A14 CAMBRIDGE TO HUNTINGDON, CAMBRIDGESHIRE

POST-EXCAVATION ASSESSMENT VOL. 2: UPDATED PROJECT DESIGN

SUBCONTRACT ORDER 3310100/1028/001

commissioned by A14 Integrated Delivery Team (IDT)
on behalf of Highways England

November 2019

MOLA HEADLAND INFRASTRUCTURE
MOLA HEADLAND ARCHAEOLOGY
with
COPA PCA PRE-CONSTRUCT ARCHAEOLOGY

highways england

REGISTERED ORGANISATION CIfA

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This report adheres to the quality standard of ISO 9001:2015

PROJECT INFO:

NGR **TL 1973 3272 to TL 4091 6169**

Parish **Alconbury, Brampton, Offord Cluny and Offord Darcy, Godmanchester, Hemingford Abbots, Hemingford Grey, Fenstanton, Conington, Boxworth, Longstanton, Oakington and Westwick, Girton**

Local Authority **Cambridgeshire County Council**

OASIS Ref. **molahead1-349390, molahead1-349397, molahead1-349403, molahead1-349412, molahead1-349422, molahead1-349417, molahead1-349427, molahead1-349436, molahead1-349438, molahead1-349463, molahead1-349469, molahead1-349473, molahead1-349476, molahead1-349542, molahead1-349548, molahead1-349561, molahead1-349567, molahead1-349569, molahead1-349581, molahead1-349587, molahead1-349589, molahead1-349600, molahead1-349616, molahead1-349619, molahead1-349631, molahead1-349637**

Archive Repository **Cambridgeshire Archaeology Archive (Cambridgeshire County Council)**

Approved by **Alex Smith** and **David Bowsher**

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POST-EXCAVATION ASSESSMENT VOL. 2: UPDATED PROJECT DESIGN

1 INTRODUCTION

This document is Volume 2, the 'Updated Project Design' (UPD), of the 'Post Excavation Assessment and Updated Project Design' for the archaeological mitigation work undertaken on the A14 Cambridge to Huntingdon Road Improvement Scheme to June 2018. This follows on from the assessment of the sites (Volume 1), which included a statement of potential for the A14 data to answer the original research questions outlined in the WSIs and regional agendas. All finds and environmental assessments are included in Volume 3.

The Updated Project Design includes the compilation of a series of 'Revised Research Questions' (based on the assessment results from the excavations, in reference to the local, regional and national research agendas); the proposed project 'Outputs'; and 'Method Statements' for each class of material, outlining the work required in analysis to answer the research questions and produce the 'outputs'. Details of the project team, task list, and programme are also included, along with the archive deposition and retention strategy.

This fulfils the requirements assessment set out in the overarching DCO WSI (Highways England 2015; Section 11). It also meets the requirements outlined in the 'MoRPHE Project Planning Note 3' (Historic England 2008) and ALGAO's 'Note for Post-Excavation Assessment' (ALGAO 2015).

1.1 LANDSCAPE BLOCKS

For the analysis, the Targeted Excavation Areas (TEAs) will be grouped into eight separate 'landscape blocks'. These are an amendment of the eleven landscape areas identified in the original WSIs (Atkins CH2M 2016a-k), based on the actual areas excavated and the results from the excavations.

Table 2.1 provides details of these eight landscape blocks, and the reasoning behind their groupings. This was primarily based on the nature of the archaeology, their geographical position, and, in some cases, their geology/topography. The location and detail of these blocks are shown on Figures 2.1–2.9. Table 2.2 provides an outline of the archaeological remains found within each of the landscape blocks.

The amalgamation of TEAs into landscape blocks will help move away from the arbitrary sub-division of archaeological landscapes into separate sites (ie the Roman settlement which is spread between TEAs 11 and 12, see Table 2.002). It is hoped that this will encourage a more holistic and coherent approach to the whole landscape. Much of the analysis work will be undertaken within these landscape blocks, and the reports will be structured by landscape block.

