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Summary

In March 2010 BAE were commissioned to carry out a borehole survey to evaluate the palaeoenvironmental potential of subsurface deposits in the Stour Valley at Wixoe. The survey recorded a possible palaeochannel as well as floodplain deposits associated with the former course of the Stour at the pumping station. The channel had a maximum depth of 3.90m with the main deposit represented by a well humified silt peat. This was sealed by a thin layer of grey alluvial clay which in turn was overlain by a thick layer of dry compacted oxidised alluvial clay. The area of the pumping station was the only area identified to have significant palaeoenvironmental potential; the peat deposits within the channel and floodplain are likely to contain microfaunal evidence for environmental change. The presence of a significant Roman settlement on the opposite bank of the river makes these deposits able to establish a landscape context for the site. There is also the possibility for the survival of wooden artefacts or structures along and within the former channel. It is recommended that a section is excavated across this channel in order to recover bulk samples and monoliths for palaeoenvironmental assessment. There is the possibility for in situ and reworked Palaeolithic remains to be encountered which should be borne in mind during groundworks. It is also recommended that an archaeologist is present during groundworks in the eventuality that wooden remains or cut features are disturbed.

KEYWORDS: palaeochannel, Stour, peat deposits, Roman, archaeology, Wixoe

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1. INTRODUCTION

In March 2010 BAE were commissioned to carry out a palaeoenvironmental assessment of deposits within the area of the proposed Wixoe pipeline. Previous coring work along the north bank of the River Stour also carried out by BAE in 2009 indicated relatively low palaeoenvironmental potential of the deposits in this area. However, the area immediately to the north of the pumping station at Wixoe was identified as having the potential to preserve significant palaeoenvironmental remains. The higher ground may have the potential for the preservation of archaeological remains.

2. METHODS

The survey concentrated on three areas: Area 1 to the north of the pumping station, Area 2 to the west of the pumping station and Area 3 300m north west of the pumping station. The coring survey was carried out using an Eikjelcamp gouge corer which will only recover fine grained sediment and will not penetrate coarse gravels. The stratigraphy of the deposits was logged in the field using the Troels Smith (1955) method and the locations of the cores were recorded using a handheld GPS. The full core logs are provided in Appendix 1.

3. RESULTS

Area 1

Area 1 was located on the south side of the River Stour just outside the current pumping station compound (Fig 2: Plate 1). A number of buried services, including electricity lines, were found to cross the west end of the proposed development area hence this area was excluded from further investigation. A large pipe and two monitoring wells which were visible on the surface also crossed the area and these too were avoided. A further problem was the presence of large tree roots and flinty gravels in the upper soils, which made hand augering very difficult. Only 7 out of the 11 planned cores were able to penetrate this upper strata and even these involved several attempts to be successful.

Cores 1 and 4 were too stony to auger to any depth so the depths are the maximum reached due to coarse material blocking the chamber. Cores 2 and 3 were more successful. Core 2 represents the edge of the floodplain with a shallow deposit (0.10-1.10m) of stiff yellow-brown clay, probably alluvial in origin, overlying the basal gravels.

This upper alluvial deposit thickens to 1.30m in Core 3. At this location this deposit trends into a grey silty clay (1.40-1.60m) which contained occasional pale rootlets and became increasingly organic with depth. This again represents an alluvial deposit with the organic component suggesting a relatively sluggish flow regime, perhaps at the edge of a floodplain.

In Cores 6, 7, 8 and 10 the clay deposits overlie typical palaeochannel deposits that represent a former course of the river Stour. The maximum depth reached was 3.60m in Core 8 (Plate 2). The general sequence consists of grey silt, with occasional wood and mollusc remains, which overlie well humified peat. The basal sediments are grey shelly sands with rootlets and occasional wood fragments.

In core 6, the basal peat (2.50-3.00m) is sealed by a coarse shelly silty sand (1.80-2.50m) which also contained woody fragments, rootlets and what appeared to be small fragments of brick. This unit then fines up into a smooth grey brown silt with highly humified organic material throughout. This silt has a sharp, probably erosive, upper boundary with a light blue silt (1.40-1.45m) which contained occasional shell fragments and rootlets. This was sealed by the oxidised upper yellow-grey alluvial clay that forms the upper deposit across much of the area. The southern edge of the palaeochannel appears to be defined by Core 9, in which the alluvial clay overlies the basal gravels.

