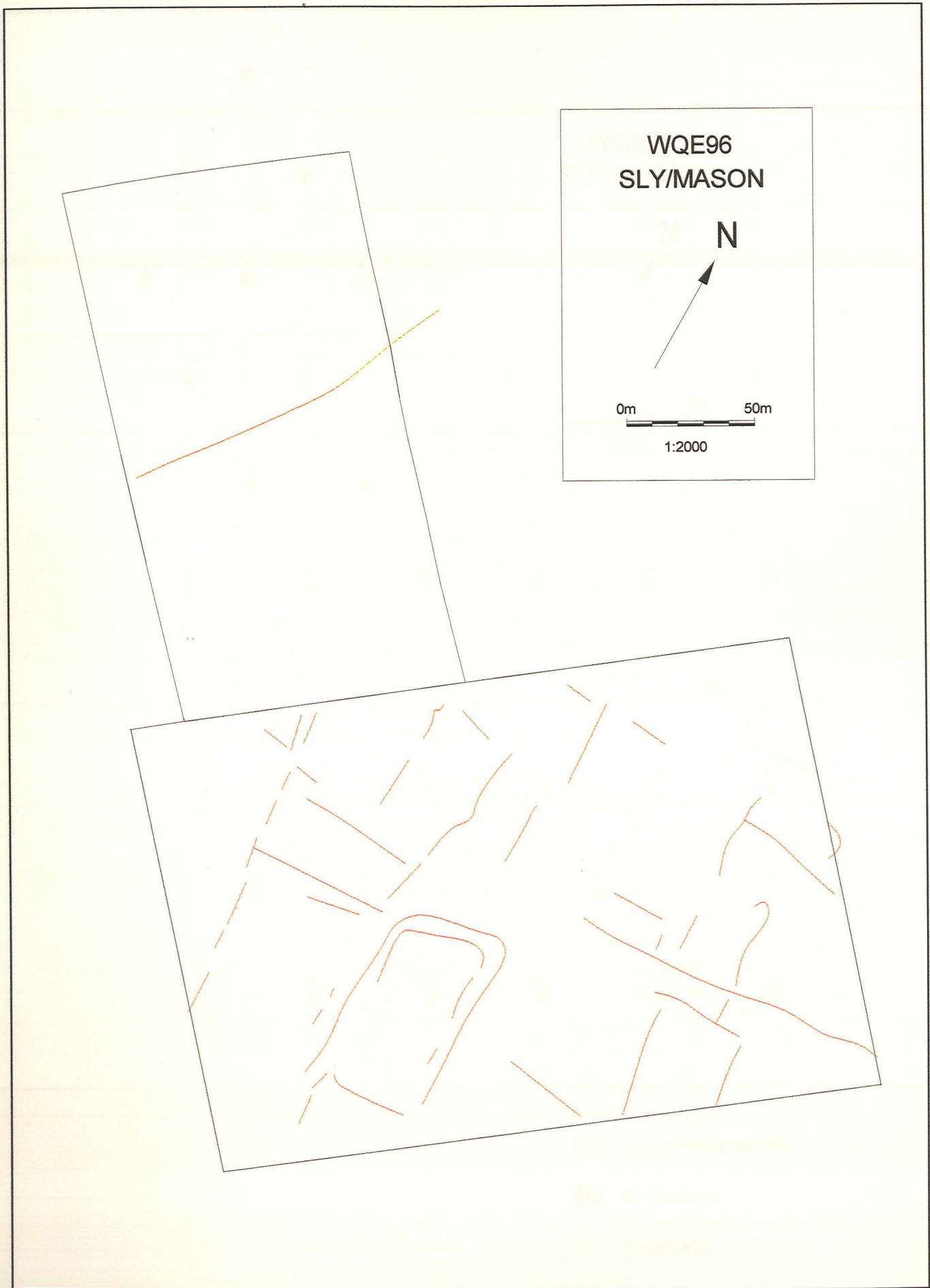


Figure 6 Crop Marks on the Sly/Mason Fields

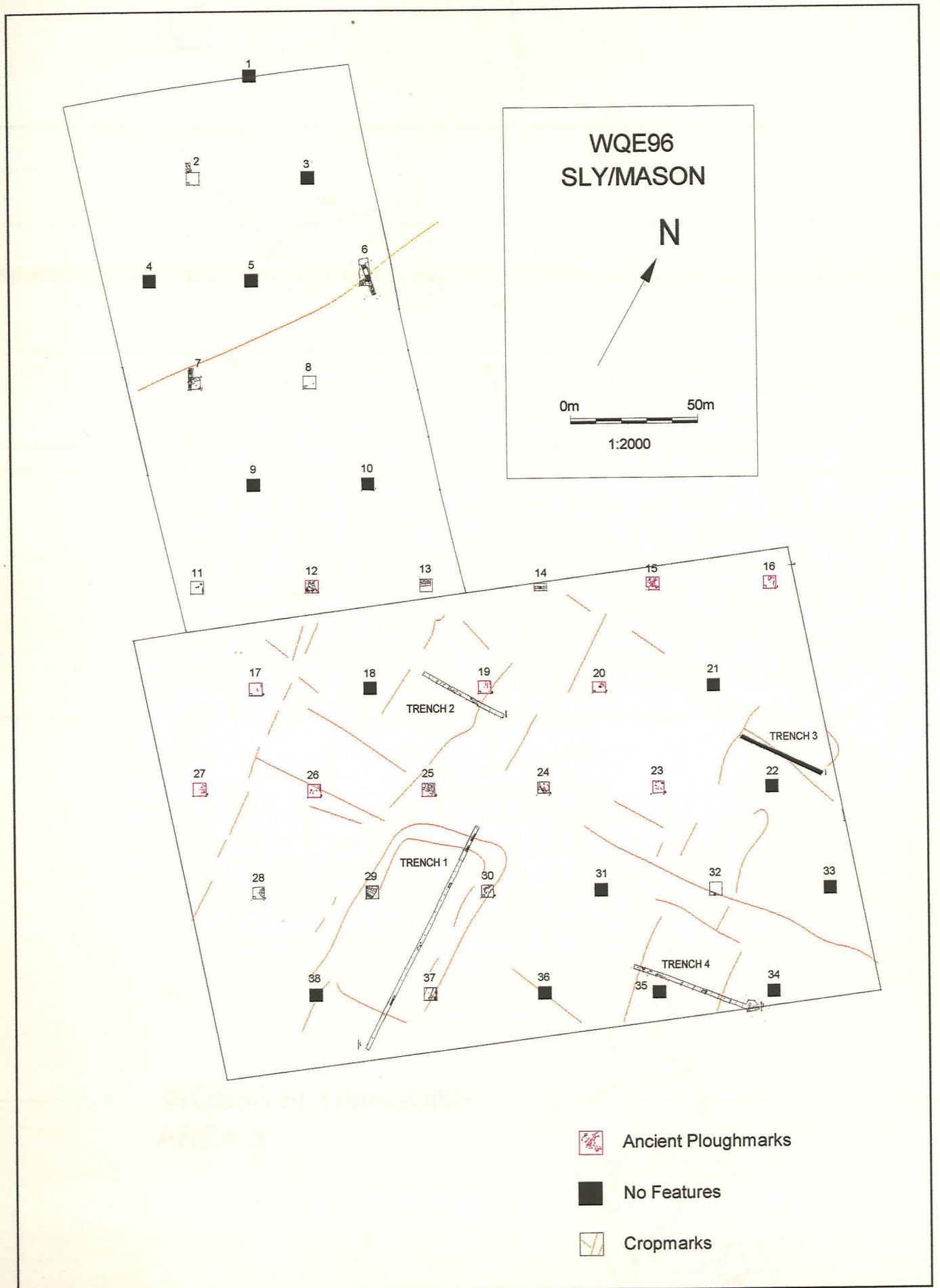
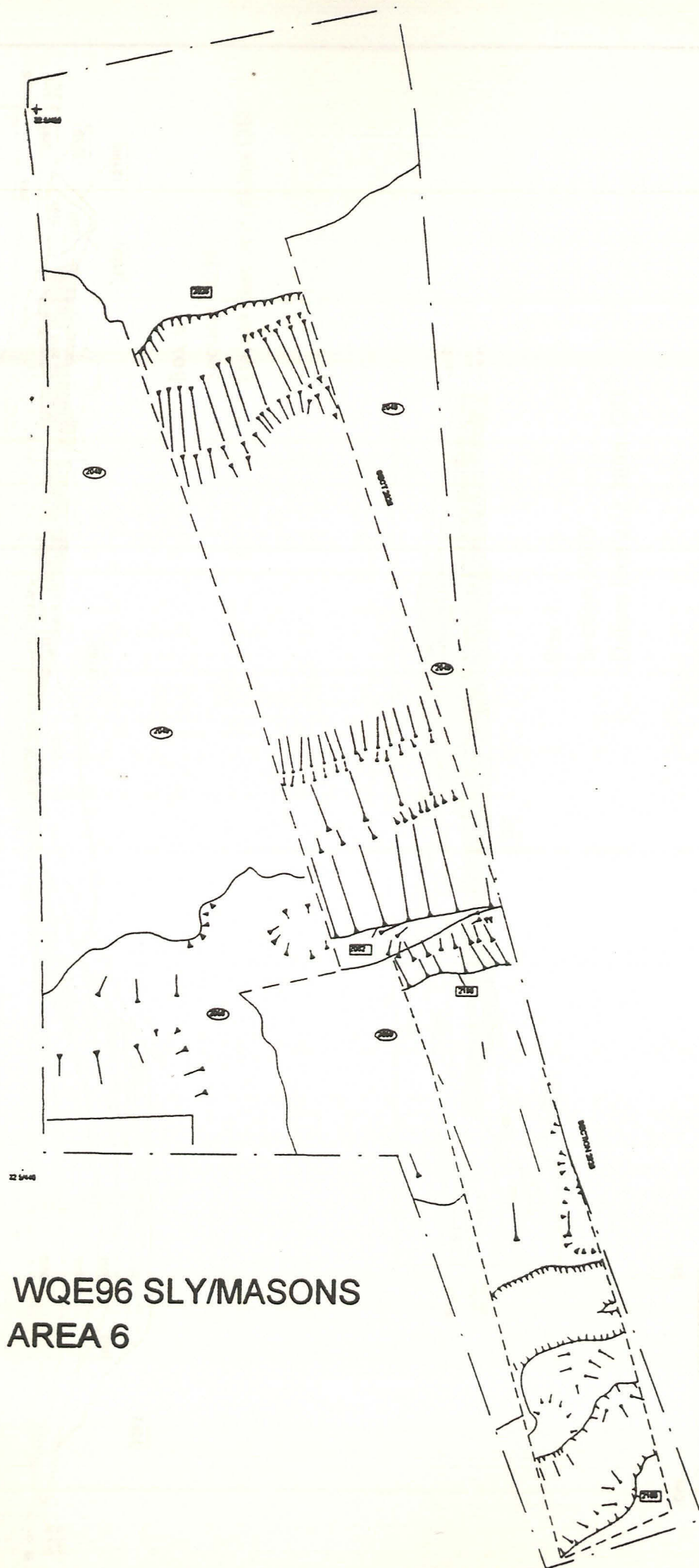


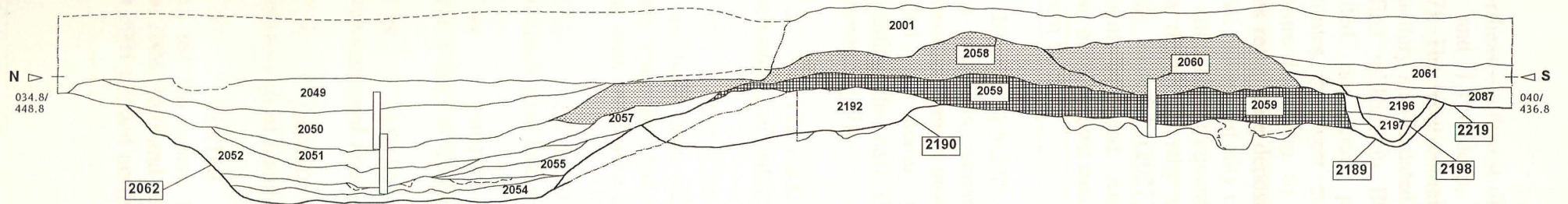
Figure 7 Location of Excavated Boxes and Trenches

Fig. 8 Box 6. Plan of excavated features

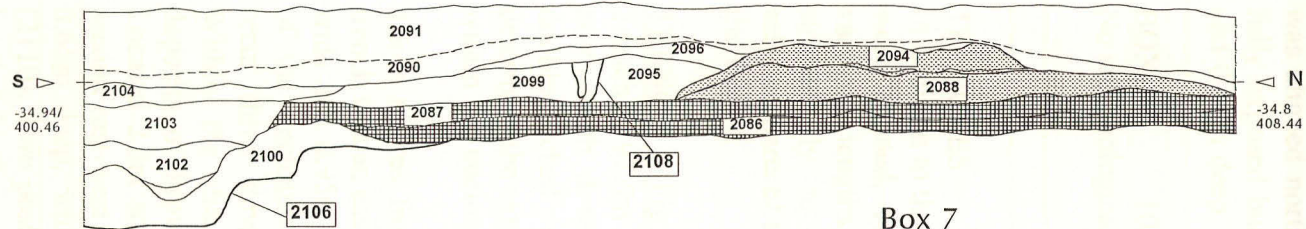


**WQE96 SLY/MASONS
AREA 6**

Fig. 8 Box 6. Plan of excavated features



Box 6
 Section 2026
 Datum Line at 2.313m OD



Box 7
 Section 2049
 Datum Line at 2.388m OD



Scale 1:50

Figure 9 Sections Through Northern Ditch in Boxes 6 and 7

A northeast-southwest ditch (2025), 3.5m wide and 1.1m deep, had been recut (2037). The recut contained animal bone and pottery sherds dated to the middle of the first millennium BC. The ditch is recorded on aerial photographs and constitutes the west side of the main enclosure ditch (Fig. 6). Filling the ditch and its recut were deposits of grey-brown organic matter and silty clay (2027, 2038), both containing frequent charcoal flecks, and a red-brown silty sand (2031). The organic material (2027) also contained fragments of wood. Above these was a deposit of red-brown sandy clay (2026), up to 15cm thick.

BOX 30 71.5/200

Mixed materials, apparently ditch fill, unexcavated. Trench positioned over ditch recorded on aerial photograph and representing the east side of the main enclosure (Fig. 7).

BOX 31 122.5/200

No archaeological features were identified

BOX 32 167.5/200

An east-west ditch (2014), was only partially excavated but measured at least 0.70m wide and 0.40m deep.