TABLE 2.1 Details and reasoning behind the landscape blocks

LANDSCAPE BLOCK	TEAS	HA	ARCHAEOLOGY	GEOLOGY/TOPOGRAPHY	HOW CONNECTED GEOGRAPHICALLY	WHY GROUPED THIS WAY
Alconbury	2–4 and 5	7.2	Prehistoric, Iron Age, Roman, and Saxon.	River terrace gravels, and alluvium to west and south of Alconbury Brook.	2–4 are interconnected; 5 lies to the south.	Geographical connection.
Brampton West	7–12	75.3	Prehistoric, Iron Age, Roman, Saxon, medieval.	River terrace gravels.	Those to west of A1 are interconnected, plus 8+9.	Geographical and archaeological connection. Archaeology spread across all of these.
Brampton South	10B East and 13	5.8	Iron Age.	River terrace gravels.	East of A1, close together.	Archaeological connection (similar IA sites), and in similar area.
West of Ouse	14–16	19.5	Prehistoric and Roman landscape, with some Saxon.	Gravels close to River Ouse.	Almost all connected.	Geographical and archaeological connection. Prehistoric and Roman landscape adjacent to river.
River Great Ouse	TEA 19, 20, 21	19.5	Iron Age and Roman (20), Iron Age farmstead and Roman agriculture (21), Roman agriculture (21).	Edge of river (floodplain of River Ouse). 21: glacial Diamicton, higher land.	19 and 20 are connected, with railway between. 21 apart.	Geographical and archaeological connection. There is one major Roman settlement spread across TEAs 19 + TEA 20. TEA 21 contains Roman agriculture on outskirts of TEA 20, and Iron Age farmstead similar to TEA 20.
Fenstanton Gravels	26–31	55.8	Prehistoric, Iron Age, Roman.	River terrace gravels, West Brook to the north (TEAs 26–31). Oxford Clay, low land (TEA 31).	One big interconnected block (26–29). 31 is separate geographically.	Geographical, archaeological, and geological connection. Clear focus of past activity in this area (26–29). 31 is a bit separate but is an Iron Age farmstead like 29
Conington	32/33	21.4	Prehistoric, Iron Age farmsteads, Roman settlement, Saxon settlement.	West Walton/Ampthill clays.	One area.	Large multi-period site on its own, which doesn't clearly fit with any others.
Bar Hill	34, 37/38, 41, 46	23.4	Iron Age – Roman agricultural settlements.	West Walton/Ampthill clays (34); Kimmeridge Clay and Greensands (37/38); Gault Clay (41).	Separate.	Archaeologically similar, and all on clays, on low land.

TABLE 2.2 Details of main phases within each landscape block

LANDSCAPE BLOCK	NEOLITHIC	BRONZE AGE	IRON AGE	ROMAN	SAXON	MEDIEVAL	POST-MED
Alconbury	TEA 2–4: Henge, cremations,	–	TEA 2–4: peripheral enclosures of Iron Age ?settlement. TEA 5: settlement & agriculture (M-LIA).	TEA 2–4: peripheral parts of poss nucleated settlement. TEA 5: Periphery of settlement; dark earth.	TEA 2–4: 1 SFB - small settlement (E-M).	–	Agricultural building.
Brampton West	TEA 7B/C: Pits, TEA 12: Henge,	TEA 7A: agriculture, burial. TEA 10: burials, barrows & pits. TEA 12: burials & agriculture.	TEA 7A: settlement (M-LIA). TEA 7B/C: settlement, agriculture & burials. TEA 10: settlement, agriculture & burials (M-LIA). TEA 12: settlement & agriculture (M-LIA).	TEA 7A: settlement, burials & kilns. TEA 10: settlement, agriculture, burials & kilns. TEA 11/12: settlement, agriculture, burials & kilns.	TEA 7C: settlement (E-L) & agriculture. TEA 10: settlement (E-M). TEA 11/12: settlement (E-M) – dispersed.	TEA 7C: settlement (DMV).	TEA 7C: brick kilns. TEA 8–9: quarrying. TEA 12: quarrying.

