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King's Dyke, New Road and Road Bridge, Whittlesey, Cambridgeshire Archaeological Evaluation

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Report No. MK 166/19

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Land to the south of the A605

King's Dyke, New Road and Road Bridge, Whittlesey Cambridgeshire: Archaeological evaluation

Report No. MK166/19

CONTENTS

Illustrations (bound at rear)

SUMMARY

CFA Archaeology Ltd carried out a trial trench evaluation in advance of the construction of a bypass around a level crossing on land to the south of the A605, King's Dyke, New Road and Road Bridge, Whittlesey. The site is located to the east of Must Farm and close to the suspected route of the Must Farm rodden (palaeochannel). The evaluation revealed 4m deep Holocene deposits with good potential for palaeoenvironemental study of the surrounding landscape. The edge of a late Holocene channel was identified at the SW edge of the site which may be the edge of the Must Farm rodden. Two C14 dates (2490-2300 cal BC and 2570-340 cal BC) were obtained from the 4th unit in the sedimentary sequence, located 2.6-3.6m below the site surface and under the channel deposits.

1. INTRODUCTION

1.1. General

This report presents the results of an archaeological evaluation undertaken by CFA Archaeology Ltd (CFA) between the 11th to the 20th of December 2018 on a new road and bridge construction intake on Land to the south of the A605, King's Dyke, New Road and Road Bridge, Whittlesey, Cambridgeshire. The work was commissioned by Kier Ltd.

The work was carried out in accordance with a Written Scheme of Investigation (WSI) produced by CFA and dated November 2018 covering this programme of works and approved by CHET.

The site archive is currently held by CFA Archaeology and will be deposited with the appropriate repository in due course.

1.2. Project Background

The site (Fig. 1) lies at a height of c 6.6m aOD on the edge of the 'high' ground of Whittlesey rising above the surrounding fen. The underlying geology comprises mudstone, siltstone and sandstone of the Kellaways and Oxford Clays formation. These are overlain by superficial deposits of peat formed up to 3 million years ago in the Quaternary period; these sedimentary deposits are lacustrine and palustrine in origin and comprise detrital and organic material and gravel of River Terrace Deposits (BGS 2019). (Fig. 1)

1.3. Archaeological Background

There are no known sites of archaeological importance within the site boundary though there are a number of undated and more recent remains.

An archaeological evaluation (ECB568 / MCB15864) was carried out in advance of the extension to Star Pit which runs across the centre of the site in 1996. The 10 trial trenches revealed a few ditches, pits and post-holes, all undated, and a background presence of prehistoric activity.

An archaeological evaluation (ECB4193) was carried out on the north-eastern and south-western parts of the site on a proposed alternate site for the Kings Dyke level crossing in 2014 (trenches shown on Fig. 1). Trenches 4 and 6 in the north-east contained foundations of 20th century buildings. Other trenches revealed a made ground including road waste dumping. In some areas this included asbestos that meant investigations could not be completed. Trench 9 revealed no modern deposits or archaeological remains.

The WW2 General Headquarters Line (GHQ) crosses the site (CB15190). The defences include various concrete and brick pillboxes between the River Welland to Floods Ferry. A pill box is located next to but not within the site (MCB19656). Also crossing the site is the Ely & Peterborough Branch of the Great Eastern Railway. (MCB24025).

Prehistoric

The March Gravels overlie the Oxford Clay and afforded well drained land on which settlement has been located since the prehistoric period, while Palaeolithic stone tools have been found within the gravel member itself (MCB19243). The most important prehistoric feature close to the site is the route of a rodden (prehistoric tidal river) which can be seen as a palaeochannel on Lidar data (Fig. 2) connecting to the Kings Dyke south-east of the site. The route of the channel north-east of the dyke is unknown but it may run close to the south side of the site. The palaeochannel is thought to be the same as that encountered at Must Farm (see below) which contained extremely well preserved Bronze Age and Iron Age remains including wooden fish weirs and log boats.

Bronze Age and Iron Age

Rescue excavations in the 1960s and 1980s brought notable significant archaeological sites to light, mainly relating to Bronze Age burials (MCB3423), Iron Age settlement (eg MCBs 3901, 1912) as well as Roman settlement and cemetery evidence. Since then, systematic examination of the archaeological landscape of the quarries in western Whittlesey and its fenland area has enabled a considerable understanding of the nature of

settlement and land use in this formerly undulating landscape from periods before peat developed in the deepest basins and rivers. Episodic marine inundation dumped deep layers of marine clays in the basin and roddonised ancient tidal rivers and creeks. Periodic alluviation and further prolonged periods of marsh development drastically altered this part of the low-lying Cambridgeshire landscape. Archaeological work focused on the pits at Kings Dyke, Bradley Fen and at Must Farm revealed Neolithic occupation, funerary and ceremonial sites set within planned, managed fields and landscapes. At Must Farm, c 1km to the west of development area, archaeological investigations between 2004 and 2016 revealed several phases of prehistoric activity from the middle Bronze Age to Late Iron Age. The main settlement was a Late Bronze Age piled village was built over a palaeochannel of former rivers of the ancient Nene river system (eg MCB16817). Within 135m of the channel, 8 log boats were discovered spread throughout the layers of the channel sequence as well as fishing structures (MCB19857). Other remains included a palisade, a burnt mound dating from the early Neolithic to early Bronze Age and a single crouched inhumation within a barrow. Other Bronze Age activity has been identified at Bradley Fen, c 1.2km north-west of the development site. A settlement and a weapon hoard were recovered during excavations between 2000 and 2004.

Roman

Excavations north of the main road c.600m opposite the site found Iron Age and Roman remains (ECB503 / 03151) including a 2nd century AD possible execution cemetery as well as waterlogged remains. Evidence of Roman activity has also been found at Itter Farm (ECB502), c.650m north-east of the site, where pits and ditches were found during archaeological investigations in the 1950s.

Medieval

King's Dyke passes the site roughly 400m to the south. The date of the dyke is not fully understood: rationalised during the 17th century fen drainage programme, it is believed to be of late Saxon or early

Post Medieval

The Whittlesey brick pits cluster on the western side of Whittlesey, from which clay has been extracted

1.4. Objectives

In accordance with the brief the aim of the evaluation was to determine the 'location, extent, date, character, condition, significance and quality of any surviving archaeological remains liable to be threatened by the proposed development' This was used to:

- Determine the character, date, condition and significance of the archaeological resource;
- Define the nature and extent of any mitigation works that may be required;
- Look for the presence/absence of palaeosols and old land surface soils/deposits;
- Determine the character of deposits and their contents within negative features;
- Investigate palaeo-channels;
- Determine site formation processes generally.

The Research Objectives were to:

- Investigate the evidence for and signs of the different phases of land use and enclosure within the area, including any evidence for pre-Roman, Roman, Saxon, medieval and post-medieval activity;
- Place the results of the investigation within the wider landscape and context and contribute to an understanding of the pattern of land use;
- Use a spectrum of environmental techniques appropriate for this aspect of investigation in an attempt to model the landscape and its transformation brought about by the settlement's inhabitants and due to natural events.

2. WORKING METHODS

2.1. General

CFA Archaeology Ltd follows the Chartered Institute for Archaeologists' Code of Conduct, Standards and Guidance (CIfA 2014a, 2014b, 2014c, 2014d).

2.2. Trenching

Six trenches were excavated; the position of Trenches 2, 4 and 6 were altered slightly because of access and site boundary concerns. All trenches were between 1.8m and 2m wide. Three trenches were 30m long, one was 40m, while the remaining two were L-shaped and 50m long in total.

Topsoil and overburden were removed with a mechanical excavator fitted with a toothless ditching bucket under constant archaeological supervision. Trenches were excavated to the first major sedimentary horizon. To establish the nature of the stratigraphy below this level, machine-dug sondages were excavated in each trench under the supervision of CHET. Following this, further machine-dug sondages were excavated under the supervision of Geoarchaeologist Mike Allen to record the geoarchaeological sequence and to reach the Devensian gravels. Sample sections and notes of deposits were recorded and the sondages quickly backfilled.

Upcast and spoil from the mechanical excavation was scanned by eye and by metal detector to aid the recovery of topsoil artefacts. Metal detecting was also conducted over exposed trench deposits. Hand sorting/sampling was also carried out at the end of each trench to look for artefacts from each deposit. No metal or other artefects were found.

2.3. Excavation and Recording Strategy

The character, composition and general depositional sequence were recorded on pro-forma context sheets conforming to CIfA standards (2014b) and CFA's quality manuals. Sample sections were drawn 1:20 and a full photographic record comprising 35mm B&W film and digital images in RAW format was carried out. The trenches and features were surveyed using RTK initialized GPS equipment accurate to 8mm horizontally and 12mm vertically and related to the Ordnance Survey grid and ordnance datum.

2.4. Archiving

The archive, comprising all CFA record sheets, finds, plans and reports, will conform fully to the current Cambridgeshire *Deposition of archaeological archives in Cambridgeshire 2017* and MoRPHE guidelines (CFA 2014d) ensuring the proper transfer of ownership. The project report will include an index to the site archive. The Cambridgeshire Historic Environment Record (CHER) event number (ECB5745), will appear on archived items and all related reports.

3. ARCHAEOLOGICAL RESULTS

3.1. General

A summary of trenches is contained in Appendix 1. Illustrations and photos referred to in the text can be found at the back of the report. The location of the trenches, sondages and sample sections are shown in Figs 2-8. A full in depth discussion of the stratigraphy is provided by Mike Allen in appendix 2 at the back of this report.

3.2. Descriptions

Trench 1 (Figs. 10-11)

This measured 40 m long by 1.8m wide and had an average depth of 0.54m. Two sondages were excavated at either end reaching a maximum depth of 2m at the west and 4.7m at the east (Figs. 2-3).

Natural gravels **(0123)** were reached at the base of the eastern sondage at a depth of -3.27m AOD. Above this were Holocene deposits: brown silty clays **(0211, 0121)** followed by a deposit of light grey-brown silty clay containing waterlogged wood **(0120)**. A sample of alder roundwood from the latter was dated to 2570-2340 cal BC. A layer of light grey-blue silty clay **(0119)** and a thin band of sandy clay **(0118)** were above this. Thick bands of peat and silt containing shell fragments had settled above this **(0113, 0116, 0117)** and on top were alluvial dark silty clays absent of shell and peat **(0112, 0111, 0110)**. Topsoil **(0101)** and made ground **(0114)** represented the uppermost layers of the trench.

Trench 2 (Figs. 12-13)

Trench 2 was 30 m long by 1.8m wide and had an average depth of 0.46m. Two sondages were excavated at either end reaching a maximum depth of 2.9m at the east and 4.2m at the east (Figs. 2 & 4).

Natural gravels **(0220)** were reached at the base of the western sondage at a depth of -3.08m AOD. Holocene deposits were found above the gravels. A light beige silty clay **(0219, 0214)** had settled above the gravels followed by a darker silty clay **(0213, 0218)**. Light grey-blue silty clay **(0217, 0212)** lay above this at the west side of the trench. On the east this same clay was contained within a darker brown more organic silty clay **(0211)** probably representing a localised area of stagnation. A similar peat layer to that found in Trench 1 had built up above this **(0210, 0216)**. At the east side of the trench above this was made ground. At the west end were thin layers of silty clay **(0209)** and peat **(0208)** followed by subsoil and topsoil.

Trench 3 (Figs. 14-15)

Trench 3 was 1.8m wide and L-shaped measuring 30 m long from the west end to the eastern corner and 20m from the eastern corner to the north end. The average depth was 0.46m. Three sondages were excavated at either end of the trench at its centre reaching a maximum depth of 4-4.2m (Figs. 2 & 4).

Natural gravels **(0321)** were reached at the base of the northern sondage at a depth of -3.35m AOD. The gravels were not reached in the central and western sondages suggesting the Holocene sequence is deeper in these locations. Above the gravels was a grey-brown silty clay **(0320)** followed by a dark-brown silty clay containing waterlogged wood **(0319)**. This same deposit appeared deeper in the central and western sondages and was represented by **(0315)** and **(0313)**. Light-blue silty clays **(0308, 0312** and **0318)** had settled above this, with this deposit notably deeper in the western sondage suggesting it may be located over a hollow. In the central and northern sondages, peat had been deposited above this **(0311, 0317)**, though a deposit of dark-grey silt **(0307)** containing waterlogged wood and above a deposit of light grey-blue clay **(0306)** were identified in the western sondage. Again, the difference in the sequence here could suggest that these deposits accumulated over or possibly with a channel or hollow. In the same sondage the shell rich silty clay identified in Trench 1 was located **(0305, 0304)**. This deposit extended into the central sondage **(0309)** not into the northern sondage where peat had accumulated **(0316)**. Above all of these were recent deposits of grey silty clay and topsoil **(0303, 0302, 0301)**.

Trench 4 (Figs. 16-17)

Trench 4 was 1.8m wide and also L-shaped and measuring 32 m long from northern end to the corner and 20m from the corner to the east end. Three sondages were excavated; one in the centre of the northern arm, and two in the eastern arm. The sondages reached depths of 2.6-4.1m.

Natural gravels **(0421)** were reached at the base of the eastern sondage at a depth of -3.06m AOD. These were not found in the northern sondage though the sterile light blue clay **(0412)** is probably very close to the top of them. The deposits above the gravels and the blue clay were dark grey and dark-brown silty clays **(0411, 0420, 0419)** followed by grey to blue silty clays **(0409, 0408, 0407, 0418)**. In the eastern sondage was a localised sequence of black and brown silty clays **(0414, 0416)** capped by a deposit of orange silty sand **(0415)**. Deposits of silty clays varying in colour but broadly similar were located above this **(0406, 0414)** below the subsoil **(0402)**, made ground **(0413)** and topsoil **(0401)**.

Trench 5 (Figs. 18-19)

Trench 5 was 31m long by 1.85m wide and had an average depth of 0.47m. Two sondages were excavated at either end; depths reached were between 3.5m and 4.75m.

Natural gravels **(0509)** were reached at the base of the south-east sondage at a depth of -3.6m AOD. In the same sondage above this was a dark-brown silty clay (0508) followed by a thick organic layer silty clay which varied in colour from light grey-blue to medium brown **(0507)**. Hazel roundwood from this layer was dated to 2490-2300 cal BC. The same sequence in the north-west sondage contained more distinctive layers of waterlogged wood **(0505, 0504)**. Peat **(0506, 0503)** had been deposited above this and was thicker in the north-west sondage. Subsoil **(0502)** and topsoil **(0501)** lay at the top of the sequence.

Trench 6 (Figs. 20-21)

Trench 6 was 31m long by 1.85m wide and had an average depth of 0.4m. Two sondages were excavated; one near the centre of the trench and another at the south-east end; depths varied from between 2m and 4.55m.

Natural gravels **(0613)** were reached at the base of the south-east sondage at a depth of -3.4m AOD. Above was a thick deposit of light blue-grey silty clay **(0612)** followed by a thinner layer of darker blue silty clay **(0611)**. On top of this had settled a dark brown clay **(0610)** containing organic inclusions and waterlogged wood (bog oak). At the top of this deposit was a tree trunk sitting at the base of a grey-brown silty clay **(0609)**. Above this was a blue-grey and red-brown silty clay **(0606, 0607, 0608)**. In the centre of the trench above this was what appeared to be a localised deposit of brown wet silt containing waterlogged wood **(0605)** possibly filling a depression and above another grey-beige silty clay deposit **(0604)**. Peat had built up above these **(0603)** and was thickest (0.95m) in the south-east sondage where it lay

directly above **(0608)**. The uppermost layers of the trench were a subsoil **(0602)** and topsoil **(0601)**.

4. DISCUSSION

The sequence of deposits revealed in the sondages at Kings Dyke reflect a c. 4m deep build up of Holocene sediments on top of late Devensian fluvio-glacial gravel deposits. The sequence is capped by recent alluvial topsoil. The deposits can be broadly ascribed to the five main units identified at King's Delph to the south-west of the site. (Geary & Chapman 2008).

As outlined by Mike Allen (see Appendix 2) seven main sedimentary units have been identified across the site. The sequence is as follows:

7. Alluvial soil (topsoil and subsoil)

6. Alluvium

5. Peat

4. Silts and muds (including humic silts) representing stasis

3. Humic muds with localised stasis

2. Blue clay

1. Gravel

The differences between the sample sections noted within and between the trenches largely occurs within units 3 to 5. The variations in the silts and muds appears to reflect pockets of localised stasis (stagnation) and areas of wood accumulation. Wood in unit 4 has been dated to the Late Neolithic / Early Bronze Age. Below this, the blue clay (2) sometimes lies directly on the glacial gravels but sometimes this is absent (trenches 1, and 5). The peat build up (5) was shown to vary across the site. The differences are presumably due to localised waterlogging. The most notable differences in the peat occur at either ends of Trenches 5 and 6. The Devensian fluvio-glacial gravel deposits (1) were encountered between -3.06m AOD and -3.6m AOD. The level difference is probably due to natural processes that reworked the gravels in the early Holocene.

The alluvium (6) present in the upper levels of Trenches 1 and 2 is potentially an important variation in the sequence representing the fill or flooding deposit of/from a late Holocene channel. The C14 dates show that this accumulated after the Late Neolithic. This appears to extend to the west end of Trench 3 as the same deposit (0305, not viewed by Mike Allen) was found in the western sondage of this trench. The alluvium was not present at

the east end of Trench 2 or in the other sondages of Trench 3. We can therefore surmise that these parts of the site lie outside the channel or flooding from the channel. The estimated extent of the channel is shown in Fig. 9. As outlined by Mike Allen, there is a small possibility that the alluvium could represent the very edge of the Must Farm rodden.

5 SUMMARY AND CONCLUSION

- The edge of a late Holocene channel represented by alluvium has been identified in Trenches 1-3. These deposits accumulated after the late Neolithic and thus could represent the very edge of the Must Farm rodden. The centre of the palaeochannel appears to lie just outside the site boundary to the south-west and construction of the road may truncate part of its northern edge.