The depth of the basal gravels, which effectively reflects the pre-Holocene surface into which the palaeochannel had incised, is shown in Figure 3. This implies that the projected former channel is 'fossilised' by the parish boundary, suggesting that the date for the final infilling of the channel must post-date the establishment of this boundary.

Area 2: compound area

This area was located to the west of the pumping station on a sloping area of lawn 70m away from the current course of the river (Figure 4: Plate 3). The area was extremely flat and appeared to have been landscaped indicating that deposits in this area may be disturbed.

Two cores, 14 and 15, were excavated in this area and both showed the topsoil to overlie a very dry and stony yellow brown clay which was difficult to recover to any great depth. The maximum depth achievable was 0.50m but the topography of the area and the distance from the river means that it is unlikely that deposits of palaeoenvironmental potential associated with the river or its floodplain would be present. It is more likely that the area represents a possible older river terrace which is more likely to be the focus of possible settlement activity. The fact that area has been landscaped may mean that any underlying archaeology may be truncated mixing artefacts into the overlying soils.

Area 3: Access Road

This area was located 300m to the north west of the pumping station alongside the A101 road and a short lane (Figure 5: Plate 4). The cores were excavated c. 50m from the current course of the river on an area of higher ground which skirted the edge of a bowl shaped depression in the field. The proximity of a major road and the lane indicates a certain amount of disturbance within this field. It is likely that die to this and extensive ploughing the deposits within this area are likely to be truncated with artefacts appearing in the topsoil.

Cores 12 and 13 showed the topsoil which was clay rich with abundant natural flint pebbles was c. 0.40m thick and overlay a stony orange brown subsoil, derived from the basal sandy gravels and are possibly colluvial in origin. The nature of these deposits made recovery by hand auger to any great depth problematic. Again the topography suggests that this would be an unlikely site for the preservation of deposits of any significant palaeoenvironmental potential and is more likely to be the site of dryland activity and settlement.

4. DISCUSSION AND CONCLUSIONS

The auger survey has identified that Area 1 has significant palaeoenvironmental potential. The presence of over 3m of organic peats and silts indicates the presence of a infilled palaeochannel of the River Stour. The parish boundary on the current Ordnance Survey map which passes through the proposed area of works in Area 1 probably represents the former course of the Stour. This suggests as discussed above that the channel remained active, or at least apparent as a feature until relatively late in the Holocene. The first edition Ordnance Survey map shows a ford to the east of Area 3 as well as identifying Areas 1 and 2 as the site of a Roman camp (Figure 6). This may be an extension of the settlement seen on the opposite bank of the Stour. Any occupation evidence on this side of the river would most likely be on the higher terraces in Areas 2 and 3. The ford may also be a relatively ancient crossing and activity associated with this may also be revealed during groundworks.

The sediment archive demonstrates the channel infilling with organic deposits over time, indicating a change in the flow regime of the river from one of incision (i.e. downcutting) to aggradation (deposition of sediment). The organic accumulation occurred under stagnant or slow moving water conditions. The coarser material overlying this peat may suggest the infilling channel was re-activated at this point, with faster moving water briefly renewing the former course of the channel. The date of the beginning of deposit accumulation or subsequent events is unknown, but elsewhere in the Stour Valley channel aggradation began relatively early in the Holocene (e.g. Hopla *et al*. 2008). The 1st edition OS map shows the channel to have a more sinuous and meandering character than its present form (Figure 6).

The areas of higher ground (areas 2 and 3) may be areas of Palaeolithic activity represented by lithic scatters. It is likely that this material would be reworked into the river terrace gravels and possibly churned up into the topsoil. This may make identification of the archaeology problematic so care should be taken when monitoring of groundworks commences. Palaeolithic deposits are often deeply buried and difficult to identify so opportunities to investigate areas of possible activity are important.

The Roman settlement site across the river at Wixoe has recently been subject to evaluation and fieldwalking as part of the same development (Krawiec *et al.* 2008: 2010). The area has also been surveyed using geophysics (Baldwin 2008). All these techniques have confirmed the presence of a large, possibly high status Roman settlement. The recovery of palaeoenvironmental evidence from Area 1 may permit the reconstruction of a wider landscape context for the site. The River Stour has been the subject to limited investigation and work at two sites, Priory Stadium and Sudbury A.F.C, recorded the assessment of palaeoenvironmental remains (Gearey *et al.* 2009; Hill and Joliffe 2007). The results of which indicate a significant phase of floodplain evolution between the Iron Age and the medieval period (Gearey et al 2009:7). There is the suggestion that peat accumulation ceased during the 12th-13th centuries when alluviation was the dominant fluvial process. The information that may be gained from the study of the deposits here will dovetail into this existing dataset further refining the model for

landscape change within the Stour Valley as a whole as well as placing an important Roman site within a landscape context.