LANDSCAPE BLOCK	NEOLITHIC	BRONZE AGE	IRON AGE	ROMAN	SAXON	MEDIEVAL	POST-MED
Brampton South	–	–	TEA 10B East: settlement & agriculture (M-LIA). TEA 13: settlement & agriculture (M-LIA).	–	–	–	–
West of Ouse	TEA 15: pits. TEA 16: monument.	TEA 15: enclosure, burials, structures, agriculture, pit alignment. TEA 16: barrow, burials (cremation cemetery), pit alignments.	TEA 14/15: settlement, agriculture (M-LIA). TEA 16: agriculture.	TEA 14/15: settlement, agriculture, burials, kilns. TEA 16: settlement (periphery), agriculture, burial, kilns.	TEAs 14–16: 5 widely spread SFBs – possibly single dispersed settlement? (E-M).	–	TEA 16: brick culvert.
River Great Ouse	TEA 19: Mesolithic soil & flints	TEA 20: Undated but possible BA structure?	TEA 19/20: settlement, agriculture (M-LIA). TEA 21: settlement, agriculture (M-LIA)	TEA 19/20: settlement (villa?), agriculture, burials, kiln. TEA 21: agriculture (cultivation trenches).	–	–	–
Fenstanton Gravels	TEA 31: 1 pit (Neolithic or BA).	TEA 27: burials. TEA 28: burials (cremation cemetery).	TEA 26: agriculture. TEA 27: settlement, agriculture (E-LIA). TEA 28: settlement, agriculture, burials (cemetery) (M-LIA). TEA 29: wells (EIA), settlement, agriculture, burials (M-LIA). TEA 31: settlement, agriculture (LIA).	TEA 26: agriculture (cultivation trenches). TEA 27: settlement, agriculture (cultivation trenches), burials. TEA 28: settlement (specialised?), agriculture (cultivation trenches), burials. TEA 31: agriculture.	TEA 31: 1 burial & 1 pit (trenching).	TEA 29: enclosure.	TEA 26: well. TEA 27: 19th century building foundations. TEA 29: track.
Conington	TEA 32/3: pits	TEA 32/3: ring ditches, agriculture.	TEA 32/3: settlement, agriculture (E-LIA).	TEA 32/3: settlement periphery (specialised?), agriculture (cultivation trenches), burials, kiln.	TEA 32/3: settlement - large (E-M).	–	–
Bar Hill	–	–	TEA 34: agriculture TEA 37/8: settlement, agriculture (M-LIA). TEA 41: settlement (M-LIA). TEA 46: settlement, agriculture (M-LIA).	TEA 37/8: settlement, agriculture, burials (cemetery). TEA 41: settlement, burial. TEA 46: settlement.	–	–	TEA 37/8: 20th century building foundations.

A wider project landscape zone has also been identified, shown on Figure 2.10. This covers an area of approximately 50km (E-W) by 40km (N-S), from Sandy in the south to Ramsey in the north, and Kimbolton in the west to Ely in the east. This will be used by the project team as the primary area from which to draw comparative material and sites. Any particularly relevant sites from further afield (eg Stonea Grange) will also be considered in the wider landscape analysis.

2 REVISED RESEARCH QUESTIONS

The following section outlines the revised research questions for the project. These are revisions of the original research aims and objectives outlined in the WSIs (CH2M Hill 2016a-k), and those outlined at the end of Volume 1 of this Post-Excavation Assessment.

These research questions consider the results of all parts of the assessment process (the stratigraphic assessment, finds and environmental assessments). They are also written with reference to the regional research agenda (Medlycott 2011), and the revisions of this which are being undertaken currently (the draft copies of the various period-based revisions are referenced throughout). The academic panel (see Project team below) have also provided input to the compilation of these research questions, commenting on draft copies.

The revised research questions are structured chronologically (Early Prehistory, Iron Age, Roman, and Post-Roman), plus an additional section on 'Landscape'. These questions will drive the focus of the analysis, as is outlined in later sections (see 'Method Statement', 'Project Outputs').

2.1 EARLY PREHISTORY

The archaeology of the A14 begins in the Palaeolithic, while there is evidence for early human activity in the Mesolithic scattered throughout the scheme. The prehistoric archaeology of the A14 mirrors wider regional and national trends with scant earlier evidence, the rise of monuments and the later dominance of settlement features. Neolithic and early Bronze Age activity is principally composed of impressive ceremonial complexes with multi-period monuments and burial traditions. This is juxtaposed against the wealth of settlement evidence from the middle Bronze Age onwards with numerous landscape-scale features. The scale and complexity of the archaeology was expected given the results of numerous impressive development-led investigations across the region. In recent years, development-led projects, most notably the work of the Cambridge Archaeological Unit (CAU), have made a significant contribution to our understanding of the prehistory of the east region. The publication of the investigations at Barleycroft Farm/Over (CAU) displays the potential of projects to untangle the complex prehistoric remains (Evans et al 2016). Published reports, synoptic research publications and the regional research framework consistently highlight **landscape** as a key research theme.