BOX 33 212.5/200

No archaeological features were identified

BOX 34 190/160

No archaeological features were identified

BOX 35 145/160

No archaeological features were identified

BOX 36 100/160

No archaeological features were identified

BOX 37 055/160

Within the 5m square Box four ditches (2004, 2006, 2007 and 2009) were present. Ditch 2004 aligned north-south, 2m wide,

was unexcavated. It is most probably that recorded on aerial photographs and representing the east side of the main enclosure. Parallel to 2004 and 2m to the east was ditch 2006, 0.45m wide and also unexcavated. Truncating 2006 was a third ditch (2007), 1.9m wide and aligned west-east. Ditch 2009, which truncated 2007 and was aligned northwest-southeast, was not fully exposed but was at least 0.2m wide and 0.15m deep.

BOX 38 10/160

No archaeological features were identified.

TRENCHES

In addition to the 38 Boxes, four Trenches were opened, each 1.5m wide and of varying lengths. These were located strategically to investigate more fully selected parts of the site and to supplement the Boxes.

TRENCH 1 (Fig. 10)

Trench 1, 97.0m in length, was positioned north-south down the centre of a large double-ditched enclosure in order to determine the extent and quality of features within the enclosure.

Three metres from the north end of the trench was an east-west ditch (2151), 3.6m wide and 0.95m deep (the northern ditch of the enclosure). This ditch had been recut three times (2152, 2126, 2122). Within the ditch and its recuts were deposits of brown and grey silty clays. Located 2.3m south of ditch 2151 was a second east-west ditch (2112), 2m wide by 0.65m deep, which had also been recut (2110). Two postholes (2114, 2133) were located in the same area. Posthole 2133 was on the southern edge of ditch (2112) and posthole 2114 truncated the ditch recut (2110).

WQE96
SLY/MASON

N



29

TRENCH 1



30

38



37



0m 10m

Figure 10 Location of Trench 1 Through Main Enclosure

Approximately 12m south of the postholes and within the enclosure was an east-west ditch (2132), 1.85m wide and 0.42m deep. Above the ditch fills was a palaeosol 70mm deep. This was truncated by a gully (2139), 1.15m wide and 0.33m deep.

Twenty-five metres south of the ditch 2132 were four oval features, probable postholes (2177, 2179, 2145, 2149). These were between 0.23m-0.36m wide and from 0.15m to 0.36m deep. Posthole 2145 truncates a possible posthole (2053), 60mm wide and 80mm deep. This feature was also truncated by gully (2141), 0.65m wide by 0.27m deep. The gully also cuts a 0.20m deep palaeosol.

Located 20m south of these postholes was east-west ditch (2155), 2.80m wide and 1.20m deep, with multiple recuts. Above the sandy silts that filled the lower part of the ditch was an organic peaty deposit (2119).

TRENCH 2

Located north of Trench 1 and 35m in length by 1.5m wide, this trench contained a number of amorphous features of sandy silts, none of which were excavated.

TRENCH 3.

Sited at the east end of the excavation Trench 3 was 35m long by 1.5m wide; no archaeological features were identified.

TRENCH 4.

Eighty metres east of Trench 1, Trench 4, 51m long, was positioned to investigate two southwest - northeast aligned linear features identified from aerial photographs. The trench was enlarged at its eastern end to investigate a corner of a gully (2221).

The east-west gully (2221) extended westward for 3.90m before turning south and continuing to the southern limit of excavation. 7.30m west of 2221 was a

north-south gully (2231), 0.30m wide and with a butt-end to the south.

9.30m west of 2231 was north-south gully (2247), 0.66m wide and 0.37m deep. It truncated an amorphous feature (2235) 0.65m long and 0.50m wide. From the southwest corner of this feature a linear gully (2236), 0.30m wide continued south to the trench section.

Six amorphous features were identified along the length of the trench. 23m west of gully (2236), was the apparent butt-end of a 1m wide ditch or gully (2237), unexcavated. This feature had the same location and alignment as a linear cropmark evident on aerial photographs.

DISCUSSION

The earliest deposits encountered were natural sands and gravels which extended across the entire investigation area. Covering most of the natural sands and gravels was a palaeosol (ancient topsoil) up to 0.3m thick. Animal bone and pottery fragments dating to the middle of the first millennium B.C. were recovered from the palaeosol. These palaeosols were protected by a deposit of freshwater alluvium up to 0.5m thick, the top c.0.3-4 metres of which constituted the modern plough soil.

Across the northern part of the area investigated lay a large northeast-southwest aligned ditch and bank, with a combined width of 8m. A posthole in the outer edge of the bank may signify that the presence of a revetment. The associated ditch probably fell into disuse, with some bank material slumping back into the ditch. Vegetation became established in the partially infilled ditch but this plant growth was terminated by natural silting. A fragment of pottery of early second millennium BC date may suggest the period of this silting, with the implication

that the initial cutting of that ditch must be earlier. Supporting this suggestion is evidence from aerial photography and the other trial trenches. Encompassing the site is a complex of cropmarks recorded on aerial photographs. These cropmarks signal the positions of buried linear and rectilinear features over an area approximately 1.7km by 0.4km. The major ditch and bank across the northern part of the site is amongst the features evident as a cropmark and is oriented northeast-southwest. This alignment of the major bank and ditch is at variance with virtually all other linear cropmark elements within the complex, which are oriented approximately north-south and east-west. The difference of alignment may imply that this northern ditch and bank was constructed at a different date to the other linear archaeological features in the complex. Several of the north-south and east-west cropmarks appearing within the trial trenches and were found to contain pottery dating from the Late Bronze Age - Early Iron Age through to about the 5th-4th century BC. However, a single sherd of 'scored ware' from a recut within the main enclosure ditch hints at a 'later continuation in at least part of the site. From these dates it can be seen that the major ditch across the northern part of the site probably pre-dates much of the cropmark complex and archaeological remains to the south.

No cropmarks were evident for a distance of 100m south of the major ditch. Within this blank zone post holes and east-west aligned gullies were encountered. The postholes perhaps signify the location of timber structures and the presence of habitation. Within this area Boxes 9 and 12 (Fig. 8) yielded comparatively abundant quantities of pottery of Late Bronze Age-early Iron Age date, bone and burnt stone. Previous investigations immediately to the west of the Sly Mason fields had identified

at least two post-built roundhouses along with deep pits (Trimble, Appendix 7). It would appear likely, therefore, that the apparent occupation remains identified in the west-central part of the present investigation form part of an easterly extension of the habitation area examined previously.

South of this apparent habitation area cropmarks were evident and form rectilinear patterns based on north-south and east-west alignments. The arrangement of cropmarks would suggest that they represent a system of fields, though a rectangular enclosure, approximately 80m by 45m in extent, is clearly defined within the area (Plate 6) and may have had an alternative function. Finds were again comparatively numerous in Boxes 29 and 38, in and over the western ditch of the enclosure and in the apparent 'entrance' at the southwest corner.

Several of the gullies and ditches which constituted the boundaries of these fields were recorded. Little occupation debris was recovered from these features, perhaps emphasising the non-habitation nature of these remains. However, a small quantity of artefacts, including the largest collection of burnt stones, was recovered from the northeast corner of the site. The presence of this material may indicate the proximity of further habitation remains, possibly cooking areas or a 'burnt mound', just to the northeast.

The excavation identified the double ditches that form the northern limit of the main enclosure. Both ditches had been recut, indicating extended use and maintenance. Pottery dated to the Late Bronze Age-early Iron Age transition was recovered from the recut ditches. This material supported the evidence recovered from the northern boundary that the enclosure was in use at this period. A

quantity of mixed occupation debris was also recovered from the inner boundary ditch on the west side of the enclosure. Postholes on the inner edge of the most southerly ditch may suggest that the enclosure boundary also incorporated a fence or palisade.

Approximately 15m south of, and parallel to, the northern boundary of the enclosure was a ditch or gully. This feature, which was not evident on aerial photographs, may have served as an internal boundary within the enclosure. This ditch became redundant and was partially filled, subsequent to a soil developing in the feature. However, the line was later re-established by the cutting of a shallow gully.

A group of postholes near the centre of the enclosure may signify the presence of timber structural remains. Some suggestion of structural repair and refurbishment was provided by apparent posthole replacement.

Cropmark evidence indicates that the western, outer boundary ditch of the enclosure extends southward beyond the line of the southern limit of the compound. Parallel to and 7m east of the extended western ditch is a further linear cropmark, probably formed by a buried ditch. The arrangement of these cropmarks perhaps suggest that the enclosure had an entrance at its southwest corner.

Ancient ploughmarks were extensive in the area within the field system outside the enclosure. The alignments of the ploughmarks were variable, though generally corresponded to the surrounding ancient field boundaries. These ploughmarks indicate that arable agriculture was a component of the settlement economy and wheat and barley grains recovered during the investigation (albeit in small quantities) suggest that these crops were grown. However, it is

unclear whether the varied orientations of the marks represent an extended period of arable or a vigorous episode of sod-busting. It is perhaps significant that the ploughmarks were only identified within 160m of the enclosure and were not evident beyond this, though the investigation extended to over 300m from the enclosure. This may imply that arable activities were concentrated in the 'in-field' close to the settlement focus with, perhaps, pasturage beyond. Certainly, some of the fields from the excavated area to the south had the corner entrances typical of a stock control function (Pryor, *pers. comm.*). Analysis of the animal bones recovered from the excavations in the field to the west are also indicative of a pastoral based economy (Rackham 1996)

5.2 The Artefacts

Introduction

Two artefact types, ceramics and lithics were recovered at the Sly Mason fields at Welland Bank.

Ceramics

In total, some 87 sherds of prehistoric pottery were recovered. Only one sherd was entirely unstratified, although a number came from excavation of the buried soil in the one metre square boxes.

All but one sherd displayed characteristics of the Late Bronze Age/Early Iron Age pottery common elsewhere at Welland Bank. One sherd, however, was 'scored ware', the distinctive pottery found commonly in the East Midlands but not closely dateable within the fifth century BC - first century BC/AD parameters. Despite the imprecision of the date the sherd does hint at activity continuing later into the Iron Age than previously encountered at Welland Bank .

The pottery was distributed throughout the

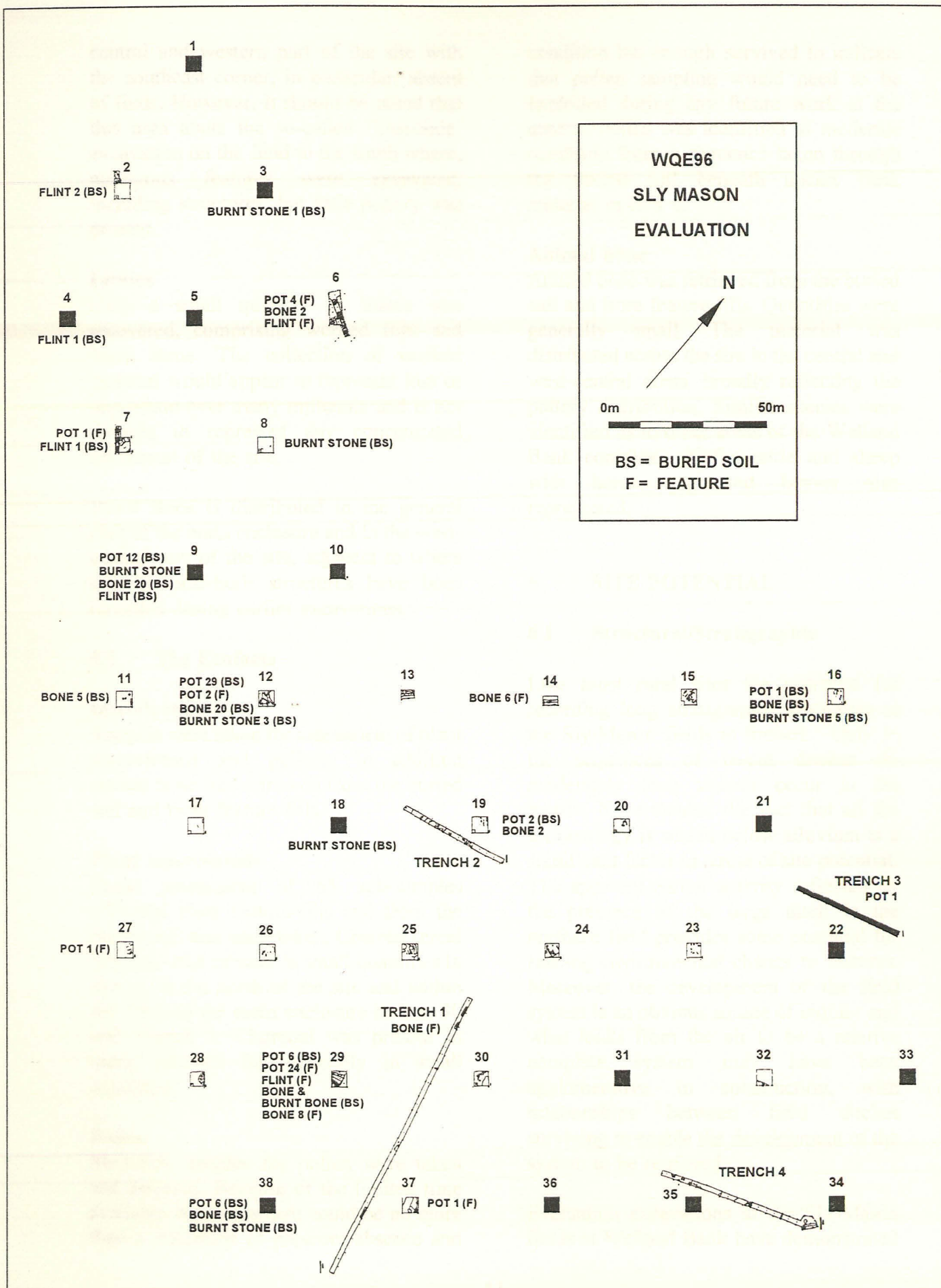


Figure 11 Location of Finds from the Excavations

central and western part of the site with the southeast corner, in particular, absent of finds. However, it should be noted that this area abuts the so-called 'East-Side' excavation on the field to the south where, numerous features were excavated, including structures, but little pottery was present.

Lithics

Only a small quantity of lithics was recovered, comprising worked flint and burnt stone. The collection of worked material would appear to represent loss or deposition over many millennia and is not thought to represent any concentrated settlement of the site.

Burnt stone is distributed in the general area of the main enclosure and in the west-central part of the site, adjacent to where circular post-built structures have been recorded during earlier excavations.

5.3 The Ecofacts

Introduction

Samples were taken for assessment of plant macrofossils and pollens. In addition animal bone was retrieved from the buried soil and from feature fills.

Plant macrofossils

Rapid assessment of 65 sub-samples collected from feature-fills and from the buried soil was undertaken. Charred cereal remains were present in small quantities in Box 3, at the north of the site and within the ditch of the main enclosure in Box 30 and Trench 1. Charcoal was present in many contexts but generally in small quantities.

Pollen

Monolith samples for pollen were taken and assessed. Because of the limited time available the assessment could be no more than a statement of presence/absence and

condition but enough survived to indicate that pollen sampling would need to be exploited during any future work at the quarry. Pollen was identified in moderate condition from a sequence taken through the buried soil beneath upcast bank material in Box 6.