- The evaluation also identified an important 4m deep sequence of Holocene deposits across the site. This sequence is considerably deeper than that recorded on surrounding archaeological sites and has the potential to supply a detailed long land-use history of the local area. Most importantly sequence may provide a long land-use record covering the period prior to, during and post the Must Farm activity to the north west.

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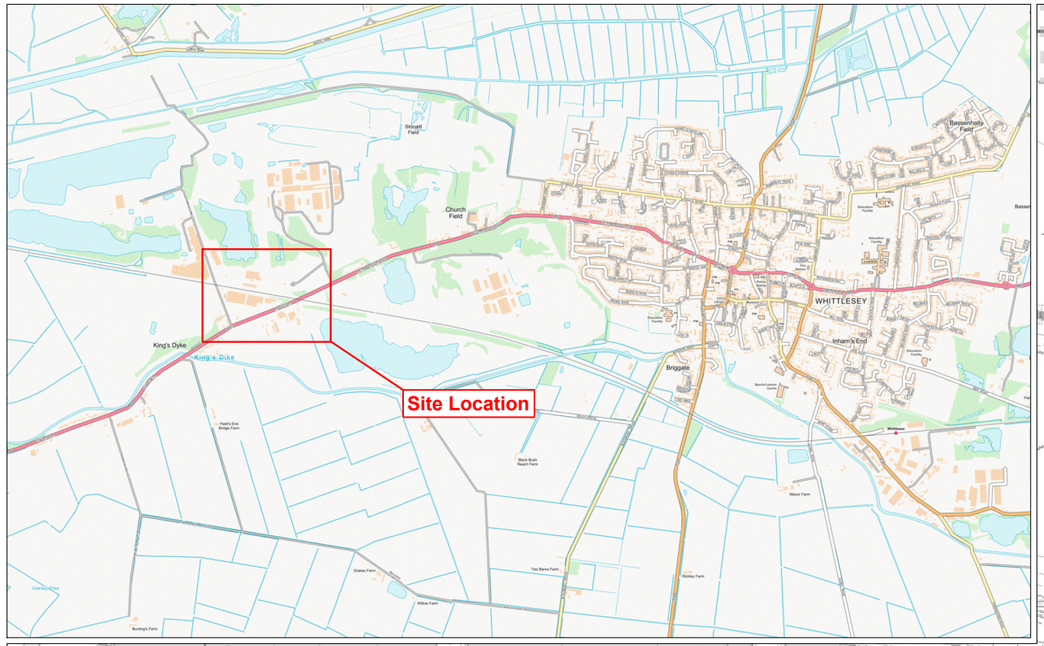

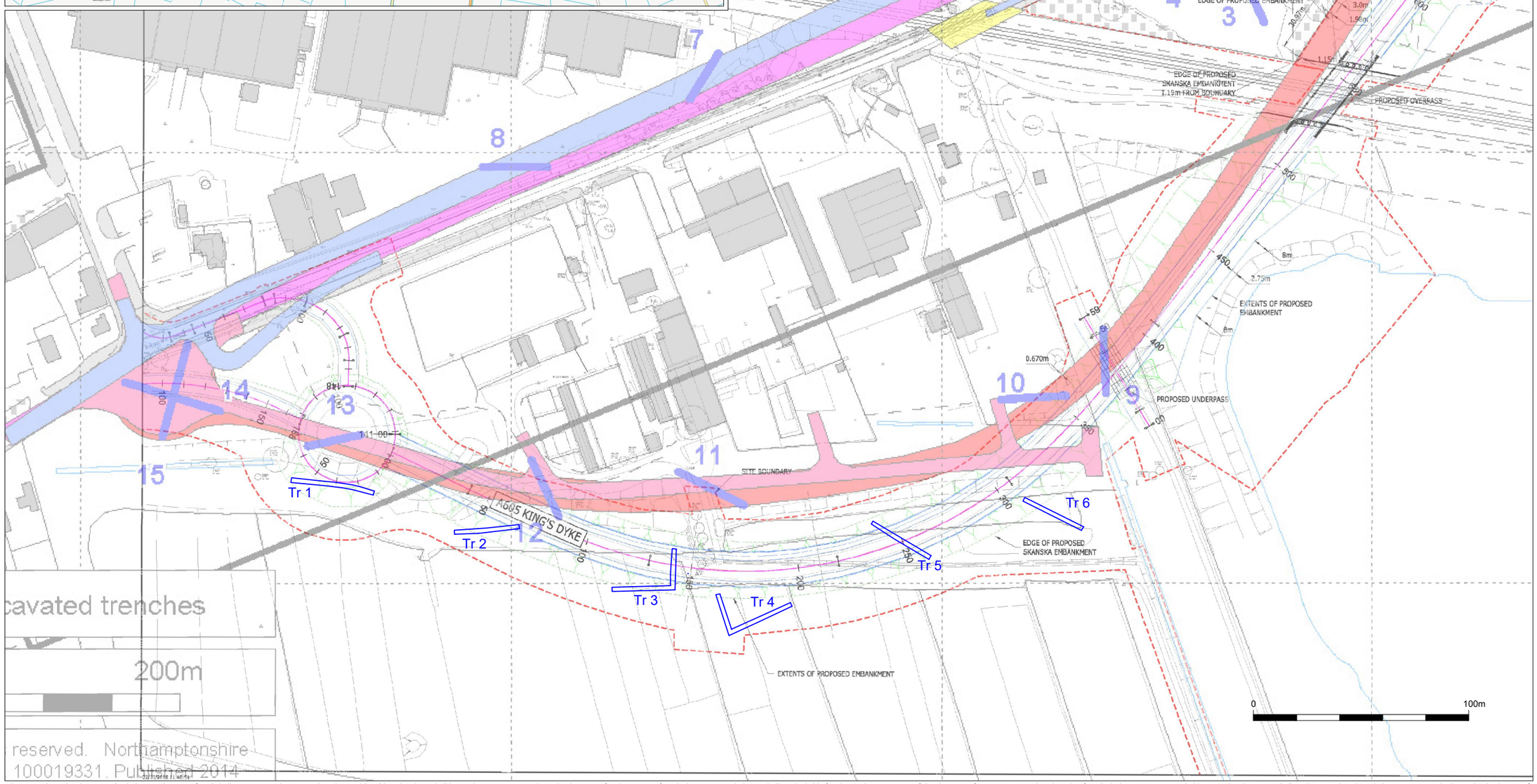

Key:

E□aluation Trench

10 E□aluation trenches from 2010 □CA□□

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Title:
Site location plan showing new road layout and e□aluation trenches

Project:
Kings Dyke, Whittlesey, Cambridgeshire: Archaeological E□aluation

Client:
Kier

Scale at A3:
1:2,000

Drawn by:	Checked:	Date:
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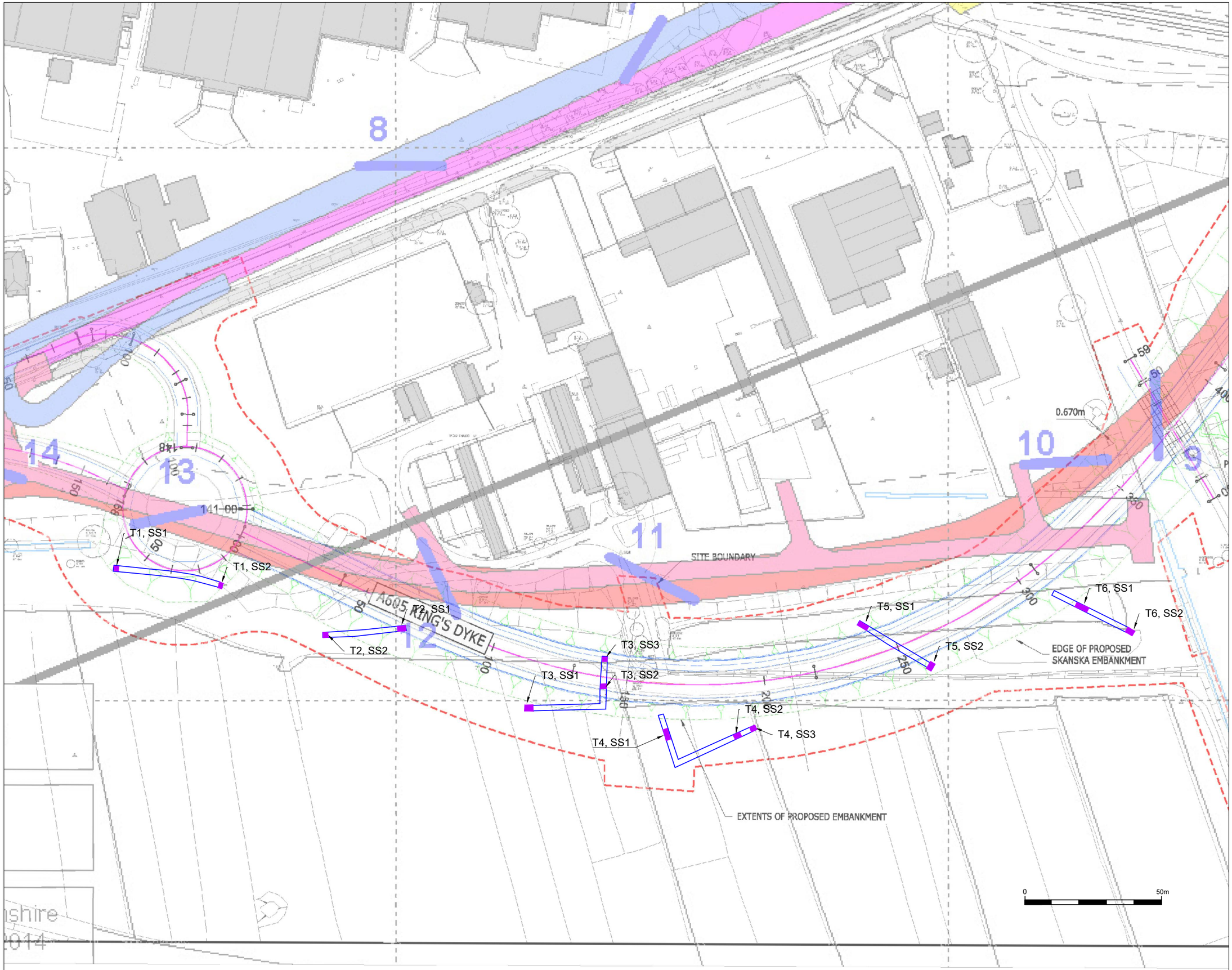

Key:

- Evaluation Trench
- Sondage
- Sample section

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Title:
Location of sondages and sample sections

Project:
Kings Dyke, Whittlesey, Cambridgeshire: Archaeological Evaluation

Client:
Kier

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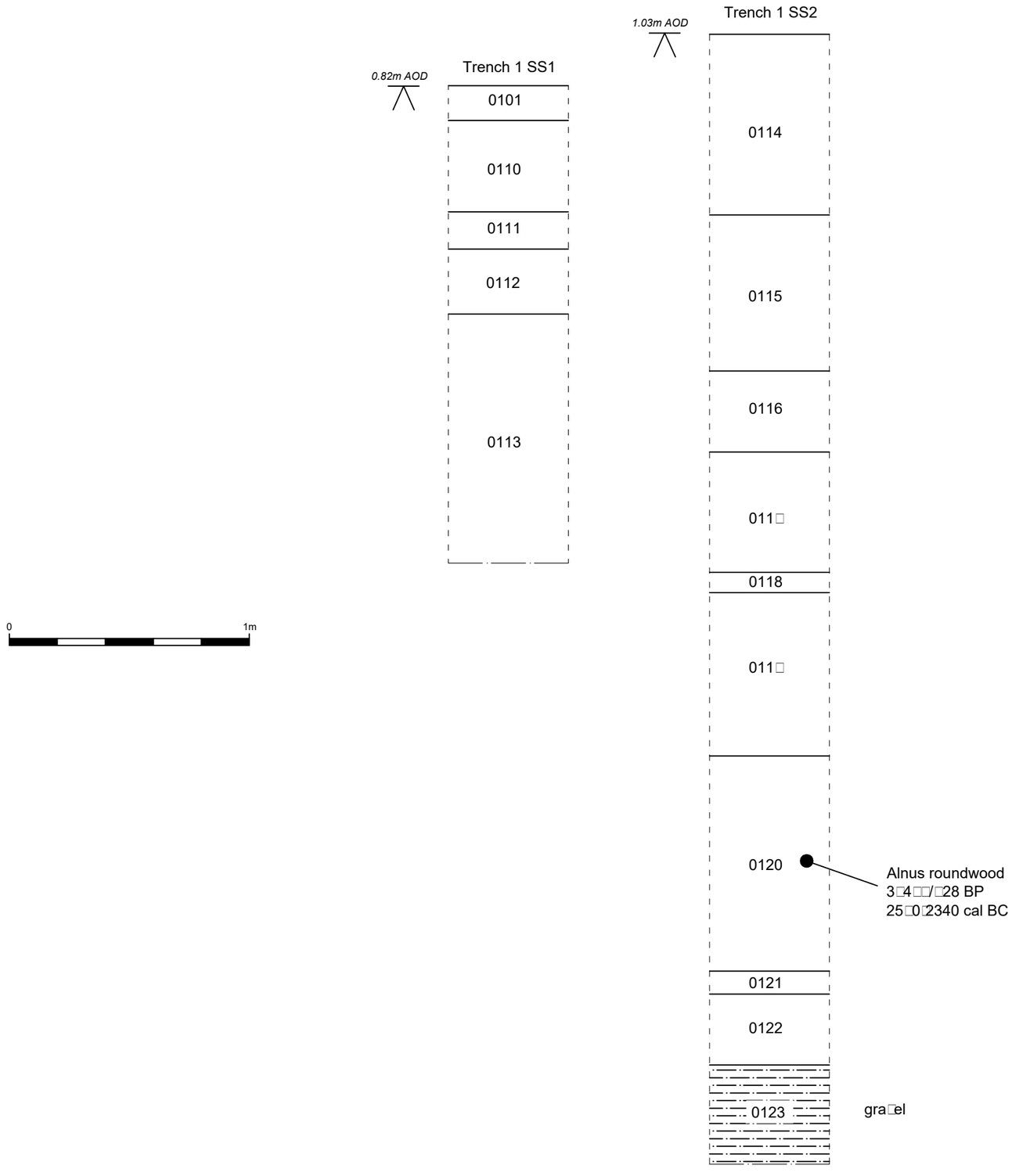

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Title:
Sample sections, Trench 1

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Kings Dyke, Whittlesey, Cambridgeshire: Archaeological E□aluation

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Scale at A3:
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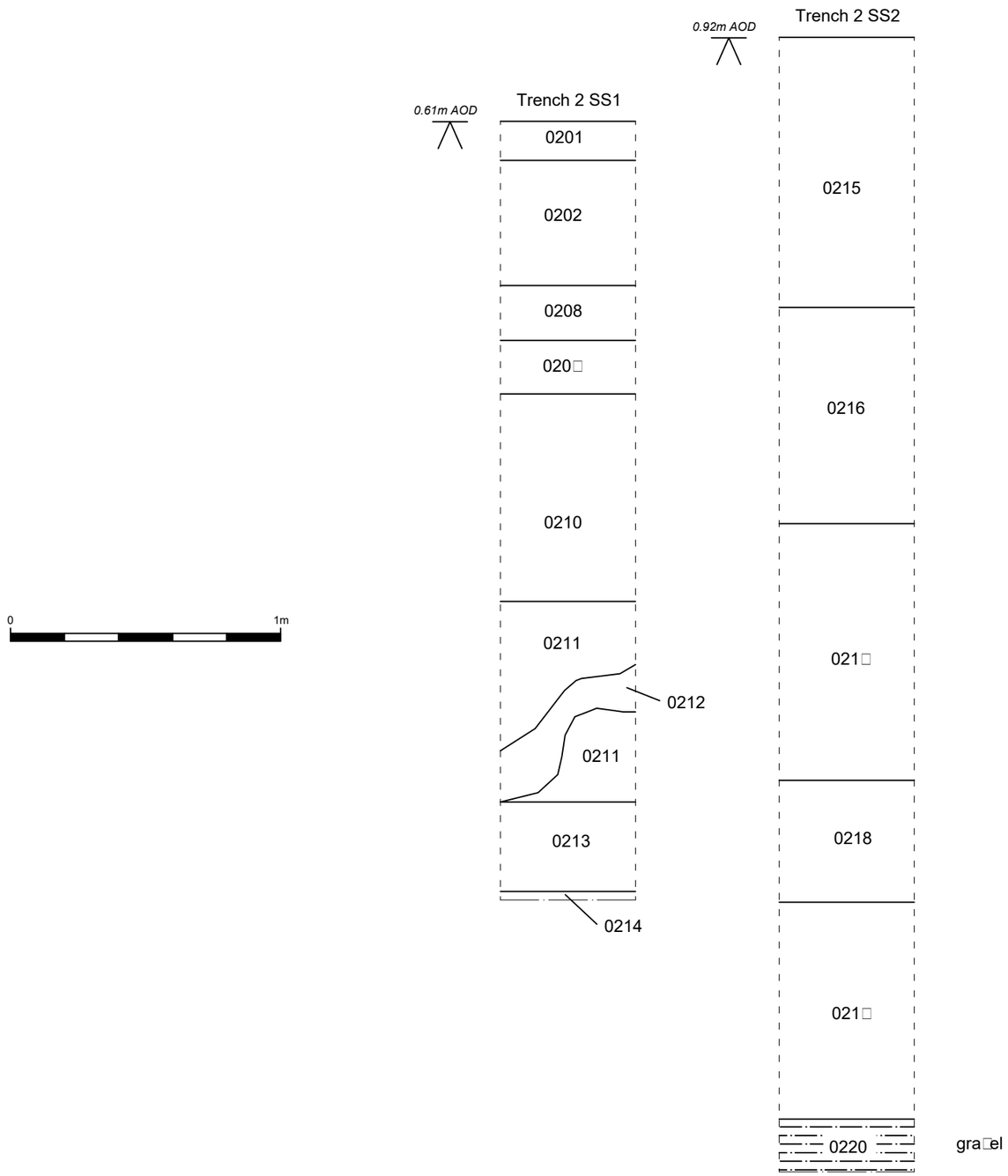

