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70 WHITECROFT ROAD, MELDRETH
ARCHAEOLOGICAL EXCAVATION

RESEARCH ARCHIVE REPORT

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District: South Cambs	Site Code: ECB5845
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Project dates (fieldwork)	*2nd – 26th October 2019*		
Previous work (Y/N/?)	*Y*	*Future work*	*N*
P. number	*P7977*	*Site code*	*ECB5845*
Type of project	*Archaeological excavation*		
Site status	-		
Current land use	*Demolished dwelling*		
Planned development	*Residential*		
Investigation Techniques	*Archaeological Test-Pitting; Soil Macromorphological Analysis; Soil Mircromorphological Analysis*		
Main features (+dates)	*Hollow and an undated ditch*		
Significant finds (+dates)	*Neolithic flint and medieval pottery*		
Project location			
County/ District/ Parish	*Cambs.*	*South Cambs.*	*Meldreth*
HER/ SMR for area	*Cambridgeshire Historic Environment Record (CHER)*		
Post code (if known)	*SG8 6LS*		
Area of site	*c.0.41ha*		
NGR	*TL 3732 4586*		
Height AOD (min/max)	*c.20m AOD*		
Project creators			
Brief issued by	*Cambridgeshire County Council*		
Project supervisor/s (PO)	*Archaeological Solutions Ltd*		
Funded by	*Bushmead Homes Ltd*		
Full title	*70 Whitecroft Road, Meldreth, Cambridgeshire. Research Archive Report*		
Authors	*Bingham, K.*		
Report no.			
Date (of report)	*Oct 2020*		

70 WHITECROFT ROAD, MELDRETH
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RESEARCH ARCHIVE REPORT

SUMMARY

In October 2019, Archaeological Solutions Ltd (AS) conducted an archaeological excavation at 70 Whitecroft Road, Meldreth, Cambridgeshire. The excavation was undertaken to provide for the requirements of a planning condition attached to planning approval for the proposed erection of nine dwellings and associated access. It was required by the LPA, based on advice from Cambridgeshire County Council Historic Environment Team (CCC HET). The excavation was preceded by an archaeological trial trench evaluation (Locke and Podbury 2019).

The trial trench evaluation recorded post-medieval furrows that correspond with the alignment of historic field boundaries, and residual sherds of medieval pottery in the subsoil. The principal archaeological feature present was a large hollow which contained flint and pottery of early Neolithic date. The hollow contained multiple silty grey fills which appear to represent the accumulation of material through alluvial action. The subsequent excvavation was focussed on the area in which the hollow was identified. The area was stripped and the hollow was investigated through a programme of systematic test pitting, comprising a series of gridded test pits excavated in a chequerboard pattern across 50% of the hollow. The test pits measured 2m x 2m and dry sieving of the deposits was undertaken. Finds recovered from the hollow demonstrated Neolithic activity in the area during the period in which the lower fill accumulated. The upper fill contained artefactual evidence predominantly of Roman and medieval date. In addition, a ditch of probable medieval date was recorded.

1. INTRODUCTION

1.1 This document comprises the Research Archive for archaeological excavations carried out by Archaeological Solutions Ltd (AS) at at 70 Whitecroft Road, Meldreth, Cambridgeshire (NGR TL 3732 4586; Figs. 1 - 2) during October 2019. The excavation was undertaken to provide for the requirements of a planning condition attached to planning approval for the proposed erection of nine dwellings and associated access (South Cambs Council Approval Ref. S/0241/18/FL). It was required by the LPA, based on the advice from Cambridgeshire County Council Historic Environment Team (CCC HET). The excavation was preceded by an archaeological trial trench evaluation (Locke & Podbury 2019).

1.2 The excavation was carried out in accordance with a *Brief for Archaeological Investigation. 70 Whitecroft Road, Meldreth* (Andy Thomas, dated 5 August 2019), and a specification prepared by AS (dated 6 August

2019), and approved by CCC HET. The excavation followed the procedures outlined in the Chartered Institute for Archaeologists' *Standard and Guidance for Archaeological Excavation* (revised 2014), and adhered to CIfA's *Standard and Guidance for Archaeological Excavation (revised 2014)*

2 SITE NARRATIVE

2.1 Overview

The principal objectives of the excavation were to preserve the archaeological evidence contained within the site by record and to attempt a reconstruction of the history and use of the site.

As set out in the CCC HET brief and below

- To examine the character and extent of Neolithic activity in this area;
- To further understand the pattern of land use in the Neolithic period in South Cambridgeshire;
- To further understand lithic technology in the Neolithic period in South Cambridgeshire;
- To look at the environmental setting of the site and the impact of human activity on the local environment; and
- Using the spectrum of environmental techniques appropriate for this aspect of investigation, an attempt will be made to model the landscape and its transformation brought about by the settlement's inhabitants and due to natural events.

Specific research priorities as identified in the WSI were:

- To place the activity in context with the known activity of these dates in the surrounding area;
- To characterise the activity present within the site;
- To identify topographical/geological/geographical influences on the layout and development of the activity present within the current site and in the surrounding area; and
- Environmental reconstruction.

Planning policy context

The National Planning Policy Framework (NPPF 2019) states that those parts of the historic environment that have significance because of their historic, archaeological, architectural or artistic interest are heritage assets. The NPPF aims to deliver sustainable development by ensuring that policies and decisions that concern the historic environment recognise that heritage assets are a non-renewable resource, take account of the wider social, cultural, economic and environmental benefits of heritage conservation, and recognise that intelligently managed change may sometimes be necessary if heritage assets are to be

maintained for the long term. The NPPF requires applications to describe the significance of any heritage asset, including its setting that may be affected in proportion to the asset's importance and the potential impact of the proposal.

The NPPF aims to conserve England's heritage assets in a manner appropriate to their significance, with substantial harm to designated heritage assets (i.e. listed buildings, scheduled monuments) only permitted in exceptional circumstances when the public benefit of a proposal outweighs the conservation of the asset. The effect of proposals on non-designated heritage assets must be balanced against the scale of loss and significance of the asset, but non-designated heritage assets of demonstrably equivalent significance may be considered subject to the same policies as those that are designated. The NPPF states that opportunities to capture evidence from the historic environment, to record and advance the understanding of heritage assets and to make this publicly available is a requirement of development management. This opportunity should be taken in a manner proportionate to the significance of a heritage asset and to impact of the proposal, particularly where a heritage asset is to be lost.

2.2 Description of the site

The site is located in the South Cambridgeshire District of Cambridgeshire, in the civil parish of Meldreth (Figs 1 & 2). It forms a rectangular-shaped parcel of land encompassing some 0.41 hectares and is located in the north-eastern area of the village. The site was the house, garden and outbuildings of 70 Whitecroft Road (now demolished).

2.3 Background

2.3.1 Topography, geology and soils

The site is located at *c*.20m AOD in a relatively low-lying area. South of Melbourne, a village some 1km south-east of Meldreth, the land rises substantially to *c*.48m AOD. The closest watercourse to the proposed development site is the River Mel, which lies approximately 450m east (Fig. 1).

The solid geology in the area consists of West Melbury Marly Chalk Formation chalk, formed in the Cretaceous period (BGS 1991). Overlying the solid geology is freely draining lime-rich loamy soil. The SSEW (1983) characterises the soils of the area as being those of the Sherborne association, which are described as shallow, well-drained, brashy calcareous clayey soils over limestone, associated with slowly permeable calcareous clayey soils. Also present in the vicinity of the site are soils of the Milton association, which are described as deep permeable calcareous fine loamy soils variably affected by groundwater and some similar shallower well drained soils over gravel in places (SSEW 1983).

2.3.2 Archaeological and historical background

The site is located within a general landscape known for multi-period archaeological remains, recorded on the Cambridgeshire Historic Environment Record (CHER). A Neolithic polished flint axe is recorded *c*.600m to the north, with a scatter of flint debitage flakes further to the north (CHER 03426 & 03136a). A crop mark *c*.950m to the south suggests the presence of a Bronze Age barrow in the landscape (CHER MCB23525), while a late Bronze Age hoard found at Meldreth Station *c*.500m to the south-east highlights the importance of the prehistoric landscape (CHER 03117). The hoard contained over 60 items, including two palstaves, 25 socketed axes, a gouge, a chisel, a knife, nine swords, three socketed spearheads, a cauldron ring and 15 possible ingots.

The Iron Age and Roman landscape appears to demonstrate a more intense, continual pattern of occupation. The ancient trackway of the Avenell Way passes *c*.75m to the south of the site (CHER MCB19147). This was a hollow way, ditched on the sides, which could be used for early vehicles. It ran between Odsey and Meldreth before becoming disused and in-filled sometime between the 10th and 13th centuries. Its precise date is unknown but excavations along the route have shown the presence of Iron Age/Roman structures indicating it was in use by this time. Also prominent in the Roman landscape was a burial site on Mettle Hill *c*.800m to the west, where a lead coffin, jewellery and five unguentaria were recorded (CHER 03167); and also the probable original location of a suspected Roman stone coffin now located in Holy Trinity Church (CHER 03060B). Extensive Iron Age to Roman enclosure systems, potentially including settlement and buildings have been identified as cropmarks in the local landscape, notable *c*.800m-1km to the south (CHER 08557, 08563, MCB23525 & MCB25638), and also *c*.1km to the west and east (CHER MCB23362 & 08909).

The local landscape appears to have undergone significant transformation in the late Anglo-Saxon and medieval periods. Notably Flambard's Manor *c*.300m to the east has produced Saxon pottery, as well as a moat that appears to have been at least partially cut in the late Saxon period (CHER 01275 & 01275a). Saxo-Norman ditches were also recorded *c*.300m to the north (CHER MCB19820), while late Saxon pottery has been found close to other medieval moated sites in the local area (CHER 02113 & MCB19435). In addition to the medieval moated enclosure and manor at Flambard's near the site, the landscape to the north and south of the village contained further moated enclosures at St. John's College Farm, Topcliffe's Mill, Sheene Farm and Vesey's Manor (CHER 01246, 01249, 01251 & 01252). The core of medieval Meldreth appears to have been focussed on Holy Trinity Church, built in the 12th century *c*.950m to the north, and once had a significantly larger burial ground (CHER 03060, 03136, 03062, 03118 & 03425). Fragments of medieval to post-medieval field boundaries have previously been recorded during evaluation excavations within *c*.500-700m east and south of the site (CHER MCB23524 & MCB25637). The site appears to have been removed from the post-medieval cores of settlement, in part evidenced

by modest numbers of extant listed building along the High Street to the north and Chiswick End to the south. In the late 19th century a Congregational chapel and villa were built within the 200m of the site (CHER MCB24552 & MCB2455) after the landscape of the village had been altered by the establishment of the railway *c*.500m to the south-east in 1851 (i.e. CHER MCB24042 & MCB16571).

2.3.3 Previous Archaeological work

A trial trench evaluation of the site was carried out in 2019 (Locke and Podbury 2019; CHER ECB 5845; Figs. 3 & 4). In summary:

The trial trench evaluation recorded post-medieval furrows that correspond with the alignment of historic field boundaries, and residual sherds of medieval pottery in the subsoil. The principal archaeological feature present was a large hollow which contained flint and pottery of an early Neolithic date. The hollow contained multiple silty grey fills which appear to represent the accumulation of material through alluvial action; a hypothesis supported by the molluscan evidence which suggests the hollow was water-filled and well-vegetated. Artefactual evidence contained in the silty fills comprise non-diagnostic body sherds of pottery, struck flint blade cores and flint debitage that appear consistent with a date in the early Neolithic period. The presence of Neolithic activity in the local landscape has been previously suggested by scatters of debitage flakes and a polished axe recovered as surface finds in the local vicinity (CHER 03426 & 03136a). The hollow represents prehistoric activity, probably seasonal or episodic, that utilised a water-filled hollow as a resource or landscape marker. Such a pattern of ephemeral settlement and settlement mobility, possibly through seasonal transhumance, is consistent with the pattern evident in much of southern Cambridgeshire (Pollard 2000, 7).

2.4 Excavation Methodology and Deposit Model

2.4.1 Excavation Methodology

Based on the results of the trial trench evaluation (Locke and Podbury 2019; Figs 3 & 4) CCC HET required a programme of open area excavation to further investigate archaeological remains within the site. Specifically, an area of excavation was identified within the brief and it was proposed excavate the large hollow revealed within Trench 1 of the evaluation through a programme of systematic test pitting, specifically:

• An initial series of gridded test pits will be excavated in a chequerboard pattern across 50% of the hollow as it is exposed. The test pits will be 2m x 2m. Dry sieving of deposits will be undertaken, and bulk samples taken from each test pit in order to retrieve any flint debitage.

• Following excavation of 50% of the feature, the strategy for excavating the remaining 50% will be agreed with CCC HET at an on-site meeting.

Environmental Research Design and Strategy

The trial trench evaluation revealed a large depression (F1010), which was sampled for mollusc shells, as well as for carbonised plant macrofossils. The findings from the mollusc investigation indicated a natural, wet depression which would have been well vegetated and likely to be prone to seasonal fluctuations in water-level, perhaps largely becoming dry in drier seasons. Evidence from the mollusc assemblage indicated that it was surrounded by dense vegetation, although there was also some evidence of grassland taxa, which may indicate grassland or grazed pasture in the near vicinity. A landscape feature such as this may have attracted transient human activity, perhaps as a convenient watering hollow for animals. The assemblage was relatively consistent throughout the profile, although aquatic taxa made a smaller contribution in the upper fills as the feature silted up and became drier.

A monolith sample for palaeoenvironmental analysis was also taken but no further work was recommended on this. Discussion with Prof. Rob Scaife, University of Southampton, highlighted the fact that the alkaline conditions and lack of permanent waterlogging within the feature are likely to have resulted in degradation of most of the pollen in the deposits.

Based on the results from the evaluation, no further environmental sampling of the depression was to be carried out unless deposits with markedly different potential for the preservation of organic remains were encountered during the excavation.

Although only a small assemblage of carbonised plant macrofossil remains was gathered from the evaluation, the number of features investigated was low. As such, further sampling was undertaken to better understand whether this low density of remains is consistent across the site.

A total of 13 test pits were excavated out of 23 (Fig. 5; DPs 1-3). The test pits avoided the area of the demolished buildings. The results of the test pitting were assessed, and the excavation ceased based on advice from CCC HET.

The excavated spoil was sieved to enhance the finds recovery and the excavation area was scanned by metal detector. 100% of the soil removed from the hollow was put through a 10mm fine sieve supported by a frame. Forty litre bulk samples were taken from each deposit within each excavated test square.

2.4.2 Deposit Model

The natural substrate recorded at the site (L2002) was a firm, very light yellow clayey silt with frequent chalk. This was overlain by Subsoil L2001, a firm, mid

grey brown yellow clayey silt with occasional small to medium sub-angular flint. Overlying this was topsoil L2000, a loose dark brown to black silt.