Animal bone

Animal bone was retrieved from the buried soil and from feature fills. Quantities were generally small. The material was distributed across the site in the central and west-central areas, broadly reflecting the pottery distribution. Similar species were identified as in other areas of the Welland Bank complex, chiefly cattle and sheep with horse, pig and beaver also represented.

6 SITE POTENTIAL

6.1 Structural/Stratigraphic

Like most rural sites the potential for recording long stratigraphic sequences at the Sly/Mason fields is limited. Only in the sequences of re-cut ditches do moderately long strands occur in the matrix. Nevertheless, the fact that all the archaeology is sealed below alluvium is a significant factor in terms of site potential. The apparent earlier activity reflected by the presence of the large ditch in the northern field provides some potential for relating environmental change to features. Moreover, the development of the field system is an obvious source of inquiry and what looks from the air to be a relative complete system may have been agglomerative in construction, with relationships between field ditches surviving to enable the development of the system to be retrieved .

Evaluation excavations at the Sly-Mason fields at Welland Bank have demonstrated

the presence of a well-sealed and protected sequence of Late Bronze Age - Early Iron Age deposits. These remains represent settlement and associated field systems. Although they generally cannot be dated or interpreted, ancient field systems have been recognised as vitally important for the development of any coherent view of landscape archaeology (English Heritage 1991, 38). The Sly-Mason fields have been found to contain a rare example of an ancient field system that is clearly associated with a dated settlement. Moreover, structural evidence, in the form of ploughmarks, permits an interpretation that at least some of the fields served an arable usage. Integration of the stratigraphic/structural elements of the site with the environmental evidence has the potential to define what crops were cultivated in the fields and thereby considerably enhance our knowledge of this type of site.

The settlement and associated remains at the Sly-Mason fields belong to one of the principal periods of changing patterns of land exploitation in British (pre)history. Between c. 1300-300 BC, there was a gradual development from a landscape dominated by burial mounds and ceremonial structures, to one where settlements predominated. Factors behind the process are not fully understood, although it was clearly far from a uniform or synchronous event across Britain (*ibid.* 36). The archaeological deposits and remains at Welland Bank have the potential to assist with the comprehension of the mechanisms and results of this changing pattern of land use on a regional level.

6.2 The Artefacts

Ceramics

The pottery represents an important collection, given the general rarity of

ceramics of the period. Evidence from excavation, both at Sly/Mason and the adjacent fields, confirms that the pottery is directly associated with features, thereby enhancing its research value. A large number of sherds have now been retrieved from the various excavations at Welland Bank. Together, the size of the overall assemblage, the variety of forms and functional-types present, the fact that it is from systematically excavated contexts (as opposed to being an unstratified surface collection) and the associations of the assemblage with other types of evidence (bones, environmental indicators) single out the assemblage as one of the most important in the region for retrieving data on chronology, typology, fabric-types and trading links

Fragments of briquetage, low-quality ceramic used in salt-making, have previously been found at the Welland Bank site. The material probably indicates that the prehistoric settlement at Welland Bank was involved in the industrial process of salt-making. Such early examples of industrial activity have been recognised as of particular importance, especially when associated with contemporary settlement (English Heritage 1991, 46). Moreover, the main industrial process may often have related, service activities. In particular reference to salt extraction, some degree of water management may be expected. Such patterns of activity have also been recognised as of importance in the understanding of the development of water technology and river valley exploitation (*ibid.*). There is the potential for the existence of evidence of water management at Welland Bank, and this would be particularly significant because of its early date.

Lithics

Quantities of worked flint at Welland Bank have generally been insignificant, even in

areas such as the 'Southeast' excavation in the field to the south, where features dating to the Late Neolithic/Early Bronze Age (a period when lithic assemblages are typically large) were identified. Usually by the Late Bronze Age/Early Iron Age flint is a little-used material and this is reflected in the minimal collections made so far.

The burnt stone is typically found on prehistoric sites where it was used for heating water, cooking and, no doubt, numerous industrial purposes.

6.3 The Ecofacts

Plant macrofossils

Pollen

The survival of pollen is important in understanding the economy and agricultural activities of the site. The presence of plough marks within the ditched 'fields' hints at an arable component and the examination of sections of field ditches for pollen 'rain' might identify the crops grown. Similarly, if the fields are stock enclosures, as might be suggested from the animal bone assemblage from Welland Bank as a whole, the pollen might confirm such use. Constant low-level drainage is required in the adjacent fields to enable extraction and the long-term survival of fragile ecofacts such as pollen grains must be considered doubtful.

Animal bone

Overall, the assemblage from Welland Bank will prove to be an important regional collection which will add to discussion of the economy of this site and fen-edge communities in general.

7. ASSESSMENT OF SIGNIFICANCE

It is considered appropriate that some

comment be made on the perceived significance and potential of site subjected to evaluation. The archaeology of the Sly Mason land is considered under the criteria used for assessing the importance of ancient monuments in *Archaeology and Planning*, DoE Planning Policy Guidance Note 16, issued in November 1990.

i *Period*

Evidence from excavations in the adjacent quarries suggest that the archaeology, in particular the field system, dates almost exclusively to the early-middle part of the first millennium BC, the late Bronze Age - Early Iron Age transition. However, in the quarry to the south, some features appeared to be of second millennium BC date, but little artefactual material was present to confirm this. During the Sly/Mason evaluation, sherds of 'scored ware' were found, the first time that such sherds have been located at Welland Bank. Typically, scored wares date to the latter part of the first millennium BC but appear to have been used over a long time span, from the 5th-4th centuries BC into the first part of the first century AD (see Knight, Appendix 3). This type of pottery, however, was not common at Sly/Mason and, in any case, may date to the earlier part of its period of use, maintaining a general Late Bronze Age/ Early Iron Age date for the site. Sparse lithic artefacts in the Sly/Mason fields also suggest a low-level Late Neolithic-Early Bronze Age presence.

ii *Rarity*

Because of the problems in site detection it is rare to discover sites of any period under alluvial cover. Moreover, the late Bronze Age-Early Iron Age transition is a poorly understood period nationally, due to the paucity of known sites. Within the excavated areas adjacent to Sly/Mason fields are elements of prehistoric settlement which are themselves rare, for instance, the apparently flimsy structure on the field

south of the evaluation. This structure would not have survived at all had not that area been subjected to the same protective alluvial cover as affected Sly/Mason. The Sly/Mason field offers a rare opportunity to retrieve the true spatial arrangement of a prehistoric site, its structures, both permanent and temporary, its fields and its communication links. Excavation in the field to the south has provided evidence of specific Late Bronze Age activities, such as the two sets of cart tracks, one leading to a structure, which are thought to be unique in Britain. Potentially, such slight features could also be present on the Sly/Mason land. The field to the west also produced waterlogged worked timbers and, whilst the constant pumping away of ground water in the quarries will have diminished the quality of the environmental indicators in Sly/Mason, the probability remains of a good environmental record being preserved at the site. Furthermore, the discovery of ceramics used in salt production on the quarry site is another rare facet of the local archaeology.

iii *Documentation*

Archaeological excavation on the fields to the south and southwest will have provided a good record of both the structural and artefactual/ecofactual aspects of the site once analysis is complete. To that record the remarkably complete picture of the fields from the air, in total extending for around 1.5km, will add a broader, landscape dimension. On a sub-regional level the surveys conducted as part of the Fenland Project and the varied surveys and excavations previously conducted in the Welland valley will provide a context and a setting for the site, its activities and environment. Therefore, overall, the documentation of the site is extremely full.

iv *Group value*

The grouping of the occupation areas and

the fields at Welland Bank provides a fine opportunity to study the inter-relatedness of the two and possibly to make statements on the farming methods of the Bronze Age. Even within the field systems shown on Figure 11 there are differences. The southern system, in Borough Fen, parallels that found at West Deeping, 6km to the west in the Welland valley, but is different in morphology to the system at Welland Bank. Is the difference chronological or functional? Moreover, what is the role of the Borough Fen ringwork which separates the two systems? The monument is dated currently to the early Iron Age, but few investigations have been made and its genesis may be slightly earlier. One final comment on group value is to emphasise the above statements regarding the amount of work previously undertaken in the general area of the lower Welland valley. As a group the varied and abundant sites of the Welland valley provide a detailed window on British prehistory.

v *Survival/condition*

Perhaps the most crucial aspect of the archaeology on this site is survival/condition. Whilst some elements of the overall condition may have deteriorated in the past months, namely the environmental indicators, which will have suffered from the adjacent de-watering, alluvial cover, probably deposited in the late Roman period, has protected the prehistoric surface from attrition and erosion, be it natural (weathering) or agricultural. Survival of prehistoric plough marks is a rarity (little over a hundred sites known from the whole of Europe [Fowler 1983, 113]). These indicators of prehistoric farming (and economy) were moderately common on the excavations to the south and present in 11 (29%) of the boxes excavated at Sly/Mason. That these slight features are preserved indicates the potential for further structural nuances -eg the cart tracks and flimsy structures.

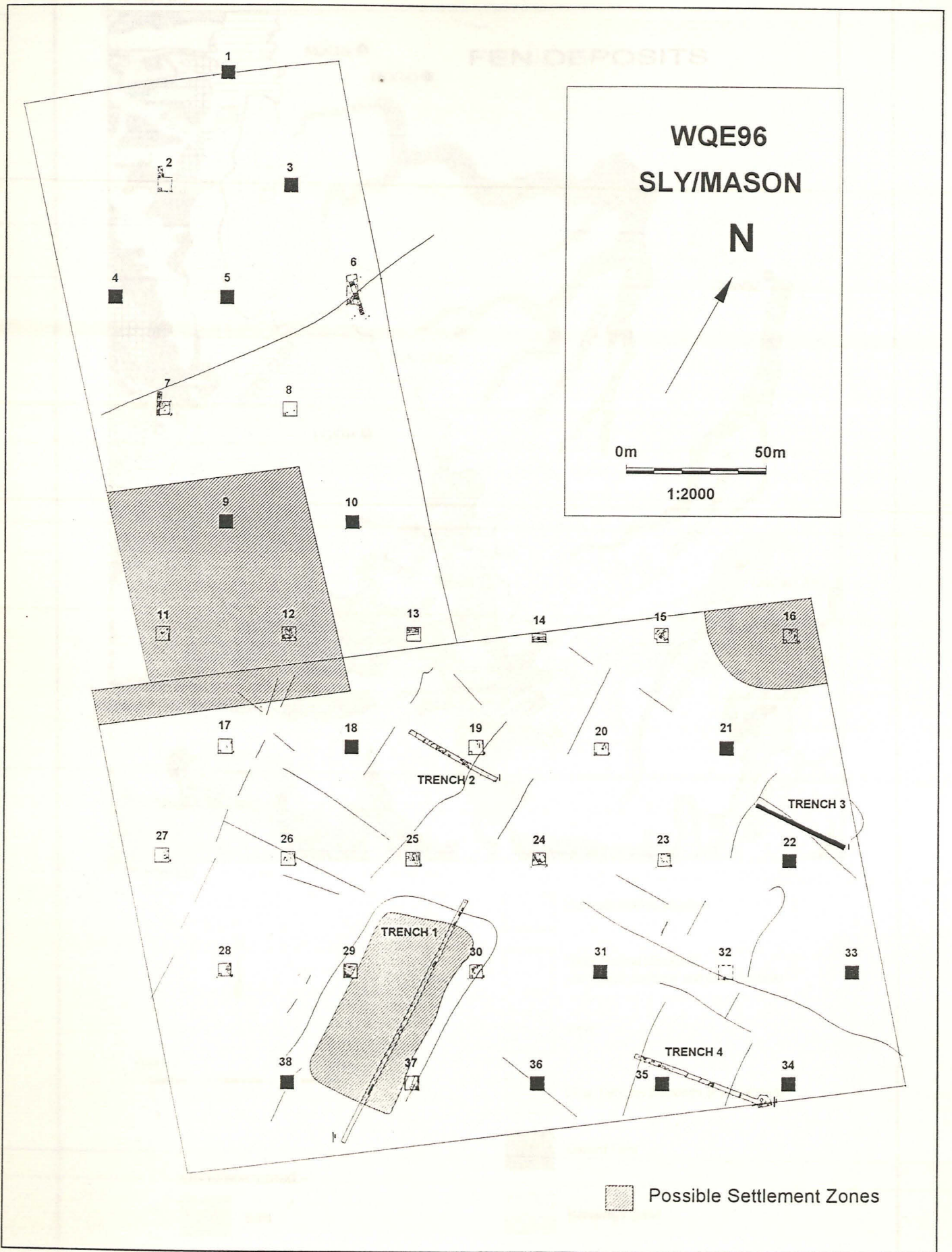


Figure 12 Possible Settlement Zones within Sly-Mason

Figure 13 Location of Crop Marks in the Contemporary Landscape

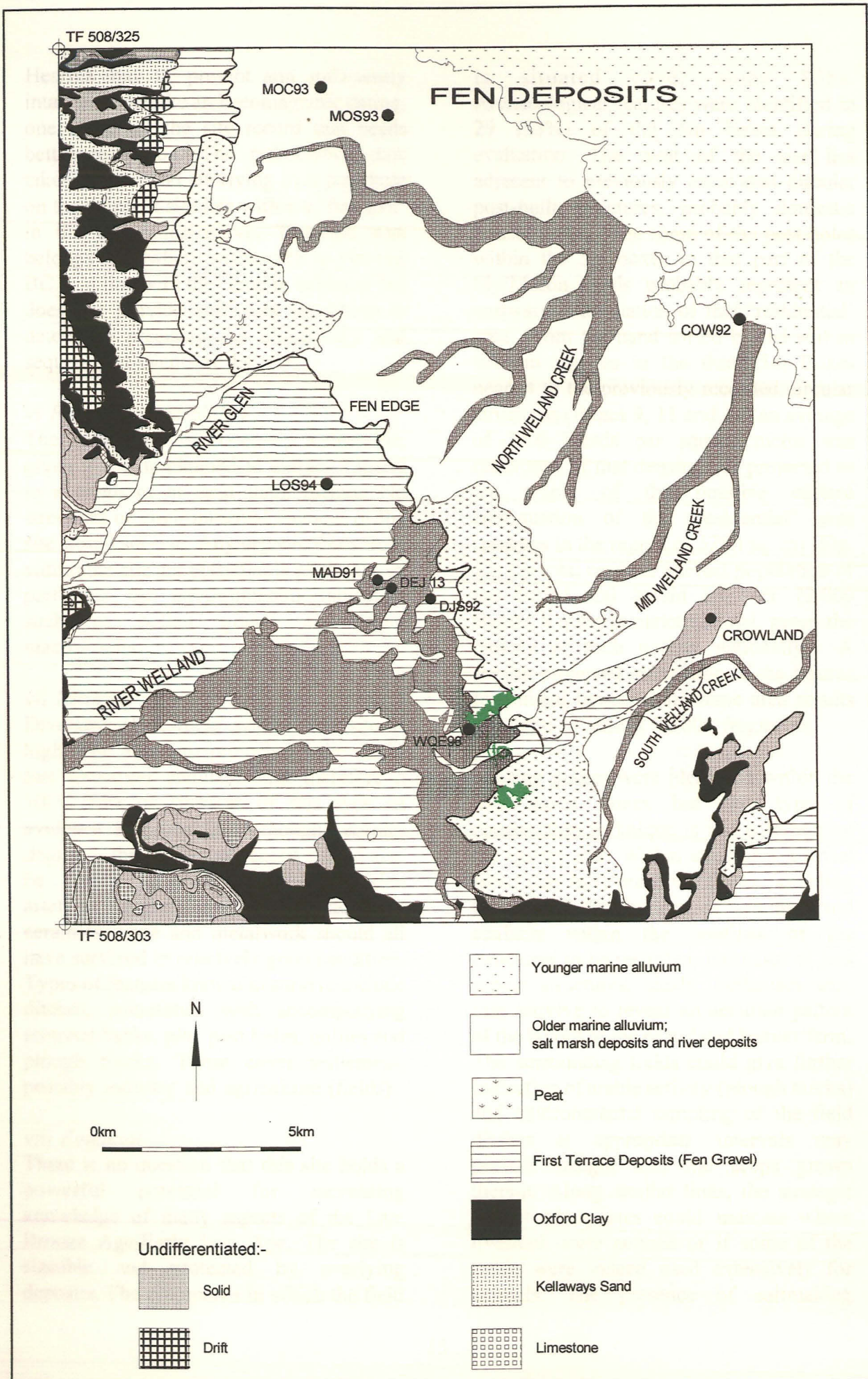


Figure 13 Location of Crop Marks in the Contemporary Landscape

Hearths may be present and sufficiently intact to undertake archaeomagnetic dating, one aspect of the site record that needs better resolution. The radiocarbon date taken from wood surviving in a post hole on the adjacent site lies within a 'flat spot' in the calibration curve. That the post belongs somewhere within 525 to 395 Cal BC is in line with the ceramic evidence but does not provide sufficient resolution to determine precisely the chronology and sequence of events at the site.