The value of linear schemes like the A14 is that they provide a spatial and chronological slice through the landscape. The location of the A14 scheme on the edge of the Fens and cutting across the River Great Ouse is an ideal setting for exploring prehistoric activity across a dynamic landscape. A key research strength of the A14 scheme is the ability to explore long term trends in landscape development and exploitation. The spread of Mesolithic activity offers the potential to explore topographic and environmental preference. Neolithic monuments clearly continued to be the focus of burial activity in the Bronze Age and were respected by settlement into the Saxon period. Increased identification and chronological distinction between Bronze Age features will allow for the development of settled landscapes to be traced into the Iron Age. The theme of landscape encompasses spatial and chronological concerns focused upon placing sites in their landscape context and exploring the continued use of specific locations throughout prehistory. The wealth of prehistoric archaeology in the area ensures that the research questions posed are both site-specific and contribute to wider research themes. This is particularly important as the potential of the prehistoric dataset is most fully realized when incorporated into wider regional and national narratives.

Along the route of the A14 improvement scheme prehistoric archaeology, dating from the Mesolithic to the Bronze Age was identified to varying degrees within the majority of TEAs. The evidence ranges from complex arrays of features to solely residual material. The distribution of evidence is not uniform with Neolithic activity concentrated in the western portion of the scheme principally on the gravel terraces. Multi-period ceremonial complexes with sequences of cremation burials were identified in TEAs 16 and 28. The most complete middle Bronze Age landscape was identified in TEA 32/33 with further potential Bronze Age features in TEAs 10 and 15. The key sites will form the focus of analytical research offering the greatest potential to address the revised research themes. Quantification of residual material from across the scheme will also be key to addressing the revised research questions for the earlier periods.

Revised research themes

The revised research themes outlined here are clearly interconnected and focused upon the theme of landscape as a means of exploring exploitation, interaction and development. Specific questions are posed alongside the means that may be used to address them at the analysis phase, and a list of the relevant TEAs (those most relevant set in bold).

'Persistent places' in the Mesolithic and Neolithic

A major research strength of the A14 project is that it enables human activity to be explored through a sample of a varied landscape. Research across the region highlights the differential or preferential occupation of specific topographic and environmental contexts throughout prehistory (see Billington 2016 and Evans et al 2016). At a national level, the identification of 'persistent places' in the Mesolithic has become a key research trend (Barton et al 1995; Evans et al 2016; Billington 2016), and there are sites in the Cambridgeshire area which clearly show Mesolithic to Bronze Age activity (eg New Road, Melbourn; Ladd 2014). The worked flint assemblage from the A14 provides tantalizing clues as to the nature of Mesolithic activity across the scheme. Mesolithic flint-working, in the form of microliths, was evident at TEAs 7, 10, 12 and 16 with probable flint working identified across the scheme. Further technological and scheme-wide spatial analysis of the worked flint assemblage can provide interpretations of phasing and activity. The scheme traverses a landscape with numerous locations ideal for identifying Mesolithic activity. Significant Mesolithic lithic scatters have been recorded associated with river valleys and terrace gravels across the region (Billington 2016, 330). This may reflect the importance of such locations in structuring movement across the landscape and providing access to a diversity of resources (ibid). Complimentary lithic and environmental analysis at TEA19, where flints were recovered from a buried soil, has the potential to indicate local vegetation history and the impact of human

activity. The understanding of the distribution of Mesolithic sites along the route of the A14 improvement scheme is limited by the difficulties in untangling the earlier Neolithic worked flints from the Mesolithic material.

The lack of Neolithic structures in southern England is understood as evidence of a more mobile way of life. As highlighted in the regional research framework, the diversity of evidence for Neolithic settlement needs be considered including; lithic scatters, stray finds, tree-throws, ephemeral spreads and pits. Neolithic settlement evidence from the A14 is confined to largely residual assemblages interpreted as resulting from repeated low intensity, or at least low impact, activity. Further analysis of the stone tool assemblage may provide some evidence of Neolithic activities associated with hunting and potentially clearance, as identified at TEA5. Quantifying and understanding the distribution of Neolithic activity across the A14 scheme may enable us to explore the nature of Neolithic activity and the affordances of different geologies, soils and topographic settings. In doing so, interrogating the absences in the data is crucial to determine absence of evidence or representative evidence of absence (following Campana 2017). The collation of the palaeoenvironmental data, including from ceremonial contexts, combined with the further analysis of the geoarchaeological evidence from TEAs 12 and 19, will allow for the environmental context to be established. The extent of cereal cultivation in the Neolithic has been hotly debated (see Stevens and Fuller 2012; Bishop 2015). The robust sampling strategy of the A14 gives confidence in the results for the limited evidence of cereal cultivation and the continued gathering of hazelnuts. The results mirror those from equally well-sampled sites at Barleycroft Farm/Over (Evans et al 2016), Trumpington (Evans et al 2018), and Biddenham Loop (Luke 2016). Placing Neolithic activity in its broader environmental and landscape context is essential when interpreting lifeways which are likely to have been highly mobile and potentially seasonally motivated.