2.5 Hollow F2003

Within the south-western part of the excavation area, a large hollow (F2003) was present (Fig.5; DPs 1-8). This was recorded during the preceding trial trench evaluation as F1010 (Locke and Podbury 2019). Hollow F2003 measured 18.50+ x 10.00+ x 0.95m; its full extent was not revealed within the excavation area but it appeared to be aligned with its assumed long axis running north to south. It had a gentle break of slope steepening into moderately sloping sides and a flat, undulating base. It contained two fills (Figs. 6-8). Its basal fill, L2005, was a firm, mid blue grey silty clay, which is likely to have been deposited through natural silting, perhaps during seasonal ponding within the hollow. It contained struck flint (1080g), burnt flint (175g), prehistoric pottery (24; 82g) and seemingly intrusive medieval pottery (14; 46g).

Its upper fill, L2004, was a friable, mid grey brown clayey silt with moderate small sub-angular and sub-rounded flint inclusions. Multiperiod activity could be seen within this upper fill with struck flint (3568g), burnt flint (321g) alongside Roman and medieval pottery (see pottery reports, below) and a variety of other finds. The hollow had no relationship to other features recorded during the excavation or evaluation phase.

Hollow F2003 is a topographical hollow or depression in the surrounding marly chalk resulting from fluvial action probably during the late glacial period. This created an erosional depression that appears, on the basis of molluscan evidence (see below), to have been prone to seasonal flooding. The fills recorded within the depression are likely to be the result of soil creep and inwash from soil erosion events.

2.6 Ditch F2006

Ditch F2006 was situated in the western corner of the site (Fig 5; DPs 9-10). It was linear in plan (4.00+ x 1.20+ x 0.50m) and orientated north-east to south-west. It had moderately sloping sides and a concave base. It contained two fills. Its basal fill, L2007, was a mid brown grey clayey silt with occasional small chalk nodules. Its upper fill, L2009, was a dark grey brown clayey silt with moderate small sub-angular flint. Two sherds of medieval pottery were recovered from the basal fill, L2007.

Ditch F2006 ran at a slightly oblique angle to Whitecroft Road to the west. This suggest that the feature was not directly related to the road, not representing a roadside ditch or similar feature, unless the alignment of Whitecroft Road itself has changed over time. The relationship of Ditch F2006 to the Hollow F2003 is unknown due to the limits of the excavation.

3 SPECIALIST REPORTS

3.1 The Struck Flint

Andrew Peachey

Excavations recovered a total of 481 pieces (2158g) of struck flint in a sharp condition but with widely varying degrees of patination (absent to heavy), consistent with significant weathering and movement of deposits. The assemblage was entirely contained in the fills of Hollow F2003 and was recovered through a sampling strategy of test pits, which produced 376 pieces (1414g) from L2004 and 105 pieces (744g) from L2005. The technological traits of the assemblage suggest this is a very homogenous group consistent with the core reduction strategies and implements of the early Neolithic period, including exhausted single platform and rotated blade cores, blades, a leaf-shape arrowhead and dominated by relatively small blade-like debitage produced as a by-product of the types of core reduction identified (Table 1).

Find/type	**Frequency**	**Weight (g)**
Core	7	344
Core fragment	10	257
Platform creation flake (sub-rectangular <50mm)	2	92
Core rejuvenation flake	4	93
Blade	12	46
Arrowhead	1	1
End scraper	5	56
Piercer	1	27
Tertiary flake (blade-like <50mm)	176	662
Un-corticated flake (blade-like <50mm)	254	410
Tertiary flake (broad-squat <50mm)	8	161
Un-corticated flake (broad-squat <50mm)	1	9
Total	*481*	*2158*

Table 1: Quantification of struck flint by type

The assemblage was produced utilising good quality dark grey to near black raw flint with, where present, a medium white cortex that is often slightly chalky, which may be the only contrast with the smooth opaque white patination that is common in vary degrees throughout the assemblage. The raw flint if of good quality and may have been sourced from the White Chalk sub-group to the south of Meldreth, on the edge of the Chiltern Scarp, and the Melbury Marly Chalk formation that underlies the immediate locality is typically not flint-bearing.

Methodology

The flint was quantified by fragment count and weight (g), with all data entered into a Microsoft Excel spreadsheet that will be deposited as part of

the archive. Flake type (see 'Dorsal cortex,' below) or implement type, patination, colour and condition were also recorded as part of this data set, along with free-text comments.

The term 'cortex' refers to the natural weathered exterior surface of a piece of flint, and the term 'patination' to the colouration of a flaked surface exposed by human or natural agency. Dorsal cortex is categorised after Andrefsky (2005, 104 & 115) with 'primary flake' referring to those with cortex covering 100% of the dorsal face; 'secondary flake' with 50-99%; 'tertiary' with 1-49% and 'un-corticated' to those with no dorsal cortex. A 'blade' is defined as an elongated flake whose length is at least twice as great as it's breadth, often exhibiting parallel dorsal flake scars (a feature that can assist in the identification of broken blades that, by definition, have an indeterminate length/breadth ratio). Terms used to describe implement and core types follow the system adopted by Healy (1988, 48-49).

Discussion

The technology of the assemblage is highly focussed on the production of blades, as characterised by type-assemblages in East Anglia such as those from early Neolithic settlement sites at Hurst Fen, Mildenhall (Clark *et al.* 1960, 217), Etton, Peterborough (Middleton 1998) and Kilverstone, Norfolk (Beadsmore 2006, 66) where assemblages were recovered from pit groups and occupation spreads, rather than the fills of a hollow.

A total of seven complete but exhausted blade cores (mean weight: 49g) were present in the assemblage, each extensively reduced to maximum length/breadth dimensions of 25-35mm, with a depth of 30-45mm, and a profile that ranged from sub-pyramidal to cuboid. The most common type of blade core has a single striking platform, with examples in L2004 TP E, TP 35, L2005 TP 27 and TP 39, with only the former having flakes removed all the way around the circumference, and the remainder utilising less than half the circumference with the opposing face backed by cortex. This may reflect the use of smaller nodules and the limitations of available raw material, as a further core with two opposing platforms in L2004 TP 39 is clearly formed on a pebble, with limited removals from each platform, each using an opposing face. This basic blade core technology may have produced sub-rectangular flakes in L2004 and L2005 TP 39 that exhibit multi-directional dorsal flake scars (trimming), prior to being removed with a hard hammer, presumably to create the required striking platform on a small nodule. The persistent and continued use of small nodules may also have resulted in the shattering of several cores as attempts were made to prolong their viability, with fragments of broken single platform cores in L2004, L2004 TP E, TP 35, TP 37, L2005 TP 27 and TP 39 likely the result of attempt to work with small cores rather than a lack of skill or material imperfection. However, two cores and several rejuvenation flakes indicate that systematic and carefully maintained core reduction typical of the period allowed for extensive production of blades. Cores in L2004 TP E and L2005 TP 27 had clearly been rotated through 90 degrees to utilise striking platforms at right angles to one another. This

process of rejuvenation and maintenance is reflected by the present of flakes removed to create new platforms on existing cores, with flakes in L2005 TP 27 and TP 37 exhibiting a tablet-like profile and facets around half the circumference. This is likely to indicate a core that has been rotated through 90 or 180 degrees (potentially using 2-4 platforms). Sub-rectangular flakes in L2004 TP 30 and TP27 exhibit parallel blade scars perpendicular to the (hard hammer) direction of removal, suggesting that a previous working face was removed to create a new platform as a cuboid core was rotated. This range of cores, notably the dominance of single platform types, and the stages of rejuvenation, are commensurate with the technology evident in early Neolithic groups at Middleton (2006, 166, 223-224).

Relative to the number of cores, blades are actually very sparse in the assemblage, and is doubtful many were actual implements, but were rather coincidentally regular pieces of debitage. The bulk have a length a 35-45mm and parallel dorsal scars, corresponding to the size of the cores in the assemblage; with the notable exception comprising a blade in L2004 TP F that has a length of 70mm and traces of wear from cutting on one lateral edge. The bulk of the debitage with blade-like profiles also falls into this size range, though includes a substantial degree of smaller material, often <20mm where larger groups are present in L2004 TP 35, TP 39 and L2005 TP 27; potentially the result of platform trimming and shaping as there is little evidence for platform abrasion (preparation/maintenance); but no matter the purpose, these flakes are often close to true blades thus highlighting the blurred distinction between un-utilised blades and debitage. Approximately 60% of the blade like debitage is un-corticated, and the remainder comprised of tertiary flakes with very limited cortex remaining, further consistent with the trimming and systematic reduction evident on the cores. Both the blades and the larger groups of debitage appear to have consistently small and neat bulbs-of-percussion, suggesting soft-hammer or indirect percussion was applied to the cores, but often this is inconclusive.

There is a very limited array of re-touched implements in the assemblage, but these are also consistent with those that characterise early Neolithic assemblages in the region. Most notably, they include a small leaf-shape arrowhead in L2005 TP 33. The arrowhead is very simple and of low investment in terms of time and skill, utilising either a small blade or possibly a Janus flake with slight bulges to the faces at either end. It is small (30x20mm) with shallow, non-intrusive, bi-facial retouch to only the edges, creating a rounded kite-shape profile that exhibits no evidence of damage or wear. The only scrapers present are end scrapers, of small to medium size, with two examples in L2004 TP D and L2005 TP 27 manufactured by the application of abrupt retouch around the distal end of blade-like flakes. A further three scrapers in L2004, L2004 TP D and L2005 TP 33 were manufactured on thicker sub-circular flakes. This latter type may have been hafted as they typically appear to have broken or shattered butts, a relatively uncommon phenomenon, but appearing to represent damage in antiquity and perhaps during their final use. The final implement is a piercer in L2005 TP 39, which utilises the ‘natural’ crested point of an elongate flake, enhanced by uni-facial abrupt retouch to both lateral edges to create a point that does not exhibit any

evidence of wear, thus may have been used to pierce a softer material such as animal hide, leather or bone, rather than as a graver on harder materials.

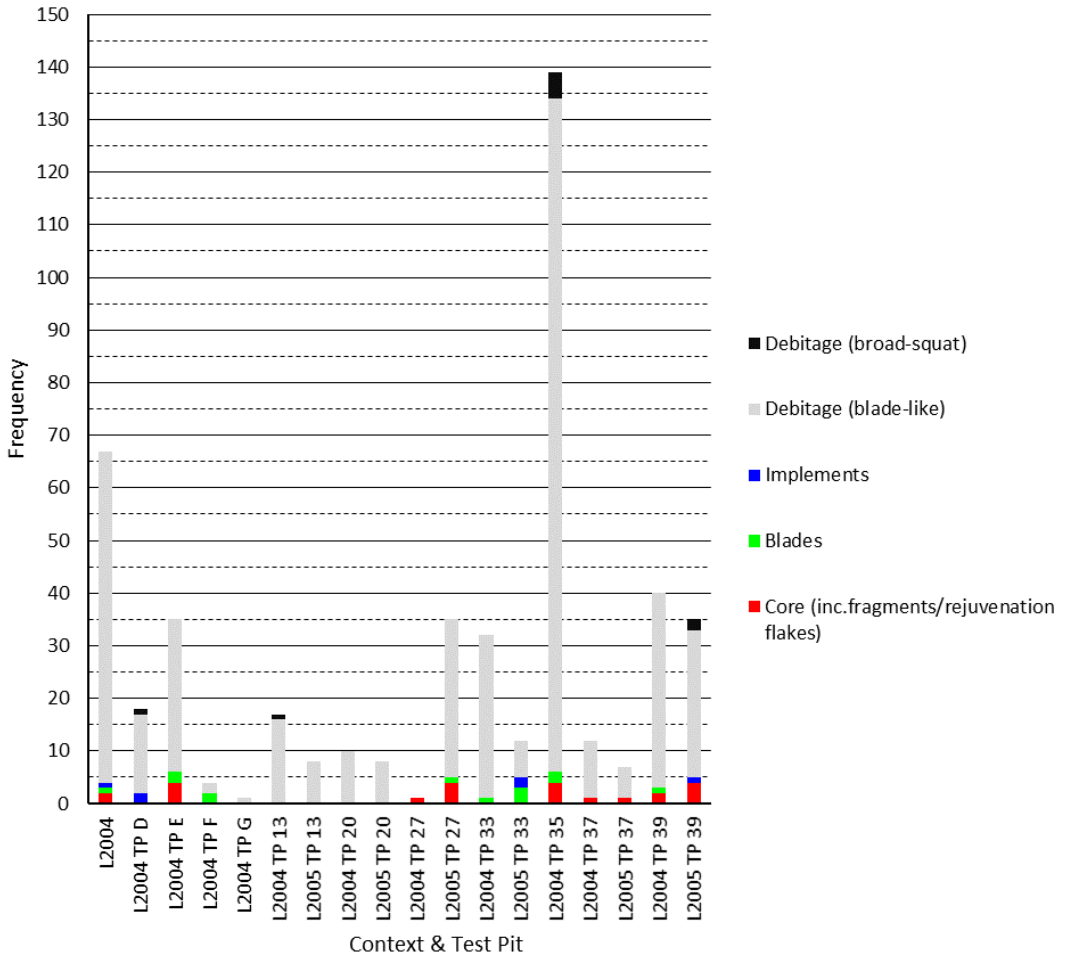

Table 2: Distribution of struck flint by type

The systematic reduction of cores to produce blades, albeit potentially with limited raw material, including some platform rejuvenation and a prevalence of un-corticated and tertiary flakes, combined with a limited array of characteristic implements is typical of early Neolithic activity in the region, and closely comparable to the significantly larger settlement assemblage from Kilverstone (Beadsmore 2006, 58-59 & 66-67). The deposits within a hollow such as F2003 are unlikely to represent such primary evidence but settlement activity may have been situated close to its margins. Alternatively, the material may have been washed in from an area of activity in the immediate vicinity. The consistent presence of cores associated with debitage in the various test pits (Table 2), suggests that the hollow was not significantly removed from an area of settlement. The moderate concentrations of debitage in L2005 TP 27, L2004 TP 33, L2004 TP 35, L2004 and L2005 TP 39, suggest that blade production was a key activity as part of this settlement, with the range of exhausted and discarded cores suggesting that this was more than episodic or expedient demand. However, the relative lack of blades and scrapers, combined with the lack of skill evident in the arrowhead, indicates that other

processing (and hunting?) activities were perhaps focussed further away from the hollow and deposited elsewhere.

3.2 The Prehistoric and Roman Pottery

Andrew Peachey

Archaeological investigation recovered a total of 78 sherds (328g) of prehistoric and Roman pottery (Table 3) in a highly fragmented condition and entirely contained in the fills of Hollow F2003, perhaps as residual or accumulated material as medieval sherds were also present. The prehistoric pottery appears limited to very small fragments of early Neolithic Plain Bowls, while the Roman pottery does not appear to pre-date the 2nd century AD and includes samian ware from central Gaul.

Period	Sherd Count	Weight (g)
Prehistoric	60	226
Roman	18	102
Total	*78*	*328*

Table 3: Quantification of pottery by period

Methodology

The pottery was quantified by sherd count, weight (g) and R.EVE with fabrics examined at x20 magnification, and rims/decorated sherds recorded in free-text comments in accordance with 'A Standard for Pottery Studies in Archaeology' (Barclay *et al* 2016), developed from the guidelines of the Prehistoric Ceramics Research Group (PCRG 1995) and the Study Group for Roman Pottery (Darling 2004; Willis 2004). Fabric codes and descriptions for Roman pottery are cross-referenced, where possible, to the National Roman Fabric Reference Collection (Tomber & Dore 1998) or regional kiln/type series; Samian ware forms reference Webster (1996). All data has been entered into a Microsoft Excel spreadsheet that forms part of the site archive.