vi *Fragility/vulnerability*

The entire site is extremely vulnerable, given that it is planned to extract mineral to a depth of at least three metres. No structural or environmental element of the site would survive. Any organic finds from within the site are classifiable as fragile, in particular the environmental indicators such as pollen grains and plant macrofossils.

vii *Diversity*

Diversity of features within this site is high. The alluvium protects all the earth-fast structural elements and therefore a 100% rate of survival of this type of evidence is probable. Although recently depleted, the ecofactual record should also be diverse. The majority of wooden artefacts are probably highly degraded but ceramics, bone and metalwork should all have survived in relatively good condition. Types of features known to survive include ditches, sometimes with accompanying remnant banks, pits, post holes, gullies and plough marks. These cover settlement, possibly industry and agriculture (fields).

viii *Potential*

There is no question that this site holds a powerful potential for increasing knowledge of many aspects of the Late Bronze Age/Early Iron Age. The site is sizeable and protected by overlying deposits. The cropmarks in which the field

is situated cover some 85ha. Archaeological features were identified in 29 (63%) of the 5m boxes during evaluation. The west of the site lies adjacent to previously excavated circular post-built structures, probably domestic houses and at least some of the post holes within the 5m boxes in that part of the Sly/Mason fields probably represent an eastward continuation of that 'residential' area. From the hand sorted buried soil in the 1m squares in the three 5m Boxes nearest to the previously recorded circular structures (Boxes 9, 11 and 12) an average of 13.6 sherds per square metre was recovered. If that density was projected to the whole of the possible eastern continuation of the 'residential' area (perhaps in the region of 5280 sq. m) (Fig. 12) the total ceramic artefact population of the buried soil would be over 72,000 sherds, a quite remarkable total, given the paucity of such pottery nationally. A similar projected calculation of the figures for animal bones in the same area results in a total of almost 80,000 fragments.

No ring gullies were identified within the five metre boxes but this type of construction technique is not common on the quarry site. Within structures alluvial cover may have preserved floors, enabling the spatial distributions of artefacts and ecofacts within the confines of the structures to be recorded. Evidence of less robust structures, sheds, outhouses etc., may survive to reveal an accurate pattern of the layout of the postulated hamlet/farm. The surrounding fields could give further indication of arable activity (plough marks) and environmental sampling of the field ditches at appropriate intervals may provide insight into the crops grown therein. Along similar lines, the strategic use of phosphates could indicate where livestock were penned or if some of the fields were indeed used extensively for animals. The presence of salting

ceramics on the adjacent site hints at another economic activity. Figure 13 demonstrates that tidal water could penetrate inland through the Fenland creeks and the potential is present for locating the *in situ* remains of salt extraction and through foraminiferal studies, the presence, salinity and velocity of any tidal effects in the ditches.

8. EFFECTIVENESS OF TECHNIQUES

The evaluation technique used at Welland Bank, that of excavating 5m square boxes on a 40m grid, is a variant of that devised by Chris Evans and Robin Boast for examining sites during the Fenland Management Project (Evans, forthcoming). Originally, the technique was devised for use on ploughed lithic scatters, with the one metre square at the southwest corner hand-sorted and sometimes sieved to provide a standardise distribution of finds. The method provides a pattern of artefact densities which may indicate 'core areas' and gives a standard window into the sealed landscape over the entire development area. It also offers a way of measuring fall-off patterns away from the cores of artefact/feature densities. There are limitations of course, particularly if the densities are interpreted as equating directly to a presence/absence of archaeology. It is worth remembering that the feature-rich area on the excavated site south of Sly/Mason produced exceedingly few finds to betray their presence.

Another frustration of the box method is that inevitably features are apparent on the periphery of the box and extend beneath the baulks. In such cases the *presence* of the features can, at least, be recorded and the boxes extended. Also on the positive side, the system provides a regulated 'window' into the site and removes any

temptations to concentrate trench locations in areas already identified as 'busy' by non-intrusive methods such as aerial photography, geophysics or fieldwalking. In short, the box method is good at enabling feature discovery (the requirement of the evaluation) but the isolated and relatively small 'windows' do not enable or assist interpretation of site function overall.

At Sly/Mason, the pre-excavation data was boosted considerably by the plotting of cropmarks. Figure 14 demonstrates the relationship between the location of the cropmarks and the boxes. It can be seen that, even without the cropmark data, many of the ditches would have been found, certainly enough to identify archaeology and comment on its potential. The aerial detail, however, was crucial at Sly/Mason in filling in 'blanks' between the boxes. The supplementary linear trenches seen on Figure 4 were positioned in relation to the aerial photographic data, their purpose to evaluate the main enclosure and to check further the apparently 'blank' parts of the field.

It is felt that use of the Box technique, which, incidentally, has been adopted as the standard required approach to evaluation in by the Cambridgeshire County Council development control office, has been justified and that it proved effective in evaluation the Sly/Mason land.

Some of the strategies relating to artefact/ecofact recovery have given insight into the quality and significance of the evidence retrieved. On sites like Sly/Mason the potential for providing environmental data to supplement the structural sequences and artefact typologies is high and has to be addressed as an important consideration within the evaluation process. In this case, the minimum necessary was undertaken to confirm the quality and condition of the

environmental indicators. Phosphates were taken but in the end not processed. It has been demonstrated numerous times in the Welland valley that the technique of phosphate survey is suited to the local soils and geology (eg Pryor *et al.*, 1985) but is most profitably used in small-resolution grids to answer specific questions. Samples were collected at Sly/Mason (one sample per 40m grid square) to provide some assessment of presence/absence of human activity in case other strands of evidence proved inconclusive. In the event, the quality and quantity of the remaining data was sufficiently high and positive to render the processing of the phosphates unnecessary. Sub-sampling of the bulk environmental samples gives sufficient data on the condition and potential of the ecofacts whilst, at the same time, leaving sufficient material to process gainfully as part of the site record at any subsequent excavation stage. Likewise, scanning of the pollen profiles provided adequate data at evaluation stage. The presence of an extensive buried soil demanded an assessment of its potential for soil micromorphology (see French, Appendix 1).

In conclusion, it is believed that the suite of techniques applied at the Sly/Mason field at Welland Bank has provided a good quality evaluation of both the individual elements within the site and its overall integrity and potential.

9. CONCLUSION

The combined prospecting methods of aerial photography and systematic evaluation have confirmed a strong archaeological presence on the Sly/Mason land at Welland Bank. Not only is the archaeology relatively dense it is well sealed by ancient alluvial deposits and therefore relatively intact. Moreover, much

of the material recovered so far indicates a date in the mid first millennium BC, a period where settlement evidence is singularly sparse in the local and national record. Not only is settlement evidence present at Welland Bank it lies in association with an extensive contemporary field system and has some evidence of industry in the form of the ceramic equipment from the processing of salt from tidal waters.

Results of the systematic evaluation of the site, in particular the distribution of occupation debris, suggest areas of greater and lesser activity. On Figure 12 three possible settlement foci are demonstrated, the eastern extension of the so-called 'residential' area previously excavated, the central enclosure and a small area in the northeast corner. The distribution of the plough marks might suggest some 'infield' arable agriculture associated with the main enclosure.

Areas of 'lesser' activity are concentrated in the extreme northwest and southeast. However, the southeast block lies firmly within the fields plotted from the aerial photographs. Moreover, it lies adjacent to the excavated section in the field to the south where features were common artefacts were rare.

Only the northern section, north of the early ditch exposed in Boxes 6 and 7 looks to be archaeologically 'quiet'. The northern field at Sly/Mason has no evidence of cropmarks other than the large ditch through Boxes 6 and 7. However, the cropmarks of ditches in the southern field do extend up to the field boundary and the ditches should, therefore, continue. The density of finds in Boxes 9 and 12 must indicate occupation and it may be that slighter features occurring within the settlement area have not produced cropmarks.

10. STORAGE AND CURATION

It is proposed that, on completion of all necessary study and analysis, the complete site archive be deposited for long-term storage and curation at the appropriate repository (City and County Museum, Lincoln). The project archive shall comprise all site and post-excavation records, together with all artefactual and environmental material (other than that recommended for disposal by the relevant specialists). In the interim, the project archive will be collated and marked with relevant identification codes, suitably packaged and maintained in appropriate storage at the offices of *Archaeological Project Services*.

11. ACKNOWLEDGEMENTS

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12. PERSONNEL

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Post Excavation Analyst: Ren Mouraille

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ABBREVIATIONS

Numbers prefixed by 'SMR' are the primary reference codes used by the Sites and Monuments Record maintained by the Archaeology Section Lincolnshire County Council.

Numbers prefixed by 'SK' are the reference codes used by the South Kesteven Community Archaeologist for identifying archaeological sites and finds.

Number prefixed by FMP are the reference codes used in the Fenland Management Project

Archaeological Project Services reports are identified by the initials 'APS'.

APPENDIX 1

Welland Quarry Evaluation (WQE/96), Lincolnshire : Soil assessment

CAI French
(13/9/1996)

Introduction

Inspection of the open area excavation on May 31, 1996, revealed a typical alluviated terrace gravel/fen-edge soil sequence, with the buried soil surviving to a greater or lesser extent over the excavation area.

A second inspection was made of the assessment area to the north on September 11, 1996. In this area, preservation of the buried soil was much more variable due to the thinness of alluvial cover, but it was exceptionally well preserved in trench 32.5/440 where a gravel bank associated with a later Bronze Age ditch preserved a complete palaeosol profile.

Observations

A buried soil survives to variable thicknesses (<25cm) across the site. It is overlain by thin (<40cm) silty clay alluvial deposits which effectively act as the present day ploughsoil, all developed on Welland terrace gravels.

The alluvium burying the archaeological landscape at the Welland Quarry is thin, but is a very distinctive brown silty clay with a blocky ped structure. Similar and ubiquitous alluvial deposits have been observed from further upstream in the Welland valley in the Maxey-Etton-Northborough area (French 1990) all the way downstream to the Borough Fen area immediately to the south of this site (French and Pryor 1993, 31-79). On comparative and morphological grounds, this alluvium was probably accumulating in post-Roman and earlier medieval times.

The bank associated with later Bronze Age ditch F.320 provides the best preservation of this palaeosol in the excavated area. In the field, this soil was comprised of two horizons : an upper horizon of mottled orangey/pale greyish brown silty clay loam and a lower horizon of pale to dark greyish brown silty clay loam. Although this soil may have suffered some truncation as a result of the construction of the bank itself, it was the best preserved exposure evident in this part of the site. Accordingly, the profile beneath the bank in section 63 was sampled for micromorphological analysis.

Partially desiccated peat acts as the upper secondary and tertiary fills of ditch F.320 and the large, adjacent/earlier pit (F.). Although this material will require radiocarbon assay, radiocarbon dates obtained from several sites in Borough Fen to the south suggest that peat growth was occurring from between earlier Bronze Age and earlier Iron Age times (French and Pryor 1993, 61).

The primary fills of ditch F.320 and the adjacent pit (F.) are anaerobic and would appear to reflect the ambient long-term groundwater table level prior to the quarry pumps being activated about one month ago. Indeed, when excavation began three weeks ago, there was still standing water in the lower ditch fills indicative of a high local groundwater table, which has now been lowered beyond the depth of the deepest features on site. These fill deposits would repay full plant macro-fossil and palynological analyses before any further desiccation and destruction of the organic record takes place.

There was an approximately oval area (c 1.5x5m by <15cm thick) of black/burnt material with frequent burnt gravel pebbles on the inside edge of the bank associated with ditch F.320. This 'burnt mound' was developed on the buried soil, and overlain by alluvium. Moreover, it was marked by ploughmarks cutting through the mound matrix at various angles. Field inspection suggests that the mound is composed of burnt/carbonised, finely comminuted organic matter and fragmented fire-cracked flint pebbles. Both the mound material and one ploughmark (context 381) were sampled for micromorphological analysis.

In the assessment area, there was a very well preserved zone of palaeosol in trench 32.5/440. Here, a substantial, *in situ* gravel bank preserved the buried soil. The c 35cm thick profile exhibited an homogeneous fine sand/silt loam texture. It is possible that the fine component of this soil indicates that it had received a additional fines component as a result of seasonal flooding, perhaps in a flood meadow kind of environment. To establish the history of this soil and compare it to the other profiles taken from the excavation area, the complete profile was sampled for micromorphological analysis.

Potential

The assessment and excavations in advance of gravel extraction have revealed a prehistoric landscape dominated by Bronze Age field systems and occupation evidence. This terrace landscape on the fen-edge of south Lincolnshire would appear to be both contiguous and contemporary with similar landscapes found to the north on the western edge of Market Deeping towards the Deeping St Nicholas barrow complex (French 1994) and to the south across the present day canalised River Welland in the Borough Fen area of Cambridgeshire (French and Pryor 1993). Effectively, the site currently being evaluated and excavated acts as a mid-way point in this buried landscape. Comprehensive analysis of the buried soil exposures at the Welland quarry site will add to the palaeo-environmental record of this Welland valley/fen-edge interface zone, and provide evidence of prehistoric land-use associated with the later Bronze Age use of this landscape.