Pits and tree throws are increasingly being recognized as a valuable source of information on prehistoric settlement, with some interpretational caveats. Tree throws excavated during the A14 improvement works often yielded worked flints suggesting prehistoric phases of clearance (TEAs 5, 7 & 16). Pits provide the greatest potential for exploring non-funerary Neolithic activity on the A14. Large unenclosed pit dominated sites are a distinctive feature of the earlier Neolithic of East Anglia. The major sites include; Hurst Fen in Suffolk (Clark et al 1960), Broome Heath and Spong Hill in Norfolk (Wainwright 1972, Healy 1988), Barleycroft Paddocks and North Fen in Cambridgeshire (Evans and Knight 1997, Tabor et al 2016) and Kilverstone in Norfolk (Garrow et al 2005). The detailed artefactual and stratigraphic analysis at Kilverstone indicated the deposition of mixed material potentially seasonally in pit clusters (Garrow et al 2005: 155). Similarly, the further artefactual, environmental and stratigraphic analysis of the pits found along the route of the A14 improvement scheme, most notably in TEA32/33, has the potential to illuminate temporal and spatial aspects of pit digging and associated practice. Comparative analysis of pits across periods, such as conducted at North Fen (Tabor et al 2016), may indicate changing activities and land use.

In southern Britain, pit clusters have become the primary source of evidence for Neolithic and early Bronze Age settlement. At Godwin Ridge, Cambridgeshire, comparative analysis of the number of pits and their contents indicate shifting scales of occupation (Evans et al 2016, 201). The single early Neolithic pit and the paucity of surrounding features were interpreted as reflecting a short-lived camp (ibid). Grooved Ware associated activity on the ridge is more extensive but still comparatively light when considered in relation to contemporary sites such as Over, Cambridgeshire (ibid). The volumetric analysis of the artefact assemblages from across the A14 combined with further interpretation of the pits can contribute to the debate surrounding the intensity of occupation from the Neolithic into the early Bronze Age.

Research Questions:

- What evidence is there for the transition between the Mesolithic and Neolithic and can we identify change or continuity in technology, activity and settlement?
  - Further analysis of the worked flint assemblage to differentiate between Mesolithic and Neolithic toolkits.
  - Analysis of the distribution of Mesolithic flints across the scheme, including residual finds from later contexts, to build a potential pattern of land use which can be compared to other datasets from the region.
  - Key TEAs: 19, 32/33
  - Relevant TEAs: 2–4, 7, 10, 12, 16
  - Residual Material TEAs: 5, 8, 11, 14, 29, 31, 34, 37/38, 41, 46 (M/NEO/BA)
- Can we determine the nature of Neolithic settlement in the area? Is there evidence for the utilization of specific landscape settings and resources?
  - Collation of the disparate evidence for Neolithic settlement from across the scheme to identify the distribution of activity and relate this to landscape/environmental contexts.
  - Analysis of the ceramic and lithic assemblages to identify specific 'toolkits' and infer associated activity.
  - Collation of the environmental evidence from Neolithic contexts and further pollen analysis to reconstruct the vegetation cover.
  - Incorporation of the results of the A14 with larger datasets to explore Neolithic activity in dynamic fenland and riverine contexts.
  - Key TEAs: 12, 19, 32/33
  - Relevant TEAs 2–4, 7, 10, 15

- What is the evidence for the temporality and spatial organization of pit deposition? Are specific locations being used and what it is the relationship between pits, settlement and monuments?
    - Further analysis of the ceramics, lithics and stratigraphy of the pits in TEA 10 and TEA 32/33.
    - Volumetric analysis of the artefact assemblage to quantity prehistoric presence in specific areas.
    - **Key TEA: 7, 10, 15, 32/33**
    - **Relevant TEAs: Isolated pits across the scheme.**