Prehistoric Pottery

The prehistoric pottery is manufactured in a fabric tempered with common calcined flint (1-4mm) that commonly protrudes from the surface, and with a patchy bonfire firing. The mean sherd size is very small at 3.76g, but small fragments of slightly out-curving rims with rolled tips were recovered from Hollow F2003 (L2004 TP E, L2004 TP 37, and L2005 TP 33). Those from L2004 TP E and L2005 TP 33 may be from a single vessel but are non-cross-joining. Small groups, typically 3-6 sherds, were recovered from several test pits into L2004 and L2005, but no cross-joins were identified and although some are conceivable from the same vessels, it is clear multiple vessels are represented. Based on limited evidence, it is almost certain that these sherds formed part of early Neolithic Plain Bowls, typically associated with Mildenhall Ware in early Neolithic assemblages in the region, including at Hurst Fen, Mildenhall (Clark *et al.* 1960), Kilverstone, Thetford (Knight 2006a) and Sawston (Peachey 2018, fig.43). The limited incidence of diagnostic sherds

and the extent of profiles restricts further statistically valid comparisons and is not dissimilar to fragmentary and eroded character of the early Neolithic assemblage from the Causewayed Enclosure at Haddenham (Gdaniec 2006, 305).

Roman Pottery

The 18 sherds (102g) of Roman pottery incorporate four fabrics, described below, and quantified in Table 4.

LMV SA	Les Martres-de-Veyre samian ware (Tomber & Dore 1998, 30) LEZ SA2
LEZ SA2	Lezoux samian ware 2 (Tomber & Dore 1998, 32)
HOR OX	Horningsea oxidised ware (Tomber and Dore 1998, 116; Evans 1991, 35; Evans et al 2017, 52). Dark orange surfaces with a mid-orange-brown core. Inclusions comprise common quartz (0.1-0.5mm) with sparse limestone and grog/ironstone (generally <2mm) and occasional flint (0.5-5mm)
GRS1	Sandy Grey ware. Mid grey, occasionally with oxidised margins or core. Inclusions comprise common moderately sorted quartz (0.1-0.25mm, occasionally to 1mm), sparse fine mica and dark grey/black iron ore or iron rich pellets (0.2-0.5mm), and occasional flint (<3mm).

Fabric	Sherd Count	Weight (g)
LMV SA	2	9
LEZ SA2	1	1
HOR OX	1	34
GRS1	14	58
Total	*18*	*102*

Table 4: Quantification of Roman fabric types

The Roman pottery included three sherds of samian ware from central Gaul. Notably, this includes a LMV SA Dr.18 dish imported in the early 2nd century AD in Hollow F2003 (L2004 TP13), while a flake of LEZ SA2 was also present in L2004 TP 37.

The remaining Roman pottery was limited to locally-produced coarse wares, notably a shallow plain rim dish manufactured in the kilns at Horningsea (HOR OX) in Hollow F2003 (L2004 TP F), which was a utilitarian form with a long currency in the 2nd to 4th centuries AD. The other Roman coarse wares were entirely comprised of plain body sherds of sandy grey wares (GRS1), possibly including further Horningsea products although this was not conclusive, and likely derived from closed forms such as jars but no diagnostic sherds were identified.

3.3 Medieval Pottery

Peter Thompson

The archaeological evaluation recovered 80 Post-Roman sherds weighing 362g (Table 5), all of the sherds derived from test pitting of a Hollow bar two 12th-13th century coarseware sherds from Ditch F2006, and a sherd of similar date from layer L2008. The pottery from the hollow was all medieval excepting a single sherd of London type stoneware (17th-19th centuries), with unabraded

surfaces, which came from Test Pit 27, while a fragment of fibreglass also came from this pit. Four glaze medieval sherds came from the hollow comprising three of Hedingham Ware and one of Brill Ware. The remaining pottery from the test pits were all abraded sandy and shelly coarsewares dating between the 12th and 14th centuries, with only one jar rim sherd and a fragment each of a strap handle and a base sherd, present the remainder being body sherds.

Methodology

The sherds were examined under x35 binocular microscope and recorded according to the Medieval Pottery Research Group Guidelines (Barclay *et al*. 2016). Fabric codes are those used for the Cambridgeshire County Council pottery type series (Spoerry 2016).

KEY:
MSW: Medieval Sandy Coarseware mid 12th-15th
EMEMS: Early Medieval Micaceous Courseware mid 11th-13th
MEMS: Medieval Micaceous Essex type ware mid 12th-14th
OLSW: Oolitic Sandy Ware 12th-14th
SSHW; Medieval Sandy Shelly ware mid 12th-15th
SHW: Medieval Shelly Ware mid 12th-15th
HDEIC: Hedingham Coarseware 12th-early 14th
HEDI: Hedingham Fine Ware mid12th-early 14th
BRILL: Brill Ware13th-15th
LOND: London type Stoneware late 17th-19th

Feature	Context	Quantity	Date	Comment
2003	2004	13x39g MSW 2x6g MSW[1] 1x10g MSW[2] 2x19g SSHW 2x1g SHW 2x7g HEDI	Mid12th-early 14th	MSW: Abraded body sherds MSW[1]: contain quite fine calcined flint, x1 has two incised horizontal lines or rilling MSW[2]: contains sparse burnt organics, two incised horizontal lines or rilling
2003	2004 TP13	4x9g MSW 2x22g SSHW 7x32g HEDIC	Mid 12th-early 14th	SSHW: part of a strap handle
2003	2004 TP20	2x17g MSW 1x2g MEMS 1x10g OLSW 1x13g BRIL	Early 13th-14th	OLSW: thickened everted jar rim BRILL: fairly flat jug base 4cm diam (-.5 reve)
2003	2004 TP27	3x9g MSW 1x1g SSHW 1x6g HEDI 1x5g LOND	17th-19th	1x10g fibre glass

2003	2004 TP37	9x38g MSW 1x1g MSW[1] 1x11g MSW[3] 1x3g MEMS 1x6g HEDI	Mid 12th-early 14th	MSW: x1 thickened externally extended jar rim 18 cm diam (0.1 reve) MSW3: x1 coarse rounded quartz similar to Essex Fabric 20
2003	2004 TP39	2x4g MSW 2x10 MSW[1] 1x8g MEMS 9x40g SSHW	Mid 12th-early 14th	
2003	2005 TP27	2x5g EMEMS	Mid 11th/12th-13th	
2003	2005 TP37	1x4g MSW[1] 1x11g SSHW	Mid 11th/12th-13th	
Ditch 2006	2007	2x10g EMEMS	Mid11th/12th-13th	
Layer	2008	1x7g EMEMS	Mid11th/12th-13th	

Table 5: Quantification of pottery by context

3.4 The Ceramic Building Materials

Andrew Peachey

A total of 14 highly abraded small fragments (100g) of CBM were recovered from Hollow F2003 (L2004, L2004 TP 27, L2004 TP 33 and L2004 TP 39). All were manufactured in a mid to dark orange fabric with inclusions of common fine silty quartz, sparse red iron rich grains (<0.5mm) and occasional flint (<5mm). This fabric suggests that the CBM is of Roman origin but there are no diagnostic fragments present. A single fragment in L2004 TP27 has an intact thickness of 15mm and appears flat, which may suggest it is derived from a tegula roof tile.

3.5 The Small Finds

Andrew Peachey

Archaeological investigations recovered a total of four iron nails from Hollow F2003 (Table 6), in a highly corroded condition and of indeterminate date, potentially manufactured from the Roman to post-medieval periods.

Fragments of pink quartzite and buff sandstone were also examined from Hollow F2003 (L2004 TP E and L2004 TP 39) respectively but were found not to have been worked or altered by human agency.

Feature	Context	Material	Frequency	Weight	Description
Hollow F2003	L2004	Fe	2	25	Two iron nails with broad, hollow domed heads (30 mm wide) and tapering square shanks (35mm long); probably door, furniture or upholstery fittings. Potentially Roman to post-medieval.
	L2004 TP 27	Fe	1	7	Nail, flat square head (15mm wide), tapering square shank (30mm long). Indeterminate date, Roman to post-medieval.

	L2004 TP 33	Fe	1	10	Nail, flat square head (13mm wide), tapering square shank (40mm long). Indeterminate date, Roman to post-medieval.
	L2004 TP39	Fe	1	5	Nail, flat square head (13mm wide), tapering square shank (40mm long). Indeterminate date, Roman to post-medieval.

Table 6: Iron nails

3.6 The Animal Bone

Julie Curl

Methodology

An analysis was carried out following a modified version of guidelines by English Heritage (Davis, 1992) and Baker and Worley, 2014. All of the bone was examined to determine range of species and elements present. A record was also made of butchering and any indications of skinning, hornworking and other modifications. When possible, ages were estimated along with any other relevant information, such as pathologies. Measurements were considered where appropriate following Von Den Driesch, 1976 and bones suitable for a tooth record following Hillson, 1996 recorded. Counts and weights were noted for each context and counts made for each species. Where bone could not be identified to species, they were grouped as, for example, 'large mammal', 'bird' or 'small mammal'. Attempts were made, where possible, to refit possible fragments in the same bag and these were included in NISP counts. As this is a small assemblage, information was recorded directly into appendix tables in this report.

The bone assemblage

Quantification, provenance and preservation

A total of 1475g of bone, consisting of 214 elements, was recovered from segments in a hollowl, which is quantified by count and weight in Table 7. Associated pottery suggests much of 2004 is of a medieval date, while 2005 is of an early Neolithic date with some medieval inclusions.

Context	Segments						Totals
	TP13	TP20	TP33	TP37	TP39		
2004	346g/37			164g/8	134g/45	32g/15	676g/105
2005		61g/8	98g/13	196g/18	436g/65	8g/5	799g/109
Total	346g/37	61g/8	98g/13	360g/26	570g/110	40g/20	1475g/214

Table 7. Quantification of the faunal remains by context, segment, weight and count.

Bone in this assemblage is generally in a heavily fragmented and poor condition. Some iron-rich sediment s and clay was encrusted on the bone and many surfaces are worn and show some root damage. Bone is quite fragile, with a few fresh breaks. Invertebrate (insect, isopod, molluscs) damage was high, indicating a slow or disturbed burial with exposure to a range of land

invertebrates and, at times, aquatic invertebrates. No canid gnawing was seen on any of the bone, perhaps indicating a lack of dogs or scavengers. No burnt bone was recovered.

The poor condition of the bone has led to a lack of butchering evidence, with any chop or cut marks eroded or damaged by invertebrates.

Species range and modifications and other observations

Three species were positively identified in the assemblage, which are quantified by species, context and NISP in Table 8.

Cattle were the most frequent, with fragments of tibia, radii, femur, humeri and tooth fragments in several segments. All of the cattle remains are from adults. Some adult teeth are in low wear and others in full wear, indicating remains of varying individuals.

Equid remains were seen in 2004. Fragments of humerus, radius and lower molars and pre-molar were found in TP13, with the small teeth suggesting an animal of mule or small pony size, the wear on the teeth suggests an aged animal. Equid metatarsal fragments, with some fresh breaks, were seen from TP39.

Pig/boar were produced from 2004, TP39 with a second molar and an unworn third molar was found in 2005, TP39; the low wear indicating young animals.

Unidentifiable **mammal** bone accounted for 146 pieces, although many of these were very small fragments. This bone lacked diagnostic features that could identify to species and the remains were heavily fragmented and worn with invertebrate damage.

Context	Species and NISP				Totals
	Cattle	Equid	Mammal	Pig/boar	
2004	13	16	75	1	105
2005	37		71	1	109
Totals	50	16	146	2	214

Table 8. Quantification of the faunal remains by context, species and NISP.

None of the animal bones could produce any metrical data that would have allowed estimation of stature

Discussion and conclusions

This is a small assemblage with a wide date range. Much of the assemblage is probably derived from butchering and food waste, but the lack of butchering evidence cannot confirm this. The mollusc assemblage included aquatic species, which might suggest a flooded and wet environment at times and

there is a possibility that some of the animals present could have been natural deaths of animals trapped in mud.

The range of species are common in all periods and the poor condition of the assemblage would probably eliminate small species such as birds and fish. Any of a Neolithic date may be from wild animals, particularly with equid and porcine remains, although the bovine elements were not of a sufficient size to suggest Aurochs. The lack of sheep is interesting, particularly with Medieval ceramics present, similarly, the lack of deer with earlier remains is surprising as they are normally a feature of earlier assemblage. However, the small size of the assemblage does affect the results.

Table 9
Catalogue of the animal bone recovered from ECB5845
Listed in context order.
A full catalogue is available as an Excel file in the digital archive.
Key:
NISP = Number of Individual Species elements Present
Measureable following Von Den Driesch, 1976.
Countable following Davis, 1992.
Butchering: ch = chopped, c = cut, s = sawn, sp = split

Context	Segment	Feature Type	Period	Ctxt Qty	Wt (g)	Species	NISP	Adult	Juvenile	Neonatal	Element range	Measureable	Countable	Butchering	Burnt	Gnaw	Comments
2004	TP13	Hollow	Medieval	37	346	Equid	10	1			humerus fragments, radius frag, lower molars and premolar		1				small equid, mule/small pony size, aged - well worn teeth
2004	TP13	Hollow	Medieval			Mammal	27				fragments						invert damage, some pieces with iron-rich soils
2004	TP37	Hollow	Medieval	8	164	Cattle	6	1			tibia frags, upper P3 and P4						worn, iron rich soil
2004	TP37	Hollow	Medieval			Mammal	2				fragments						
2004	TP39	Hollow	Medieval	45	134	Equid	6	1			metatarsal fragments		1				invertebrate damage, iron

																	rich sediment, some fresh breaks
2004	TP39	Hollow	Medieval			Cattle	7	1			radius frags, tooth frags						invertebrate damage, iron rich sediment
2004	TP39	Hollow	Medieval			Pig/boar	1		1		M2						
2004	TP39	Hollow	Medieval			Mammal	31				large mammal fragments						invertebrate damage, iron rich sediment, some fresh breaks
2004		Hollow	Medieval	15	32	Mammal	15				fragments						fragile, some fresh breaks; iron-rich soils, invert damage
2005	TP20	Hollow	?Early Neolithic	8	61	Cattle	2	1			radius frags						worn
2005	TP20	Hollow	?Early Neolithic			Mammal	6				fragments						
2005	TP33	Hollow	Early Neolithic	13	98	Cattle	12	1			humerus fragments						
2005	TP33	Hollow	Early Neolithic			Mammal	1				single fragment						heavily worn
2005	TP37	Hollow	Medieval	18	196	Cattle	6	1			humerus frags, Lower P4 and M1						humerus shows invert damage
2005	TP37	Hollow	Medieval			Mammal	12				fragments						fragile, some fresh breaks; iron-rich soils, invert damage
2005	TP39	Hollow	?Early Neolithic	65	436	Mammal	6				fragments						eroded surfaces

2005	TP39	Hollow	?Early Neolithic			Cattle	13	1			upper and lower molars, femur fragments						invert and root damage, worn. Worn lower M3s
2005	TP39	Hollow	?Early Neolithic			Pig/boar	1		1		unworn lower M3						
2005	TP39	Hollow	?Early Neolithic			Mammal	46				fragments						invertebrate damage, iron rich sediment, some fresh breaks, root damage
2005	Base	Hollow	?Early Neolithic	5	8	Cattle	4	1			P4 and tooth frags						low wear
2005	Base	Hollow	?Early Neolithic			Mammal	1				single fragment						

3.7 The Mollusc Assemblage

Julie Curl

Methodology

The molluscs were identified to species using a variety of reference material. Shells were catalogued by species and where appropriate, counts were made of the number of individual species present (NISP), counts of top and base shells and an estimate of the minimum number of individuals (MNI). Bivalve shells are known to be used as painter's palettes and the remains are examined for any traces of pigments. Shells are also examined for any cut marks that would confirm their use for food from the prising apart of the shells or removal of meat with a knife. Information was recorded directly into an appendix with this report.