Several 'burnt mounds' have already been identified and investigated during the Fenland Management Project, for example at Coveney, Cambs. (French 1993) and Northwold, Norfolk and Stickford, Lincs. (French 1995 a and b).

APPENDIX 2

All of these sites have had micromorphological analysis of the mound deposits to provide information on composition, derivation and possible function. Similar work on this example should provide comparative interpretative evidence.

In addition and as at Stickford, the mound at the Welland Quarry is cut by ploughmarks. Well preserved prehistoric ploughmarks are an infrequent occurrence in the archaeological record. Also, in the light of current research on the micromorphological characteristics of agricultural features (by Helen Lewis at Cambridge), this example should provide additional research and comparative material.

Thus full micromorphological analysis of the buried soil profiles, 'burnt mound' and ploughmarks are recommended. The estimated costs of this analysis are attached.

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APPENDIX 2

DEEPING ST JAMES: TF1808:

LINCOLNSHIRE:

AERIAL PHOTOGRAPHIC ASSESSMENT

SUMMARY

This assessment of aerial photographs examined an area of some 7 hectares (centred TF18450830) scheduled for gravel extraction. Photo interpretation and mapping has increased the known extent of bronze age field system and identified an enclosure of different character within those fields.

Mapping of the development area was at 1:2500 with a broader context provided at 1:12500.

DEEPING ST JAMES: TF1808:
LINCOLNSHIRE:
AERIAL PHOTOGRAPHIC ASSESSMENT

Rog Palmer MA MIFA

INTRODUCTION

This assessment of aerial photographs was commissioned to examine an area of some 7 hectares (centred TF18450830) in order to identify and accurately map archaeological and natural features and thus provide a guide for field evaluation prior to gravel extraction. Mapping was to be at 1:2500.

ARCHAEOLOGICAL AND NATURAL FEATURES FROM AERIAL PHOTOGRAPHS

In suitable soils, sub-surface archaeological features – including ditches, banks, pits, walls or foundations – may be recorded from the air in different ways in different seasons. In spring and summer, features of natural and anthropogenic origin may show through their effect on crops growing above them. Such indications tend to be at their most visible in ripe cereal crops, in June or July in this part of Britain, although their appearance cannot accurately be predicted and their absence cannot be taken to imply evidence of archaeological absence. In winter months, when the soil is bare or crop cover is thin (when viewed from above), features may show by virtue of their different soils. Upstanding remains are also best recorded in winter months when vegetation is sparse and the low angle of the sun helps pick out slight differences of height and slope.

The most informative aerial photographs of archaeological subjects are those resulting from specialist reconnaissance. This activity is usually undertaken by an experienced archaeological observer who will fly at seasons and times of day when optimum results are expected. Oblique photographs, taken by a hand-held camera, are the usual record of such investigation and can be expected to show what the observer thought to be of archaeological relevance. To be able to map accurately from these photographs it is necessary that they have been taken from a sufficient height to include surrounding control information.

Vertical photographs cover the whole of Britain and can provide scenes on a series of dates between (usually) 1946-7 and the present. Unfortunately these vertical surveys are not necessarily flown at times of year that are best to record the crop and soil responses that may be seen above sub-surface features. Vertical photographs are taken by a camera fixed inside an aircraft and adjusted to take a series of overlapping views that can be examined stereoscopically. They are often of relatively small scale and their interpretation requires higher perceptive powers and a more cautious approach than that necessary for examination of obliques. Use of these small-scale images can also lead to errors of location and size when they are rectified or re-scaled to match a larger map scale.

All archaeological features mapped for this assessment are the sub-surface remains of former ditches and banks which have been identified through differences in crop growth. Interpretation and mapping has translated this crop-marked evidence back into its archaeological reality.

Natural deposits can cause similar differences in crops and appear as startling colour changes in bare winter soils. Photographs examined for this assessment recorded fields in both conditions and thus differences in tone (or colour) or changes in crop growth were sought by the photo interpreter. Deeper soil advances cereal growth and paths of former water courses can be identified in this way. The edges and extents of such features tend to vary from year to year with the amount of ground moisture content. However, soils in the assessment area and its immediate vicinity showed little information concerning changing soil depths or of periglacial cracks

PHOTO INTERPRETATION AND MAPPING

Photographs examined

A search for photographs was made at the Cambridge University Collection of Aerial Photographs (CUCAP) and an earlier listing (1991) from the National Library of Air Photographs (NLAP), Swindon was held by Air Photo Services. Photographs covering the area included those resulting from specialist archaeological reconnaissance and routine vertical surveys. Heritage Lincolnshire also provided eight prints of highly oblique photographs taken in summer 1996.

Photographs consulted are listed in the Appendix to this report.

Base map

A base map at varying scales close to 1:2500 was provided by the client. Since the accuracy of the base map is directly related to the accuracy of the rectified output from photo interpretation it should be noted that the distance between individual (100m) grid lines varied between a scale 100m and 103m. During digitising this could be corrected, to some extent, by measuring control information from the nearest grid line but the mapped result has to be matched to the map supplied rather than output at true 1:2500 scale. No attempt has been made to reproduce the variable-scale National Grid.

Photo interpretation and mapping

Photographs held at CUCAP and NLAP had previously been examined by myself as part of the RCHME's National Mapping Programme. Interpretation and mapping for that part of the NMP was undertaken at 1:10560 and the working documents were retained. Notes showed there to be one oblique photograph from a stereoscopic set that provided most of the information for the area under examination. Laser copies were obtained of a stereo pair of prints, plus one other listed as informative. This allowed the original interpretative overlay to be compared back to the photographs to seek any additional information that may be relevant at a 1:2500-level of interpretation. At the same time, the control points were edited from a mapped input of 1:10560

to the more accurate set measured from the 1:2500 plan. Previously acceptable control-match error values of up to 6.0m were thus reduced to 2.5m or less.

All remaining photographs were examined by eye and under slight (1.5x) magnification, viewing them as stereoscopic pairs when possible. Vertical photographs were also examined stereoscopically using a 1.5x magnification stereoscope. Interpretations were marked on overlays to individual prints following procedures described by Palmer and Cox (1993). All rectification was computer assisted and carried out using AERIAL 4.2 software (Haigh 1993).

AERIAL computes values for error of control point match between the photograph and map. In all rectifications prepared for this assessment these were returned at less than ± 2.5 m although the effect of the variable base map scales cannot accurately be assessed. Rectified output was combined to form the basis of the digital plan that accompanies this assessment (Figure 1).

COMMENTARY

Soils

The Soil Survey of England and Wales (SSEW 1983) show the area to be covered in river alluvium (series 813b). This overlays gravel deposits.

Archaeological features

The Deeping St James area has been overflown for archaeological reconnaissance many times. Recent quantification by RCHME showed there to be at least 41 oblique photographs in the Lincolnshire part of quarter sheet TF10NE (Palmer 1995, Fig 3). Of these, only two sets show features within the assessment area. These have now been supplemented by those taken in 1996 by Heritage Lincolnshire. Vertical photographs, taken on three dates, cover the area but add little information to that on the obliques. Given the amount of specialist reconnaissance in the area – by experienced observers such as Pickering and Upex as well as by professional teams from Cambridge and RCHME – it is likely that the overlying alluvial deposit has hindered the normal development of crop marks above sub-surface features. Those that have been recorded may indicate ditches whose size or fill content has been suitable to affect growth on those few occasions when other variables have combined to enable the differential development of crops.

Figure 1 shows features mapped at 1:2500 within, and adjacent to, the assessment area. It must be stressed that these have been recorded on only two dates and that the mapped detail comes principally from one photograph (TF1808/4/214) taken by RCHME. Lack of photographic cover and 'difficult' soils make it probable that additional features will be visible when topsoil is removed.

The recorded ditched features extend the bronze age field system identified during recent excavation in fields in the south-east corner of the map (Denison 1996). The crop-marked ditches adhere to a similar alignment and appear to form a series of enclosures that was designed and functioned as a system of fields. The majority of the recorded ditches are of fairly uniform character, but within the mapped area are two features with unusually broad ditches. One, now quarried away, is cut by the west edge of Figure 1 and is recorded as three sides of what – if it

did complete – would be a large enclosure. Within this are traces of slighter structures. A second enclosure, of sub-rectangular form, is in the present assessment area. Photographs show this to have a broad outer ditch within which may be traces of a bank (showing as a slightly reduced growth of cereal) and a second, narrower, ditch. The latter may show a bank-retaining palisade. This enclosure has an entrance in its south-west corner but the apparent gap in its south-east corner may be due to poor crop response or masking by agricultural activity.

It is probable that the ditched field system extends into the north-western field of the assessment area but the crop in that field has never been observed in a responsive condition. The linear feature that crosses that field is unlikely to be archaeological. Although recorded in 1975, 1986 and 1996 it appears, when viewed stereoscopically, to include a slightly hollowed length and it may, therefore, mark a recent field division. Alternatively, and perhaps more probably due to its alignment and change of direction, it may show the course of a periglacial crack. Such cracks, often accompanied by areas of pits, are common on gravel terraces and many occur in the vicinity of this assessment area.

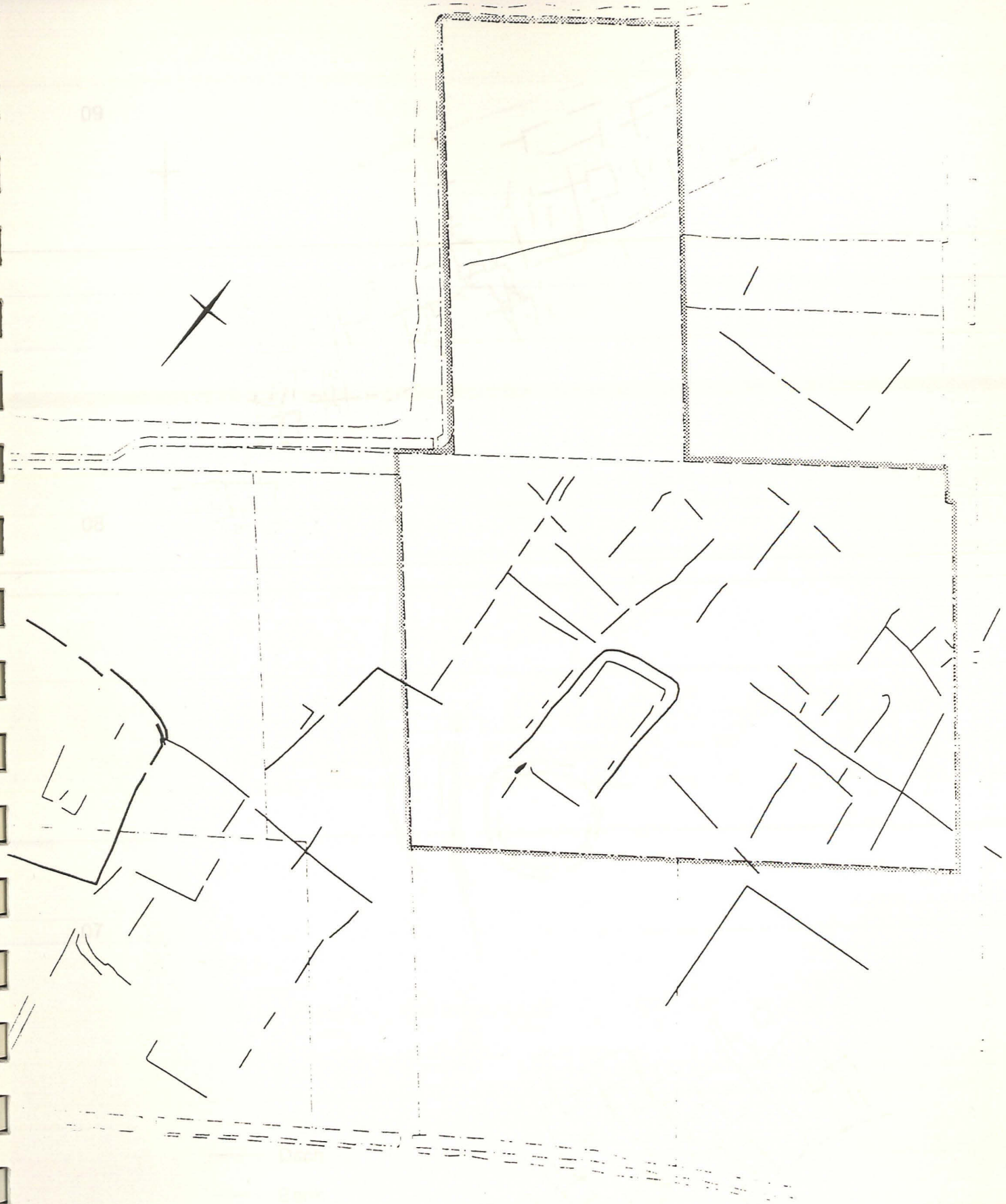
No information was recorded showing other natural features in the assessment area. As has been noted, the alluvial deposit makes it likely that more – probably slighter – features will be detected when topsoil has been removed. The north-west field remains an unknown area but has archaeological potential. Extension of adjacent ditch alignments suggest that elements of the bronze age field system will continue into this field even though aerial photographs show no direct evidence.

A better impression of the extent of the field system is given in Figure 2. This combines the information from the assessment area with that mapped at 1:10560 as part of the Lincolnshire Fenland NMP and, in Cambridgeshire, for the Fenland Survey. Original mapping for this figure was at 1:10560 but it has been reduced to 1:12500 for inclusion on an A4 page. The Deeping St James system can be seen to continue on a single alignment to cover an area of at least 850 ha. Any extension to the west is now lost to gravel extraction and current knowledge to the east is limited by cessation of NMP mapping at the TF20 easting. To the south, the present course of the River Welland and its Washes have effectively destroyed any immediate evidence. Beyond this, alluvial deposits may hinder the development of differential crop growth above any levelled ditches.

Another purpose of Figure 2 is to suggest a greater bronze age landscape. The field system at Borough Fen (TF1906) was identified by David Hall and given a bronze age date for environmental reasons (Hall 1987, Fig 10; gazetteer BOF 4). Since that date, aerial reconnaissance (by myself with RCHME) has considerably extended the size of that field system and given it a structure of small fields and droves similar to those at Fengate described by Pryor (1996; and pers comm). Aerial reconnaissance in this area has also recorded two lengths of linear ditches both lying west of Borough Fen ringwork (in km square TF1807). These are of unknown date but it is tempting to suggest that their alignments may relate them to both sets of fields.