5. RECOMMENDATIONS

Area 1 is the only area shown to have potential for palaeoenvironmental remains. Areas 2 and 3 should be subject to monitoring under archaeological control but no further palaeoenvironmental work is recommended other than what may be recovered from cut features during monitoring of groundworks. The possibility for reworked material in the topsoil of these areas should be taken into account.

There is the potential for waterfront structures associated with the Roman settlement to be preserved within the channel sediments. Two such structures have been identified during bank realignment works along the river Waveney at Barsham and Beccles Marshes (Krawiec *et al.* forthcoming).

The River Stour has been identified as having the potential to contribute to local and regional understanding of landscape development in this region (Hill *et al.* 2007). Studies of such deposits have yielded a great deal of information relating to human activity (Hopla *et al.* 2009). This site thus presents an opportunity to examine a relatively thick sedimentary sequence. It is therefore recommended that a test pit be excavated by machine over the Core 8 location in order to provide a section for sampling. The sampling should take the form of a continuous sequence recovered in monolith tins, for the assessment of pollen, and accompanying bulk sediment samples for the assessment of beetles and plant macrofossils. This strategy will also permit the recovery of samples for radiocarbon dating to provide a chronology for the landscape development.

In summary the following recommendations are made:

- A test pit should be excavated at the location of Core 8;
- Monolith and bulk samples to be recovered from the exposed section of the test pit;
- Assessment of these samples for pollen, plant macrofossils and coleoptera.
- A 'range finder' dating programme to be undertaken to provide an outline chronology for the sequence.
- Monitoring under archaeological control to be carried out on all three areas, with particular attention to Area 1 where there is the possibility of the presence of fragile organic archaeological material. Also care to be taken when monitoring the topsoil removal as artefacts may be reworked within upper strata.

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Figures

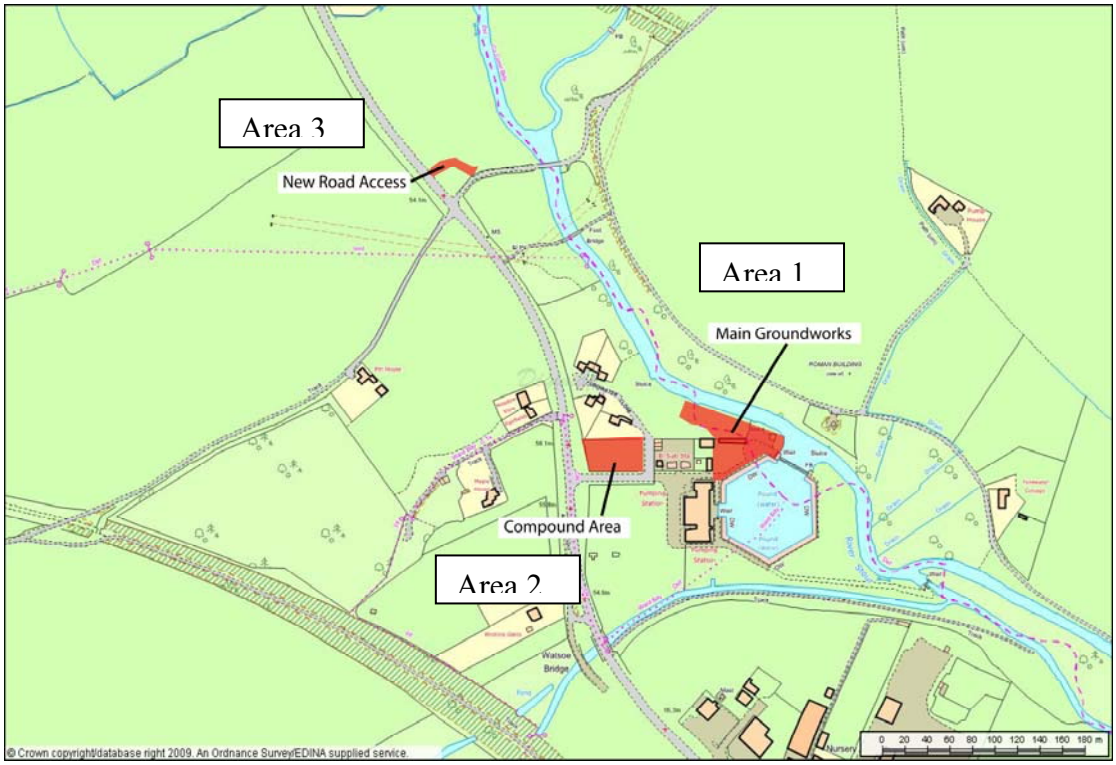

Figure 1: Areas of investigation (courtesy of Savilles)