The assemblage

A total of 35g of shell, consisting of 15 elements, was recovered from this excavation, which is quantified by feature type in Table 10 by feature, species and NISP. Shell was recovered from a variety of sediments within a hollow, with faunal material recovered with a variety of finds with pottery in a wide date range from Roman to Medieval and Neolithic material has also been recorded in the finds assemblage.

The shell is in reasonable to fairly fragmented condition, with surfaces of marine shell still showing remains of marine sponges that attests to the shell coming from a marine environment rather than farmed stock. Some freshwater molluscs have survived including an aquatic snail.

Context	Segment	Type	Period	Ctxt Qty	Weight	Species	NISP
2004		Hollow	Medieval	2	2	Dwarf Pond Snail	1
2004		Hollow	Medieval			Freshwater Mussel	1
2004	TP20	Hollow	Medieval	1	16	Marine Oyster	1
2004	TPF	Hollow	Roman	1	16	Marine Oyster	1
2004	TP37	Hollow	Medieval	11	1	Marine Mussel	11
			Totals	15	35g		15

Table 10. Quantification of the mollusc assemblage.

Species and observations

A total of four species were identified, two of marine origin, two from freshwaters.

Marine oyster, *Ostrea edulis*, was found in 2004 TPF and TP20; an abundant species in coastal areas and shallow waters. Marine Mussel, which is found in the same environment, was identified with fragments from 2004, TP37.

Freshwater molluscs were seen in 2004, with two species. One fragment of freshwater mussel was identified, these larger mussels reach over 10cm in length and live in a range of rivers and ponds, often in shallow areas. One complete shell from a Dwarf Pond Snail (*Lymnaea truncatala*), a small pond snail reaching just

12mm in height and common in shallow waters, ditches, streams, temporary pools and small bodies of water; these snails will remain inactive in mud during droughts.

Discussion and conclusions

This is a small shell assemblage and of mixed origin, with marine and freshwater species. It includes remains of the most frequent food species on archaeological sites. Some marine shells can come inland with floods, but such shells this distance from the coast suggest they were from food waste. The freshwater shells both suggest they came from shallow areas of water and may have been washed into an old river channel at times of floods and high tides, although freshwater mussels can be eaten.

Table 11. Catalogue of the mollusc remains from ECB5845

Context	Segment	Feature Type	Period	Ctxt Qty	Weight	Freshwater	Marine	Land	Fossil	Species	NISP	Top	Base	MNI	Apex	Fragment	Distort	Worms	Sponge	Barnacles	Attached	Cuts	Comments
2004		Hollow	Medieval	2	2g	1				Dwarf Pond Snail	1			1	1								good condition. Ditches, streams, pools, often acidic conditions.
2004		Hollow	Medieval			1				Freshwater Mussel	1			1		1							*Unionidae*, larger bodies of water
2004	TP20	Hollow	Medieval	1	1g		1			Marine Oyster	1		1	1	1				1				
2004	TPF	Hollow	Roman	1	1g		1			Marine Oyster	1	1		1	1		1		1				
2004	TP37	Hollow	Medieval	11	11g		11			Marine Mussel	11			1	1	11							

3.8 The Environmental Samples

Dr John Summers

Introduction

During the archaeological excavation at 70 Whitecroft Road, Meldreth, a large depression containing evidence of early Neolithic activity was defined and excavated in a pattern of test pits. Bulk samples were taken from both layers (L2004 and L2005) within the feature from numerous test pits, in part for the recovery of small flint artefacts. These samples were also sorted for the recovery of plant macrofossils and mollusc shells.

This work follows an initial trial trench evaluation of the site, which also investigated these deposits (Summers 2019). The evaluation determined that preservation of terrestrial and aquatic mollusc shells was excellent and a column of samples <14> for molluscs was taken through the deposits within the depression from TP 27 (Fig. 7).

Methods

Samples were processed at the Archaeological Solutions Ltd facilities in Bury St. Edmunds using standard flotation methods. The light fractions were washed onto a mesh of 500µm (microns), while the heavy fractions were sieved to 1mm. The dried light fractions were sorted under a low power stereomicroscope (x10-x30 magnification). Botanical and molluscan remains were identified and recorded using reference literature (Cappers *et al.* 2006; Jacomet 2006; Kerney and Cameron 1979; Kerney 1999) and a reference collection of modern seeds.

Of primary interest for the investigation of Depression F1010 was a column of small (1.5 litre) samples taken in 10cm spits. These were recovered for the investigation of mollusc remains with the intention of understanding conditions in and around the feature and how they changed during its silting. Larger 20-40 litre bulk samples, which were 50% processed for assessment, were taken from all three fills (L1007-L1009) and distributed across the feature. These were intended for the assessment of carbonised plant macrofossil preservation within the feature.

Results

The data from the bulk sample light fractions are presented in Table 12 (Tables 12 and 13 are presented as part of Appendix 6). The quantified mollusc shells from column sample <14> are presented in Table 13.

Carbonised plant macrofossils from the bulk samples

Three samples were taken from lower fill L2005 which dates to the early Neolithic. Carbonised cereal grains were present as single specimens in all three samples, with hulled barley (*Hordeum* sp.) and indeterminate grains identified. A small number of small charcoal fragments were present in two samples, although this was insufficient for detailed identification and interpretation. The low density of remains might indicate small amounts of scattered background debris contemporary with the deposit but it is also possible that they represent intrusive remains from material in the chronologically later overlying deposit L2004.

Nine samples were taken from upper fill L2004, which is likely to be medieval in date. Carbonised plant macrofossils, including cereal grains, were recorded in all nine samples, with a range of taxa present. Free-threshing type wheat (*Triticum aestivum/turgidum* type), hulled barley (*Hordeum* sp.) and oat (*Avena* sp.) were the cereal taxa represented, with some pulses (large Fabaceae) also represented. Seeds of associated arable weed taxa were rare, with only a single medium Fabaceae (vetch/tare type) seed from Test Pit 20. The combination of free-threshing type wheat, hulled barley, oats and pulses is common for the medieval period (e.g. Moffett 2006) and in keeping with the medieval date for the deposit. The density of carbonised remains was low and is likely to represent mixed carbonised debris from multiple sources. The carbonised remains are likely to represent debris from domestic activity in the vicinity of the sampled deposit.

Mollusc column sample <14>

Column sample <14> was taken as nine samples each of 10cm thickness (1.5 litre volume) through the full sequence of deposits in Depression F2003. These incorporated deposit L2008, which corresponds with modern topsoil, upper fill L2004, and lower fill L2005, with a total depth of 90cm (Table 13). Table 14 shows the proportions of shells from molluscs in broad ecological groupings for comparison.

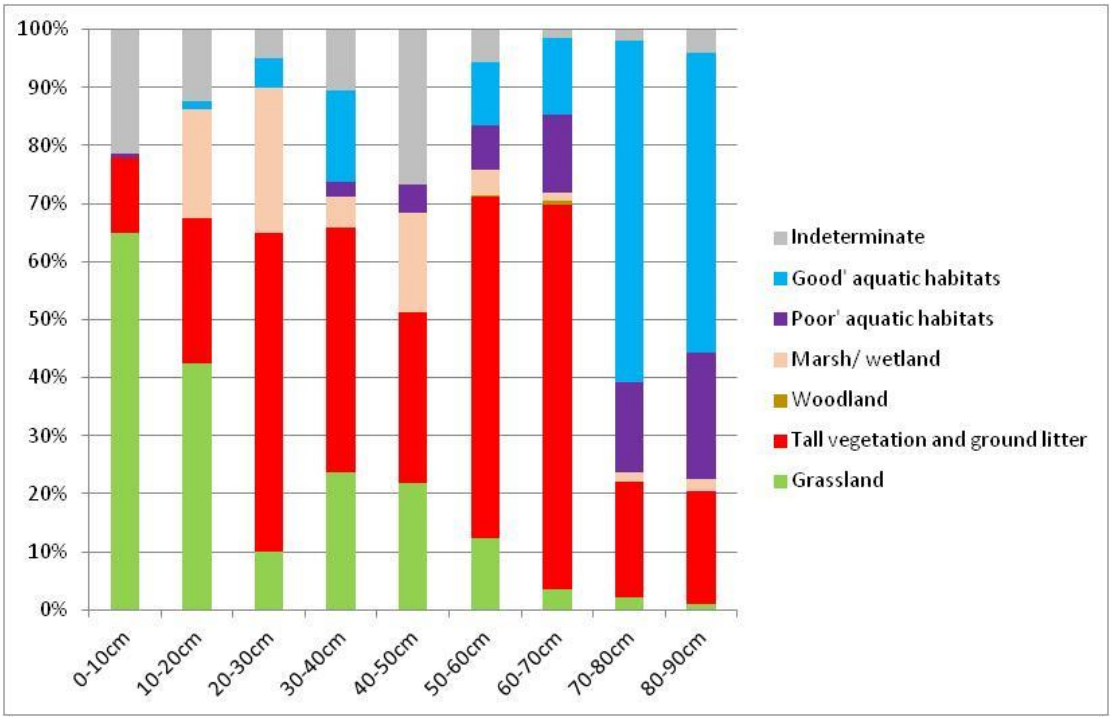

Table 14: Molluscs from Column Sample <14> in broad ecological groupings by depth

70-90cm (L2005)

The basal 20cm of the deposits contained abundant mollusc shells, with those from aquatic taxa overwhelmingly dominant (*c.*75%). The majority of these were from taxa that live in permanently wet habitats that do not dry up, including twisted ram's-horn (*Bathyomphalus contortus*), nautilus ram's-horn (*Gyraulus crista*) and flat valve snail (*Valvata cristata*). The latter is indicative of well-oxygenated slowly flowing or still freshwater (Kerney 1999, 27), often with a muddy substrate and abundant vegetation. Also common was button ram's horn (*Anisus leucostoma*), which is most typical of swampy pools and ditches and can tolerate seasonal desiccation. Overall, it is likely that conditions in the feature at this time were permanently wet, with abundant weed and a muddy substrate. This may have been fed by a small stream or simply have been filled by a high local ground water table.

A range of marsh/wetland taxa were recorded but in low numbers (*c.*2%). These included *Euconulus alderi*, marsh pond snail (*Lymnaea truncatula*), smooth grass snail (*Vallonia pulchella*), narrow-mouthed whorl snail (*Vertigo angustior*), marsh whorl snail (*Vertigo antivertigo*) and striated whorl snail (*Vertigo substriata*). Such taxa could have occupied the wet margins of the depression where conditions were wet but not aquatic.

Also well represented were taxa indicative of tall vegetation and ground litter (*c.*20%). Slender herald snail (*Carychium tridentatum*), which occupies moist, sheltered, well-vegetated places, such as woods, hedge banks or damp grassland (Kerney 1999, 45), was most common. Round snail (*Discus rotundatus*) and glass snail (*Oxychilus* sp.) were also common. Both are common to all kinds of moderately moist and sheltered places, such as

ground litter in woods, damp herbage, under logs and stones in waste ground (Kerney 1999). Also present were slippery moss snail (*Cochlicopa lubrica*), round-mouthed snail (*Pomatias elegans*), dwarf snail (*Punctum pygmaeum*), hairy snail (*Trichia hispida*) and crystal snail (*Vitrea crystallina*). Damp rough grassland, waste ground and/or scrub type habitats are likely to have existed on the margins of the feature

Grassland taxa, including moss chrysalis snail (*Pupilla muscorum*), ribbed grass snail (*Vallonia costata*) and common whorl snail (*Vertigo pygmaea*), were present but in small numbers (1-2%). It is likely that short-turf grassland was uncommon in the immediate vicinity of F2003 at this time.

L2005 was determined to be alluvial in origin with organic matter also present (Lang 2020). The source of the organics is being investigated by micromorphology but could be from organic silts in the base of the water–filled hollow. The molluscs from this deposit indicate that during the early Neolithic, F2003 was a water-filled hollow containing abundant weed and a muddy substrate.

20-70cm (L2004/L2005)

The 50cm representing predominantly fill L2004 produced samples that were dominated by taxa characteristic of tall vegetation and ground litter. In particular, large numbers of slender herald snail (*Carychium tridentatum*) were present, which are found in moist, sheltered, well-vegetated places, such as woods, hedge banks or damp grassland (Kerney 1999, 45). This was particularly true in the basal 20cm of L2004 (50-70cm), which contained much more abundant shells and is similar to the underlying deposit (L2005). In this lower portion of the deposit (50-70cm), round snail (*Discus rotundatus*) and glass snail (*Oxychilus* sp.) were also common, producing a comparable pattern to underlying L2005 (70-90cm). Also present were slippery moss snail (*Cochlicopa lubrica*), dwarf snail (*Punctum pygmaeum*), hairy snail (*Trichia hispida*) and crystal snail (*Vitrea crystallina*).

Grassland taxa were present in larger proportions than in L2005 (3.55% - 23.68%), largely moss chrysalis snail (*Pupilla muscorum*), ribbed grass snail (*Vallonia costata*) and common whorl snail (*Vertigo pygmaea*) but it is apparent that short-turf grassland did not predominate in the vicinity of the sample location.

A smaller proportion of aquatic molluscs were also present between 20cm and 70cm than in the basal deposits (4.88% - 26.95%). These were mostly nautilus rams-horn (*Gyraulus crista*) and button ram's-horn (*Anisus leucostoma*), with *Planorbis* sp. and flat valve snail (*Valvata cristata*) also present in the lower part of the deposit.