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100 0 100
Metres (approx)

Original photo interpretation and mapping at 1:2500 (+/-)
using distorted base map as supplied

© Air Photo Services 1996

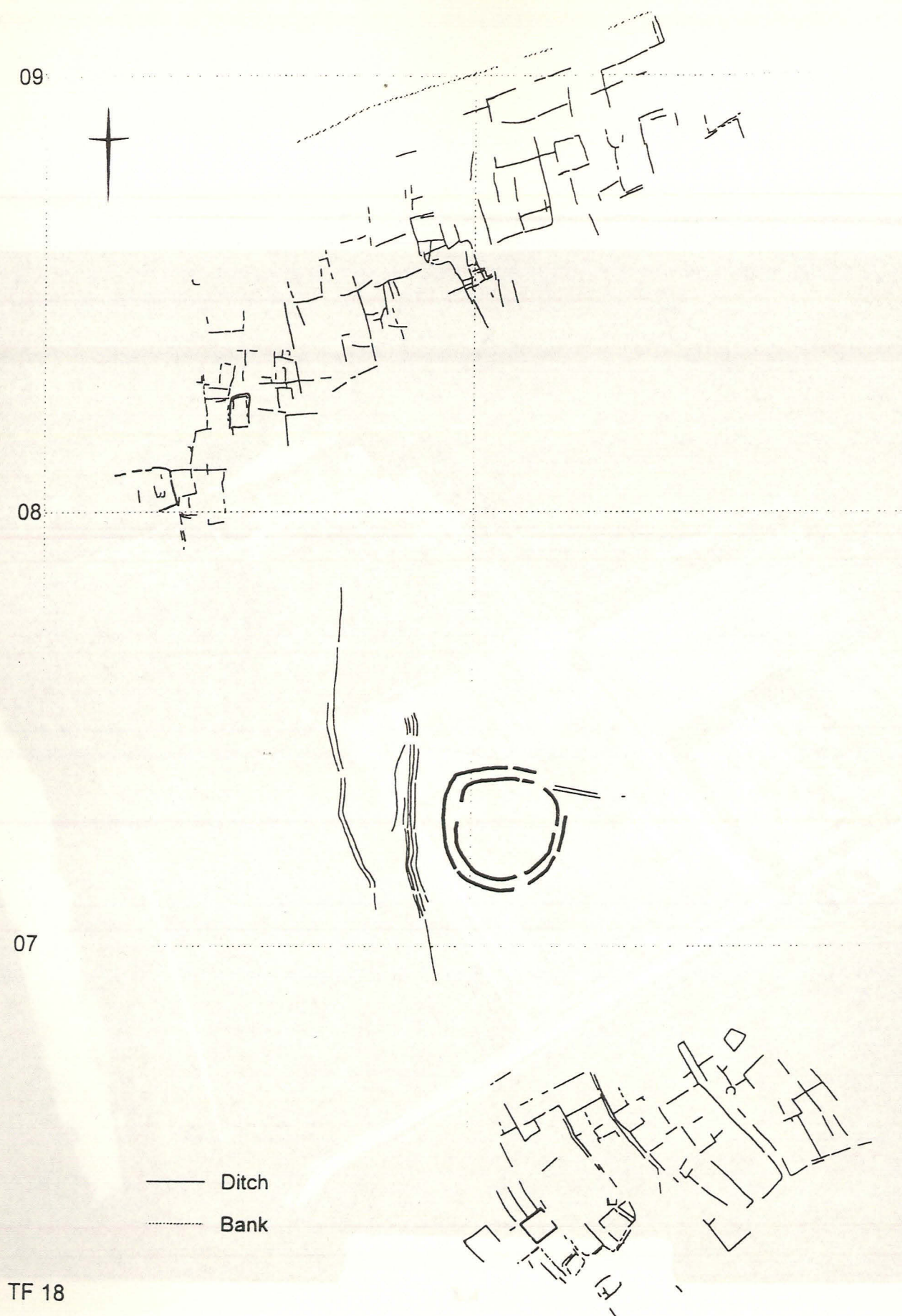
Archaeological features

— Ditch

- - - Possible ditch

..... Development area

Fig. 14 Archaeological features mapped from aerial photographs



— Ditch
 Bank

TF 18



From original interpretation and mapping at 1:10560

dsj-bal pdw

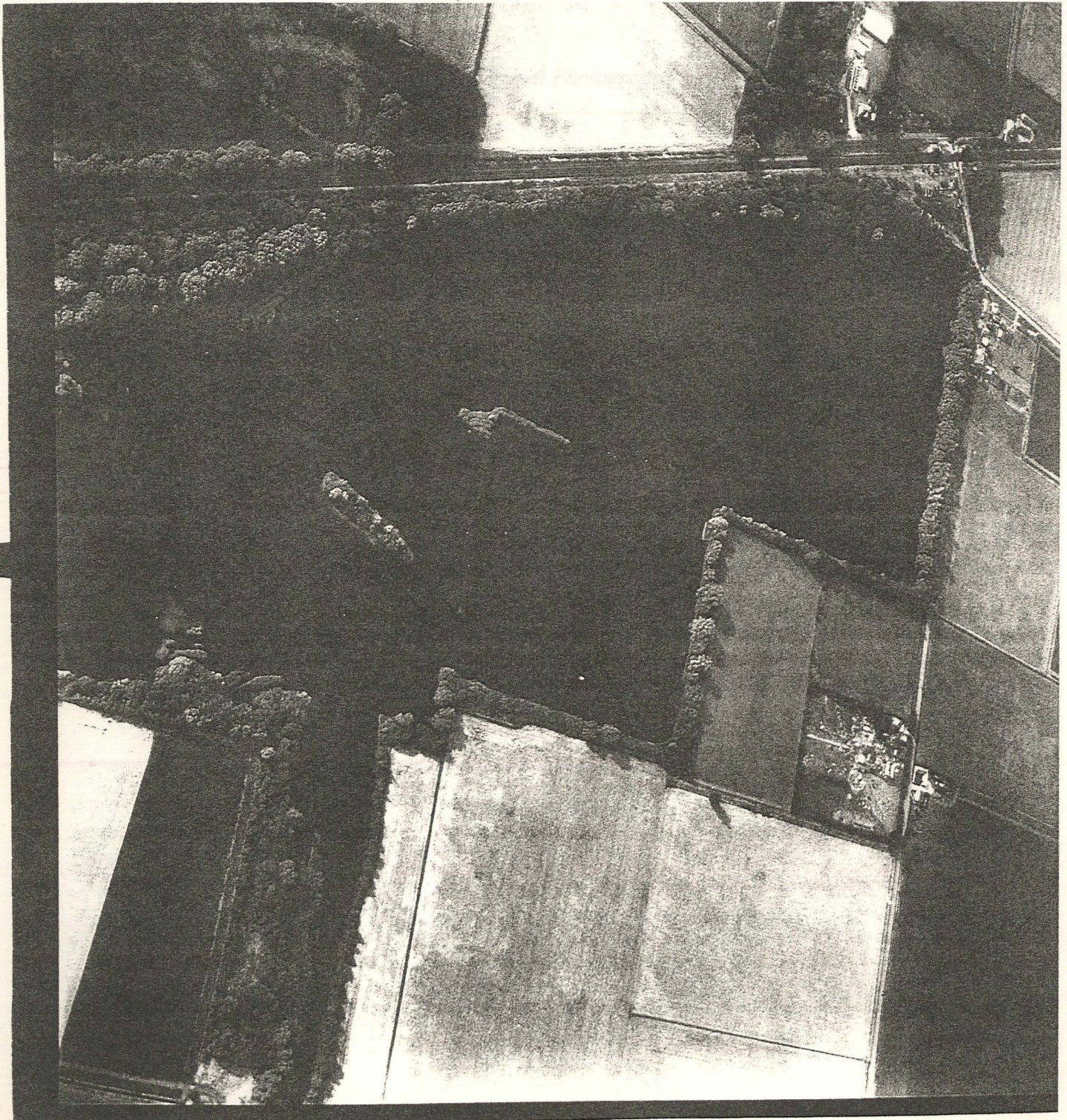
Fig. 15 Possible Bronze Age features in Deeping St. James and Borough Fen



0214

Plate 6 Cropmarks at Welland Bank

APPENDIX



APPENDIX 3

APPENDIX

Aerial photographs examined

Source: Cambridge University Collection of Aerial Photographs

Vertical photographs

RC8-CN 6-8	5 April 1978	1:14000
RC8-EG 77-79	25 March 1982	1:10000
RC8-KnBD 126, 128	23 May 1988	1:10000

Source: National Library of Air Photographs

Specialist collection

TF1808/2	8 August 1975
TF1808/4/214-215	24 July 1986

Source: Heritage Lincolnshire

Oblique photographs

8 un-numbered B&W prints	summer 1996
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Most informative photographs

TF1808/4/214-215	24 July 1986
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APPENDIX 3

LATE BRONZE AGE AND IRON AGE POTTERY FROM SLY MASON, WELLAND QUARRY EAST, DEEPING ST. JAMES, LINCOLNSHIRE (WQE96; TF184081)

Author: David Knight (T&PAT)

17 Sept 1996

Project Code: FMP

Filename: FMP.WBE95

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A total of 87 prehistoric pottery sherds was submitted for assessment from the following sample of contexts: 2002, 2008, 2031, 2033, 2035, 2041, 2045, 2049, 2066, 2067, 2068, 2202, 2212, 2203 and 2227 (plus one unstratified sherd from Trench 03). This material was scanned by the writer, with the aim of establishing the range of ceramic types from the site and the probable date range of the collection.

A detailed fabric analysis was beyond the scope of this assessment. It is clear, however, that the pottery was manufactured mainly from a range of coarse to fine shelly and quartz-gritted wares, comparable to the fabrics recorded during earlier evaluation work on the site (Knight, 1996). These invite comparison with the fabrics of other later Bronze Age and Iron Age pottery collections recovered during excavations in south Lincolnshire, including several sites assessed by the writer as part of the Fenland Management Project (e.g. Cowbit, Dowsby and Market Deeping). Many of the calcareous inclusions have dissolved out, rendering identification difficult, but these survive in a significant proportion of sherds. Petrological analysis is recommended to characterise more precisely the range of fabrics, and to permit consideration of the possible sources of raw materials and hence the pattern of ceramic production and distribution.

All of the sherds appear to derive from handmade vessels, although the small size of some fragments prevents positive identification of the method of manufacture. A limited range of ceramic forms may be distinguished, including carinated and round-shouldered vessels with everted, upright or concave necks; these survive mainly as girth fragments, but a fragment of a round-shouldered vessel with a row of finger-tip impressions along the girth (context 2068) and a plain carinated vessel with an everted neck (context 2227) preserve direct rounded rims. A fragment of an ovoid or related form with a probably upright neck and flattened rim, pinched out slightly externally, was retrieved from context 2031; many more of the 23 sherds from this context may derive from the same vessel, but only a few of these certainly join. Other rim fragments, all from vessels of uncertain profile, include direct rounded or flattened forms, occasionally pinched out internally and/or externally. Bases, where they survive, are invariably flat, and may be pinched out around the circumference; none, however, is associated with a

vessel of definable profile, with the possible exception of two flat base angles from 2031 which could derive from an ovoid or related form.

A fragment of a round-shouldered vessel from context 2068 preserves a row of five finger-tip impressions along the girth, but finger ornament is otherwise absent. Many of the 23 sherds from context 2031, all possibly from a vessel of ovoid or related form, preserve a seemingly random pattern of lightly incised lines on the exterior, related probably to the later Iron Age scored ware tradition.

The typological affinities of the pottery, specifically the examples of carinated and round-shouldered vessels and of finger-tip ornament along the girth, lie mainly with Late Bronze Age/ Early Iron Age ceramic collections from south Lincolnshire and neighbouring areas, notably Billingborough (Chowne, 1988), Fengate (Hawkes and Fell, 1945; Pryor, 1974, 1984), Maxey (Simpson, 1981), West Deeping (Knight and Allen, 1996) and Dowsby (Knight, 1995). Large ceramic collections of this period, however, are still comparatively poorly represented in this region, especially in the Fens, and the material thus provides an important addition to the corpus of material. Work in progress on pottery from Lincolnshire sites investigated as part of the Fenland Management Project is currently shedding further light upon the ceramics of this period, and in particular the subject of trade and exchange, and the Welland Quarry collection has major potential for contributing further to ceramic research into this period. The pottery may be expected also to provide important supporting evidence for the early origins of salt production on this site. Bronze Age salt production sites are gradually becoming better known along the Lincolnshire coast and in the Fenland, as for example at Northey (Gurney, 1980.) Tetney (Palmer-Brown, 1993) and Dowsby (Knight, 1995), but this is still an important area of research to which the evidence from Welland Quarry may contribute significantly.

The small collection of sherds from context 2031 with incised patterns on the outer face stands out from the remainder of the pottery on the grounds of its affinities with later Iron Age scored pottery. Similar pottery is widespread on Middle and Late Iron Age sites in the region, notably at Fengate, Cambs. (Pryor, 1974), and Market Deeping, Lincs. (Knight, in prep), and on current evidence would appear to date from between the fifth/fourth centuries BC and

the first century AD (e.g. Elsdon, 1992). Its discovery introduces an important new dimension to the site chronology, suggesting that activity may have continued on some areas of the site well into the later Iron Age.

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APPENDIX 4

Welland Bank Quarry, Lincolnshire. Preliminary Evaluation of soil samples.

Report No. 2

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Introduction

Following rapid evaluation of a collection of some 200 samples from earlier stages of excavation (see Report 1), a second group of 65 samples was received. As with the first batch, detailed assessment of all samples would have been prohibitively time-consuming. Instead, an initial rapid evaluation of small sub-samples has been undertaken, based entirely on the contents of the samples, with no consideration of context at this stage. Sub-sample size was small, but sufficient to indicate the presence of any non-charred macrofossils, mollusc shells and concentrations of charred plant material. On this basis it was intended to establish a sample discard policy, and to highlight samples requiring more detailed assessment, before devising a final Project Design for Analysis.

Separate Assessment Reports on bone and pollen will be produced by Umberto Albarella and James Greig.

Data collection and method statement

200g sub-samples (approximately) were removed from the bulk samples. They were disaggregated by manual agitation in water and organic fractions and charred plant material were separated by wash-over, using a 0.5mm collecting mesh. This material was then rapidly scanned under a binocular microscope at magnifications of up to x 50, noting the main categories of macrofossils present. Most samples included intrusive fibrous roots. Modern straw fragments, grass florets, seeds, fly puparia and beetles were also frequent. The dense residue was cursorily inspected for bone, shell and artefacts, though none were seen. In Table 1 presence of macrofossil types is indicated by an 'x'.

Samples thought to be significant are highlighted in Table 1. These samples either include charred crop remains etc, uncharred seeds, and/or sufficiently high charcoal densities for conventional radiocarbon dating to be potentially possible.

Results of evaluation

Charcoal

The presence of charcoal fragments >2mm is noted in Table 1. In most cases charcoal densities were exceedingly low, but samples including higher densities, potentially sufficient for conventional radiocarbon dating are highlighted.

Other charred plant macrofossils

Charred cereal remains were very infrequent, but were noted in samples 2012 and 2083 (a charred wheat grain and barley grain, respectively).