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Title:
Sample sections, Trench 2

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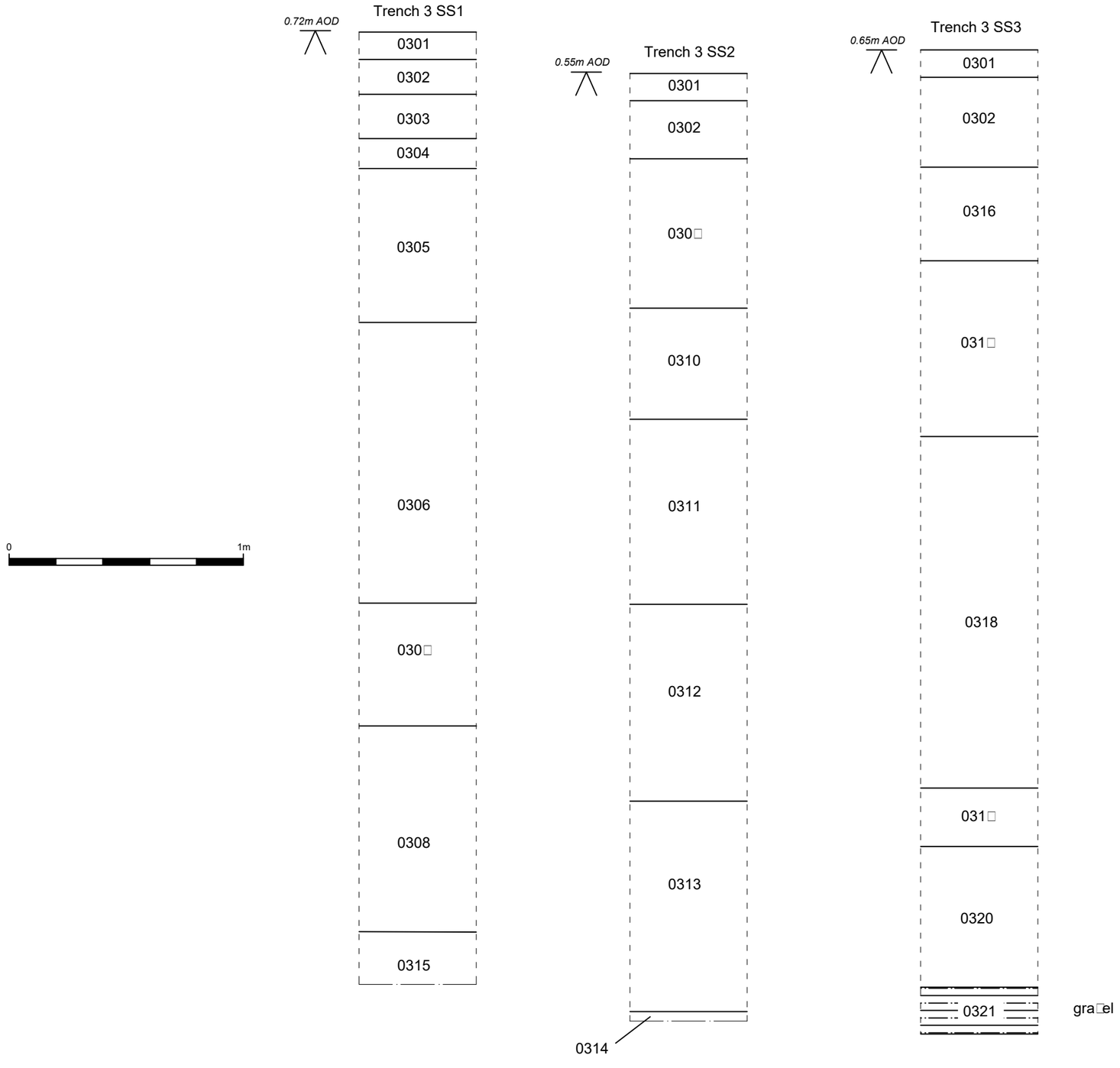

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Title:
Sample sections, Trench 3

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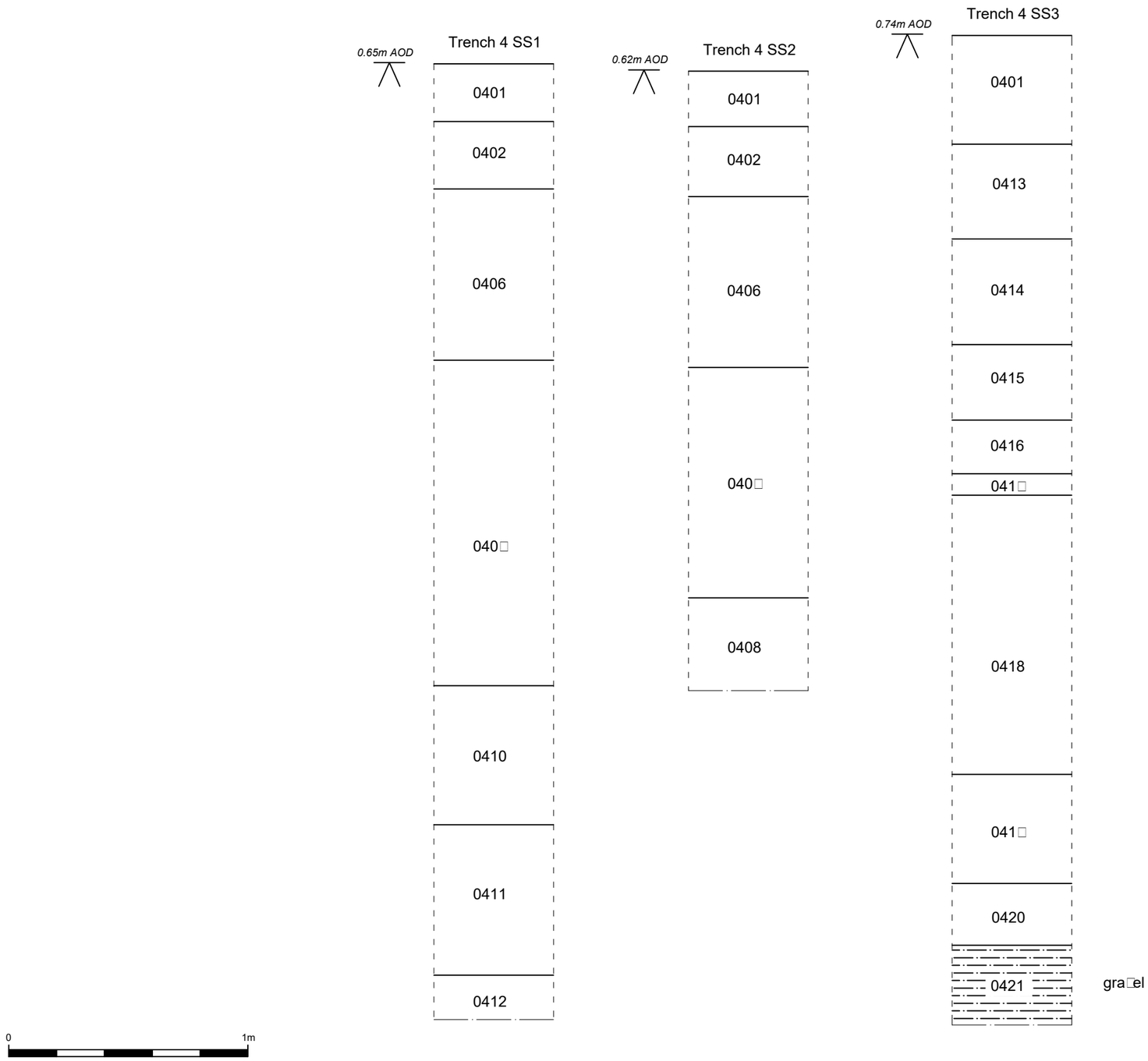

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Title:
Sample sections, Trench 4

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Scale at A3:
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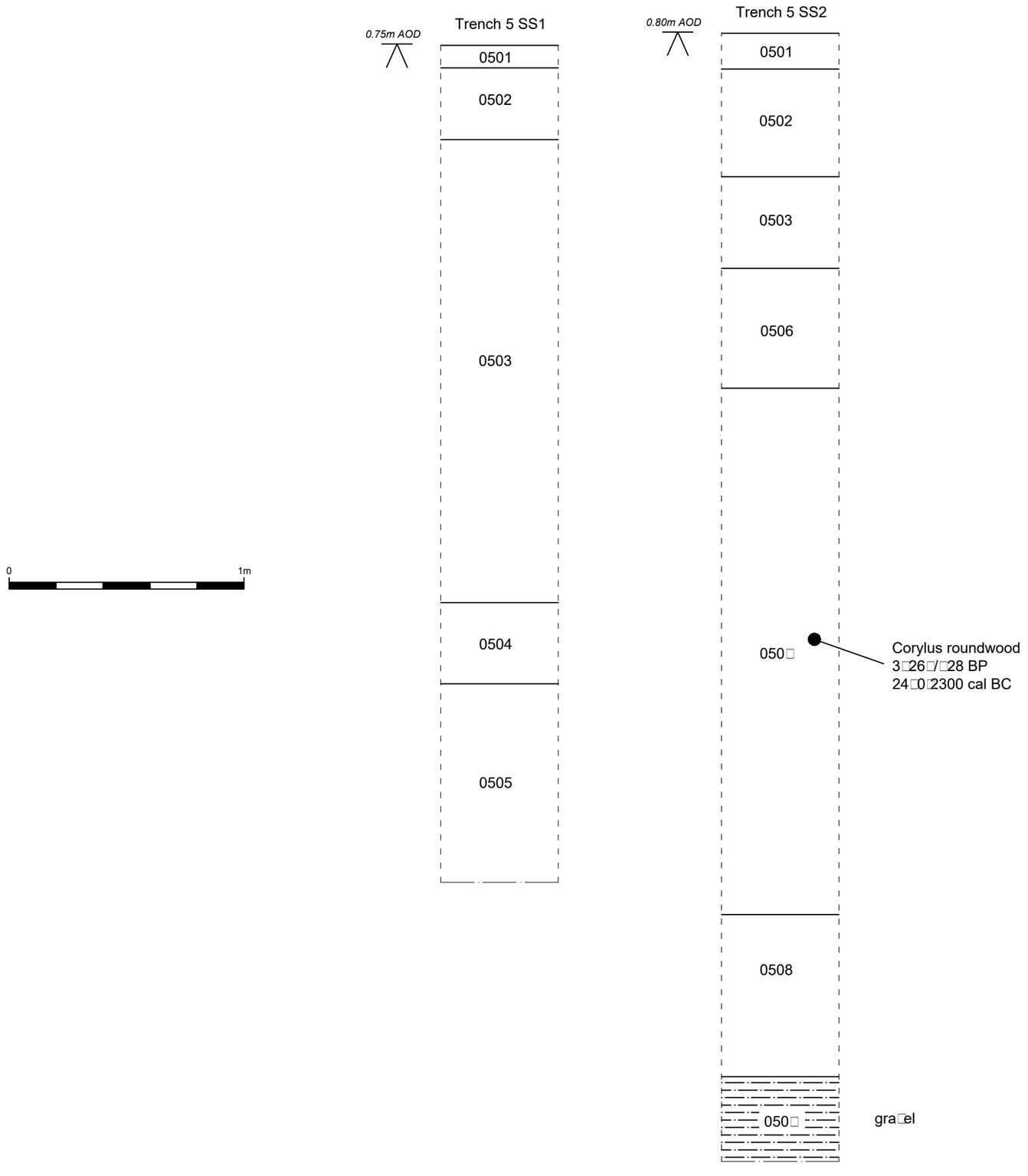

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Title:
Sample sections, Trench 5

Project:
Kings Dyke, Whittlesey, Cambridgeshire: Archaeological E□aluation

Client:
Kier

Scale at A3:
1:20

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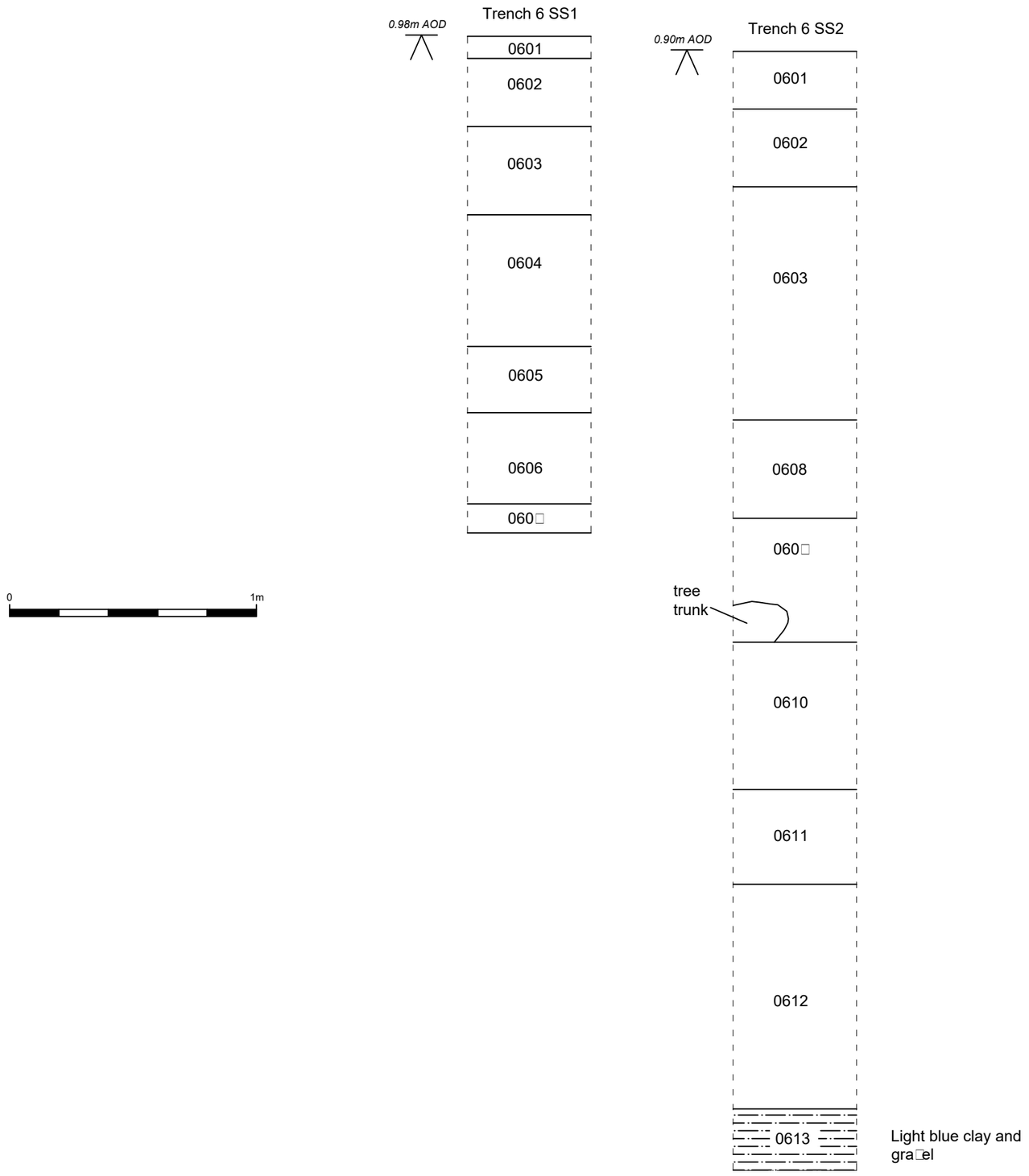
Report.No:	Fig. No:
MK166/18	□



Key:

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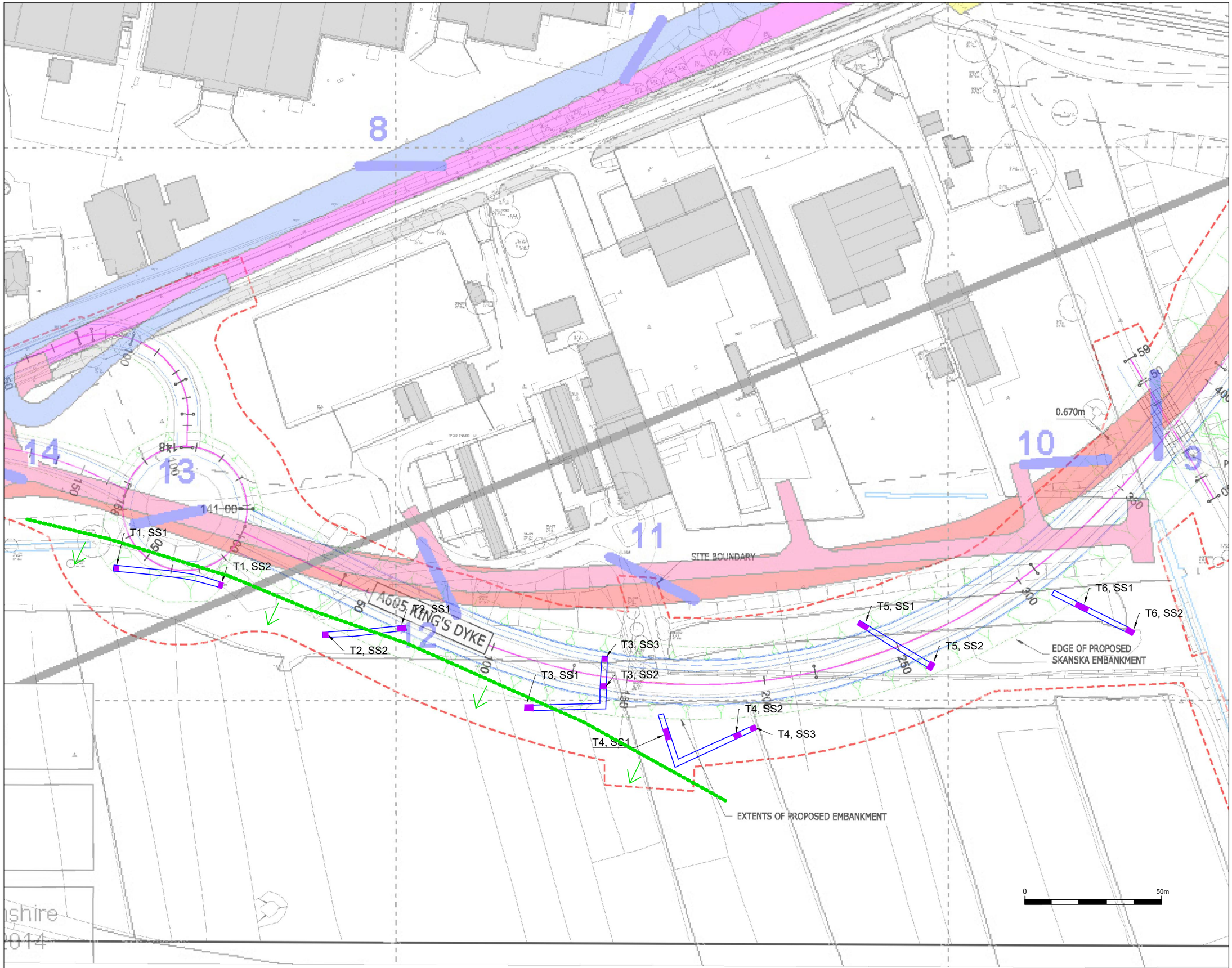