Deposit L2004 is likely to have been alluvial in origin (Lang 2020). The mollusc taxa indicate predominantly terrestrial habitats, although it is possible that the deposit was periodically water-filled during this period, which might

account for the presence of shells from aquatic taxa. The shells from the basal portion of L2004 (50-70cm) indicate predominantly damp conditions. Most prevalent were taxa indicative of tall damp vegetation and ground litter. It seems likely that such conditions would have predominated within the feature at this time. Indicators for grassland may reflect conditions surrounding and beyond F2003. Although the mollusc samples became less rich towards the top of the feature, the proportion of grassland taxa in general increased, while aquatic taxa decreased

0-20cm (L2008)

The upper 20cm of the sequence, which corresponds to the modern surface L2008, was dominated by taxa of short-turfed grassland, in particular moss chrysalis snail (*Pupilla muscorum*) and eccentric grass snail (*Vallonia excentrica*). The lower part of the deposit (10-20cm) had a higher proportion of taxa from marshland habitats, in the form of smooth grass snail (*Vallonia pulchella*), which inhabits wetter grassy, base-rich places, including water meadows on river floodplains, moist pastures and marshes (Kerney 1999, 108). The proportion of taxa indicating tall vegetation and ground litter were also more common at 10-20cm. The most frequent type was the hairy snail (*Trichia hispida* group), which inhabits ground litter and herbage in moist, generally well-vegetated places, such as roadside verges, fields, marshes, the base of walls and waste ground (Kerney 1999, 197).

Single shells of aquatic taxa *Anisus* sp. and twisted ram's-horn (*Bathyomphalus contortus*) provide limited evidence for standing water, although they could have been introduced in flood water.

The mollusc remains from Column <14> were broadly consistent with the assessed data from the same deposits in the evaluation (Summers 2019), although with a wider range of taxa identified, including aquatic molluscs, due to the more detailed level of sorting and identification.

Conclusions

The carbonised plant macrofossil remains from L2004, the medieval upper fill of Depression F2003, were of common medieval cereal crops free-threshing type wheat, hulled barley and oat, accompanied by pulses (pea/bean). The density of remains is consistent with background scatters of carbonised debris from nearby domestic occupation.

The very small number of carbonised remains from L2005, the lower early Neolithic fill of depression F2003, are considered unlikely to indicate significant contemporary occupation in the vicinity of the feature. The likelihood that they represent intrusive material from the overlying medieval deposit L2004 should be considered one of the most probable interpretations.

The mollusc assemblage from Column Sample <14> indicated a water filled depression during the early Neolithic, with areas of damp grassland, waste ground and scrub type habitats on the margins of the feature (L2005). Deposits dated to the medieval period (L2004) indicate that the feature was predominantly dry by this time, although with possible periods of standing water. Most taxa were indicative of tall damp vegetation and ground litter. Indicators of aquatic conditions reduced as the feature's silting advanced. Taxa indicative of calcareous short-turf grassland were dominant in the upper, modern horizon L2008.

3.9 Soil Macromorphology Analysis

C. Lang/QUEST

Introduction

Site context, aims and objectives

This report summarises the findings arising out of the macromorphological assessment undertaken by Quaternary Scientific (QUEST), University of Reading on a monolith sample collected from Meldreth, Cambridgeshire. Quaternary Scientific were commissioned by Archaeological Solutions to undertake the works.

Monolith 2 <13> was sampled in the NE-SW profile of test pit 27 and comprise a lower fill (2005) which appear to have developed under wet conditions and contain Neolithic struck flint, while the upper deposit (2004) appears to represent a later possible plough soil (based on mixed artefactual remains from Neolithic to medieval). The aim of the assessment was to ascertain the potential of further higher resolution micromorphological analysis to understand the transition between the two contexts and determine if evidence of soil development can be identified.

Geological and archaeological significance

The application of a soil macromorphological appraisal to the Meldreth monolith - the visual and textural analysis of soil/sediment - can play a significant role in the archaeological investigation particularly when carried out with a methodical approach to observations and their interpretation.

Soil/sediment properties reflect the environment in which they have been formed, and so the recovery of known anthropic sediments from archaeological contexts has the potential to assist archaeologists to understand complex site formation processes related to past land use and the palaeo-environment. By applying macromorphological investigation to soils it enables soil deposition properties to be examined: thickness, particle size, sorting, coarse to fine ratios, composition of the fine material, colour, structure, distribution of inclusions, shape of inclusions and presence of artefacts.

Methods

Macromorphological analysis was undertaken on monolith 2 <13> following the FAO Guidelines for Soil Description (Jahn *et al*. 2006). Colour differentiation (Munsell 2009), difference in lithographic units, semi quantitative particle-size characterisation of the coarse fraction, and hand texturing of the fine material were all identified.

Results and Discussion

Table 15 presents a summary of the features recorded during the macromorphological appraisal of monolith 2 <13> from Meldreth,

Depth (cm)	Description	Context
0 - 36	Alluvial deposits; Grey (7.9Y 4.5/2.5) silty clay; Hard; Friable; Slightly plastic; Slightly sticky; Coarse to fine ratio (*c/f*) 3:7; Unsorted fine and very fine gravels; Moderately developed large to medium sub-angular peds; Calcite concretions (~5%); Large angular flint fragments; Mollusc shell (~10%); Redoximorphic nodules (~5%); Diffused boundary to lower deposit.	2004
36 - 44	Alluvial deposits; Grey/brown (6.5Y 3.8/5.5) silty clay loam; Slightly plastic; Slightly sticky *c/f* 1:4; Unsorted very fine gravels; Well-developed medium to small sub-angular peds; Calcite concretions (<5%); Mollusc shell (~5%); Diffused boundary to upper and lower deposits.	2005
44 - 48	Alluvial deposits; Light grey (2.4Y 6.1/5) compacted silty clay; Plastic; Sticky; Hard; *c/f* 1:4; Moderately developed angular peds; Redoximorphic nodules (~10%); Diffused boundary to upper deposit.	2010

Table 15: A summary of the description from the monolith with characterisation of depth (cm), colour in partially dried samples (Munsell 2009), texture and structure and consistency, following the FAO Guidelines for Soil Description (Jahn et al*. 2006).*

The high silt and clay content identified in all the lithological layers indicate that the soil was initially deposited through alluvial means. The upper and mid soil layers containing low levels of coarse material, comprising of fine and very fine gravels, indicative of low velocity deposits (Sundborg 1956). Angular flint fragments were also identified in the upper layer; these were not weathered suggesting deposition in the soil after deposition. The presence of redoximorphic nodules, identified in the upper and lower layers, are indicative of reduction and oxidation conditions occurring in the soil, this redox process occurs through localised areas of waterlogging. The nodules, utilised as indicators of ground water fluctuation by the USDA-NRCS (2010), show precipitation, translocation and dissolution of iron (Fe) had occurred in the upper and lower soil forming gleying conditions; thus the grey hue identified in the upper and lower layers.

Bioturbation had occurred as mollusc shells were identified in the upper and middle layers, the upper layer containing the highest frequency. Calcite concretions were also found in the upper and mid soil, these symptomatic of

decalcification of soil in the upper strata and evaporation of calcite rich soil water that had percolated through the soil into voids, forming calcite nodules. The middle deposits (36-44 cm) were darker in colour than the upper and lower soils, the texture of this soil was also different, being less plastic and sticky, these features suggesting there was a higher degree of organic matter present and less clay and silt content.

The differential structures identified in the layers was indicative of the difference in the composition of the fine material in the monolith, with the lower layer having an angular structure; a vertic resulting from a higher clay content (Brady and Weil 1990). In contrast, the well-developed blocky structure in the mid layer indicates increased organic matter (Oades 1984).

Conclusions

The macromorphological analysis of the monolith indicated that there were three clear deposition layers all with individual pedogenic characteristics. The three layers were all formed initially through alluvial deposition and then affected by further individual pedogenesis.

The soil development of the layers indicates that the lower layer has undergone considerable gleying, the soil structure providing evidence of high clay content. The mid layer contains a higher level of organic matter due to the colour and composition. There was evidence in the upper layer of the inclusion of flint fragments, not originally deposited through alluvial processes and indicative of fragments newly broken.

3.10 Soil Micromorphology Analysis

C. Lang/QUEST

Non-Technical Summary

Micromorphological analysis was undertaken on two slides from monolith <13> collected at Meldreth. The aim of the analysis was to provide high resolution analysis of the pedological features and determine whether evidence of early soil development can be determined in the soil samples collected from the diffused boundaries in the soil stratigraphy identified during fieldwork and macromorphological analysis.

The results of the micromorphology analysis indicate that the samples were derived from localised parent material and differentiation in the pedogenic processes between the regions in the samples is apparent. There has been a high level of bioturbation in Region 1 of sample Mel40. Additionally, there is evidence to indicate that Region 1 of Mel40 and Mel34 were from a similar sediment sources due to the size and composition of the coarse mineral and rock inclusions, while Mel Region 2 displayed higher levels of weathering.

Introduction

Site context, aims and objectives

This report summarises the findings arising out of the micromorphological analysis undertaken by Quaternary Scientific (QUEST), University of Reading on a monolith sample collected from Meldreth, Cambridgeshire. Quaternary Scientific were commissioned by Archaeological Solutions to undertake the works.

Monolith <13> was sampled in the NE-SW profile of test pit 27 and comprise a lower fill (2005) which appear to have developed under wet conditions and contain Neolithic struck flint, while the upper deposit (2004) appears to represent a later possible plough soil (based on mixed artefactual remains from Neolithic to medieval). The aim of the analysis was to provide high resolution analysis of the pedological features and determine whether evidence of early soil development can be determined in the soil samples collected from the diffused boundaries in the soil stratigraphy identified during fieldwork and macromorphological analysis.

Geoarchaeological and archaeological significance

The application of micromorphological techniques to the Meldreth samples - the microscopic analysis of soil/sediment thin sections - can play a significant role in archaeological and palaeoenvironmental investigation particularly when carried out with a methodical approach to observations and their interpretation.

Soil/sediment properties reflect the environment in which they have been formed, and so the recovery of known anthropic sediments from archaeological contexts has the potential to assist archaeologists to understand complex site formation processes related to past land use and the palaeo-environment. By applying micromorphological investigation to undisturbed soils it enables soil development properties to be examined: thickness, bedding, particle size, sorting, coarse to fine ratios, composition of the fine material, groundmass, colour, related distribution, microstructure, and distribution of inclusions, the shape of inclusions, and finally the inclusions to be identified and quantified. Additionally, these analyses can provide details of micro-artefacts, not seen by the naked eye during macromorphological analysis.

Methods

The undisturbed sediment samples were sampled from monoliths <13> collected at Meldreth, Cambridgeshire, these were subsampled for micromorphological investigation after macromorphological analysis had been undertaken by Lang Archaeology.

The sedimentary block has been air dried for several days, then impregnated with transparent and uncoloured polyester resin. The sample is immediately placed in a vacuum chamber for 6hrs to allow the resin to impregnate the block entirely. The samples is then left at room temperature for 12hrs and placed in an oven set at 30°C to completely cure the resin. The block is then sliced and mounted on a 2mm thick glass slide to be ground using a Brot until the sample is only one millimetre thick. The sample is mounted onto a 3mm thick frosted slide and lapped until it reaches a thickness of 30µm. if needed, the slide can be hand finished with lapping paper. The slide is then covered slipped with a borosilicate glass cover.

By following procedures laid out in the International Handbook for Thin Section Description (Bullock *et al.* 1985) and Guidelines to Analysis and Description of Soil Regolith Thin Sections (Stoops 2003) soil properties were recorded semi-quantitatively and adapted specifically for the Meldreth samples. The thin sections were analysed using an Olympus polarizing microscope at a range of magnifications (x10- x400) and under Plane Polarized Light (PPL), Crossed Polarized Light (XPL) and where applicable Oblique Incident Light (OIL). Each light source allowed identification of specific microscopic features, such as, mineral and organic components, pedology and feature classification. All features observed were recorded on an Excel spread sheet with the limit of the coarse to fine material being 20µm (*c/f*$^{20\mu m}$).

Results and Interpretation

The following sections show characterisation and interpretations of two micromorphological thin sections from <13> Meldreth (Mel34 and Mel40; Table16), with a summary of the frequency and type of pedofeatures in each thin section recorded in a supplementary table (Table 18).

A

B

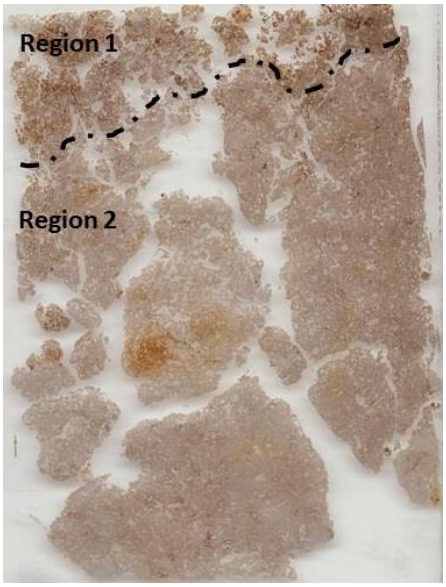

Table 16: Annotated thin sections of the samples from the Meldreth soil thin sections. A. Scan of the soil thin section Mel34; B. Scan of the sample Mel40 displaying the upper Region 1 and the lower Region 2 the lower region displays a visible redoximorphic area due to localised waterlogging.

The coarse mineral and rock materials observed in the soil thin sections from Meldreth are mainly small (20-500 µm) partially weathered subangular and sub rounded quartz (~30%), weathered subrounded and rounded calcite (10%) and unweathered angular flint (~10%). It was observed that Region 2 of sample Mel40 had smaller flint and calcite inclusions in the groundmass when compared to upper Region 1 (Mel40 Region 1: 20-1200 µm; Mel40 Region 2: 20-500 µm). The composition of the quartz and calcite inclusion in the groundmass were derived from the localised geology in the area comprising of West Melbury Marly Chalk Formation, with localised Alluvium – Clay, Silt, Sand and Gravel [1] .

The samples exhibited the same coarse to fine (*c/f*) of 1:4 throughout and an enaulic related distribution; identified by the association between the coarse and fine material. The limpidity of the groundmass under PPL illumination was similar in both samples and displayed a speckled appearance. This is due to the presence of fine calcites and clays making up the fine matrix (Stoops 2003). The b-fabric had a speckled/crystalitic appearance in both samples and sample regions (Mel34 and Mel40) as a result of the clay colloids/calcite (Durand *et al.* 2018; Stoops 2003).

Weathered and partially weathered calcitic worm castes (20-500 µm) were identified throughout the samples (~5%) with Region 1 of sample Mel40 containing the highest level (~20%) (Table 17). Shell fragments (20-900 µm) and mollusc shell was also identified within all regions of the samples (~20%) (Table 17). Increased levels of amorphous organic matter were evident in sample Mel34 and Region 1 of sample Mel40. Mel40 Region 2 displayed areas of redoximorphic inclusions.

The microstructure in sample Mel34 was subangular blocky, with strong development in sample Mel34. Sample Mel40 had developed a crumb microstructure in Region 1 (20% of the sample region); see Table 16, while Region 2 moderately developed subangular blocky. The peds in sample Mel34 and Region 2 of Mel40 were separated by partially accommodated interpedal channel voids and displayed unaccommodated intra pedal chambers and vughs. Region 1 of sample Mel40, where the crumb microstructure had developed, displayed unaccommodated interpedal channels and unaccommodated intra pedal vughs. The boundary between the crumb microstructure and the sub-angular microstructure in sample Mel40 was diffused.