Wood

Wood from these samples was in a very degraded state, commonly only a few shreds per sample, where it occurred at all. In some cases blackened shreds of degraded wood were difficult to distinguish from charcoal.

Other uncharred plant macrofossils

Sample 2052 (2118) included seeds preserved by phosphatic mineral-replacement. Though commonplace at Roman and medieval urban sites (particularly in latrine pits), this form of preservation is very uncommon at rural prehistoric sites (*c.f.* the Bronze Age midden at Potterne, Wiltshire). It normally indicates the presence of high concentrations of biogenic phosphate, often from faeces. This sample requires more detailed examination.

General comments

Compared to the first batch of samples from the site, few of the samples evaluated for this report appeared to be of significance. (It is possible that some samples containing low densities of charred cereals etc. have been overlooked during rapid evaluation of sub-samples, but it is improbable that such samples would affect site interpretation in any significant way). None of the samples included potentially informative organic material preserved by waterlogging. Mollusc shells and bone were not noted.

Samples requiring full processing and assessment are 2012, 2052 and 2083, which either contain charred cereals or mineral-replaced plant material. Other samples with relatively high charcoal densities should also be processed in case radiocarbon dating is needed. The flots from these samples should be assessed to determine whether larger-scale processing has produced other charred material of significance.

Up-dated project design for assessment stage

Aims and objectives

These remain the same as those defined in the first report. The present sample collection supplements the earlier collection to a small extent, but adds no additional aims or objectives.

Method statement

Discard policy

On the basis of this preliminary evaluation, all samples not highlighted in Table 1, and not selected for foraminiferal analysis may now be discarded.

Sample pre-treatment and storage

The samples are currently stored in less than ideal conditions. Deterioration will occur unless the highlighted samples are extracted and treated as follows. Samples for extraction of charcoal and other plant macrofossils should be stored indoors, initially open, to allow air-drying. This will prevent fungal growth, reduce weight and make flotation/bulk sieving easier. Once dried, the sample bags should be tied for transport.

Processing for assessment

Full contextual details will be required on highlighted samples for assessment.

Charcoal-rich samples and those including other plant macrofossils are highlighted in Table 1. All plant material is to be separated from these samples by flotation/washover, using a 0.5mm collecting mesh. Material extracted is to be fully assessed, looking particularly for charred plant macrofossils other than wood (eg cereals, nutshell). The potential suitability of these samples for radiocarbon dating is to be assessed, with respect to the species composition and stem size of the material and the nature of the archaeological context.

File wellan.ba2

Sample	Context	Area	Chc (%)
2012	7	1.00/100	5.7
2052	7	1.45/100	
2083	2/3/5	0.5/5/100	
2088	2/3/5	0.5/5/100	
2097	2/3/5	0.5/5/100	
2098	2/3/5	0.5/5/100	
2099	2/3/5	0.5/5/100	
2100	2/3/5	0.5/5/100	
2101	2/3/5	0.5/5/100	
2102	2/3/5	0.5/5/100	
2103	2/3/5	0.5/5/100	
2104	2/3/5	0.5/5/100	
2105	2/3/5	0.5/5/100	
2106	2/3/5	0.5/5/100	
2107	2/3/5	0.5/5/100	
2108	2/3/5	0.5/5/100	
2109	2/3/5	0.5/5/100	
2110	2/3/5	0.5/5/100	
2111	2/3/5	0.5/5/100	
2112	2/3/5	0.5/5/100	
2113	2/3/5	0.5/5/100	
2114	2/3/5	0.5/5/100	
2115	2/3/5	0.5/5/100	
2116	2/3/5	0.5/5/100	
2117	2/3/5	0.5/5/100	
2118	2/3/5	0.5/5/100	
2119	2/3/5	0.5/5/100	
2120	2/3/5	0.5/5/100	
2121	2/3/5	0.5/5/100	
2122	2/3/5	0.5/5/100	
2123	2/3/5	0.5/5/100	
2124	2/3/5	0.5/5/100	
2125	2/3/5	0.5/5/100	
2126	2/3/5	0.5/5/100	
2127	2/3/5	0.5/5/100	
2128	2/3/5	0.5/5/100	
2129	2/3/5	0.5/5/100	
2130	2/3/5	0.5/5/100	
2131	2/3/5	0.5/5/100	
2132	2/3/5	0.5/5/100	
2133	2/3/5	0.5/5/100	
2134	2/3/5	0.5/5/100	
2135	2/3/5	0.5/5/100	
2136	2/3/5	0.5/5/100	
2137	2/3/5	0.5/5/100	
2138	2/3/5	0.5/5/100	
2139	2/3/5	0.5/5/100	
2140	2/3/5	0.5/5/100	
2141	2/3/5	0.5/5/100	
2142	2/3/5	0.5/5/100	
2143	2/3/5	0.5/5/100	
2144	2/3/5	0.5/5/100	
2145	2/3/5	0.5/5/100	
2146	2/3/5	0.5/5/100	
2147	2/3/5	0.5/5/100	
2148	2/3/5	0.5/5/100	
2149	2/3/5	0.5/5/100	
2150	2/3/5	0.5/5/100	

Sample	Context	Area	Charcoal >2mm	Charred cereals/ nutshells etc.	Wood/ twigs	Uncharred plant	Insects	Molluscs	Other macrofossils/comments
2003	?	100/160	x						
2004	?	145/160	x		x				
2005	2005	055/160	x		x				
2006	2008	055/160	x						
2007	2011	055/160							Sample not received
2008	?	190/160	x			x			
2011	?	127.5/200	x						
2012	?	077.5/200	x	x					Charred Triticum grain; ?invasive seeds
2014	?	min35/320	x						?C14 on charcoal
2015	?	min12.5/360	x						?C14 on charcoal
2017	2002	min57.5/440	x						
2019	2002								
2020	2017	min35/320	x						?C14 on charcoal; woody roots
2032	?	190/240							
2033	2002	122.5/280							
2034	2066		x						
2035	?	77.5/280	x						?C14 on charcoal
2036	2002	32.5/280							
2037	2002	min12.5/280							
2038	2002	10/240							
2040	?	055/240							
2041	2002	110/240	x						?C14 on charcoal
2042	2002	145/240	x						
2043	2002	212.5/200					x		
2044	?	122.5/200							
2045	?	71.5/200	x						
2046	2002	min12.5/200							
2048	2086								
2050	2128T1		x						
2051	2119		x		x				Degraded organic sample: scraps of wood
2052	2118		x			x			Mineral-replaced seeds etc. Very rare in earlier prehistoric contexts. Needs close scrutiny.
2053	2127								
2054	2120								
2055	2124T1		x						

Sample	Context	Area	Charcoal >2mm	Charred cereals/ nutshells etc.	Wood/ twigs	Uncharred plant	Insects	Molluscs	Other macrofossils/comments
2056	2123		x						?C14 on charcoal
2057	2121		x			?			
2058	2117		x						
2059	2116		x						?C14 on charcoal
2060	2115								
2061	2111		x						
2062	2109								
2063	2140		x						
2064	2136								
2065	2137								
2066	2142		x						
2067	2143								
2068	2200	010/320	x						?C14 on charcoal
2069	2201	min35/320	x						?C14 on charcoal
2070	2202	min12.5/360	x						?C14 on charcoal
2071	2203	32.5/200	x						
2072	2204	55/160	x						
2073	2205	167.5/280	x						
2074	2206	167.5/200	x						
2075	2207	190/320							
2076	2208	145/320							
2077	2209	100/320	x						
2078	2210	055/320							
2079	2211	32.5/360	x						?C14 on charcoal
2080	2212	010/400	x						
2081	2213	min12.5/440							
2082	2214	32.5/440	x						
2083	2215	010/480	x	x					Charred Hordeum grain and cereal frags.
2084	2216	min57.5/440							
2085	2217	min35/480							
2086	2218	min12.5/520							

APPENDIX 5

APPENDIX 5

Welland Bank Quarry

The Lithics

Introduction

Evaluation of the Quarry site yielded a small quantity of lithics. These were recovered from both features and sampling of the buried soil in the southwest corner of each 5m box (see Methods). The material took two forms, struck flint flakes and unworked pebbles that had been burnt.

Burnt Stone

Context	Box Number	No of Pieces	
2002	32	2	
2207	16	5	
2212	8	5	
2215	3	2	
2227	12	3	

Table 1 Burnt Stone

The material is almost all pebbles of the sort that occur locally on the site. Burnt/crazed pebbles are common on prehistoric sites in either industrial or domestic contexts. In this case the quantities are low and there is no evidence that they derive from a 'burnt mound' -type industrial site. Localised concentrations occurred on the excavated areas to the south and west of the Sly/Mason Fields. However, the finds at Sly/Mason are distributed widely on the field with no obvious concentrations and little can be deduced other than that their presence fits with other indicators to suggest human presence on the site.

Flints

Context	Box Number	Description
2131	2	Struck Flake
2031	29	Pebble. Poss Hammerstone
2202	9	Struck Flake with limited secondary working
2216	4	Struck Blade/Flake fragment

2217	2	Two struck Flakes, one a broken Blade, one a broken core fragment
2250		Single struck Flake

Table 2 Flints

Other than the possible hammerstone none of the pieces could be categorised as tools. The flakes were are classed as *debitage*, the waste material incurred during tool preparation. Quantities were exceedingly small and clearly did not represent any sustained activity on the site. Moreover, although dating of worked flints is notoriously difficult, the flints collected from Sly/Mason included both those with a greater length to breadth ratio (blades), generally dated to the Earlier Neolithic and earlier, and more squat examples typical of assemblages from Later Neolithic/ Early Bronze Age and later. Therefore, although the distribution of worked flints (Fig.00) tends to indicate a clustering towards the northwest of the area this may be coincidental.

One flint tool was recovered subsequently from the spoil heap associated with Box??. This was a so-called 'Thumbnail' scraper of the type found in many periods during prehistory but most commonly during the Later Neolithic/Early Bronze Age. The piece had been severely fire-damaged.

Conclusion

From the density and typology of the flints recovered there was little indication of sustained industrial or domestic activity on the site. However, the possibility of some limited temporary activity can not be ruled out.

The presence of burnt stone is perhaps a better indication of human presence and augments the other strands of evidence that suggest prehistoric communities settled and worked the area.

Tom Lane 29.9.96

APPENDIX 6

Welland Bank, Sly Mason's WQE96

Animal bone Archive report

A small collection of animal bones from this phase of work at Welland Bank were submitted for identification. 52 bones were recorded (see attached archive) of which a number were fragmented and were reconstructed prior to identification.

The most common species was cattle and among these fragments was a distal femur from a very small adult, being comparable in size to an adult red deer but clearly bovid. This size of animal occurs frequently on sites of 1st millenium BC date. Sheep (or goat) bones were the next in frequency and included a lamb tibia. Two bones were identified as horse and one as pig. A single intact astragalus of red was recovered from context 2202.

One interesting find is the mandible of an adult beaver, its tooth row intact, which was recovered from context 2227. Given the proximity of the river and fens this is not unexpected and the species has been found at a number of prehistoric sites. It is probable that the animals were trapped for their furs.

D.J.Rackham

Key to codes used in the cataloguing of animal bones

SPECIES		BONE	
BOS	cattle	SKL	skull
CSZ	cattle size	TEMP	temporal
SUS	pig	FRNT	frontal
OVCA	sheep or goat	PET	petrous
OVI	sheep	PAR	parietal
SSZ	sheep size	OCIP	occipital
EQU	horse	ZYG	zygomatic
CER	red deer	MAND	mandible
CAN	dog	MAX	maxilla
MAN	human	ATL	atlas
UNI	unknown	AXI	axis
CHIK	chicken	CEV	cervical vertebra
GOOS	goose, dom	TRV	thoracic vertebra
LEP	hare	LMV	lumbar vertebra
UNB	indet bird	SAC	sacrum
MALL	duck, dom.	CDV	caudal vertebra
GULL	gull sp.	SCP	scapula
FISH	fish	HUM	humerus
UNIB	bird indet	RAD	radius
UNIF	fish indet	MTC	metacarpus
GSZE	goose size	MC1-4	metacarpus 1-4
BEAV	beaver	INN	innominate
		ILM	ilium
		PUB	pubis
		ISH	ischium
		FEM	femur
		TIB	tibia
		AST	astragalus
		CAL	calcaneum
		MTT	metatarsus
		MT1-4	metatarsus 1-4
		PH1	1st phalanx
		PH2	2nd phalanx
		PH3	3rd phalanx
		LM1-LM3	Lower molar 1 - molar 3
		UM1-UM3	upper molar 1 - molar 3
		LPM1-LPM4	lower premolar 1-4
		UPM1-UPM4	upper premolar 1-4
		DLPM1-4	deciduous lower premolar 1-4
		DUPM1-4	deciduous upper premolar 1-4
		MNT	mandibular tooth
		MXT	maxillary tooth
		LBF	long bone
		UNI	unidentified
		STN	sternum
		INC	incisor
		TTH	indet. tooth
		CMP	carpo-metacarpus

SIDE

W - whole
L - left side
R - right side
F - fragment

FUSION

Records the fused/unfused condition of the epiphyses
P - proximal; D - distal; E - acetabulum;
N - unfused; F - fused; A - anterior; C - caudal

TOOTH WEAR

- Codes are those used in Grant, A. 1982 The use of tooth wear as a guide to the age of domestic animals, in B.Wilson, C.Grigson and S.Payne (eds) *Ageing and sexing animal bones from Archaeological sites, 91-108.*

Teeth are labelled as follows in the tooth wear column:

h 1dpm4/dupm4 f 1dpm2/dupm2
H 1pm4/upm4 g 1dpm3/dupm3
I 1m1/um1
J 1m2/um2
K 1m3/um3

ZONES

- zones record the part of the bone present.
The key to each zone on each bone is on page 2