Key:

- Evaluation Trench
- Sondage
- Sample section
- Estimated edge of late Holocene channel

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Title:
Estimated edge of late Holocene channel

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1:1250

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Fig. 10 - Trench 1, looking E

Fig. 11 - Eastern sondage, Trench 1 (SS2), looking NE

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Fig. 12 - Trench 2, looking E

Fig. 13 - Western sondage, Trench 2 (SS2), looking E

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Fig. 14 - Trench 3, looking E

Fig. 15 - Northern sondage, Trench 3 (SS3), looking E

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Fig. 16 - Trench 4, looking W

Fig. 17 - Eastern sondage, Trench 4 (SS3), looking E

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Fig. 18 - Trench 5, looking SE

Fig. 19 - South-east sondage, Trench 5 (SS2), looking SE

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Fig. 20 - Trench 6, looking SE

Fig. 21 - South-east sondage, Trench 6 (SS2), looking NE

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APPENDIX 1: TRENCH AND CONTEXT SUMMARY

Trench 01				Trench size: 40m x 2m	Same As
Trench depth: 1.25m – 4.70m				Trench orientation: NW SE	
Context	*Fill of*	*Type*	*Dimensions*	*Description*	
0101	-	Topsoil	0.15m	Dark brown silt with frequent roots and organic material inclusions, covered by marsh grass and shrub.	
0102	VOID	VOID	VOID	VOID	VOID
0103	VOID	VOID	VOID	VOID	VOID
0104	VOID	VOID	VOID	VOID	VOID
0105	VOID	VOID	VOID	VOID	VOID
0106	VOID	VOID	VOID	VOID	VOID
0107	VOID	VOID	VOID	VOID	VOID
0108	VOID	VOID	VOID	VOID	VOID
0109	VOID	VOID	VOID	VOID	VOID
0110	-	Deposit	0.35m	Light brown silt clay moderate compact and with organic material inclusions.	
0111	-	Deposit	0.12m	Light grey-beige silt clay, no inclusions.	0115
0112	-	Deposit	0.28m	Medium orange silt clay, crumbly and with iron oxide.	0115
0113	-	Deposit	1.05m	Brownish dark grey silt clay with inclusion of shells.	0116 / 0117
0114	-	Deposit – Made Ground	0.75m	Medium brown silt sand clay with occasional stone inclusions.	
0115	-	Deposit	0.65m	Medium reddish brown silt clay, no inclusions.	0112
0116	-	Deposit	0.35m	Dark brown silty peaty clay with occasional inclusion of shells.	0113
0117	-	Deposit	0.50m	Dark brown silt peat with shell fragments	0113
0118	-	Deposit	0.10m	Yellowish brown gritty clay sand.	
0119	-	Deposit	0.65m	Light blue-grey silt clay.	
0120	-	Deposit	0.90m	Light brown grey silt clay with frequent waterlogged wood and organic material inclusions.	
0121	-	Deposit	0.10m	Dark brown humic silt clay.	
0122	-	Deposit	0.30m	Brown silt clay.	
0123	-	Gravel	0.20m+	Light brown sand with frequent stones inclusions and gravel.	

Trench 02				Trench size: 30m x 2m	Same As
Trench depth: 0.93m – 4.20m				Trench orientation: E - W	
Context	*Fill of*	*Type*	*Dimensions*	*Description*	
0201	-	Topsoil	0.14m deep	Dark brown silt with frequent roots and organic material inclusions, covered by marsh grass and shrub.	
0202	-	Subsoil	0.45m deep	Orange and grey crumbly medium silt clay with rare inclusions.	

VOID	VOID	VOID	VOID	VOID	VOID
VOID	VOID	VOID	VOID	VOID	VOID
VOID	VOID	VOID	VOID	VOID	VOID
VOID	VOID	VOID	VOID	VOID	VOID
VOID	VOID	VOID	VOID	VOID	VOID
0208	-	Deposit	0.20m deep	Dark brown silt peat.	
0209	-	Deposit	0.20m deep	Light grey – beige silt clay.	
0210	-	Deposit	0.83m deep	Medium brown silt peat.	0216
0211	-	Deposit	0.75m deep	Dark brown silt clay with organic material inclusions.	
0212	-	Deposit	1m max length; 0.60 max thickness; 0.7m min thickness	Grey light blue clay, contained within the layer 2011.	0217
0213	-	Deposit	0.30m deep	Dark brown grey organic silt.	0218
0214	-	Deposit	0.10m+ deep	Light grey blue clay.	0219
0215	-	Deposit – Made Ground	1m	Light brown sand and silty clay	
0216	-	Deposit	0.8m	dark-brown peat and silt	0210
0217	-	Deposit	0.95m	light grey-blue silty clay	0212
0218	-	Deposit	0.45m	dark brown silty clay	0213
0219	-	Deposit	0.8m	light beige organic silty clay	0214
0220	-	Gravel	0.20m+	Light brown sand with frequent stones inclusions and gravel.	

Trench 03				Trench size: 50m x 1.8m	Same As
Trench depth: 0.60m – 4.20m				Trench orientation: N-S-E (“L” shaped)	
Context	*Fill of*	*Type*	*Dimensions*	*Description*	
0301	-	Topsoil	0.15m	Brownish dark grey silt with organic material inclusions. Covered by marsh grass and shrub.	
0302	-	Subsoil	0.38m	Medium to light brown silt clay no inclusions	
0303	-	Deposit	0.20m	Grey and orange medium brown crumbly silt clay.	
0304	-	Deposit	0.10m	Light compact grey silt clay with stone and shell inclusions.	
0305	-	Deposit	0.65m	Dark grey silt with shell inclusions.	
0306	-	Deposit	1.20m	Light blue/grey clay with stone and organic inclusions.	
0307	-	Deposit	0.55m	Dark grey silt with waterlogged wood.	
0308	-	Deposit	0.85m	Light blue grey clay with some organic inclusions.	0312
0309	-	Deposit	0.6m	Dark grey silt with shell inclusions.	0305
0310	-	Deposit	0.5m	Light compact dry beige silt clay.	

0311	-	Deposit	0.8m	Dark brown dry crumbly peat.	0317, 0316
0312	-	Deposit	0.85m	Light blue grey clay with some organic inclusions.	0318, 0308
0313	-	Deposit	0.9m	Dark grey silt clay with frequent waterlogged wood.	0319, 0320
0314	-	Deposit	0.04m+	Light blue grey silt clay	
0315	-	Deposit	0.22m+	Dark grey-brown silty clay with waterlogged wood	0313, 0319, 0320
0316	-	Deposit	0.4	Dark brown peat	
0317	-	Deposit	0.75m	Dark brown rotting peat	
0318	-	Deposit	1.5m	Light grey-blue silty clay	
0319	-	Deposit	0.25m	Dark brown silty clay containing waterlogged wood	
0320	-	Deposit	0.6m	Grey-brown silty clay	
0321		Gravel	0.20m+	Light brown sand with frequent stones inclusions and gravel.	

Trench 04				Trench size: 50x2m	Same As
Trench depth: 0.65m – 4.12m				Trench orientation: NE-SW-N ("L" shaped)	
Context	*Fill of*	*Type*	*Dimensions*	*Description*	
0401	-	Topsoil	0.20m	Dark grey silt clay with no inclusions, covered by marsh grass and shrub.	
0402	-	Subsoil	0.36m	Medium to light brown beige dry silt clay with no inclusions.	
VOID	VOID	VOID	VOID	VOID	VOID
VOID	VOID	VOID	VOID	VOID	VOID
VOID	VOID	VOID	VOID	VOID	VOID
0406	-	Deposit	0.72m	Medium orange brown dry silt clay.	0414
0407	-	Deposit	0.96m	Dark grey silt clay with no inclusions. (same as 0401)	0409, 0418
0408	-	Deposit	0.40m	Bright blue grey silt clay.	
0409	-	Deposit	1.34m	Light grey beige silt clay with <5% organic inclusions.	0408, 0407, 0418
0410	-	Deposit	0.60m	Medium red brown silt clay.	0419
0411	-	Deposit	0.64m	Dark grey black silt clay	0420,
0412	-	Deposit	0.18m	Medium blue grey silt clay with no inclusions. Probably just above gravels	0421?
0413	-	Deposit	0.30m	Made ground medium brown silt, sand and clay with occasional stone inclusions.	
0414	-	Deposit	0.40m	Light brown silt clay.	
0415	-	Deposit	0.24m	Medium yellow orange gritty silt sand.	
0416	-	Deposit	0.20m	Brown silt clay.	
0417	-	Deposit	0.10m	Black brown silt clay	0411
0418	-	Deposit	1.10m	Light grey blue silt clay.	
0419	-	Deposit	0.45m	Dark brown silt clay.	0411
0420	-	Deposit	0.25m	Dark grey silt clay.	0411
0421	-	Gravel	0.32m+	Light brown sand with frequent stones	

				inclusions and gravel.	

Trench 05				Trench size: 30x1.85m	Same As
Trench depth: 0.52m – 4.75m				Trench orientation: SE - NW	
Context	*Fill of*	*Type*	*Dimensions*	*Description*	
0501	-	Topsoil	0.15m	Dark brown friable silt sand clay with <1% stone inclusions, covered by marsh grass and shrub.	
0502	-	Subsoil	0.37m	Mid grey brown silt clay with no inclusions.	
0503	-	Deposit	1.80m	Medium brown peat and silt.	0506
0504	-	Deposit	0.40m	Light grey blue silt clay with inclusions of waterlogged wood.	0507
0505	-	Deposit	0.84m	Dark grey waterlogged silty clay with frequent pieces of waterlogged wood.	0507
0506	-	Deposit	0.52	Dark grey-brown peaty silt	0503
0507	-	Deposit	1.20m	Medium to light grey-blue and brown silty clay with organic staining.	0505, 0504
0508	-	Deposit	0.31m	Dark brown silt clay.	
0509	-	Gravel	0.32m+	Light brown sand with frequent stones inclusions and gravel.	

Trench 06				Trench size: 30x1.85m	Same As
Trench depth: 0.40m - 4.55m				Trench orientation: N-S	
Context	*Fill of*	*Type*	*Dimensions*	*Description*	
0601	-	Topsoil	0.05m	Dark brown friable silt sand clay with no inclusions, covered by marsh grass and shrub.	
0602	-	Subsoil	0.35m	Medium grey brown silt sand with no inclusions.	
0603	-	Deposit	0.36m	Dark red brown peat.	
0604	-	Deposit	0.44m	Light grey beige silt clay.	
0605	-	Deposit	0.16m	Dark brown wet silt with waterlogged wood inclusions.	
0606	-	Deposit	0.28m	Red brown silty clay with organic inclusions.	0608
0607	-	Deposit	0.12m	Blue clay with no inclusions.	0609
0608	-	Deposit	0.40m	Light to medium grey-blue silt clay.	0606
0609	-	Deposit	0.50m	Medium grey-brown silty clay with a waterlogged large tree trunk and bog oak (base).	0607
0610	-	Deposit	0.58m	Dark brown clay with organic material inclusions and bog oak	
0611	-	Deposit	0.38m	Dark blue silt clay.	
0612	-	Deposit	0.88m	Light blue-grey silt clay.	
0613	-	Gravel	0.25+	Light blue/ grey clay with frequent stones inclusions and gravel.	

APPENDIX 2: Palaeo-environmental and geoarchaeological report

(Mike Allen)

KINGS DYKE, WHITTESLEY, CAMBRIDGESHIRE, (KDWC 18)

Palaeo-environmental and geoarchaeological record (Geoachaeological test pits – trenches 1-6)

by ***Michael J. Allen***

version AEA 389.01.01
12th February 2019

for:-

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KINGS DYKE, WHITTLESEY, CAMBRIDGESHIRE, (KDWC 18)

Palaeo-environmental and geoarchaeological record (Geoachaeological test pits – trenches 1-6)

The site at Kings Dyke, Whittesley (Fig. 1) was visited on 19th December with Tam Barton (CFA) to examine the excavation of 6 deep sondages at the ends of evaluation trenches 1-6 to record the main sedimetological stratigraphy. The aims were to: -

- examine the geoarchaeological and palaeo-environmental nature and potential of the deposits recorded by CfA,
- relate these, where possible to
    - a) rodden or rodden-side sequences, and
    - b) to the Must Farm sequence
- obtain any suitable preliminary palaeo-environmental and/or dating samples

The overall aims were to:

- define the nature of the deposits and the palaeo-environmental potential of any rodden deposits
- use this data to outline an appropriate mitigation strategy

This report provides the descriptions of the 6 trenches examined (Appendix 1) and:-

i) provides a geoarchaeological narrative, attempting to define the nature of the stratigraphy, and its spatial variation with the aim of attempting to define rodden side vs rodden stratigraphy

ii) suggests suitable material for preliminary radiocarbon assays to provide some chronology for the main stratigraphy (Table 3 and recommendations)

iii) relates the 6 profiles recorded with that of previous work by CAU and Birmingham Archaeo-Environmental (eg, Tabor 2008; 2010; Geary & Chapman 2008; Geary *et al.* 2009) and the Must Farm sequence, and

iv) provides an appropriate mitigation strategy in discussion with the Cambridge County Council Development Control Archaeologists.

Site and Background (Geology and Sediments)

The evaluation corridor is generally lies at about 0.5m AOD and 2m AOD land rising steeply on tot the A605, and rising more gently and generally from east to west with land rising from drained fenland in the east towards higher ground (Horsey Toll and Bunting's Farm) to the west and south-west.

The underlying geology along the southern portion of the route (trenches 1-6) comprises mudstone the Oxford Clay formation, overlain locally by First River Terrace gravels. Overlying the gravels are a series of peat deposits and marine sediments reflecting the sequence of freshwater fen conditions and marine incursions that prevailed during the Holocene in this area (Fig. 2). Within this sequences is the Middle Bronze Age marine incursion represented by intertidal sediments known as 'Fen Clay' or the Barroway Drove Beds. The Holocene deposits over the 'fen Clay' generally comprises silty clays and organic sediments

The area immediately to the south east was investigated as a part of Martyn Waller's Fenland Project (1994), and that to the south has been examined as a part of longer pipe project (Tabor 2008). Much of these investigations were associated with the definition of the fen sequence and at that time the definition of a possible southern course of the River Nene between Whittlesey and Black Bush and the westward extent of Bronze Age marine sediments (Tabor 2008). A 6m deep buried channel filled by Holocene sediments had been identified by Burton & Robson (1985) following this course, and Hall (1987) believed that the large roddon at Black Bush (see Tabor 2008, TP 39 & 40) which represented a Bronze Age tidal creek in the same position.

In recent years archaeological evaluation and excavation has continued to add to the growing compendium of nationally significant prehistoric sites to the east of Peterborough including Must Farm, Bradley Fen for instance (see Fig. 3). Associated with this was the unknown coarse 'Must Farm Rodden' at the evaluation location (see Figs 1 & 4).

Methods

Machine cut deep test pits were excavated at the ends of the 6 excavation trenches (Figs 1 & 5) under archaeological and geoarchaeological supervision. The deposits were recorded by Michael Allen (AEA) with Tam Barton / Cassandra (CFA), and the geoarchaeological records (Appendix 1) follow standard nomenclature (Hodgson 1997).

The six geoarchaeological test pits were excavated using a 360° tracked excavator with 1.8m wide toothless bucket along the southern portion of the route (Fig. 1). Deposits were described visually from the trench edges, and from disturbed deposits on the spoil. Sondages were excavated to depths of between 4.12 and 4.75m (Table 1; Appendix 1).

Trench	*Depth*	*basal deposit*
Trench 6	4.55m	Bluish grey silty clay
Trench 5	4.75m	Gravel at 4.45m
Trench 4	4.12m	Gravel at 3.8m
Trench 3	4.2m	Gravel at 4m
Trench 2	4.2m	Gravel at 4m
Trench 1	4.7m	Gravel at 4.5m

Table 1. Depth of sondages and basal deposits

Advances and Limitations

All of the sondages were in excess of 4m deep, and 5 of 6 clearly recorded the basal gravels (Table 1). Each geoarchaeological sondage was excavated, recorded and backfilled with a

couple of hours. The depth of largely unstepped trenches, with water ingress in many, were unsafe to enter and to record the profiles with any detail. Although the machine-cut trenches were excavated with great expertise, the sides were often smeared making distinguishing between various sedimentary units difficult / not immediately obvious. Pedological and sedimentary structure, contacts/boundaries and detail could not be readily observed. No trench was open long enough to allow any section to weather and emphasise different sedimentary or pedological structure (cf. French 2003; 2015; Allen 2017). The end sections often revealed the stratigraphy more clearly with fresh broken faces (cf. French 2015, Allen 2017), but were not as flat, and were partially 'sculpted' by the bucket. The sedimentary records have, therefore, some limitation in the detail, nevertheless the main sedimentary units have been recognised and defined, and can be mapped vertically and horizontally. In addition a number of samples, including 4 of waterlogged roundwood suitable radiocarbon dating were taken (Table 3). It was obviously not possible to sample any of the sequences as undisturbed sediments in monoliths.