Calcite coatings (~30%) were identified on the walls of the channels voids, with calcite inclusions (5%) exhibited in Region 2 of sample Mel40 these had

[1] Carol Lang, "Meldreth" [PDF map], Scale 1:, DiGMapGB-50, [geospatial data], Updated: October 2020, British Geological Survey (BGS), UK, Using: EDINA Geology Digimap Service, <http://digimap.edina.ac.uk/>, Created: September 2015

developed on the walls of the channel voids, and within the intra pedal chambers and vughs.

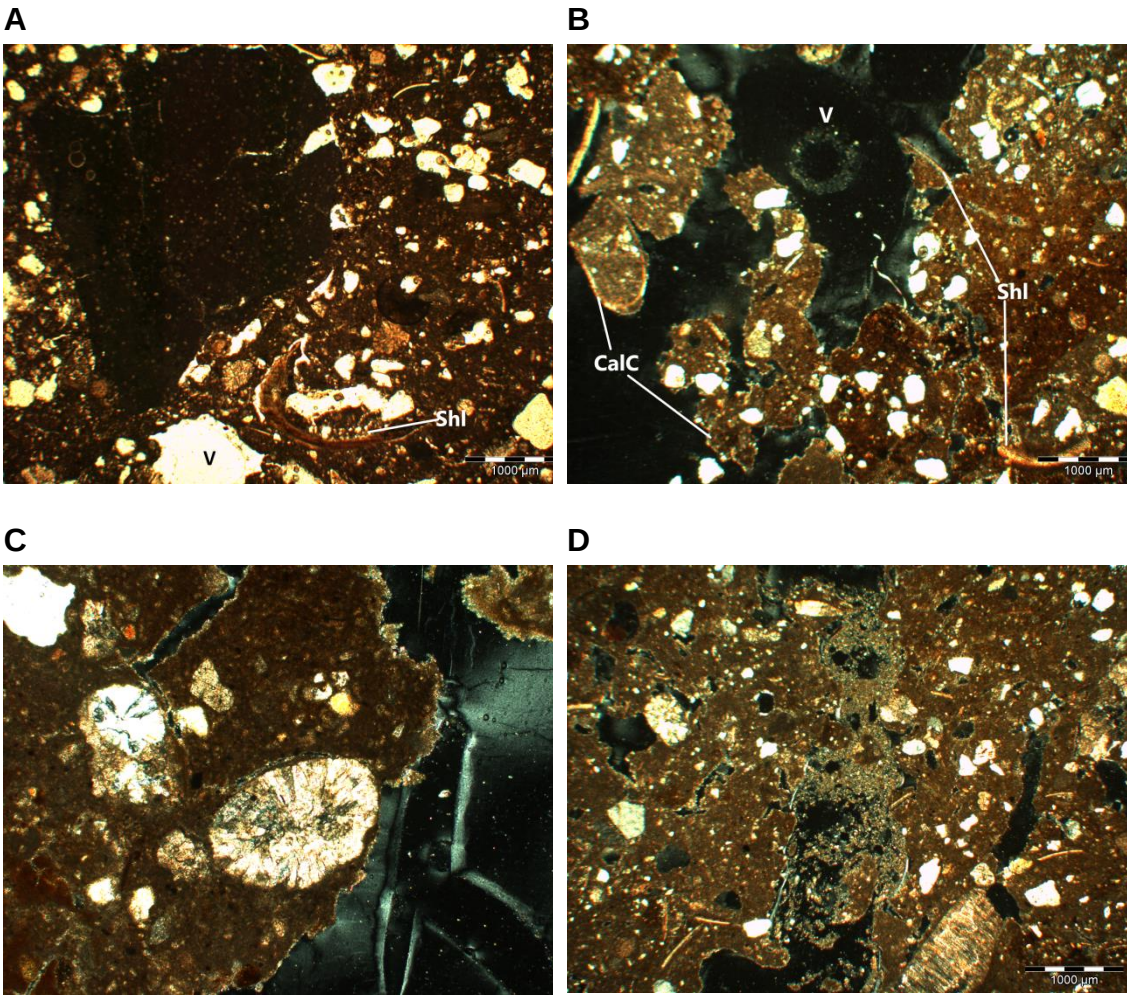

Table 17: A. Groundmass of sample Mel34 containing shell (Shl) and chamber voids (V)' (PPL); B. difference in the colour of the groundmass in sample Mel40 Region 1, darker brown indicating amorphous organic matter, shell (Shl) evident and also calcite coatings (CalC) on void walls, (XPL); C. Calcitic worm castes evident in the groundmass, (XPL); D. Calcitic inclusions in the channel void from sample Mel34 (XPL).

Discussion

Micromorphological investigation determined that the composition of the coarse rock and mineral inclusions in sample Mel34 and Mel40 were derive from the localised geology; predominantly comprised of quartz and calcite. The microstructure in both samples (Mel34 and Region 2 Mel40) displayed a sub-angular blocky appearance, with stronger development being identified in sample Mel34. Sample Mel40 also displayed a crumb microstructure in the upper Region 1. The strongly developed crumb microstructure in Region 1 of sample Mel40 indicates that there has been an increased level of bioturbation, this being borne out by an increased level of calcitic worm caste identified. Additionally, the development of the crumb microstructure through bioturbation is supported by the presence of amorphous organic matter present within the crumb peds. The increased level of amorphous organic matter was not being identified in the lower Region 2 of this sample or the upper Mel 34. This would point to a build-up of organic matter in this area, there was, however, no evidence indicative of rooting or plant fragments suggesting advance organic matter degradation. This may suggest that the addition of organic matter had occurred, either from the anthropogenic means of from the burial of plant matter as the upper deposition of sediments (Mel34) was deposited.

Calcite infillings had formed within the chambers and vughs in both samples and sample Regions, while a crystalitic b-fabric was identified. These pedofeature and characteristics occur through the percolation of calcite rich soil water evaporating in the soil profile and forming calcretions on the walls of voids and within micropores in groundmass (Durand *et al.* 2018). Evidence of these processes was also identified on the walls of the channels voids, with the development of calcitic coatings. The dissolved carbonates that are derived from weathered calcite precipitated in soil water as a result of decreases in soil water pH either from changes to the pH of precipitation or the addition of organic matter to the soil (Chesworth *et al.*, 2008; Haynes and Naidu 1998; Martínez Cortizas *et al.* 2003). The formation of Fe aggregation in the samples, particularly in Mel40 Region 2, suggests there has been localised waterlogging of the soils, the presence of water providing reduction and oxidisation conditions required for the precipitation, translocations and dissolution of Fe from a low to high areas of concentration (Lindbo *et al.* 2010). The infrequent presence of these features is indicative that waterlogging occurred in pockets in the soil and not throughout the thin section sample location.

The diffused boundaries identified between the upper Region 1 and the lower Region 2 of sample Mel40 indicates that there has been some mixing of the groundmass. The high level of calcitic worm castes identified in Region 1 of the sample and the mollusc shell indicates that bioturbation was the reason for the mixing of the deposition layers. Initially, both the upper and lower deposits would have had an abrupt boundary. Moreover, the composition of the deposits in Sample Mel34 and Mel40 Region 1 when compared to Mel40 Region 2 are indicative of different formations processes. The differentiation in the size of the coarse rock and mineral material particularly the size of the

calcite inclusions would indicate that there has been difference in pedogenic processes. Additionally, the flint fragments in Sample Mel34 and Sample Mel40 Region 1 were considerably larger than in Mel 40 Region 2. This evidence demonstrating that, although the composition of the coarse material in sample Mel40 Region 2 was similar to Mel34 and Mel40 Region 1, the morphology was indicative of a distinction the level of weathering.

Conclusions

The undisturbed soil samples collected from the investigation at Meldreth, Cambridgeshire indicated that the soil/sediments in the samples were derived from localised parent material. It is evident that there is differentiation in the pedogenic processes between the regions in the samples.

It is apparent from the micromorphological investigation that there has been a high level of bioturbation in Region 1 of sample Mel40. The evidence of bioturbation initially identified during macromorphological analysis was confirmed to be mollusc and earthworm activity in the soil. The increased levels of bioturbation were enhanced by the higher levels of amorphous organic matter in the upper Region 1 of sample Mel40, prior to deposition of Mel34 sediment.

Additionally, there is evidence to indicate that Region 1 of Mel40 and Mel34 were from a similar sediment sources due to the size and composition of the coarse mineral and rock inclusions, while Mel Region 2 displayed higher levels of weathering.

Micromorphological analysis has provided high resolution data on the pedogenic formation of the soil thin sections from Meldreth. Investigation has identified soil formation processes indicating there has been differentiation soil pedogenesis through weathering and bioturbation.

Table 18: Supplementary table with a summary of the main micromorphological observations and the frequency of the features from the thin sections subsampled from monolith sample <13> collected at Meldreth, Cambridgeshire.

Thin section	Sample Region	Related distribution	*c/f (20 µm) distribution* (ratio)	Coarse Fraction				Groundmass		Microstructure			Pedofeatures			
				Rock/Mineral			*Organic*									
				Quartz	*Calcite*	*Flint*	*Shell*	*PPL*	*XPL*	*Peds*	*Voids*	*Development*	*Redoximorphic inclusions*	*Excremental pedofeatures*	*Clay Inclusion*	*Clay coatings*
Mel34		Enaulic	*1:4*	*****	***	*	*	Speckled	Crystalitic	SA-B	Channels, Chambers, Vughs	Strong	****	*		*****
Mel40	*1*	Enaulic	*1:4*	****	***	**	***	Speckled	Crystalitic	Crumb	Channels, Vughs	Strong	***	***	*	****
	2	Enaulic	1:4	****	***	**	***	Speckled	Crystalitic	SA-B	Channels, Chambers, Vughs	Moderate	***	*	*	*

All measurements indicated are semi quantitative

*Key: Peds: SA-B-Sub-angular blocky; Frequency: *Low (<2%); **Moderate (5-10%); *** High (10-20%); **** Very High (>20%)*

4 DISCUSSION

4.1 Overview of the recorded archaeology

The excavation revealed a large hollow, with its long axis aligned north to south. It is likely that this is the result of fluvial action in a periglacial environment. It is notable that its orientation is similar to that of the drainage channel that lies to the north of the excavation site and leads to the river Cam.

Hollow F2003 contained two fills. Dateable artefactual evidence from basal Fill L2005 is from the Neolithic period. This included both struck flint and pottery. However, sherds of medieval pottery were also present within this fill. As a feature of possible late glacial origin, the accumulation of Fill L2005 is likely to have originated earlier than the Neolithic period but this material represents the first identifiable human activity associated with F2003. More mixed dating evidence was recovered from upper Fill L2004. The majority of this consisted of medieval pottery but also included 18 sherds of Roman pottery, 14 very small fragments of Roman CBM, and four iron nails of Roman to post-medieval date. Some early Neolithic struck flint and pottery was also present in this deposit.

Ditch F2006 was identified in the north-western corner of the excavated area. It extended beyond the limits of excavation, but its observable eastern edge indicated that it was aligned north-north-west to south-south-east. This alignment places it an oblique angle to the adjacent Whitecroft Road which suggests that it is unlikely to represent a former roadside ditch. It is possible that an earlier iteration of the road was positioned on a slightly different alignment, but this has certainly not been the case since at least the late 19th century. No finds were recovered, and no enlightening stratigraphic relationships were observed between Ditch F2006 and the dateable fills of Hollow F2003, meaning that there is no basis upon which to assign it a date.

4.2 The fills of Hollow F2003

The basal fill of Hollow F2003 was observed, during excavation, to be L2005. This was a maximum of 0.12m deep and was only present in the deeper parts of the hollow. Soil macromorphological analysis has, however, identified a distinction between the upper parts of L2005 and its lower 4cm. These lower portions have been assigned the context number L2010. L2010 appears to have undergone significant gleying and had a higher clay content whereas L2005 contained a higher proportion of organic material.

The silt and clay content of both L2010 and L2005 indicate that they were deposited under alluvial conditions and the presence of fine gravel within L2005 suggests that this was fairly slow-moving water. This would be consistent with the results of environmental sample analysis which demonstrated that L2005 (including L2010) contained a mollusc assemblage indicating that F2003, at its time of deposition, was a water filled depression, containing abundant weed and a muddy substrate, with damp grassland,

waste ground and scrub-type habitats at its margins. Micromorphological analysis has demonstrated that the material at the base of the deposit (L2010), was the product of different formation processes to the overlying layers. This lower deposit shows evidence for localised waterlogging through the presence of Fe aggregation. This suggests that waterlogging occurred only in pockets in the soil and not throughout, at least at the location from which the sample, and the thin section derived from it, was taken. The molluscs from the lower part of the deposit, however, indicate more permanent aquatic conditions during the early silting of the feature, but it is possible that conditions fluctuated during what could have been an extended period of time. The material overlying this has higher levels of bioturbation from earthworms and molluscs, as well as having higher levels of amorphous organic material. This may represent plant material buried by the overlying material which was, nevertheless, very similar in structure to the material below.

Upper fill L2004 was described during excvavation as a mid grey brown clayey silt with moderate small sub-angular and sub-rounded flint inclusions. Macromorphological analysis has revised this description to a silty clay but confirms that, like L2005 (and L2010), it is an alluvial deposit. Environmental sampling has identified a variety of mollusc species in this deposit, including those associated with grassland. It is possible that some of these are derived from habitats in the surrounding area but its perhaps more likely that, at this time, F2003 existed as a damp depression during the drier months of the year perhaps becoming water-filled during the wetter seasons.

4.3 Human activity in association with Hollow F2003

Man-made objects present in basal fill L2005 consisted of struck flint and small fragments of early Neolithic pottery. Four sherds of medieval pottery were also recovered. It appears likely that these were intrusive.

It is possible that the Neolithic material was incorporated into L2005 through overland flow carrying material distributed as occupational detritus in the area surrounding Hollow F2003 into the feature. It is, however, equally feasible that such material was deliberately deposited into feature. It is possible that, as in later prehistoric periods, that there was some kind of symbolic motivation behind the deposition of objects into watery contexts. Indeed Davis *et al*. (2007) discuss the possible ritual deposition of Neolithic stone axes in a wetland context in Cumbria, but there is insufficient evidence to reach such a conclusion with regard to the objects recovered from L2005.

The material evidence is suggestive of human occupation within the vicinity of Hollow F2003. It is possible that this occupation took the form of settlement in close proximity but the environmental conditions that appear to have been prevalent, consisting of a pond surrounded by damp grassland, are likely to have attracted game and waterfowl that would could have been hunted or trapped. A small, simple leaf-shape arrowhead, recovered from L2005, might be indicative of such activity. Similarly, debitage, cores and evidence for blade production, alongside the small fragments of pottery that were recovered,

could represent activity occurring within the temporary camps of hunting/trapping parties.

The density of carbonised remains of common medieval cereal crops, including free-threshing type wheat, hulled barley and oat, as well as pulses, in L2004 is suggestive of domestic occupation in the vicinity during the medieval period. The medieval pottery assemblage can also be considered to indicate the presence of this type of occupation in the surrounding area. This is not particularly surprising, medieval activity is well-attested in Meldreth. The medieval moated manorial complex of Flambard's Manor is located *c*.300m to the east of the current site and the medieval core of Meldreth, focussed on the 12th century Holy Trinity Church, lies *c*.950m to the north.
The small quantity of possible Roman CBM and the 18 sherds of Roman pottery also attest to Roman occupation in the surrounding area. Extensive Iron Age to Roman enclosure systems have been identified locally and the Avenell Way, an ancient trackway possibly utilised during the Romano-British period, passes *c*.75m to the south of the site.