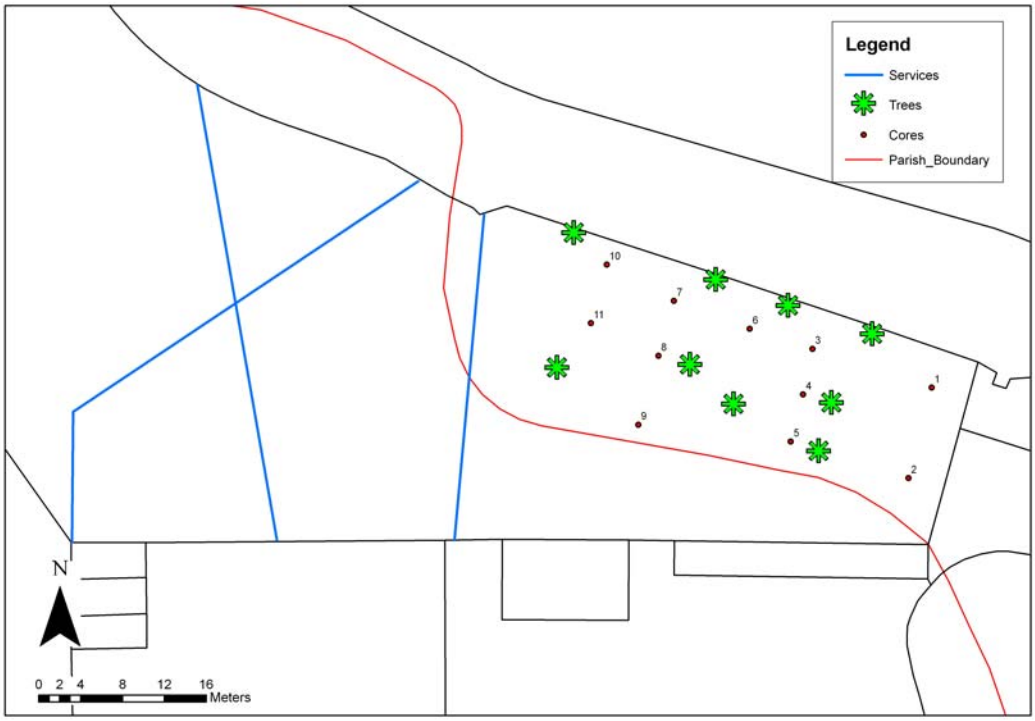

Figure 2: Borehole locations (cores 1-11) Area 1

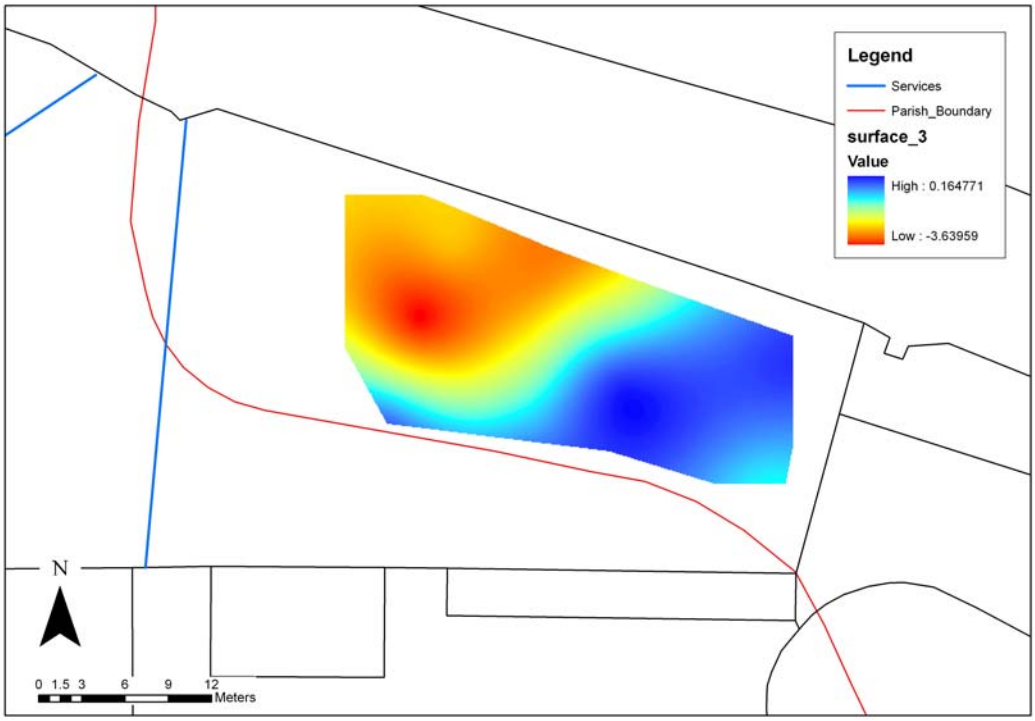

Figure 3: Surface of the gravels

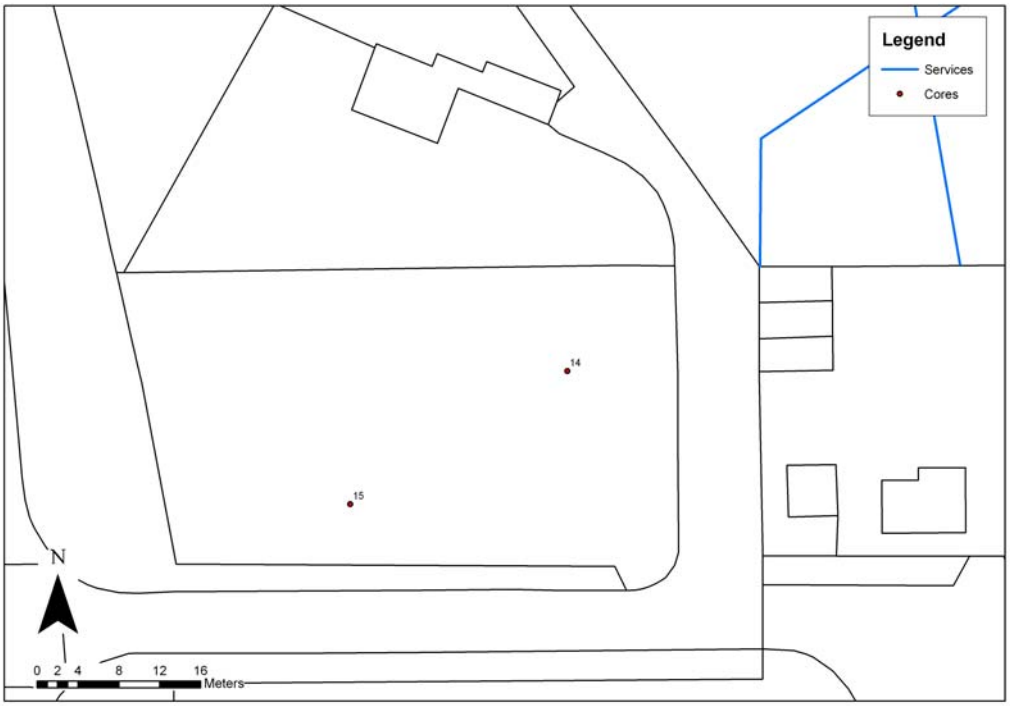

Figure 4: Borehole locations (14-15) Area 2

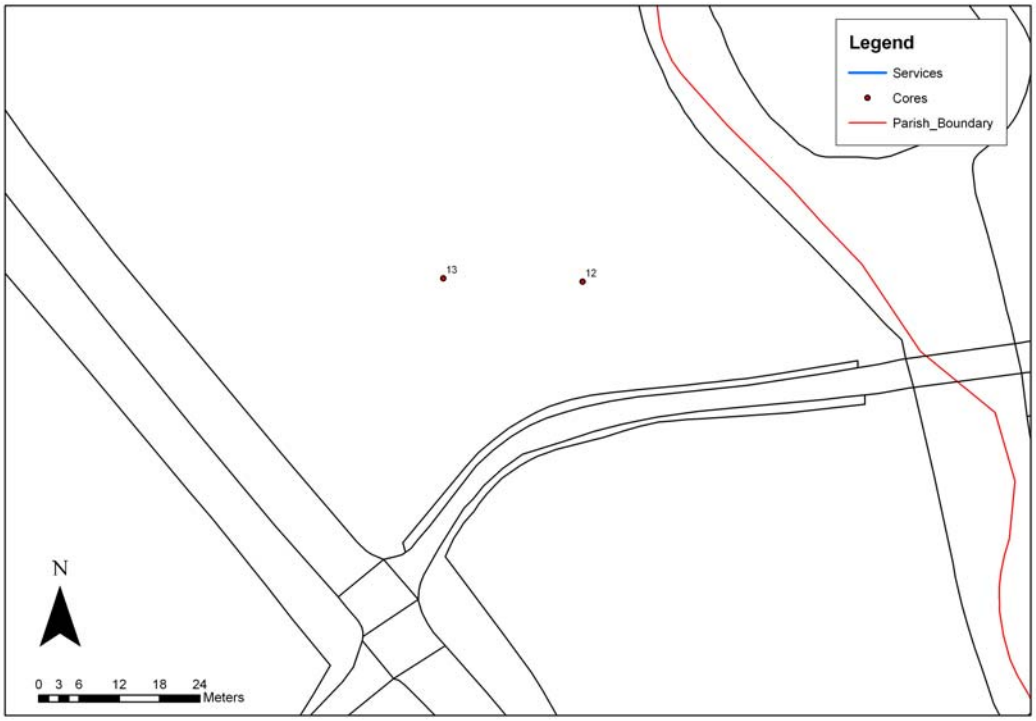

Figure 5: Borehole locations (12 and 13) Area 3

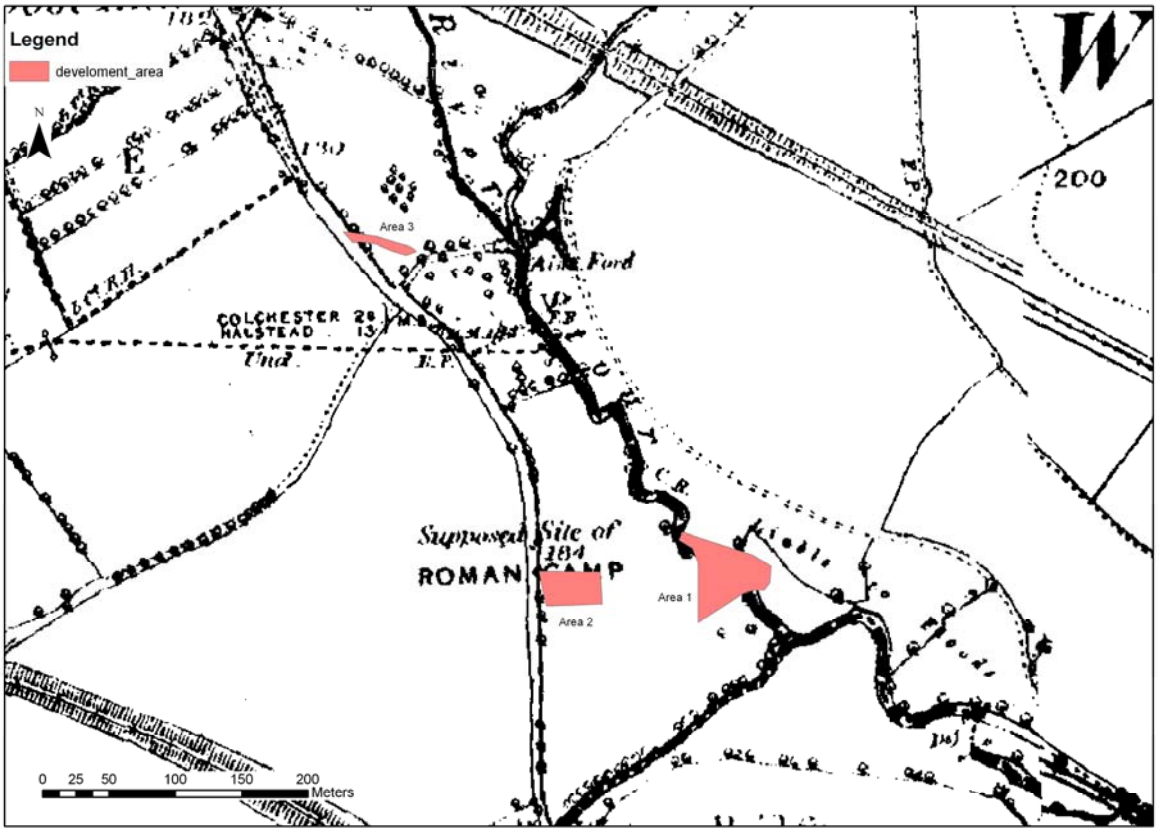

Figure 6: 1st Edition Ordnance Survey c.1880

Plates

Plate 1: Area 1 looking east

Plate 2: Core 8 peat

Plate 3: Area 2 looking north west

Plate 4: Area 3 looking north west

Appendix 1

Borehole Logs

<u>Area 1: north of pumping station</u>

Core 1 TL 70842 43109

0-0.10m dry topsoil
0.10-0.27m stiff yellow brown clay, occasional charcoal frags, too stony to core

Core 2 TL 70842 43098

0-0.10m dry topsoil
0.10-1.10m stiff yellow brown clay, smoother at base

Core 3 TL 70834 43107