Stratigraphy

The full stratigraphic records are given in appendix 1; all records are by depth, and have not been related to relative heights nor OD. A series of 7 main sediment facies were identified (Table 2) which can be broadly equated with the five main units identified at King's Delph (Geary & Chapman 2008). They have been allocated unit number in parity with Geary and Chapmen (2008) and Geary *et al*. (2009) to facilitate comparison.

7. The current relatively thick soil is an alluvial soil / alluvial brown earth up to 0.6m thick.

6. In test pits 1 and 2 only, up to 1m fine-grained minerogenic alluvium containing fresh/brackish water shell fragments seems to overlie the peat (Fig. 5), and may represent the edge of a small local late Holocene channel.

5. All profiles revealed a humified, dried and desiccated peat below the present alluvial soil; but two or multiple superimposed or stratified peats were not seen. The top of the peat occurs below the topsoil except in test pits 1 (SS3) and 2 (SS2) where it is sealed by up to 1m of alluvium. The top of the peat was recorded at between 0.55 and 1.75m depth and the base at 0.9 to 2.8m depth with a maximum thickness of 1.8m in test pit 2 (SS2). It was generally dry, desiccated and with obviously recognisable plant material; only in test pit 3 (SS3) was the lower portion (0.95-1.5m) was wet. Even here this seemed to be localised and non-permanent as the peat was essentially (seasonally) re-wetted desiccated peat.

4. Essentially a minerogenbic grey (to greyish brown) stone-free silt to silty clay with localised more humic zones. Waterlogged roundwood fragments were noted and in some places reed (*Phragmites)* stem. At the base of this unit in test pit 6 (SS2) were two large wood trunks; one possibly oak. Occasional, and presumably localised stasis horizon occur within this unit such as in test pit 4.

3. Occurring at the base of this was a more humic minerogenic silt with dark colours (greyish browns to brown and containing occasional roundwood fragments and reed stem cases. In some cases this unit over the gravel (1), or 'Blue clay' (2), and in others may be contained with the grey silt (4). Localised stasis horizons (or even soil formation) occur at the top of this unit in test pit 4 (SS2).

2. ‘Blue clay’; a greyish silt with stronger bluish (reduced) hues were present at the base of some profiles (eg, test pits 2[SS2], 3[SS3] and 6[SS2]), but was not always clearly distinguishable from the greys silt (4) above, especially where they was no humic silt (3). Whether this represent a clearly separate sedimentary facies, of the colour is due to depth and groundwater with reduced conditions is unclear.

1. The basal unit which was reached in all 6 test pits were the fluvio-glacial gravels, or the top of this facies anyway. It occurred consistently at depths of between 3.8 and 4.45m. It was often characterised by either grey blue silts with small and medium gravel, or more dense gravels with medium sand.

The occurrence of the main sedimentary units is summarised in Table 2

Unit	*Deposit*	*1*	*2*	*3*	*4*	*5*	*6*
7. Alluvial soil	Top soil	-	-	0-50	0-45	0-60	0-55
6. Alluvium	Alluvium	75-175	65-100	-	-	-	-
5. Peat	Top peat	175	100	50	85	60	55
	Base peat	225	280	90	155	95	150
4. Silt and muds with localised humic silts and stasis	stasis				180-190		
	Silt 1	235-300	280-275	90-165 165-315	190-310	150-195 195-310 310-360 360-375	155-190
	Humic silt 1	300-390	-	-	-	-	190-300
3. humic muds with localised stasis	Stasis	390-400	-	-	-	-	-
	Humic silt	400-430	275-320	?315-400	310-380 355-380	375-445	-
2. ‘Blue clay	Blue clay	-	320-400	340-400	-	-	300-340 340-430
1. Gravel	gravel	430+	400+	400+	380+	445+	430

Table 2. Summary of the stratigraphic units (depth in cm)

Samples – wood and organic material

A number of samples, including 4 of waterlogged roundwood suitable radiocarbon dating were taken (Table 3). It was obviously not possible to sample any of the sequences as undisturbed sediments in monoliths due to access / health & safety issues during this phase of the works.

Sample	*Trench / location*	*Purpose*	*Description*
1	Tr 6 (SS2)	Id	Bog oak (machined strips) not C^{14} suitable C14
2	Tr 6 (SS2)	Record only	Wood 2 ?oak 139mm *c.* 200mm diameter
3	Tr 5 (SS2) @2.6m	Id (C^{14} suitable)	Roundwood with bark 111mm x 24 x 17mm diameter
4	Tr 5 (SS2) 3.75-4.45m	Description	Dark grey silt
5	Tr 1 (SS2)	Description	Upper shelly layer
6	Tr 1 (SS2)	Description	Shelly peat
7	Tr 1 (SS2) c 3.0m	Id (C^{14} suitable)	Roundwood 272mm x 98mm diameter
8	Tr 1 (SS2) *c.* 3.5m	Id (C^{14} suitable)	Roundwood 135mm x 41mm diameter (?not oak)

Table 3. List of samples and purpose

Four fragment of wood were identified and are given in Table 4. They are all typical species of the fen environs and all have been recorded in the locality (Scaife 2001; Waller 1994; Geary *et al.* 2010).

Sample	*Trench / location*	*Purpose*	*Description*
1	Tr 6 (SS2)	Large wood	*Quercus* (Bog oak) not C^{14} suitable C14
3	Tr 5 (SS2) @2.6m	Id (C^{14} suitable)	*Corylus* (hazel) roundwood
7	Tr 1 (SS2) c 3.0m	Id (C^{14} suitable)	*Alnus* (alder) roundwood
8	Tr 1 (SS2) *c.* 3.5m	Id (C^{14} suitable)	*Alnus* (alder) roundwood

Table 4. Wood identifications from grab sample from test pits

Discussion and Potential

Over 4m of Holocene stratigraphy was in 6 geoarchaeological test pits recorded along the route line. This provides one of the deepest stratified sequences available in open section in the area

General sedimentary consistency can be seen between the trenches but stratigraphic variation is clear

There is no clear evidence of the 'Must Farm rodden', or of any major palaeo-channel. It can be concluded that the main line of the rodden does not run though the route, although the edge of an alluvial channel does occur in the southern test pits (1 [SS2] and 2 [SS2]) and may represent the edge of this rodden. However, on the whole the 'Must Farm rodden' probably runs to the south as predicted (see Fig. 1)'

There is the potential for a dated long environmental and land-use history from these sediments to augment that recorded at Kings Delph to the south west by Geary *et al.* (2009), and the fen to the south east by Waller (1994), and more generally by Scaife (2001).

Comparison with deposit modelling by Birmingham Archaeo-Environmental

The interim and final reports of a large coring programme at King's Delph is described by Geary and Chapman (2008) and Geary *et al.* (2009). The stratigraphic information of 40% (19 of 46) of the cores is presented (Geary *et al.* 2009), and the deposits are generally comparable with those recorded from 6 test pits here. They summarise the deposits as five main units:

5. Upper desiccated peat
4. Silts/clays/humic-organic muds
3. Peaty/silty peat
2. Silts and sand
1. Sands and gravels

The deposits recorded here have been given comparable unit numbers to aid comparison, but no detailed spatial data is available from just the 6 trenches recorded here other than the north-south profile shown in Figure 5.

Sediments
The basal gravels are considered to be late Devensian fluvio-glacial deposits (eg, Lewis *et al*. 1991) later reworked by early Holocene channelling and fluvial activity

Holocene sediment deposition is largely represented by minerogenic silts (Blue clay) (unit 2) humic silts (unit 3) and greys silts (unit 4) which are probably brackish-water sediments of salt marsh conditions (cf. Geary *et al.* 2009), and are largely fluvial. Peat formation seems to occur at about at 3800-3650 (4935±30BP, SUERC-2229) and King's Delph and represented drier conditions with carr (alder) and herbaceous vegetation (monocotyledonous plants – grasses and reeds) based on palaeo-environmental assessment by Birmingham Archaeo-Environmental (Geary *et al*. 2009).

Human activity
The basic geoarchaeological record at Kings Dyke has no evidence for human activity – but it is unlikely that any obvious record of human activity would be recovered from such rapid excavation and recording. There is the potential for evidence of human impact and land-use within the proxy palaeo-environmental record.

Palaeo-environmental potential (and limitations of previous work)
The fine-grained sediments, organic deposit and the peat all contain the potential to preserve proxy palaeo-environmental indicators; typically pollen and diatoms. Further the presence of organic matter such as *Phragmites* reed stems and waterlogged roundwood (hazel and alder, Table 4) provides the potential for absolute (^{14}C) dating of the deposit sequence and thus the palaeo-environmental and land-use record.

There is the potential of providing a long and dated sequence of the channel fill (fen deposits) and accompany this with a long record of environmental and land-use change via the detailed geoarchaeological record and pollen/diatom analyses. The 4m sequence potentially covers a significant proportion of the Holocene and may provide a long land-use record covering the period prior to, during and post the Must Farm activity to the north west. As such it would be an important contribution the understanding of the fen basin (cf. Scaife 2001; Waller 1994).

Previous work (Geary & Chapman 2008; Geary *et al*. 2009) has only assessed the palaeo-environmental potential. Further samples only spot samples were taken from numbers different cores (ie, insects 11 cores, plants 5 cores, pollen 10 cores, and ostracods/foraminifera 4 cores), and no single long stratified sequence giving detailed change over time was undertaken. The assessment, however, shows the preservation, albeit variable in some cases, of a range of proxy palaeo-environmental indicators.

Although waterlogged plant and insects remain preservation was generally poor; ostracod preservation was generally poor and foraminifera preservation better but variable. Pollen was preserved and the preservation of diatoms (not assessed) is likely except in the peat and highly organic deposits (Cameron pers. comm.; Cameron unpubl. Must Farm data).

Evaluation trenching by the Cambridge Archaeological Unit at King's Delph, Whittlesey (Tabor 2010) produced relatively shallow deposits (<2m) with peat and buried soil directly over gravel; apart from waterlogged wood, included timber posts (Bamforth in Tabor 2010)

no palaeo-environmental work was conducted (Tabor 2010). Similarly more detailed excavation along the King's Delph to Linwood concentrated on archaeological features where plant remains (de Varielles) and worked waterlogged wood (Randall) were examined. Long stratified sequences were recorded in a number of the 40 test pits which were recorded suitably but summarily (Tabor 2008, appendix B). Most test pits were bottomed to gravel (23, 75%) which occurred at depths of between 1,8 and 2.8m; sequence considerably shallower than at Kings Dyke.
Evidence of deep palaeochannnel (large roddon) at Black Bush (see Tabor 2008, TP 39 & 40) which represented a Bronze Age tidal creek in the same position was recorded and a profile constructed (Tabor 2008, appendix A), and was filled with principally minerogenic sediments with little or no organic matter. No assessment or detailed palaeo-environmental analysis was undertaken on these deposits.

With the exception of Must Farm, the sequence at Kings Dyke, Whittlesey provides a relatively rare and surprisingly good opportunity to obtain a long land-use sequence that has not been previously available, or student tin detail in this landscape.

Recommendations
No relative or absolute heights were given for the test pits examined in the field. Consequently the deposits could only be related by depth (Fig. 5). It would be ideal to relate these to each other by absolute altitude (OD) so that the altitude the sediments can be compared with previously recorded sequences, and that a more informed consideration given the location of proposed further detailed geoarchaeological test pit investigation.

Radiocarbon dating of roundwood from one or both test pits (Table 4) to provide a basic indication of the date of the lower minerogenic facies – to facilitate comparison with that from the King's Delph.

At least one, and preferably a series of 2-3, targeted geoarchaeological test pit excavations should be conducted to the basal gravels allowing access and more detailed examination and sampling of the stratigraphy. One should be selected for full sampling for geoarchaeological record and palaeo-environmental proxies (ie, pollen and diatoms) to provide a long, and dated, land-use and environmental history for this area.

The selection of the sequence for sampling should be based on stratigraphic criteria and absolute (^{14}C) dating potential of the sequence. All attempt should be made to recover suitable datable material from the deeply stratified minerogenic deposits below the peat.

A method statement for the geoarchaeological and palaeo-environmental aims and sampling should be defined and agreed with the Cambridge County Council Development Control Archaeologists.

It is suggested that this should include the recording, sampling for, and assessment of:

- A detailed geoarchaeological record characterising the deposits and in particular examine the more humic lenses as potential stasis or land surfaces

- A suite of pollen and diatom samples

- Suitable short-lived identified plant matter or round wood suitable items for radiocarbon dating the sequence

- Waterlogged plant remains from suitable deposits.

- Targeted sampling for land snails (seen in deposits in test pit 1 for instance)

It might be expected that sampling would be a combination of a full sequence of undisturbed deposits in overlapping monolith tins from an open (stepped) face facilitating more detailed geoarchaeological description and subsampling for pollen, diatoms etc.

Acknowledgements
Many thanks to Tam Barton and Cassandra for assistance on site, Dr Alan Clapham for wood identification and Prof. Charly French (University of Cambridge), Prof. Rob Scaife (University of Southampton), Dr Nigel Cameron (UCL) and Kasia Gdaniec (Cambridge County Council) for various discussions and information.

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APPENDIX 1: deposit record

Test Pit trench 6 (SS2)

	Depth (cm)	Unit	Description
0.90m AOD	0-55	7. Ap/A	Topsoil / ploughsoil Ap and A – Alluvial soil
	55-150	5. Peat	Brown humic silty peat: a brown humified massive peaty silt, no observable vegetation, rare roundwood twigs *c.* 3-4mm diameter
-1.00m AOD	150-190	4. Silt	Grey massive silty clay
	190-250	4/3. Humic silt	Greyish brown ?humic silt with tree trunk *c.* 0.25-0.3m diameter lying on contact and second within this deposit
-2.10m AOD	250-300	4/3. Humic silt	Dark yellowish brown humic silt with organic matter Water table at 2.5m – high water ingress Tree and /bog oak at 3m at contact with 'Blue clay' 1 and 2. Samples <1> & <2>
	300-340	2. 'Blue clay'	Strong blue firm massive stone-free silty clay
-3.40m AOD	340-430		'Blue' silt to silty clay
	430-455+	1. Gravel	Light blue/grey massive clay and with some gravel of rare small and medium stones

Sample 1 Bog oak at 20cm into silt/ against peat edge
Sample 2 second oak

Trench 6 (SS2)

Images CFA and AEA (M.J. Allen) 2018

Test Pit trench 5 (SS2)

	Depth (cm)	Unit	Description
0.80m AOD	0-60	7. Ap / A	Topsoil / ploughsoil Ap and A; greyish brown silty loam to slity clay loam, almost stone free – Alluvial soil
0.20m AOD	60-95	5. Peat	Dark brown to dark reddish brown peat and silty peat becoming a dark greyish brown, becoming wetter ad greyier with depth, clear to gradual boundary Dry humified and desiccated peat
	95-150		Dark greyish brown wet peat silt, humified, but wet and ?waterlogged, gradual boundary Humified peaty silt
-0.70m AOD	150-195	4. Silt	Grey (look looks greyish blue) to greyish brown silty clay with organic staining,
	195-310		Dark greyish brown (bluish hues) massive silty clay <3> at 2.60m Roundwood with bark (Table 3)
	310-360		As above becoming darker bluish grey, vertical reed stem noted
	360-375		Bank of greyish blue silt to silty clay (lighter colour – more minerogenic), clear boundary
-2.95m AOD	375-445	3. ?Humic silt	Dark brown to very dark brown silty clay, abrupt indurated boundary <4> dark grey silt (additional description)
-3.65m AOD	445-475+	1. Gravel	Greyish brown to yellowish brown gravel and medium sand – water at base

Trench 5 (SS2)

Test Pit trench 4 (SS3)

	Depth (cm)	Unit	Description
0.74m AOD	0-45	Ap / A	Topsoil / ploughsoil Ap and A; greyish brown silty loam to silty clay loam, almost stone free
	45-85	Made Ground	Made ground (gravel and topsoil), abrupt boundary
-0.11m AOD	85-155	5. Peat	Very dark brown silty humic/humifed 'peat' (light brown silty clay) + (Medium yellow-orange gritty and sand)
	155-180		Dark yellowish brown, silt loan, gritty with some sand
-1.06m AOD	180-190	4. ?stasis	Very dark grey silt, possible stats/soil
-2.36m AOD	190-310	4. silt	Grey (with clear blue hues) massive silty clay
	310-355	3. ?humic silt	dark greyish brown (?weakly humic) silty clay with small woody fragments
	355-380		Grey to greyish brown (clear brownish blue hues) silty clay with small woody fragments and *Phragmites* reed
-3.06m AOD	380-412+	1. Gravel	Yellowish brown to light yellowish brown medium stones and sand (medium)

Trench 4 (SS3)

Test Pit trench 3 (SS3)

	Depth (cm)	Unit	Description
0.65m AOD	0-50	7. Ap / A	Topsoil / ploughsoil Ap and A; greyish brown silty loam – Alluvial soil
0.15m AOD	50-90	5. Peat	Dessicated humified peaty silt
-0.25m AOD	90-165	4. Grey silt	Grey (bluish hue) massive silty clay with occasional organics
	165-315		Light grey (bluish hue) massive silty clay with occasional organics
-2.50m AOD	315-340	3. Dark silt	Dark greyish brown massive silty clay with some roundwood fragments
-2.75m AOD	340-400	?2 'Blue clay'	Light brown to light greyish brown (slight blue hue) massive silt, abrupt boundary
-3.35m AOD	400-420+	1. Gravel	Small and medium stones

0.92m AOD

Trench 3 (SS3)

Test Pit trench 2 (SS2)