Quite how F2003 was utilised during the Roman and medieval periods remains open to speculation. These assemblages are mostly associated with upper fill L2004, evidence from which suggests that it is representative of only seasonal waterlogging or ponding. It is possible that the hunting or trapping of wildfowl, and possibly game, still occurred in these periods but the presence of hunting camps is unlikely by this time. This occupational detritus might therefore derive from refuse deposits or from episodes of manuring subsequently be removed from there, perhaps through agricultural processes or perhaps through natural processes.

4.4 Hollow F2003 in wider context

Early Holocene or periglacial hollows, similar to F2003, appear to be fairly common in the chalk landscapes of southern Cambridgeshire (Revell 2019, 45). Several examples have been recorded in nearby Melbourn (e.g. Graham 2019; Ladd 2018, Ladd 2017; Ladd 2016). Amongst the best known such features are those recorded at the Hinxton Genome Complex. These have been found to contain significant quantities of struck flint dating from the Mesolithic, Neolithic, Bronze Age and Iron Age periods as well as nationally significant assemblages of late glacial upper Palaeolithic date (Bishop 2016).

Revell (2019, 45) notes that hollows of this type can often contain traces of activity from a number of distinct archaeological periods. This is certainly the case with regards Hollow F2003.Occasionally some may preserve clear evidence of more coherent activity in one or more particular periods (*ibid.*). The identification of almost solely early Neolithic activity in association with basal fill L2005 would appear to conform to this pattern, although the accumulation of this deposit must have begun earlier than the early Neolithic. At Linton Road, Great Abington a hollow of this type was found to contain finds of Mesolithic, Neolithic, Bronze Age, late Iron Age to early Roman, and post-medieval date. These artefacts were recovered primarily from the upper

fill and were considered to indicate that the feature was ‘open’ for a long period of time, or that the upper fill accumulated over a prolonged period (Revell 2019, 45). A similar interpretation might be applied to L2004, the upper fill of F2003, which contained Roman and medieval artefactual evidence. At Great Abington, however, it was suggested that later ploughing of the site could have caused at least some degree of post-depositional mixing (Revell 2019, 45). It cannot be entirely ruled out that the same did not occur at the current site.

5 CONCLUSIONS

Excavation at Whitecroft Road revealed a large hollow of probable late glacial origin, similar to features recorded elsewhere on the chalklands of southern Cambridgeshire. Analysis of its fills indicates that they are of alluvial origin and derived from the local parent material but displayed different pedogenic characteristics when subject to micromorphological analysis. Artefactual evidence recovered from the basal fill, L2005, indicates that human activity occurred in the vicinity of the hollow during the early Neolithic period. It is possible to speculate that the hollow, and the environmental conditions that prevailed there, provided certain resources, perhaps such as game, wildfowl and even reeds, that were attractive to the local Neolithic population. The area surrounding the hollow may have been subject to occasional visits by hunting or trapping parties, groups bringing livestock to the hollow for water, or by people gathering reeds and other plant material. Alternatively, more permanent settlement could have been present in the surrounding area.

More mixed dating evidence was recovered from upper fill L2004. The presence of carbonised cereal remains of species typical of medieval assemblages, as well as medieval pottery, indicates that the site lay in proximity to domestic activity of some kind. The known history and archaeology of Meldreth demonstrates that this is almost certainly the case. The Roman artefacts recovered from L2004 also suggest that occupation of this date occurred in proximity to the site.

It is possible that fluctuations in water levels, periods of high precipitation, and seasonal flooding, caused nearby objects to wash into the hollow and deposited within upper fill L2004. Some deliberate discard must be considered amongst the agencies that led to the deposition of this material and later ploughing may have contributed to the mixing of the dateable evidence within this deposit.

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OASIS ID: archaeol7-407089

Project details

Project name	70 Whitecroft Road, Meldreth, Cambridgeshire - Archaeological Excavation
Short description of the project	In October 2019, Archaeological Solutions Ltd (AS) conducted an archaeological excavation at 70 Whitecroft Road, Meldreth, Cambridgeshire. The excavation was undertaken to provide for the requirements of a planning condition attached to planning approval for the proposed erection of nine dwellings and associated access. It was required by the LPA, based on advice from Cambridgeshire County Council Historic Environment Team (CCC HET). The excavation was preceded by an archaeological trial trench evaluation (Locke and Podbury 2019). The trial trench evaluation recorded post-medieval furrows that correspond with the alignment of historic field boundaries, and residual sherds of medieval pottery in the subsoil. The principal archaeological feature present was a large hollow which contained flint and pottery of early Neolithic date. The hollow contained multiple silty grey fills which appear to represent the accumulation of material through alluvial action. The subsequent excvavation was focussed on the area in which the hollow was identified. The area was stripped and the hollow was investigated through a programme of systematic test pitting, comprising a series of gridded test pits excavated in a chequerboard pattern across 50% of the hollow. The test pits measured 2m x 2m and dry sieving of the deposits was undertaken. Finds recovered from the hollow demonstrated Neolithic activity in the area during the period in which the lower fill accumulated. The upper fill contained artefactual evidence predominantly of Roman and medieval date. In addition, a ditch of probable medieval date was recorded.
Project dates	Start: 02-10-2019 End: 26-10-2019
Previous/future work	Yes / No
Any associated project reference codes	P7977 - Contracting Unit No.
Any associated project reference codes	ECB5845 - Sitecode
Type of project	Recording project
Site status	None
Current Land use	Vacant Land 1 - Vacant land previously developed
Monument type	HOLLOW Uncertain
Monument type	DITCH Uncertain
Significant Finds	FLINT Neolithic
Significant Finds	POTTERY Medieval
Investigation type	'"Full excavation"'
Prompt	Planning condition

Project location

Country	England
Site location	CAMBRIDGESHIRE SOUTH CAMBRIDGESHIRE MELDRETH 70 Whitecroft Road, Meldreth, Cambridgeshire
Postcode	SG8 6LS
Study area	0.41 Hectares
Site coordinates	TL 3732 4586 52.093587502355 0.00475226801 52 05 36 N 000 00 17 E Point
Height OD / Depth	Min: 20m Max: 20m

Project creators

Name of Organisation	Archaeological Solutions Ltd
Project brief originator	Cambridgeshire County Council
Project design originator	Jon Murray
Project director/manager	Jon Murray
Project supervisor	Archaeological Solutions Ltd
Name of sponsor/funding body	Bushmead Homes Ltd

Project archives

Physical Archive recipient	Cambridgeshire County Council Archaeological Store
Physical Contents	"Animal Bones","Ceramics","Environmental","Metal","Worked stone/lithics","other"
Digital Archive recipient	Cambridgeshire County Council Archaeological Store
Digital Contents	"Animal Bones","Ceramics","Environmental","Metal","Worked stone/lithics","none"
Digital Media available	"Database","Images raster / digital photography","Spreadsheets","Text"
Paper Archive recipient	Cambridgeshire County Council Archaeological Store
Paper Contents	"Animal Bones","Ceramics","Environmental","Metal","Worked stone/lithics","none"
Paper Media available	"Context sheet","Correspondence","Drawing","Map","Photograph","Plan","Report","Section","Survey"

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	70 WHITECROFT ROAD, MELDRETH - ARCHAEOLOGICAL EXCAVATION - RESEARCH ARCHIVE REPORT
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Author(s)/Editor(s)	Bingham, K.
Author(s)/Editor(s)	Haygreen, J.
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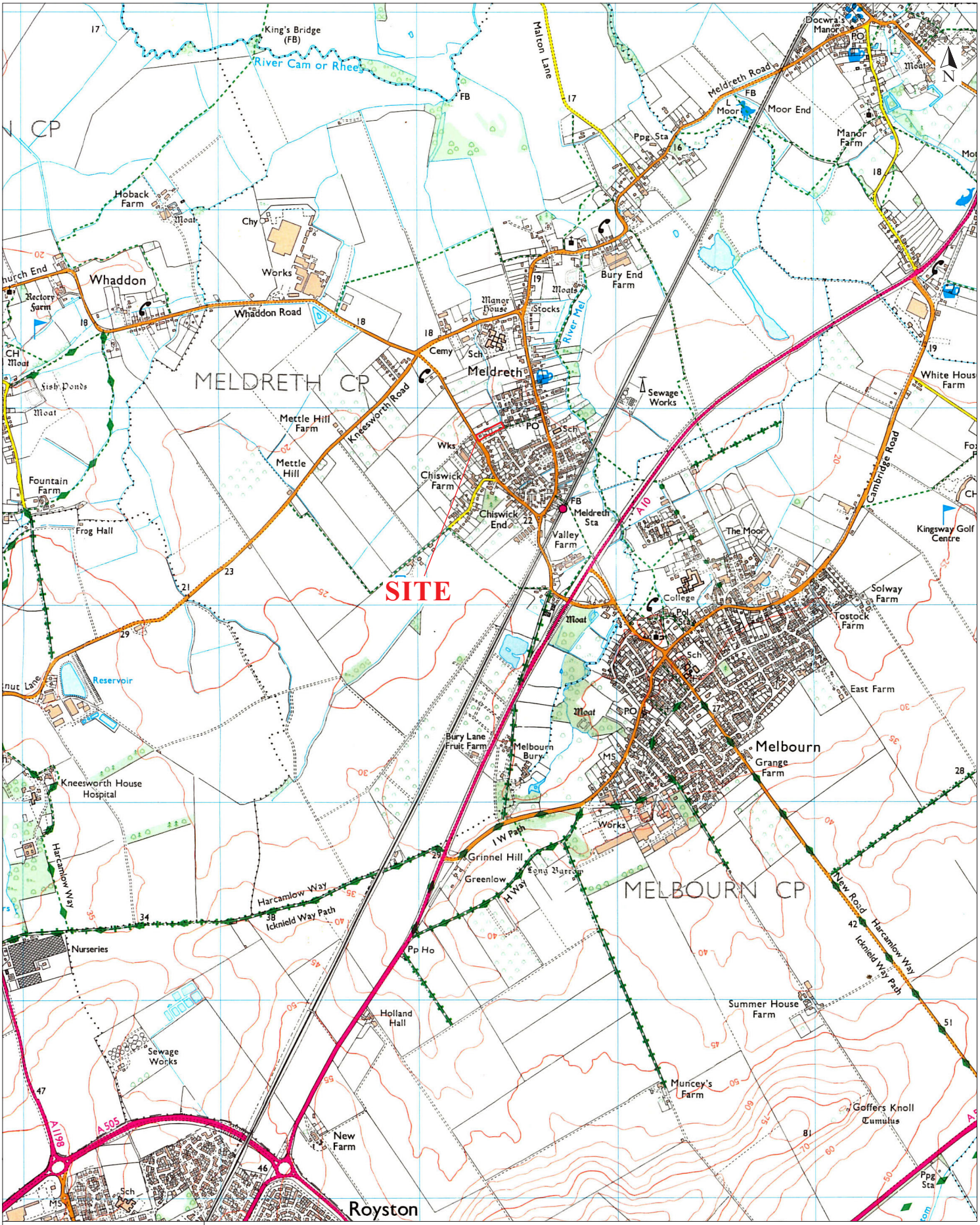

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Fig. 1 Site location plan

Scale 1:25,000 at A4

70 Whitecroft Rd, Meldreth, Cambridgeshire (P7977)

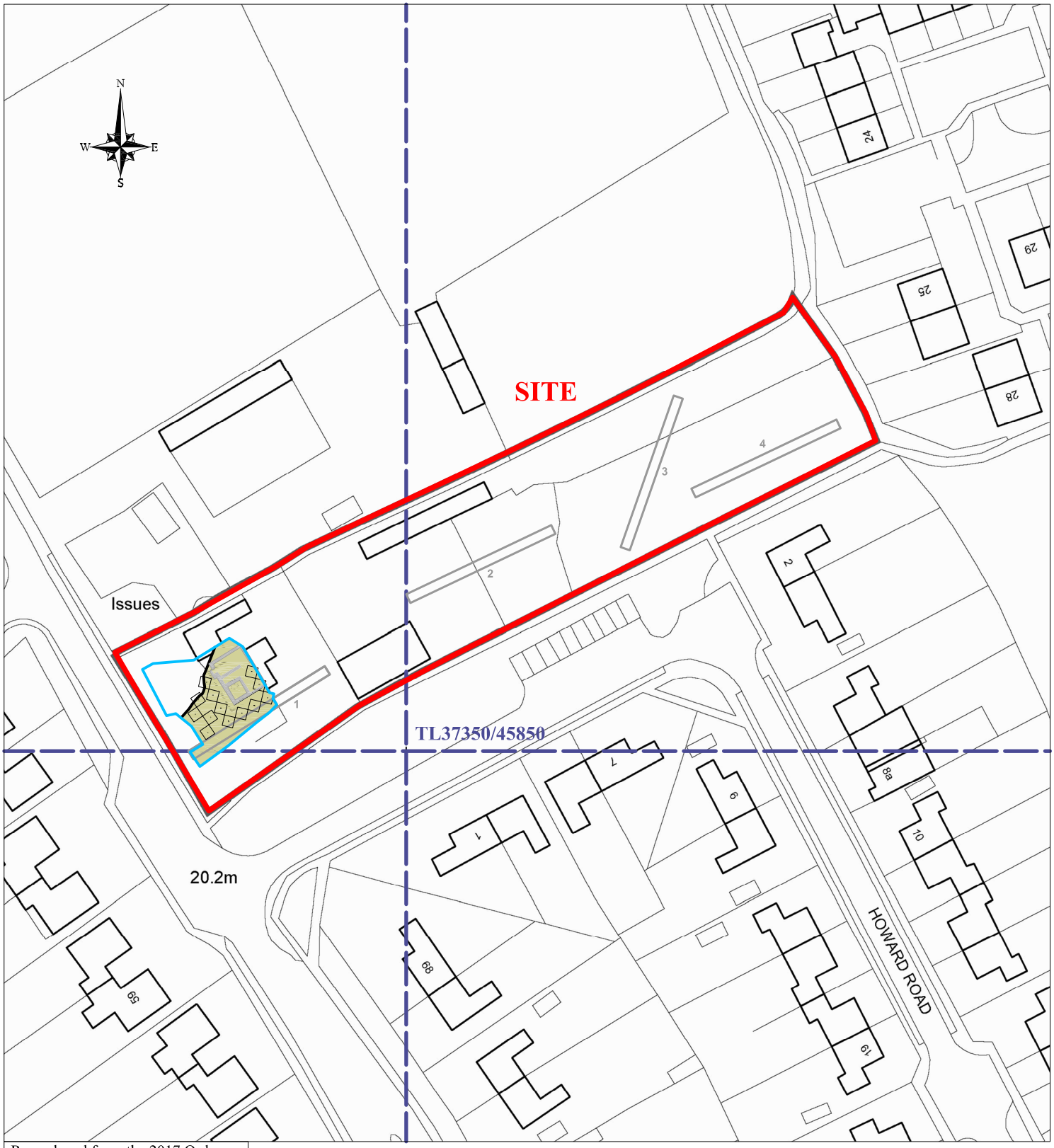

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Fig. 2 Detailed site location plan