0-0.10m dry topsoil
0.10-1.30m stiff yellow brown clay, grey mottling at base

1.30-1.40m	grey sticky silt clay, occasional pale rootlets
1.40-1.60m	trends into a darker grey smooth silt with occ pale rootlets, wood frags

Core 4 TL 70831 43109

0-0.10m	topsoil
0.10-0.90m	stiff dry yellow brown clay, too dry to core

Core 5 TL 70821 43108

0-0.10m	topsoil
0.10-0.50m	stiff yellow brown clay, top stony to core

Core 6 TL 70824 43115

0-0.10m	topsoil
0.10-1.30m	stiff yellow brown clay
1.30-1.40m	trending into grey yellow sticky silt clay, occ pale rootlets, shelly fragments
1.40-1.45m	sharp transition onto light blue grey silt, occ shell frags, dark rootlets
1.45-1.80m	diffuse lower boundary, grey brown smooth organic silt, freq rootlets
1.80-2.50m	coarse shelly black grey silt sand, wood frags, occ brick fragments? Rootlets
2.50-2.80m	dry gritty well humified silty peat, pale rootlets, small stones, diffuse lower boundary
2.80-3.00m	brown grey well humified silty peat, wood at base

Core 7 TL 70817 43120

0-0.10m	topsoil
0.10-1.95m	stiff yellow brown clay
1.95-2.10m	grey sticky silt, shelly fragments, occ wood fragments at base
2.10-2.30m	well humified silty peat, monocot remains, pale rootlets, wood fragments
2.30-2.35m	smooth grey brown silt, occ shells, pale rootlets
2.35-2.80m	well humified silty peat, abundant monocot remains, gravel at base

Core 8 TL 70818 43111

0-0.10m	topsoil
0.10-1.60m	stiff yellow brown clay
1.60-1.70m	sticky grey clay
1.70-1.80m	brown grey organic silt, shelly frags, occ rootlets
1.80-3.50m	well humified silty peat, abundant monocot remains, woody fragments, occ shell fragments, reed fragments at base
3.50-3.60m	grey shelly sand, occ wood fragments and rootlets

Core 9 TL 70817 43098

0-0.40m	topsoil

0.40-0.60m stiff yellow clay, chalk fragments onto gravels

Core 10 TL 70811 43119

0-0.10m topsoil
0.10-1.10m stiff yellow clay
1.10-1.35m blue grey sticky silt clay
1.35-2.35m well humified silty peat, abundant monocot remains, rootlets and occ shell fragments
2.35-2.60m grey shelly sand, occ molluscs, rootlets and wood fragments

Core 11

Ground too rooty and stony to core

Area 2: Compound site

Core 14 TL 70780 43088

0-0.25m Turf and topsoil
0.25-0.50m yellow brown clay too stony to core

Core 15 TL 70738 43058

0-0.30m Turf and topsoil
0.30-0.50m yellow brown clay too stony to core

Area 3: Access road site

Core 12 TL 70620 43339

0-0.40m clayey stony topsoil
0.40-0.80m orange brown stony subsoil
0.80-0.90m gravels

Core 13 TL 70599 43339

0-0.30m clayey stony topsoil
0.30-0.40m gritty yellow clay, to coarse to core