Monuments as lasting landmarks

Along the Ouse, spatial continuity has been suggested for the development of monumental complexes throughout the Neolithic and Bronze Age (Malim 2000, 81). Further investigation of the relationship between funerary monuments, landscapes and associated features was raised as a key research goal within the East Anglia Research Framework. The henges and barrows along the route of the A14 add to the growing corpus of excavated examples with the potential to explore the importance of specific locations. These 'highly structured spaces' arguably acted as anchor points within a changing landscape where people would gather for a variety of activities including depositing material and burying their dead (Brück 2000; 2019). The incorporation of the results of the A14 with other 'big data' projects can contribute to producing a landscape-scale understanding of the distribution of monuments and their relationship to other features. This includes linear pit alignments, with those uncovered on the A14 seeming to respect or relate to the barrows and other monumental features. Pit alignments often represent the first evidence for the greater division of space in the early first millennium BC. They are comparatively rare in Cambridgeshire (examples include Meadow Lane, St Ives, Barleycroft Farm and Bourne Bridge, Pampisford) with earlier excavations indicating they form a key element of monumental complexes (Malim 2000). The pit alignments across the A14, in TEAs 13, 15 and 16, appear to relate to earlier henges and barrows.

In recent years, there has been increased recognition of the complex development of ceremonial centres and the sheer diversity of monuments in the region (eg the Godmanchester 'sun temple'). A henge with opposing entrances and no internal features was uncovered in TEA2. Charcoal from the fill of a pit truncating the northern terminal of the eastern entrance was radiocarbon dated to the early Bronze Age, 1901–1695 cal BC (95.4% probability; SUERC-75283), and charcoal from the fill of the henge ditch was radiocarbon dated more closely to 1871–1659 cal BC. Two cremations were identified 1.5m to the south-east with a further two cremations located c 17m to the north-west. The cremations are undated but may be associated with the henge. A range of ring ditch monuments have been excavated across the region, not all clearly associated with burial (Cooper 2018, 9). Very few large circular unbroken ditched monuments, such as the monument uncovered in TEA12, have been explored in detail. The interpretation of the large circular monument uncovered in TEA12, currently uncomfortably termed a ring ditch monument, is problematic. In the broadest sense, the monument has been described as a henge, yet no entranceways could be identified. On this basis, the alternative interpretation of a disc-barrow has also been suggested although no central burial was identified. The classification of such sites is more than a semantic issue as at its core lies a distinction between a monument for the living or a monument for the dead. The basal fills of the ditch were radiocarbon dated to 1955–1774 cal BC (95.4% probability; SUERC-85541). A burial, radiocarbon dated to 1546–1415 cal BC (95.4% probability; SUERC-75948), was cut into the ditch along with the deposition of a copper alloy dagger, indicating the continued significance of the site. The detailed excavation of the A14 sites has provided the opportunity to explore the construction, function, maintenance and continued significance of such a site. The further analysis of the samples taken from the monument have the potential to allow for reconstruction of the local environment. A further unusual monument, interpreted on site to be prehistoric, was uncovered in TEA20 composed of a ring of grouped postholes. The groups are composed of five post-holes arranged similarly to the five on a dice or domino. Thus far, no parallels have been identified for this timber monument and the feature has been radiocarbon dated to the middle Bronze Age, 1754–1632 cal BC (95.4% probability; SUERC-85548). The further investigation of this monument will be key to ascertaining its significance.

The remodeling of earlier monuments in the Bronze Age is a common theme across the region with examples from Barnack (Donaldson et al 1977) and Barleycroft/Over, Cambridgeshire (Evans et al 2016; Yates 2007: 95). Studies of Bronze Age barrows have consistently highlighted multiple phases of construction, longevity of activity and the close relationship to earlier monuments (Brück 2000; Garwood 2007). The complexities of barrow construction and development are exemplified by the barrow in TEA16. Excavation revealed initial clearance in the Neolithic followed by the construction of a ditched monument (16.1) with no central burial or associated funerary features. The overlying early Bronze Age barrow (16.2) was formed of an inner mound, into which 68 cremation burials and 15 pits were cut, and an outer bank. The 68 cremation burials, which relate to various phases of activity, were split into six groups:

- Three urned cremations (Cremation Burials 16.1) in the southeastern quadrant;
- Seven unurned cremations (Cremation Burials 16.2) in the southwestern quadrant;
- One cremation (Cremation Burial 16.3), possibly contained within an organic container, in the northwestern quadrant;
- Two cremations (Cremation Burials 16.4) in the northwestern quadrant. These may indicate later, potentially Iron Age, funerary activity at the site;
- Two urned cremations (cremation Burials 16.5) in the southeastern quadrant and;
- 53 cremations (Cremation Burials 16.6), both urned and unurned, were assigned to the middle Bronze Age. A longbone fragment from one of the cremations was radiocarbon dated to 1495–1310 cal BC (95.4% probability; SUERC-85543).

In addition to the cremations, a series of modifications, including the recutting of the outer ditch, occurred in the middle Bronze Age. The outer bank continued to be infilled in the Iron Age with worked flint, pottery and animal bone recovered from the upper fills. Iron Age pottery was also recovered from the ditch fill of another ring-ditch barrow in TEA10. In TEA16, two later pit alignments, provisionally dated to the late Bronze Age, appear to respect the barrow. Saxon settlement within prehistoric monumental landscapes, such as at TEAs 10, 12 & 16, is also a feature at other sites such as Eynesbury (Ellis 2004). The barrow, burials, and associated activity in TEAs 10 and 16 provide the opportunity to conduct detailed chronological analysis to investigate the longevity and tempo of activity at the site. This is particularly pertinent as the undated burials may relate to later Bronze Age activity, with the role of barrows in late Bronze Age burial practices until recently arguably being under-represented (Cooper 2016a; 2016b). Three undated ring ditches identified in TEA32 have been tentatively identified as small barrows, potentially associated with ditches and a Bronze Age enclosure. The transition between the earlier and later Bronze Age is often understood in terms of the decline of monuments and a rise in settlement architecture and land division (Bruck 2000). The continuing role of barrows as focal points for later activity is repeatedly suggested by the evidence from the A14 and warrants further analysis. The level of detail obtained from the program of radiocarbon dating and Bayesian modelling undertaken at Over Quarry, Cambridgeshire, provides an example of the potential of this approach (Evans et al 2016).

Research Questions:

- Can patterning be identified in the distribution of monuments across the A14? Does the distribution compare to that witnessed at other sites in Cambridgeshire and along the River Great Ouse?
    - Spatial (GIS) analysis of the distribution of monuments along the A14 with a focus on their relationship to specific topographic, environmental and geological contexts.
    - Further analysis of geoarchaeological samples to determine the contemporary environmental conditions and the role this may have played in their positioning (eg pollen from the auger sample taken from TEA 19).
    - Landscape-scale analysis incorporating data from other projects.
    - **Key TEAs: 2-4, 12, 19**
- Can we determine the function and continued significance of ring ditched monuments such as that in TEA12?
    - Radiocarbon dating of a sequence through ditch fills to ascertain a date of construction and confirm the early Bronze Age activity.
    - Comparative analysis with other excavated sites and those identified through aerial photography
    - Exploring parallels for the timber monument in TEA20.
    - **Key TEAs: 2, 12, 20**
- How did barrows develop and what is their relationship to earlier and later features? Did the barrows continue to provide a focal point in later periods?
    - Radiocarbon dating programme and potentially Bayesian modelling of the barrow and cremations in TEA16 to ascertain:
    - The timespan for the construction, use, and disuse of the earlier monument;
    - Date of the construction of the barrow;
    - Date the sequence of cremation burials to give an indication of the timespan of the barrow use;
    - Date of the later modifications; and
    - Date of the Iron Age activity at the barrow.
    - **Key TEAs: 10, 16**
- How did the cremation burials in TEA2 relate to the henge?
    - Radiocarbon dating of the henge and the cremation burials.
    - **Key TEA: 2**

Dividing and enclosing the landscape

The transition from the earlier to later Bronze Age witnessed a refocusing of the landscape with settlement architecture and enclosures coming to the fore and replacing monumental structures (Brück 2000; 2019). The dramatic shift in the archaeological visibility of settlement during this period informs our interpretation of agricultural practice, mobility, and the longevity of activity. In recent years a greater number of middle Bronze Age settlements, both open and enclosed, have been discovered, such as North West Cambridge (Evans 2015) and Mitchell Hill Common (Tabor 2017). A diverse range of settlements have been uncovered, some with associated roundhouses and others comprising pits, enclosures, wells and working areas (Evans et al 2016). Paleoenvironmental analysis of waterlogged samples from TEA32/33 adds further detail with the range of species indicating the presence of hedgerows. Our understanding of Bronze Age settlement across the A14 is limited by the lack of chronological resolution. Potential Bronze Age settlement activity has been identified across the scheme in the form of ditches and field boundaries, pits and postholes.