	Depth (cm)	Unit	Description
0.92m AOD	0-65	7. Made ground	Made Ground – dumped soil and gravel etc. abrupt boundary
0.27m AOD	65-100	6. Alluvium	Brown to greyish brown silty clay – alluvium
-0.08m AOD	100-280	5. Peat	Dark brown humified silty peat
-0.88m AOD	180-275	4. Silt	Light grey (blue hue) massive silty clay
-1.83m AOD	275-320	3. Humic silt	Dark brown humic silts
-2.28m AOD	320-400	2. Blue Clay	Greyish blue silty clay, abrupt boundary
-3.08m AOD	400-420+	1. Gravel	Small and medium gravel and sand (no water ingress)

Trench 2 (SS2)

Test Pit trench 1 (SS2)

	Depth (cm)	Unit	Description
1.03m AOD	0-75	7. A / Made Ground	Topsoil and layers of made ground, abrupt boundary
0.28m AOD	75-140	6. Alluvium	Grey firm silty clay
	140-175		Brown to dark brown silty loam to silty clay with shell fragments – terrestrial and freshwater
-0.72m AOD	175-225	5. Peat lens	Dark brown silty humified silty peat with shell fragments
-1.32m AOD	225-235		Yellowish brown gritty lens
	235-300	4. Grey silt	Light grey (with bluish hue) massive clay to silty clay, rare small stones, rare woody / reed fragments, clear to gradual boundary
	300-390		Light brownish grey silt with small waterlogged roundwood fragments <7> Roundwood c 3.0m <8> Roundwood c 3.5m
-2.87m AOD	390-400	3. ?stasis	Dark brown humic silt band – possible stats/soil
	400-430	3. Humic silt	Brown to dark greyish brown silty clay
-3.27m AOD	430-470+	1. Gravel	Small and medium gravel and sand mainly medium sand)

Trench 1 (SS2) (Photo M.J. Allen)

FIGURES

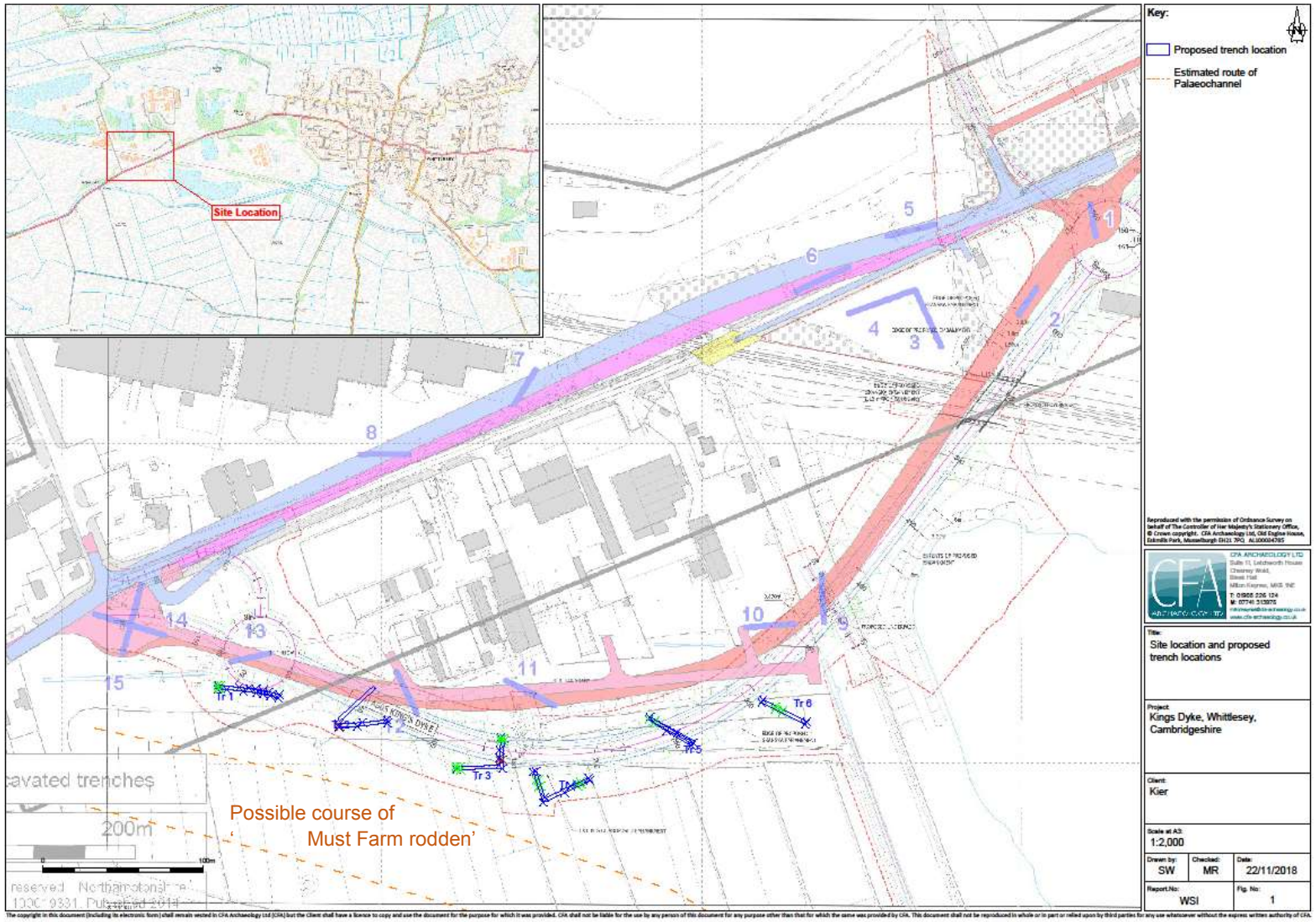

Figure 1.Kings Dyke evaluation trenches showing the possible course of the ‘Must Farm rodden’ south of the evaluation– not to scale (CFA)

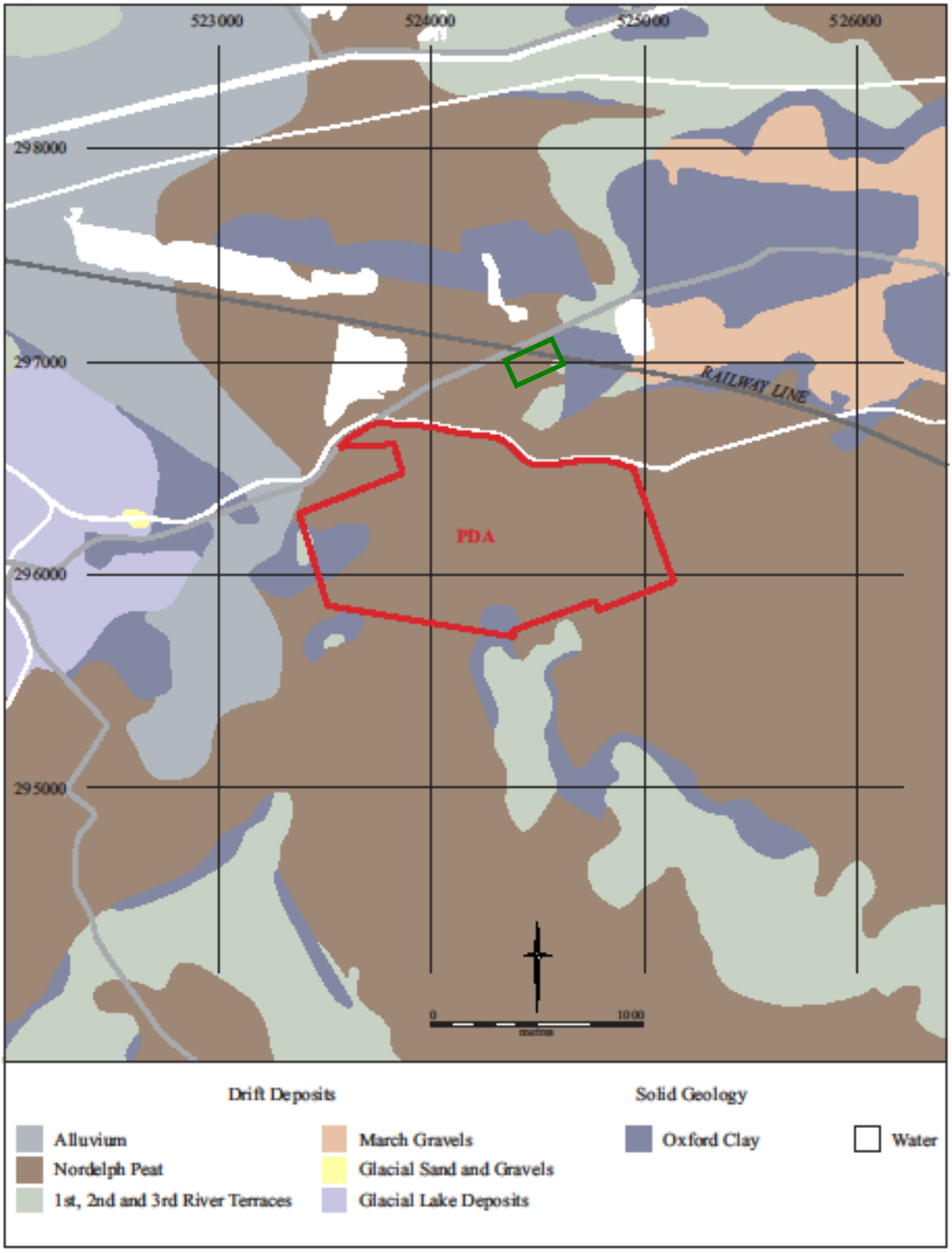

Figure 2. Geology and Drift deposits, showing the approximate location of the evaluation area as a green box (© CAU, from Tabor 2010)

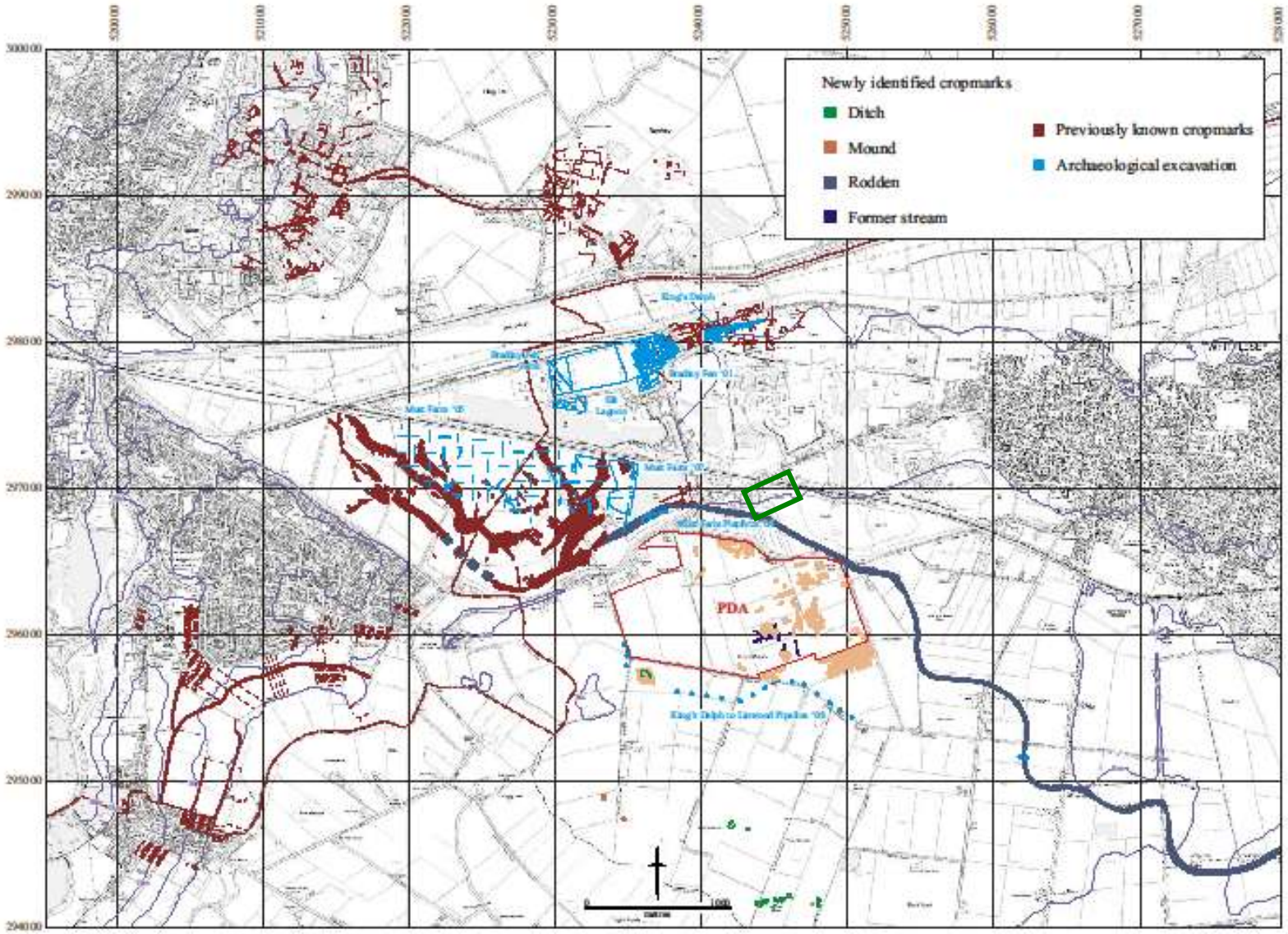

Figure 3. Archaeology within the surrounding area – evaluation area = green box (© CAU, From Tabor 2010)

Figure 4. Course of the 'Must Farm rodden' overlain over a map of the archaeology of the local area (produced by T. Barton, CFA)

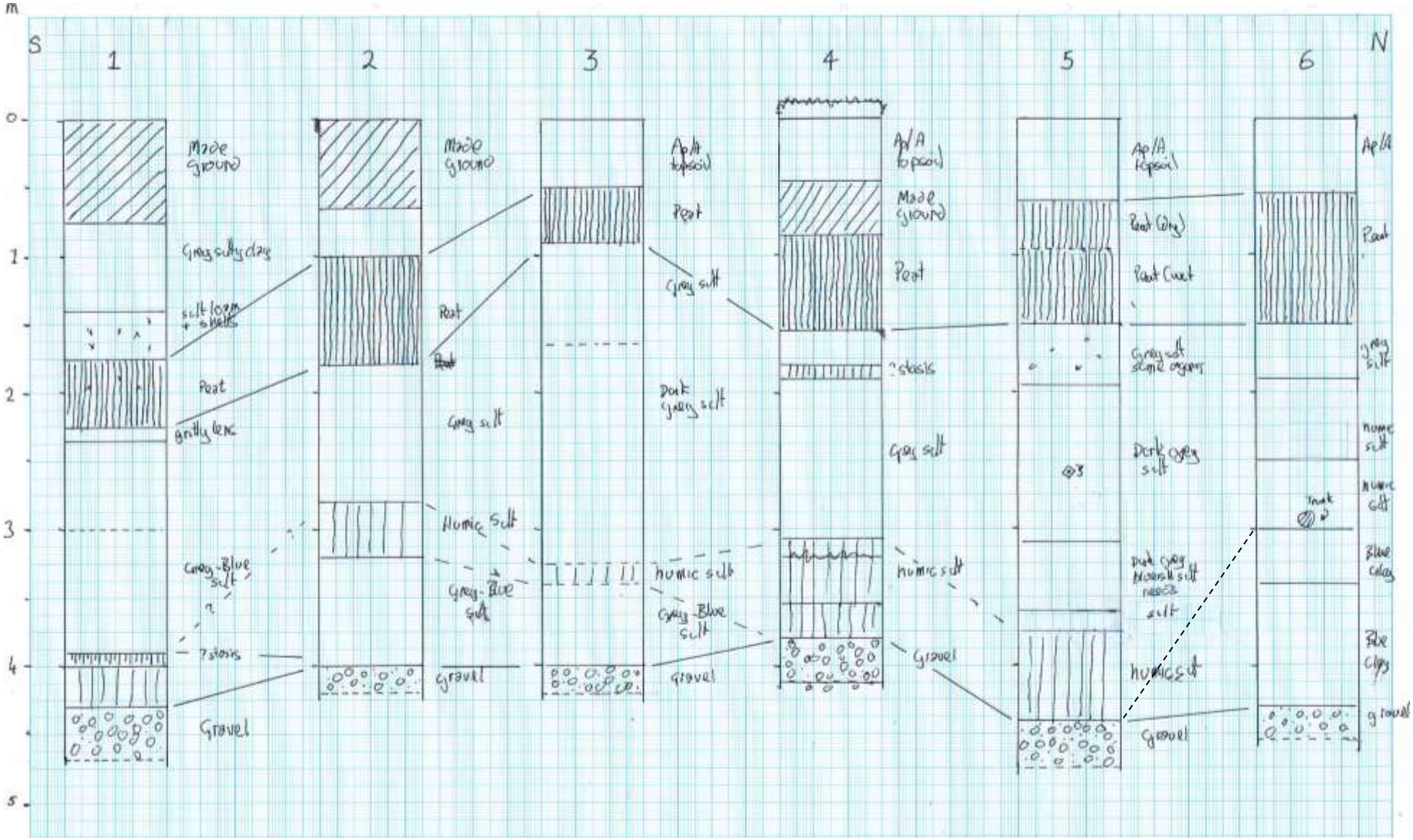

Figure 5. Profiles from the geoarchaeological test pits in trenches 1-6

APPENDIX 3: Radiocarbon Results from trenches 1 and 5

(Mike Allen)

AEA 389: KINGS DYKE, WHITTLESEY, CAMBRIDFGESHIRE, (KDWC 18)

Radiocarbon Results from Trenches 1 and 5

by ***Michael J. Allen, PhD, MCIfA, FLS, FSA***

version AEA 389.03.01
25th April 2015

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Radiocarbon Results from trenches 1 and 5

Four fragments of wood, three of them short-lived roundwood pieces suitable for radiocarbon dating, were recovered and retained from the rapid geoarchaeological fieldwork résumé (Allen 2019; Table 1).