Scale 1:1000 at A4

70 Whitecroft Road, Meldreth, Cambridgeshire (P7977)

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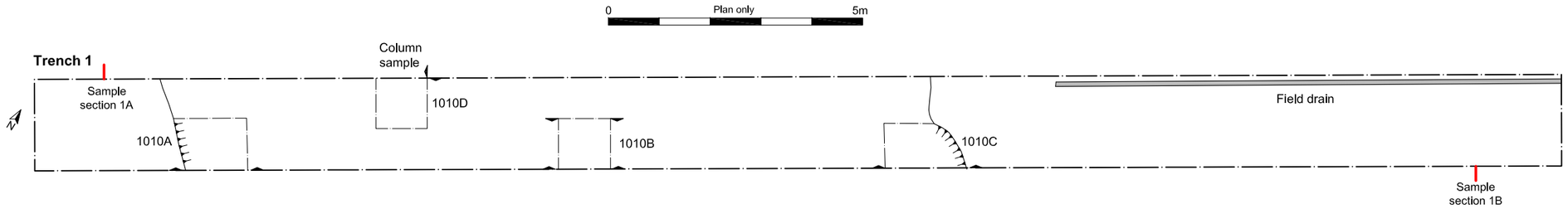
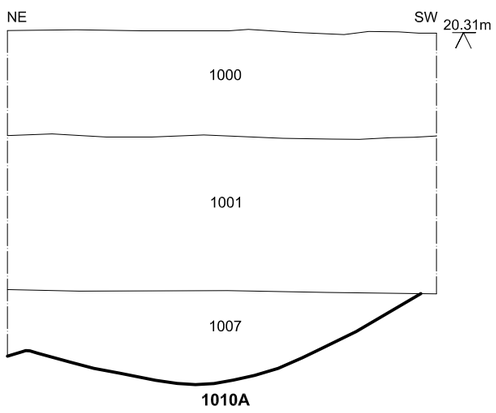
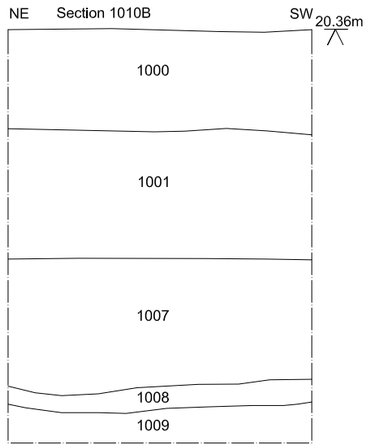
Fig. 3 Trench location plan

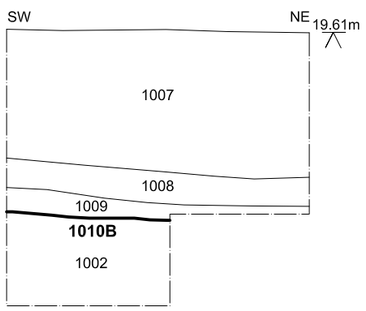
Scale 1:500 at A4

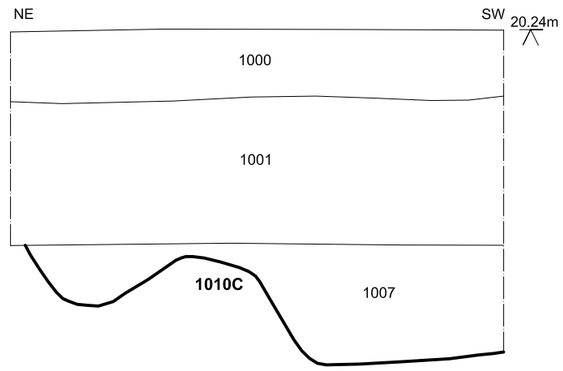
70 Whitecroft Road, Meldreth, Cambridgeshire (P7977)











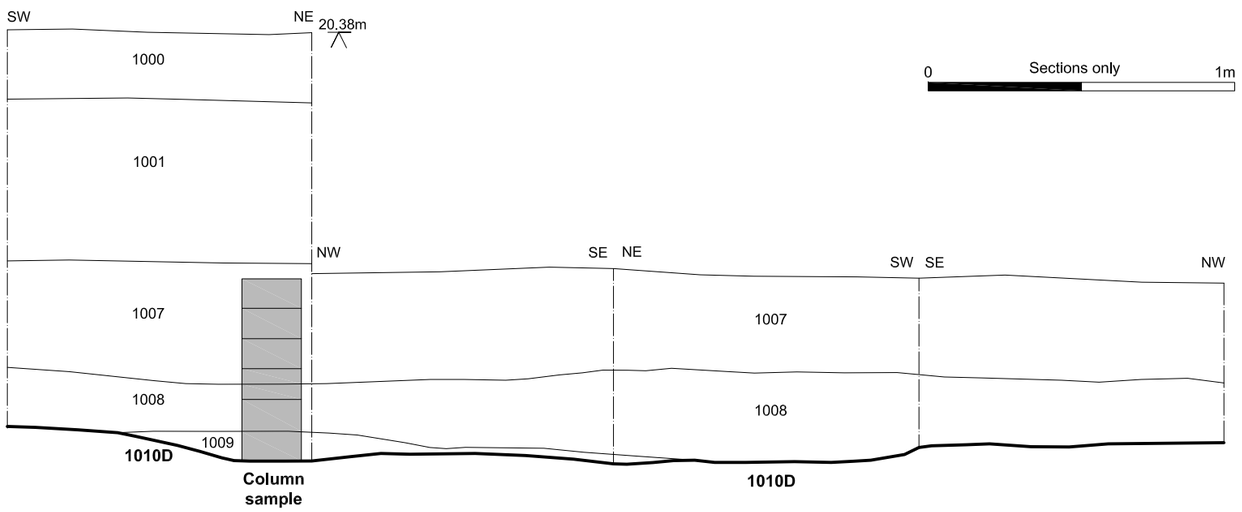


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Fig. 4 Trench 1 plan and sections

Scale Plan 1:100, sections 1:20 at A4

70 Whitecroft Road, Meldreth, Cambridgeshire (P7977)

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Fig. 5 Test pit location plan
Scale 1:125 at A4
70 Whitecroft Road, Meldreth, Cambridgeshire (P7977)

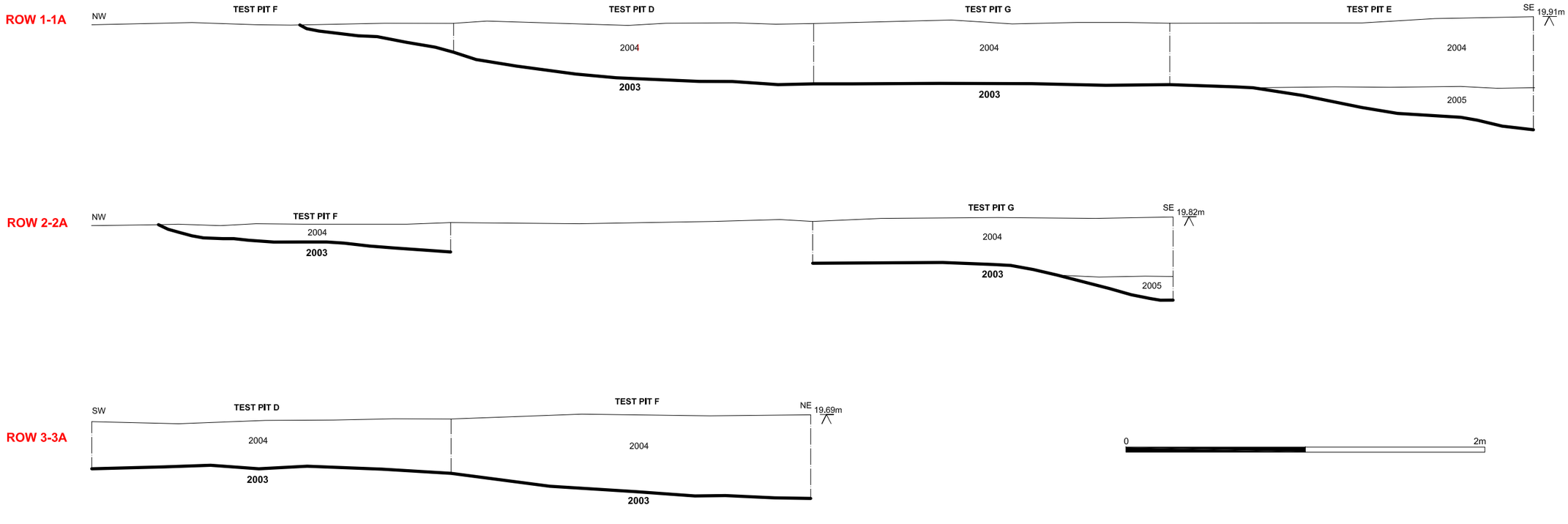

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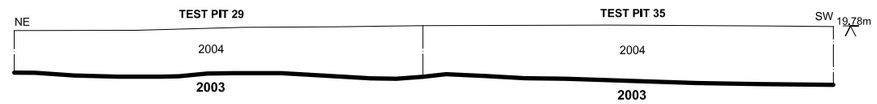
Fig. 6 Test pit sections

Scale 1:25 at A3

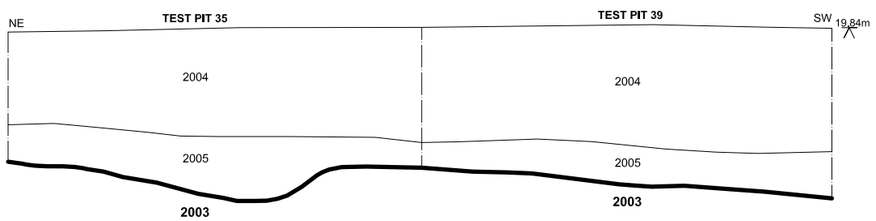
70 Whitecroft Road, Meldreth, Cambridgeshire (P7977)

ROW A-A1

ROW B-B1

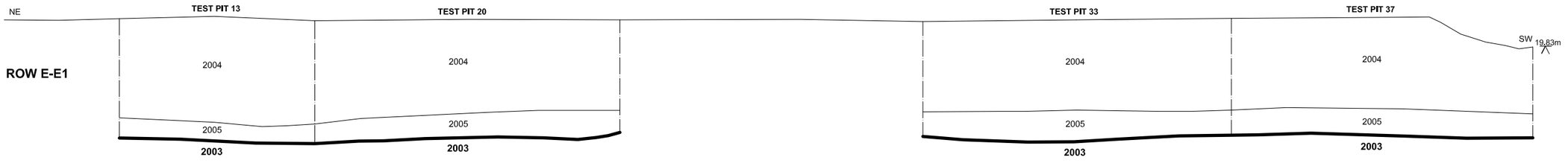


ROW C-C1



ROW D-D1

ROW E-E1



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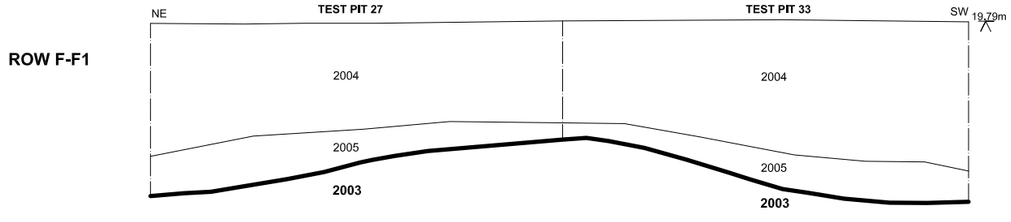

ROW G-G1

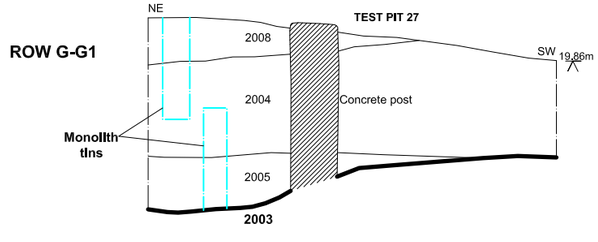

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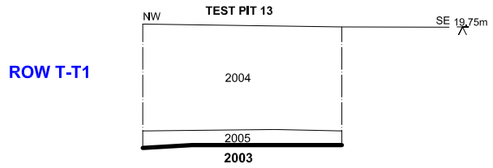
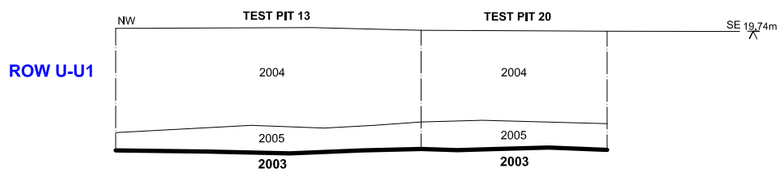
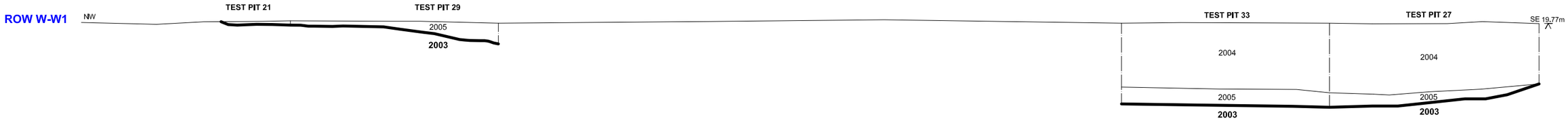
Fig. 7 Test pit sections

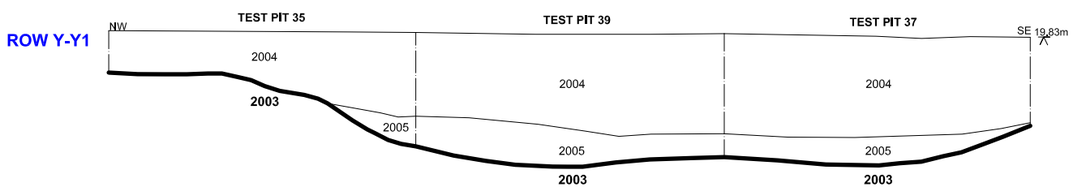
Scale 1:30 at A3

70 Whitecroft Road, Meldreth, Cambridgeshire (P7977)









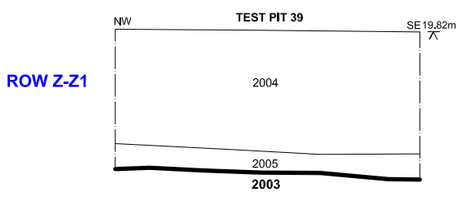


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Fig. 8 Test pit sections
Scale 1:40 at A3
70 Whitecroft Road, Meldreth, Cambridgeshire (P7977)