MEASUREMENTS

- Any measurements are those listed in A.Von den Driesch (1976) *A Guide to the Measurement of Animal Bones from Archaeological Sites*, Peabody Museum Bulletin 1, Peabody Museum, Harvard, USA

site	conte	specie	bone	nos	sid	fusion	zone	toothwear	butcher	gnaw	comments
WQE96	2002	BOS	CAL	1	R					PDG1	PROXIMAL SHAFT-PROX END SHOWING CHEWING
WQE96	2027	BOS	MTC	1	R					PDG1DIS	SHAFT WITH BOTH ENDS CHEWED-SMALL-PROB JUVENILE
WQE96	2038	BOS	MAND	1	R			113J11K8			IN 8 PIECES-M3 LACKS POSTERIOR COLUMN
WQE96	2064	OVCA	FEM	1	R						MIDSHAFT-5 PIECES-ERODED SURFACE-VERY FLATTENED SHAFT
WQE96	2067	BOS	TTH	1	F						2 ENAMEL FRAGMENTS
WQE96	2130	CSZ	LBF	1	F						SHAFT FRAGMENT
WQE96	2130	UNI	UNI	1	F						INDET FRAGMENT
WQE96	2156	BOS	TIB	1	L		47			DISDG1	SHAFT ONLY-DISTAL CHEWED-SMALL-POSS JUVENILE
WQE96	2165	BOS	FEM	1	R	DF	567				DISTAL END-VERY SMALL-SAME SIZE AS DEER BONE
WQE96	2201	SSZ	LBF	2	F						CALCINED SHAFT FRAGMENT
WQE96	2201	UNI	ATL	3	F						CALCINED FRAGMENTS -PROBABLY ALL FROM PIG ATLAS
WQE96	2202	OVCA	TTH	1	F						WELL WORN CUSP FRAG
WQE96	2202	CSZ	UNI	3	F						INDET FRAGMENTS-WORN/ERODED
WQE96	2202	UNI	UNI	1	F						INDET
WQE96	2202	SSZ	FEM	1	F						MIDSHAFT FRAGMENT-PROBABLY ROE DEER
WQE96	2202	BOS	UM1	1	R			115			DAMAGED
WQE96	2202	CSZ	UNI	3	F						INDET FRAGMENTS
WQE96	2202	BOS	TIB	1	R	DF	57				DISTAL END-BROKEN AND IN PIECES
WQE96	2202	BOS	MTC	1	L		5				SHAFT WITH PART PROX END-IN PIECES-DIST POSSIBLY CHEWED
WQE96	2202	CER	AST	1	L		1				COMPLETE LL-53.2 L2-50.6 Bp-32.4 Bd-33.5
WQE96	2203	EQU	LM	1	R						COMPLETE-WELL WORN
WQE96	2203	SSZ	LBF	1	F						CALCINED SHAFT FRAGMENT
WQE96	2207	BOS	MAND	1	F						LATERAL FRAG HORIZONTAL RAMUS
WQE96	2227	EQU	MAND	1	R		45678	K			M3 WORN- SMALL TOOTH L = 30.4 - ONLY LITTLE BIGGER THAN BURRO
WQE96	2227	OVCA	TIB	1	R		7			DISDG1	DISTAL HALF SHAFT-DIST CHEWED
WQE96	2227	BOS	SKL	1	F						ANT DORSAL FRONTAL FRAG
WQE96	2227	OVCA	TIB	1	R		4				MIDSHAFT-VERY SMALL-POROUS-LAMB-ENDS PROB UNFUSED
WQE96	2227	CSZ	LBF	2	F						SHAFT FRAG
WQE96	2227	OVCA	LM	1	F						CUSP FRAG-SL WEAR
WQE96	2227	UNI	UNI	2	F						INDET-POSS RIB
WQE96	2227	CSZ	FEM	1	F		7				CHARRED FRAG DISTAL CONDYLE
WQE96	2227	SUS	SKL	1	L						DORSAL LATERAL FRAG FRONTAL-SMALL-PIGLET- 2 PIECES
WQE96	2227	CSZ	SKL	1	F						INDET FRAG
WQE96	2227	SSZ	INN	1	F						ISCHIAL FRAG-PROBABLY PIG
WQE96	2227	UNI	SKL	1	F						INDET FRAG
WQE96	2227	UNI	UNI	1	F						INDET
WQE96	2227	OVCA	MAND	1	L						POSTERIOR VENTRAL FRAG HORIZONTAL RAMUS
WQE96	2227	UNI	UNI	1	F						INDET-VERY SMALL BONE
WQE96	2227	BEAV	MAND	1	R		237	HIJK			COMPLETE MOLAR ROW-INCISOR BROKEN AND ASCENDING RAMUS LOST
WQE96	2249	OVCA	LM2	1	L			J9			
WQE96	2249	CSZ	LBF	1	F						SHAFT FRAGMENT-2 PIECES
WQE96	2249	BOS	MTC	1	R		12				PROXIMAL HALF-SMALL Bp-46 SD-25.4
WQE96	9999	BOS	TIB	1	R		47			PDG1	SHAFT-PROX CHEWED-2 PIECES

ZONES - codes used to define zones on each bone

SKULL - 1. paraoccipital process	METACARPUS -	1. medial facet of proximal articulation, MC3
2. occipal condyle		2. lateral facet of proximal articulation, MC4
3. intercornual protuberance		3. medial distal condyle, MC3
4. external acoustic meatus		4. lateral distal condyle, MC4
5. frontal sinus		5. anterior distal groove and foramen
6. ectorbitale		6. medial or lateral distal condyle
7. entorbitale	FIRST PHALANX	1. proximal epiphysis
8. temporal articular facet		2. distal articular facet
9. facial tuber	INNOMINATE	1. tuber coxae
0. infraorbital foramen		2. tuber sacrale + scar
MANDIBLE		3. body of illium with dorso-medial foramen
1. Symphyseal surface		4. iliopubic eminence
2. diastema		5. acetabular fossa
3. lateral diastemal foramen		6. symphyseal branch of pubis
4. coronoid process		7. body of ischium
5. condylar process		8. ischial tuberosity
6. angle		9. depression for medial tendon of rectus femoris
7. anterior dorsal ascending ramus posterior M3		
8. mandibular foramen		
VERTEBRA	FEMUR	1. head
1. spine		2. trochanter major
2. anterior epiphysis		3. trochanter minor
3. posterior epiphysis		4. supracondyloid fossa
4. centrum		5. distal medial condyle
5. neural arch		6. lateral distal condyle
SCAPULA		7. distal trochlea
1. supraglenoid tubercle		8. trochanter tertius
2. glenoid cavity		
3. origin of the distal spine	TIBIA	1. proximal medial condyle
4. tuber of spine		2. proximal lateral condyle
5. posterior of neck with foramen		3. intercondylar eminence
6. cranial angle of blade		4. proximal posterior nutrient foramen
7. caudal angle of blade		5. medial malleolus
HUMERUS		6. lateral aspect of distal articulation
1. head		7. distal pre-epiphyseal portion of the diaphysis
2. greater tubercle		
3. lesser tubercle		
4. intertuberal groove	CALCANEUM	1. calcaneal tuber
5. deltoid tuberosity		2. sustentaculum tali
6. dorsal angle of olecranon fossa		3. processus anterior
7. capitulum		
8. trochlea	METATARSUS	1. medial facet of proximal articulation, MT3.
RADIUS		2. lateral facet of proximal articulation, MT4
1. medial half of proximal epiphysis		3. medial distal condyle, MT3
2. lateral half of proximal epiphysis		4. lateral distal condyle, MT4
3. posterior proximal ulna scar and foramen		5. anterior distal groove and foramen
4. medial half of distal epiphysis		6. medial or lateral distal condyle
5. lateral half of distal epiphysis		
6. distal shaft immediately above distal epiphysis		
ULNA		
1. olecranon tuberosity		
2. trochlear notch- semilunaris		
3. lateral coronoid process		
4. distal epiphysis		

APPENDIX 7

Previous excavation at Welland Bank Quarry

by

Dale Trimble, Archaeological Project Services

To the north and west of the area currently under extraction are large worked out quarries (Fig. 3). These were extracted prior to the implementation of PPG16 and as a consequence received no archaeological consideration in the planning process. As a result, no fieldwork was undertaken.

During watching briefs at the Welland Bank site in 1993, linear features, interpreted as droveways and large pits were recorded but no dating evidence was retrieved. During 1994 archaeological evaluation revealed a number of features including a large pit, post holes and a construction slot. Again, no dating evidence was recovered. In November and December of 1994 archaeological observation and recording was undertaken under a watching brief condition during the removal of overburden (modern topsoil, late/post-Roman alluvium and a palaeosol) in advance of mineral extraction. Two large ditches were recorded beneath the alluvium and artefacts including animal bone and pottery of Late Bronze Age date were collected. Further evaluation at the site was undertaken between May and August of 1995 when a number of archaeological features including post holes, ditches and pits were identified. One of the deeper ditches contained abundant animal bone and Late Bronze Age pottery. A number of pieces of briquetage was also recovered and indicate that at some stage salt production took place at or near the site. Subsequent to the evaluation, further work was carried out under a watching brief condition. Archaeological activity was found to be far greater than anticipated and much of the recording of these deposits was restricted to basic surface planning immediately in advance of mineral extraction, with full excavation of selected features only. Numerous post holes, gullies, ditches, pits and one hearth, all bounded by a 2.5m wide and 1.9m deep ditch were among the features recorded. The quantity and quality of the archaeological deposits encountered led to a revision of the archaeological recording strategy for the remaining area. During this phase of work in January 1996, under an enhanced watching brief condition, investigation concentrated on six areas identified as being of greatest archaeological value.

Within one of these areas adjacent to the enclosing ditch, a rectangular post built structure measuring 25m x 10m was identified. A fragment of timber retrieved from one of the post holes within the structure was submitted for dating at the Beta Analytic Radiocarbon Dating Laboratory, Florida. A one sigma calibrated date of 525 to 395 Cal BC (68% probability) was obtained. Numerous sherds of probable Late Bronze Age/Early Iron Age pottery and some fragments of animal bone were recovered from a small pit adjacent to this structure. A 'C' shaped gully recorded some 70m west of the rectangular structure may represent remains of a drip gully that once surrounded a circular building. Excavation of a 2.5m diameter and at least 1.2m deep pit on the final day of the excavation led to the retrieval of a worked, well preserved, timber 1.5m in length, 0.7m wide and 0.08m thick. Adze or axe marks were clearly visible on the wood. Assessment of the pottery assemblage from the 1995 evaluation by David

Knight points to a Late Bronze\Early Iron Age date. Pottery of this date is rare in the region and further research on the material, particularly in conjunction with that currently in progress from Fenland Management Project excavations, should help elucidate trade and exchange networks and refine ceramic chronologies for this period.

Feature fills on site are organic rich and have clear potential for yielding charred plant macrofossils and, depending on how far de-watering has caused degradation, uncharred macrofossils. Palaeoecological studies should help clarify the status of what could be a very significant early saltern. Fenland Management sites of this period produced few well preserved environmental indicators and the material from Welland Bank could produce important new information for this period (P.Murphy, pers. comm). Assessment by James Rackham of the bone assemblage from the 1995 evaluation suggests a mainly pastoral economy, although salt production may have played an important part. The collection is generally in good condition and has a range of survival which should allow a relatively good consideration of the Late Bronze Age economy of the site.

Recognition of the importance of the archaeological deposits at the Welland Bank Pit site led to significantly improved methods and conditions in dealing with remains located in the eastern part of the quarry. A geophysical survey using a magnetometer revealed anomalies at the south-east and north-east corners of this area. Stripping of topsoil from over the site began early in 1996 under archaeological supervision. Initially few archaeological features were revealed. However, the western end of a large, ditched enclosure with a low, internal gravel bank surviving to an average height of around 0.30m was identified in the eastern part of the stripped area. Within this enclosure significantly high levels of archaeological activity were present and in May of 1996 a three week archaeological excavation was undertaken in the south-western corner of the quarry. This excavation was followed by a six week project to record the archaeology in the area to the north of the first two week excavation (known as the East side excavation).

At the northeast corner of the area covered by the 1995 investigations a 50m x 30m area had been left unextracted. This was partially excavated in June 1996. At least two circular post built structures were recorded, along with gullies and deep pits.

Analysis of the pottery found during these excavations suggests the archaeological deposits at the eastern end of the quarry are broadly contemporary with the Late Bronze Age remains identified during earlier phases of work in areas further to the west. However, at the eastern end of the quarry the nature of the remains appears to be significantly different. Evidence for domestic activity in the form of structures, pits, ditches and post holes containing high levels of pottery, animal bone or other domestic refuse was uncommon. Within the ditched and banked enclosure and at the south-east corner of the quarry a complex of rectilinear gullies were identified which may be interpreted as part of a system for the management of domestic farm animals, similar perhaps to the system in use at Fengate near Peterborough in the Late Bronze Age (Pryor, 1996). Also recorded in the eastern area was a burnt mound, probably of Late Bronze Age date. Possibly this feature represents the cooking activities of those engaged in stock management activities. Immediately south of the northern limit of the main banked enclosure ditch, and north of the rectilinear enclosure complex, a discreet area of archaeological activity was recorded. Here, a large, 1.46m deep, 3m long and 1.7m wide triangular pit and an adjacent group of post holes delimiting an approximately rectangular area were located south-west of a circular structure. Two parallel gullies, one metre apart and

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between 10mm and 60mm deep, extended from the eastern limit of excavation and terminated adjacent to the post hole group. It is likely that these gullies represent ruts cut by a Late Bronze Age wheeled vehicle. If so, they would be unique in Britain. Very little pottery or animal bone was recovered from any of these features and it is possible that the complex as a whole represents an as yet unidentified industrial process. Possible interpretations for the function of the pit include hemp retting or tanning. Results of the processing of the environmental samples may help determine the function of the pit.

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Statement of pollen content in cores from Welland Quarry (WQE96)

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Three monoliths from the site were collected by the excavators and sent for testing to see whether pollen was preserved there. This is not a full assessment, but rather a brief statement to be faxed.

subsamples

lab nr	monolith, <sample>	subsample place	
2)	WQE96 <2089>	box 2	10 cm from top
3)	WQE96 <2089>	box 2	40 cm from top
4)	WQE96 <2089>	box 1	30 cm from top
5)	WQE96 <2090>	-	20 cm from top
6)	WQE96 <2091>	box 2	25 cm from top
7)	WQE96 <2091>	box 1	5 cm from top
8)	WQE96 <2091>	box 1	25 cm from top

note; <2091> was marked on the section diagram with box 2 above box 1, while in the case of 2089 box 1 was on top of box 2. Looking at the stratigraphy of <2091> it looks as though box 1, with a layer of grey clay in the top few cm, might in fact be the upper one - which is right?

Processing

Subsamples of about 1 cm³ were taken from the cores with a cork borer. The material was selected as the likeliest to contain pollen, for example the crumbly peat sediment, and some of the clay, although the monoliths did not look very organic or waterlogged, as a whole.

These samples were very quickly processed for pollen analysis and pollen slides made. Four of these have been partially counted, and the rest scanned for pollen.

The results so far obtained are that pollen is present in most of the samples for a pollen count to be at least possible.

Table 1; POLLEN RESULTS

sample	2	3	4
trees			
<i>Quercus</i>	2	17	1
<i>Pinus</i>	1	-	-
<i>Fagus</i>	-	-	1
<i>Alnus</i>	17	5	3
<i>Corylus</i>	5	7	-
herbs			
Poaceae	4	12	6
Chenopodiaceae	2	1	1
Cichorioidae	-	10	3
<i>Aster</i> -type	1	1	2
Brassicaceae	1	-	-
<i>Mentha</i> -type	-	1	-
<i>Plantago lanceolata</i>	1	8	-
<i>Ranunculus</i>	1	-	1
wetland			
Cyperaceae	1	8	4
<i>Ranunculus Batrachium</i>	-	1	-
? <i>Menyanthes</i>	-	+	-
<i>Sparganium</i> -type	1	-	-
cf. <i>Sagittaria</i>	1	-	-