Sample	*Trench / location*	*Location*	*Description*	*Wood age*	*C14 suitability*
1	Tr 6	Base of grey/humic silt	*Quercus* (Bog oak)	>100 rings no sapwood	×
3	Tr 5 @ 2.6m	Mid Grey silt	*Corylus* (hazel) roundwood	>10 rings	✓
7	Tr 1 c 3.0m	Grey silt	*Alnus* (alder) roundwood	>10 rings	✓
8	Tr 1 *c.* 3.5m	Nr base Grey silt	*Alnus* (alder) Roundwood	>10 rings	✓

Table 1. Wood identifications from grab sample from test pits

Three species were present; the large trunk was oak, and the roundwood twigs hazel (trench 5) and alder (trench 1). All three suitable pieces were from the grey silt below the peat and alluvium in test pits at trenches 1 and 6, and were from the lower part of this facies. The sample of bog oak <1> from trench 6, in contrast, lies at the base of the grey silt facies and on the 'blue clay – see stratigraphic record below'.

Test pit at Trench 5 (SS2)

(cm)		
0-60	7. Ap / A	Topsoil / ploughsoil Ap and A; greyish brown silty loam to slity clay loam, almost stone free – Alluvial soil
60-95	5. Peat	Dark brown to dark reddish brown peat and silty peat becoming a dark greyish brown, becoming wetter ad greyier with depth, clear to gradual boundary Dry humified and desiccated peat
95-150		Dark greyish brown wet peat silt, humified, but wet and ?waterlogged, gradual boundary Humified peaty silt
150-195	4. Silt	Grey (look looks greyish blue) to greyish brown silty clay with organic staining,
195-310		Dark greyish brown (bluish hues) massive silty clay <3> at 2.60m Roundwood with bark (Tables 1 and 2)
310-360		As above becoming darker bluish grey, vertical reed stem noted
360-375		Bank of greyish blue silt to silty clay (lighter colour – more minerogenic), clear boundary
375-445	3. ?Humic silt	Dark brown to very dark brown silty clay, abrupt indurated boundary <4> dark grey silt (additional description)
445-475+	1. Gravel	Greyish brown to yellowish brown gravel and medium sand – water at base

Test pit at trench 1 (SS2)

Depth (cm)	***Unit***	***Description***
0-75	7. A / Made Ground	Topsoil and layers of made ground, abrupt boundary
75-140	6. Alluvium	Grey firm silty clay
140-175		Brown to dark brown silty loam to silty clay with shell fragments – terrestrial and freshwater
175-225	5. Peat	Dark brown silty humified silty peat with shell fragments
225-235	lens	Yellowish brown gritty lens
235-300	4. Grey silt	Light grey (with bluish hue) massive clay to silty clay, rare small stones, rare woody / reed fragments, clear to gradual boundary
300-390		Light brownish grey silt with small waterlogged roundwood fragments <7> Roundwood c 3.0m <8> Roundwood c 3.5m (Tables 1 and 2)
390-400	3. ?stasis	Dark brown humic silt band – possible stats/soil
400-430	3. Humic silt	Brown to dark greyish brown silty clay
430-470+	1. Gravel	Small and medium gravel and sand mainly medium sand)

Consequently two samples were submitted for AMS radiocarbon dating to provide some crude chronological framework and assist in relating the sequences chronologically as well as stratigraphically, to the fenland sequence and assist in defining the significance of the sequences.

i) Tr 1 3.5m (alder) towards the base (2.35-2.90m) of the 'grey silt (unit 4)
ii) Tr 5 @ 2.6m (hazel) (1.50-3.75m) in the middle of the 'grey silt' facies (unit 4)

Radiocarbon results

The samples were submitted for AMS radiocarbon dating at the Scottish Universities Environmental Research Centre. They were processed at SUERC following a modified version of the pre-treatment method outlined by Longin (1971) with modification of ultrafiltration method (Bronk Ramsey *et al.* 2004) and using the Groningen method for cremated bone as described by (Dunbar *et al.* 2016), and measurement by AMS as described by Xu *et al.* (2004).

The AMS radiocarbon dates and results are given in table 2 and are quoted in accordance with the international standard known as the Trodheim convention (Stuiver & Kra 1986). They are conventional radiocarbon ages (Stuiver & Polach 1977). Calibration of the results has been performed using the data set published by Riemer *et al.* (2013) and performed using the programme OxCal v4.2.3 (www.flaha.ox.ac.uk/). Details of the algorithms employed by this program are available from the on-line manual or in Bronk Ramsey (1995; 1998; 2001; 2009). The calibrated date ranges (Table 2) in text are cited are those with 95% confidence and have been rounded out to the nearest 10 years (Mook 1986). The certificates are presented separately.

The radiocarbon age given is calibrated to the calendar timescale using the Oxford Radiocarbon Accelerator Unit calibration program OxCal 4.3.2 (Bronk Ramsey 2009) date

ranges have been calibrated using the IntCal13 atmospheric calibration curve (Reimer *et al*. 2013).

The results are present in Table 2 and as a histogram of probability distribution (Fig. 1), and calibrated results detailed in archive list (Appendix 1). The radiocarbon certificates and presented separately.

Test pit	*Sample depth*	*Waterlogged wood*	*Lab no*	*Result BP*	*δC^{13} ‰*	*Cal AD*
5 unit 4	2.6m	*Corylus* roundwood	SUERC-86116	3926±28	-29.0	2490-2300 cal BC
1 unit 4	3.5m	Alnus roundwood	SUERC-86112	3949±28	-25.2	2570-2340 cal BC

Table 2. Radiocarbon results

Consideration of the results

The results (Table 2) clearly indicate that grey silt (unit 4) below the humified and desiccated peat (unit 5) was being deposited during the 24th to 25th centuries BC; ie Late Neolithic/Early Bronze Age, and thus the overlying peat, *might* relate to that at Must Farm. It indicates the potential of a Neolithic stasis (unit 3) buried at *c.* 4m depth, and the potential for a long dated palaeo-environmental sequences relating this and the wider landscape during Neolithic and that ten later relating to activity Must Farm and later prehistory/early historic times.

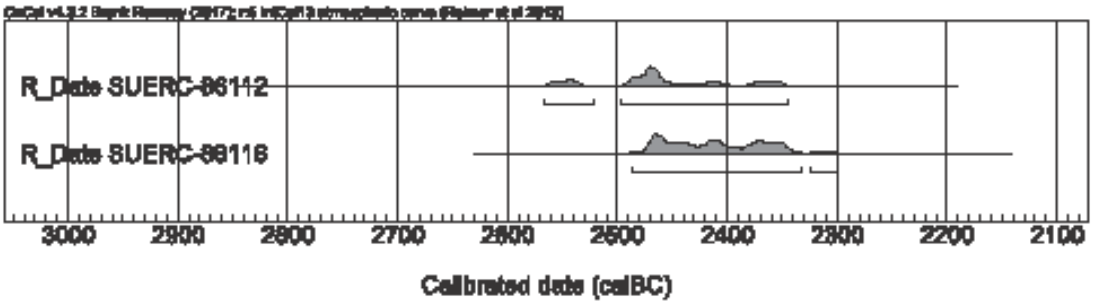

Figure 1. Radiocarbon probability distributions

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APPENDIX
OxCAL Probability Distributions

OxCal v4.3.2 Bronk Ramsey (2017); r:5
IntCal13 atmospheric curve (Reimer et al 2013)
SUERC-86112 R_Date(3949,28)
68.2% probability
2560BC (12.5%) 2536BC
2492BC (40.4%) 2454BC
2418BC (5.6%) 2407BC
2376BC (9.7%) 2351BC
95.4% probability
2566BC (17.7%) 2522BC
2498BC (77.7%) 2346BC
SUERC-86116 R_Date(3926,28)
68.2% probability
2473BC (30.9%) 2433BC
2422BC (14.5%) 2402BC
2380BC (22.8%) 2348BC
95.4% probability
2488BC (91.5%) 2334BC
2324BC (3.9%) 2300BC

APPENDIX 4: WSI

Land to the south of the A605, King's Dyke, new road and road bridge, Whittlesey; Archaeological Evaluation

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19th November 2018

Written Scheme of Investigation

Version 3

Planning Ref. F/YR15/2010/CC

Event Number ECB5745

Grid ref; TL 2427 9679

Contents

Figures

Introduction

This document is a Written Scheme of Investigation which details the standard procedures and approach to the project which will be employed by CFA Archaeology (CFA) and is a response to a brief for an archaeological investigation prepared by Cambridgeshire County Council Historic Environment Team (CHET) dated 4th June 2018. Planning permission (F/YR15/2010/CC) has been granted for the construction of a new road and bridge crossing the railway; Kier are carrying out the work (EAHIAL-CFA-EHR-XX-RP-LA-01087). A condition requiring archaeological work is a part of this planning consent. This WSI is for an initial evaluation and CHET may require further works outside the scope of this WSI. No changes will be made to the specification without the agreement of CHET before being implemented.

Project Background

The site lies at a height of c 6.6m aOD (Fig. 1) on the edge of the 'high' ground of Whittlesey rising above the surrounding fen. The underlying geology comprises mudstone, siltstone and sandstone of the Kellaways and Oxford Clays formation. These are overlain by superficial deposits of sand and gravel of River Terrace Deposits (BGS 2014).

An HER search of the surrounding area has been carried out by CHET and was issued in their brief (Appendix 1). The main findings are summarised below.

Within the Site Boundary:

There are no known sites of archaeological importance within the site boundary though there are a number of undated and more recent remains.

An archaeological evaluation (ECB568 / MCB15864) was carried out in advance of the extension to Star Pit which runs across the centre of the site in 1996. The 10 trial trenches revealed a few ditches, pits and post-holes, all undated, and a background presence of prehistoric activity.

An archaeological evaluation (ECB4193) was carried out on the north-eastern and south-western parts of the site on a proposed alternate site for the Kings Dyke level crossing in 2014 (trenches shown on Fig. 1). Trenches 4 and 6 in the north-east contained foundations of 20th century buildings. Other trenches revealed a made ground including road waste dumping. In some areas this included asbestos that meant investigations could not be completed. Trench 9 revealed no modern deposits or archaeological remains.

The WW2 General Headquarters Line (GHQ) crosses the site (CB15190). The defences include various concrete and brick pillboxes between the River Welland to Floods Ferry. A pill box is located next to but not within the site (MCB19656). Also crossing the site is the Ely & Peterborough Branch of the Great Eastern Railway. (MCB24025).

The Wider Study Area:

Prehistoric

The March Gravels overlie the Oxford Clay and afforded well drained land on which settlement has been located since the prehistoric period, while Palaeolithic stone tools have been found within the gravel member itself (MCB19243). The most important prehistoric feature close to the site is the route of a rodden (prehistoric tidal river) which can be seen as a palaeochannel on Lidar data (Fig. 2) connecting to the Kings Dyke south-east of the site. The route of the channel north-east of the dyke is unknown but it may run close to the south side of the site and could be encountered in the trenches. The palaeochannel is thought to be the same as that encountered at Must Farm (see below) which contained extremely well preserved Bronze Age and Iron Age remains including wooden fish weirs and log boats.

Bronze Age and Iron Age

Rescue excavations in the 1960s and 1980s brought notable significant archaeological sites to light, mainly relating to Bronze Age burials (MCB3423), Iron Age settlement (eg MCBs 3901, 1912) as well as Roman settlement and cemetery evidence. Since then, systematic examination of the archaeological landscape of the quarries in western Whittlesey and its fenland area has enabled a considerable understanding of the nature of settlement and land use in this formerly undulating landscape from periods before peat developed in the deepest basins and rivers. Episodic marine inundation dumped deep layers of marine clays in the basin and roddonised ancient tidal rivers and creeks. Periodic alluviation and further prolonged periods of marsh development drastically altered this part of the low-lying Cambridgeshire landscape. Archaeological work focused on the pits at Kings Dyke, Bradley Fen and at Must Farm (see HER search) revealed Neolithic occupation, funerary and ceremonial sites set within planned, managed fields and landscapes.

At Must Farm, c 1km to the west of development area, archaeological investigations between 2004 and 2016 revealed several phases of prehistoric activity from the middle Bronze Age to Late Iron Age. The main settlement was a Late Bronze Age piled village was built over a palaeochannel of former rivers of the ancient Nene river system (eg MCB16817). Within 135m of the channel, 8 log boats were discovered spread throughout the layers of the channel sequence as well as fishing structures (MCB19857). Other remains included a palisade, a burnt mound dating from the early Neolithic to early Bronze Age and a single crouched inhumation within a barrow.

Other Bronze Age activity has been identified at Bradley Fen, c 1.2km north-west of the development site. A settlement and a weapon hoard were recovered during excavations between 2000 and 2004.

Roman

Excavations north of the main road c.600m opposite the site found Iron Age and Roman remains (ECB503 / 03151) including a 2nd century AD possible execution cemetery as well as waterlogged remains. Evidence of Roman activity has also been found at Itter Farm (ECB502), c.650m north-east of the site, where pits and ditches were found during archaeological investigations in the 1950s.

Medieval

King's Dyke passes the site roughly 400m to the south. The date of the dyke is not fully understood: rationalised during the 17th century fen drainage programme, it is believed to be of late Saxon or early Medieval date.

Post – Medieval
The Whittlesey brick pits cluster on the western side of Whittlesey, from which clay has been extracted throughout the 20th century and continues today.

Project Objectives

In accordance with the brief the aim of the evaluation is to determine the 'location, extent, date, character, condition, significance and quality of any surviving archaeological remains liable to be threatened by the proposed development' This will be used to:

- Determine the character, date, condition and significance of the archaeological resource
- Define the nature and extent of any mitigation works that may be required
- Look for the presence/absence of palaeosols and old land surface soils/deposits
- Determine the character of deposits and their contents within negative features
- Investigate palaeochannels
- Determine site formation processes generally

The Research Objectives are to:

- Investigate the evidence for and origins of the different phases of land use and enclosure within the area, including any evidence for pre-Roman, Roman, Saxon, medieval and post-medieval activity;
- Place the results of the investigation within the wider landscape context and contribute to an understanding of the pattern of land use;
- Use a spectrum of environmental techniques appropriate for this aspect of investigation in an attempt to model the landscape and its transformation brought about by the settlement's inhabitants and due to natural events.

Research objectives will re-evaluated during the course of the project to reflect the nature and significance of findings, they will be informed by and will follow relevant regional research frameworks (Glazebrook 1997, Brown and Glazebrook 2000, Medlycot 2011 and Knight et al. 2012).

Method Statement: Trenching

Six trenches will be excavated within the site boundary as an addition to the 2014 work (ECB4193) representing just over a 3% sample of the site area. All trenches will be 1.7m wide; three trenches will by 30m long, two will be L-shaped - 50m long, and one 40m long. Proposed Trench locations are shown on Figure 1. The precise locations of the trenches may be altered slightly to take into account local ground conditions and services. All trench locations will be scanned with a Cable Avoidance Tool (CAT) prior to excavation. A further 1% of the area is allowed for as contingency trenching; this would be used if palaeochannels are encountered.

Topsoil and overburden will be removed by mechanical excavator (JCB) using a toothless ditching bucket (c.1.7m wide), under archaeological supervision. The spoil generated during the evaluation will be mounded away from the edges of each trench. Topsoil and subsoil will be stored separately. Mechanical excavation will cease at either undisturbed natural deposits or the top of archaeological deposits. If excavation of the trenches reaches the limit of safe working depth without natural geology being encountered, a machine-dug sondage will be excavated in order to establish the depth of natural geology, provided that this can be achieved without damaging significant archaeological remains.

Upcast and spoil from mechanical excavation will be scanned by eye and by metal detector to aid the recovery of topsoil artefacts. Metal detecting will also be conducted over the surface of all exposed features before the end of each working day. The detector will not be set to discriminate against iron.

Hand sorting/sampling will be carried out at the end of each trench where 90 litres of spoil will be hand sorted for artefacts from each soil horizon encountered.

Trenches will not be backfilled without the approval of CHET. Further trenching or deposit testing may be a requirement of the site monitoring visit by CHET if unclear archaeological remains or geomorphological features present difficulties of interpretation, or to assist with the formulation of a mitigation strategy. Appropriate provision should be made for this eventuality. CHET will be informed in writing at least one week in advance of the proposed start date for the project.

Excavation and Recording Strategy

All features will be investigated unless agreed otherwise with CHET; linear features (ditches and gullies) will be sample excavated at a minimum of 10% of their length and a minimum of 1m per section at regular intervals. Intersections will be investigated to establish relationships between features. Pits and post holes will be sampled at a minimum of 50%, and ovens, hearths and other significant industrial or domestic features will be recorded and left in situ unless otherwise agreed with CCCHET. Should burials be encountered then they will be recorded and left *in situ*. Where the reburial of revealed human remains would be considered detrimental to their survival, arrangements for their immediate excavation should be made to establish the date, condition and character of the burial. If removal is essential an exhumation licence should be requested from the Ministry of Justice. Archaeological features will be systematically scanned by metal detector set not to discriminate prior to excavation and spoil routinely scanned for finds.

Any palaeochannels encountered will fully investigated. This will involve a staged recording approach to allow for excavation in steps to address health and safety concerns relating to working at depth. A pump will be on standby to deal with groundwater. Geoarchaeologist Mike Allen will be on standby should important sequences be recovered.

Archaeological recording will be undertaken by means of standard recording sheets, drawings and photographs. Survey will be carried out with GPS equipment accurate to 8mm horizontally and 12mm vertically. Site plans will be located on development plans supplied by the client. Archaeological sections will normally be hand drawn at 1:10 or 1:20 and plans at an appropriate scale.

Photographs will include an appropriate scale. All photographs will be recorded on a photographic register detailing subject, location and direction of shot. The photographic record will consist of 35mm B&W film supplemented by digital photographs.

A non-discriminating metal detector will be available on site; all site staff are familiar with its use and use it on a regular basis. All archaeological layers including widespread buried deposits and the fills of negative cut features will be scanned in advance of excavation; spoil will also be regularly scanned for metal objects and other finds.

Any finds covered by the Treasure Act will be reported to the Finds Liaison Officer at CHET and dealt with according to the Act.

Environmental Sampling Strategy

The following environmental sampling strategy was developed by CFA's palaeoenvironmental specialist in consultation with Historic England's Regional Scientific Advisor, Zoe Outram. Results of environmental work will be included in the report.

Environmental samples will be taken as necessary from significant archaeological deposits in accordance with relevant guidelines (AES 1995, Dobney et al. 1992, Murphy and Wiltshire 1994, HE 2011, HE 2014, HE 2015). Deposits identified as archaeologically significant (e.g. fills from negative features such as pits and postholes) will be sampled for environmental material and other finds (e.g. bone, pottery etc.). Bulk samples will be taken from deposits for wet sieving and floatation in order to recover any environmental

material including carbonised plant macro-fossil remains and wood charcoal. Sieve nest sizes range from 4mm, 2mm-1mm and 250 microns.

A bulk sample ranges from 20 to 40 litres, however, where large deposits (e.g. midden spreads) are encountered more than one bulk sample may be taken. Advice on the appropriate amount of sampling from deposits identified as containing primary midden material will be obtained from relevant specialists. Small deposits such as the fill of postholes may contain less than 10 litres of sediment and will be fully sampled. Graves and cremation pits will be 100% sampled to recover the maximum of palaeoenvironmental information. Formal grid sampling strategies may be applicable for grave fills where there is a potential for soil pollen or phosphate analysis. All samples taken will be given a unique identifying number and fully catalogued and appended in the report. Any environmental assessment will pay particular attention to:

- The retrieval of charred plant macro & microfossils, faunal remains and land molluscs from former dry-land palaeosols and cut features;
- The retrieval of plant macro & microfossils, insect, faunal remains, molluscs, pollen and other biological remains from waterlogged deposits located;
- Provision for the absolute dating of critical contexts

A copy of the report including the results of any environmental work (residue analyses, palaeo-environmental investigation or work on industrial residues) will be sent to the Historic England scientific advisor.

Biological Remains

Where waterlogged deposits are encountered (such as peat or waterlogged clay/silts) advice on the appropriate amount and type of sampling from deposits identified as waterlogged will be obtained from CFA's Palaeoenvironmental Scientist; appropriate wetland sampling techniques will be employed so as to maximise the environmental recovery and information gained from such deposits. Once lifted from their context, wood, leather and other waterlogged biological material will be kept wet and placed in an air-tight container, in cold storage (minimum 4°c) until it is examined by CFA's Palaeoenvironmental Specialist.

Soil samples from primary fills may be taken for specialist soil micromorphology. CFA uses purpose-made stainless steel Kubiena tins ranging from 1m deep to 0.10m.

Sampling strategies will follow the methods and protocols described in relevant Historic England guidance (2011). Overlapping samples or single-tin sampling may be appropriate, depending on the nature and depth of the sample taken.

Samples obtained using tins may be suitable for pollen and non-pollen palynomorphs (e.g. testates and fungal spores) and large specialist samples for plant macrofossil, wood and insect analyses.

Analysis and Reporting

A post-excavation assessment and updated project design will include all specialist assessments of artefact assemblages will be completed within an agreed timescale. A draft will be submitted to CHET within four weeks or an agreed timetable. A digital copy of the report will be supplied in PDF format to the Local Planning Authority and CHET. In addition a hard copy of the report will be sent to the CHET.

All finds, if appropriate, will be retained, washed and where appropriate, be marked with the site code and context number in accordance to accepted professional standards (CIfA 2014a).

A submission will be made to the index of archaeological investigations (OASIS) during the initiation of the project. A PDF version of the report will be uploaded to the OASIS website and a copy of the form will be appended to the report.

The report will contain:

- a concise non-technical summary of the project results;
- the site code and project number;
- planning and other relevant reference numbers;
- dates when the field work took place;
- the site location given as an 8 figure grid reference;
- a location plan of the site at a scale of at least 1:10 000;
- a location plan showing the locations of the areas of strip and record within the site at an appropriate scale;
- plans and sections of archaeology located at a scale of 1:10, 1:20, 1:50 or 1:100, as appropriate (including an overall plan of the site, the location of trenches, individual trench plans and sections);
- a statement and analysis of the results;
- an assessment of the significance of any findings and a model for any further analysis;
- a table summarising the deposits, features, classes and numbers of artefacts encountered;
- separate interpretative statements including phasing and dating of finds supported by appropriate photographs and drawings; and
- an assessment of each category of artefacts/ecofacts recovered, to 'MAP 2 standard', an assessment of significance, and recommendations for future work.

Finds Recovery and Post-excavation Strategy

All finds of pre-modern date will be retained for analysis; modern finds will be retained should they be from stratigraphically critical deposits or be intrinsically significant. All finds which come under the purview of the Treasure Act 1996 will be reported to the Finds Liaison Officer and relevant procedures will be followed.

All finds will be treated in accordance with relevant guidance (CIfA 2014a). Ferrous and non ferrous objects will be x-rayed as appropriate.

The report will describe the methods employed and outline the results in sufficient detail to enable the results to be interpreted without recourse to the site archive. It will include tabulations of contexts and finds by context. It will also include a non-technical summary and the results will be interpreted in relation to the archaeological and historical context of the surrounding area.

Standards and Guidance

CFA Archaeology is a registered organisation (RO) with the Chartered Institute for Archaeologists (CIfA). All work will be conducted in accordance with relevant CIfA Standards and Guidance documents (CIfA 2014a-d), Historic England guidance (EH 2005a, 2005b, 2006, 2007 and 2011), relevant regional guidance (Gurney 2003) and CFA's standard methodology. This WSI, the project brief (Appendix 1).

Monitoring

The archaeological work will be monitoring by CHET who will be informed in advance of the works taking place, updated as to progress and any significant archaeological discoveries. Contact numbers for the site will be forwarded to CHET and the client in advance of the work starting. Chet will be informed of any developments during site works and any subsequent post-excavation work.

The archaeological advisory and planning role of Cambridgeshire County Council's Historic Environment Team will be acknowledged in any report or publication generated by this project.

Archiving

The project archive, comprising all CFA record sheets, finds, plans and reports, will be deposited at the Cambridgeshire Archaeological Archive facility and will conform to the current Cambridgeshire *Deposition of archaeological archives in Cambridgeshire 2017* and MoRPHE guidelines (CFA 2014d)) ensuring the proper transfer of ownership. The project report shall include an index to the site archive. The Cambridgeshire Historic Environment Record (CHER) event number (ECB5569), will appear on archived items and all related reports.

Outreach

Should significant archaeological remains be encountered then appropriate avenues of publicity may be explored, with approval of the client and in consultation with CCCHET. This may include press releases or articles to local and national media, television, web-based and social media, an open day for visitors or presentations or talks of the excavated remains to local societies or interested local people. All public outreach events will be conducted following consultation with and approval by the client and CCCHET. Details of the project may also appear on CFA's website.

Welfare, H & S and Environmental Policy

CFA Archaeology promotes the welfare and development of all staff irrespective of their status as permanent or temporary employees. Health and Safety executive guidance is followed for the provision of welfare on site and in office environments. CFA is an equal opportunities employer.

Policy Statement:

It is the Company's policy, so far as is reasonably practicable to:

- provide and maintain plant and equipment and systems of work that are safe and without risks to health;
- make arrangements for ensuring safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances;
- provide such information, instruction, training and supervision as is necessary to ensure the health and safety at work of employees and visitors;
- maintain any place of work under the Company's control in a condition that is safe and without risks to health and to provide and maintain means of access to and egress from it that are safe and without such risks;
- provide and maintain a working environment for employees that is safe and without risks to health and is adequate as regards facilities and arrangements for their welfare at work;
- provide such protective equipment as is necessary for the health and safety at work of employees;
- encourage staff to set high standards of health and safety by personal example;
- monitor the effectiveness of health and safety provisions within the Company, and;
- keep the Health and Safety Policy under regular review and to duly circulate any amendments.

It is equally a duty under the Health and Safety at Work Act for everyone engaged in company activities to exercise responsibility and care in the prevention of injury and ill health to themselves and to others who may be affected by acts and omissions at work. Those who supervise work in the company premises and at field locations elsewhere have special obligations to ensure that they do not endanger the health and safety of other colleagues or visitors.

Prior to the start of site works a risk assessment will be carried out identifying risks to staff, visitors to the site and members of the public. Staff and visitors to the site will wear appropriate PPE at all times.

No person shall intentionally interfere with, or misuse anything provided by the Company in the interests of health, safety or welfare. CFA Archaeology's full Health and Safety policy and guidance is available on request.

CFA Archaeology is committed to reducing its carbon footprint and maintains an environmental policy which may be supplied on request.

Resources

Mark Roberts (BA MLitt MCIfA) is a Regional Manager for CFA. Mark has project managed numerous archaeological projects of all periods throughout the UK including those undertaken for large infrastructure projects. Mark has an IOSH *Managing Safely* certificate.

The evaluation will be directed by CFA staff that have direct experience of working in fenland environments.

Assistant Archaeologists will be selected from CFA's pool of staff, all of whom have appropriate experience. The project officer and supervisor will be first aiders and all site staff will have current CSCS cards (archaeological technician).

CFA's Graphic's Manager Shelly Werner BA MPhil DPhil, who is responsible for the organisation and management of all GIS, CAD and Illustrative material. She is an experienced illustrator with specialist knowledge in GIS consultancy.

List of Specialists

Osteoarchaeology / small finds	Sue Anderson BA MPhil PGDip MCIfA
Lithics	Torben Bjarke Ballin MA PhD MCIfA (Freelance)
Prehistoric pottery /briquetage	Elaine Morris BA PhD FSA MCIfA
Prehistoric pottery	Melanie Johnson MA PhD FSA Scot MCIfA (CFA Archaeology)
Pre-Roman Iron Age pottery	Paul Blinkhorn
Roman pottery	Katie Anderson BA MA
Saxon and Medieval pottery	Paul Blinkhorn
Samian	Felicity Wild
Querns	John Cruse
Conservation Laboratory (Lead Conservator)	The Scottish Conservation Studio (Will Murray BSc PGDip ACR)
Dendrochronology	Ian Tyers
Palaeoenvironmental Scientist	Mike Cressey HND BA MSc PhD MIfA (CFA Archaeology)
Geoarchaeologist	Dr Mike J Allen MCIfA, FLS, FSA
Archaeobotany	Mhairi Hastie BSc MSc ACIfA (CFA Archaeology)
Archaeozoology	Jennifer Thoms MA PhD FSA Scot
Soil Micromorphology	Clare Ellis BA PhD MIfA
Mollusca and fish remains	Ruby Ceron-Carrasco MA PhD
Post-medieval pottery	Sue Anderson BA MPhil PGDip MCIfA
Palynology	Robert McCulloch BA PhD (University of Stirling)
Ceramic Building Material	John Tibbles BA ACIfA
Industrial and domestic waste analysis	David Starley BSc PhD

The above list is not exhaustive, should unusual or locally specific archaeological materials be discovered; appropriate specialists will be sort on the advice of the Regional Historic England scientific Advisor. Cvs and examples of work for all specialists may be supplied on request.

Timetable

The envisaged start date for the fieldwork is TBC with an estimated programme of fieldwork lasting five days with three staff. Resources may be varied depending on the level and complexity of archaeological remains encountered.

Quality Assurance

CFA works to the highest achievable standards across the range of its archaeological activities and employs best archaeological practices. CFA operates according to the appropriate codes and standards of the Chartered Institute for Archaeologists (CIfA).

A quality system has been produced to fulfil the requirements of best archaeological practice. This system comprises the Quality Policy, Quality Manual, project specific Quality Plans, and a series of Standard Operating Procedures, copies all of which may be supplied on request.

CFA staff are instructed in the requirements of the quality system. All staff working on projects are inducted in CFA working practices, including quality responsibilities. Every member of staff is made aware of their individual responsibilities within the project and within the Quality Plan. CFA ensures that all staff are qualified, experienced archaeologists, and that training is conducted in appropriate areas of CFA work procedures and in developing uses of new technologies. All staff are encouraged to apply for membership of the CIfA, the recognised professional body for field archaeology, at an appropriate level and are encouraged and assisted through an appraisal system to maintain continuing professional development documentation.

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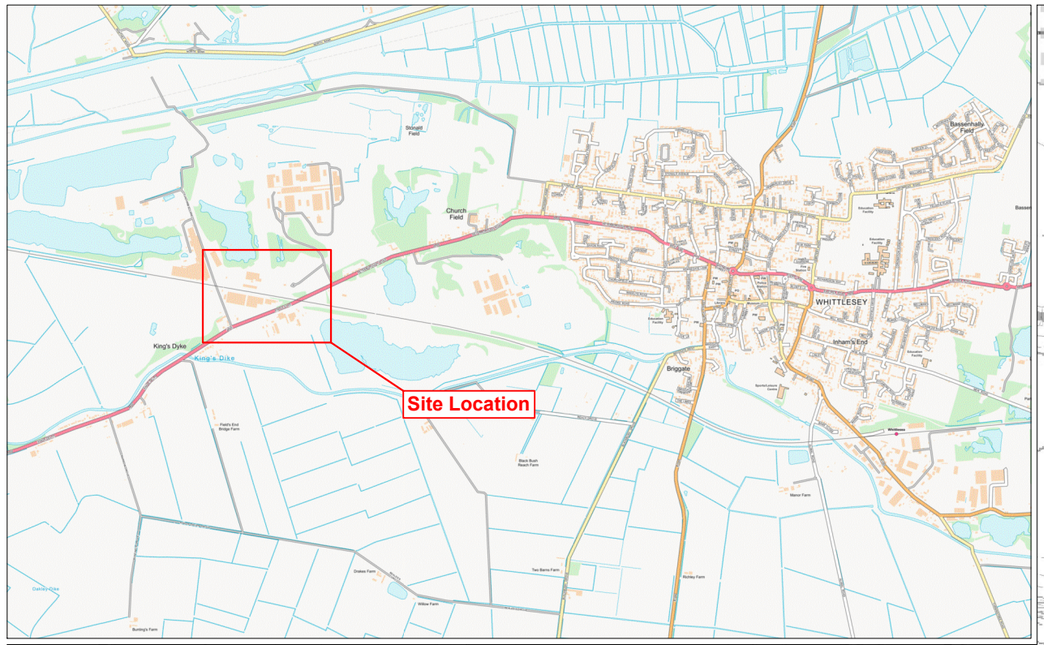
Appendix 1 BRIEF FOR ARCHAEOLOGICAL EVALUATION



cavated trenches

Key:

Proposed trench location

Estimated route of Palaeochannel

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Title:
Site location and proposed trench locations

Project:
Kings Dyke, Whittlesey, Cambridgeshire

Client:
Kier

Scale at A3:
1:2,000

Drawn by:	Checked:	Date:
SW	MR	22/11/2018

Report.No:	Fig. No:
WSI	1

Key:

- Proposed trench location
- Route of Palaeochannel
- Estimated route of Palaeochannel

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Title:
Site showing palaeochannel

Project:
Kings Dyke, Whittlesey, Cambridgeshire

Client:
Kier

Scale at A3:
1:8,000

Drawn by:	Checked:	Date:
SW	MR	22/11/2018

Report.No:	Fig. No:
WSI	2

APPENDIX 5: OASIS entry

Printable version

OASIS ID: cfaarcha1-343317

Project details

Project name	King's Dyke, Whittlesey
Short description of the project	CFA Archaeology Ltd carried out a trial trench evaluation in advance of the construction of a bypass around a level crossing on land to the south of the A605, King's Dyke, New Road and Road Bridge, Whittlesey. The site is located to the east of Must Farm and close to the suspected route of the Must Farm rodden (palaeochannel). The evaluation revealed 4m deep Holocene deposits with good potential for palaeoenvironemental study of the surreounding landscape. The edge of a late Holocene channel was identified at the SW edge of the site which may be the edge of the Must Farm rodden.
Project dates	Start: 11-12-2018 End: 20-12-2018
Previous/future work	No / Yes
Any associated project reference codes	KDWC - Sitecode
Type of project	Field evaluation
Site status	None
Current Land use	Grassland Heathland 4 - Regularly improved
Monument type	CHANNEL Bronze Age
Significant Finds	NONE None
Methods & techniques	''Sample Trenches'',''Test Pits''
Development type	Not recorded
Prompt	Planning condition
Position in the planning process	After full determination (eg. As a condition)

Project location

Country	England
Site location	CAMBRIDGESHIRE FENLAND WHITTLESEY King's Dyke
Study area	32021 Square metres
Site coordinates	TL 2427 9679 52.554370208109 -0.166831466483 52 33 15 N 000 10 00 W Point

Project creators

Name of Organisation	CFA Archaeology Ltd
Project brief originator	Local Authority Archaeologist and/or Planning Authority/advisory body
Project design originator	CFA Archaeology Ltd

Project director/manager	Mark Roberts
Project supervisor	Tam B
Type of sponsor/funding body	Landowner
Name of sponsor/funding body	Kier

Project archives

Physical Archive recipient	Cambridgeshire County Council’s Historic Environment Team Store
Physical Archive ID	ECB5745
Physical Contents	''Wood''
Digital Archive recipient	Cambridgeshire County Council’s Historic Environment Team Store
Digital Archive ID	ECB5745
Digital Contents	''Stratigraphic'',''Survey''
Digital Media available	''Images raster / digital photography'',''Images vector'',''Survey'',''Text''
Paper Archive recipient	Cambridgeshire County Council’s Historic Environment Team Store
Paper Archive ID	ECB5745
Paper Contents	''Stratigraphic'',''Survey''
Paper Media available	''Context sheet'',''Map'',''Plan'',''Report'',''Section'',''Survey ''

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	Land to the south of the A605 King's Dyke, New Road and Road Bridge, Whittlesey Cambridgeshire: Archaeological evaluation
Author(s)/Editor(s)	Barton, T
Other bibliographic details	MK166/19
Date	2019
Issuer or publisher	CFA Archaeology Ltd
Place of issue or publication	Milton Keynes

Entered by	Tamlin Barton (tbarton@cfa-archaeology.co.uk)
Entered on	20 February 2019

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