The Bronze Age landscape uncovered in TEA32/33 comprised two enclosures, a field system, pits, wells, possible ring ditch barrows, and two cattle burials. A similar, but smaller, Bronze Age landscape, with greater stratigraphic clarity, was uncovered in TEA15. The relationship between earlier and later settlement across the A14 is a key concern. It has been proposed that there is a shift in monumentality from circular monuments in the early Bronze Age to the construction of landscape-scale features in the middle to later Bronze Age (Brück 2000). The archaeology of TEA32/33 provides an opportunity to track and test this development. At TEA32/33 there is the possibility that the ring-ditch monuments relate to the early Bronze Age phase of activity. These may be examples of ring

bank monuments typically associated with burial mounds, but not always funerary (Needham pers comm). In terms of the transition from the middle to later Bronze Age, it has been suggested that some 'middle Bronze Age field systems went out of use in the late Bronze Age' (Yates 2007, 112). However, supposed Bronze Age ditches across the A14 show evidence for multiple phases of re-cutting, raising questions about the longevity and maintenance of the boundaries into the late Bronze Age. The possible long-term use of boundaries was also identified at Biddenham Loop in Bedfordshire (Luke 2008). Boundaries potentially dating to the Bronze Age have also been identified in TEA7A and in TEA12. Further dating of potential Bronze Age features across the A14 is necessary to explore the development of land use in the Bronze Age. This should be complemented by further paleoenvironmental work to establish changes in environmental conditions and agricultural practices. The sequential analysis of waterlogged samples from wells and water holes in TEA10 and TEA32/33 offers the opportunity to track these changes at a local scale.

Research into late Bronze Age Cambridgeshire has been revolutionized by the excavations of the Must Farm pile-dwelling. Elsewhere, excavations have revealed settlement across a variety of landscape settings including away from the river valleys and Fen edges, such as at Striplands Farm, Longstanton (Evans and Patten 2011). The lack of confidently identified late Bronze Age features from the A14 is in part due to difficulties in distinguishing between later Bronze Age and early Iron Age features and artefacts types. The transition from the Bronze Age to the Iron Age, once assumed to be one of continuity, witnessed transformations in material culture and subtler changes in settlement form and ceramics. Potential Bronze Age features have been uncovered across the scheme with settlement features being identified in TEA15 (linear features, pits and posthole structures). This site provides the best opportunity to explore the settlement shift from the Bronze Age into the Iron Age. In the Iron Age, there is the suggestion that settlement and off-site activities were conducted at specific topographic locations, creating a pattern of land use. It is currently unclear if any patterning can be identified in the Bronze Age remains and how this relates to developments in the Iron Age. Further stratigraphic, dating and palaeoenvironmental analysis will help us to identify and understand transitions in settlement pattern, agricultural activity, and landscape use.

Research Questions:

- What is the relationship between Bronze Age features and earlier monuments? Can a shift in the scale of monumentality be observed?
    - Radiocarbon dating of features to improve chronological resolution, particularly in TEA32/33.
    - Analysis of the distribution of Bronze Age features across the A14 in comparison to earlier periods.
    - Critical comment on this theme incorporating comparisons with other site and excavations in the regions.
    - **Key TEAs: 32/33, 15, 16, 2–4, 12, 20. Undated features in TEA10.**
- Can the totality of the evidence inform an understanding of the spatial distribution of Bronze Age activity? Can this aid in informing an interpretation of Bronze Age settlement including on and off-site activities?
    - Spatial analysis of the distribution of Bronze Age features at a landscape scale including extraction pits, water holes, disparate element and residual material.
    - Compare this to the evidence from burials and the comparative distribution of settlement and cemeteries.
    - Collation of the plant and animal remains to build a picture of agricultural strategies and compare this to other sites, perhaps in differing landscape contexts.
    - **Relevant TEAs: 2–4, 7, 10, 11, 12, 13, 15, 16, 19, 20, 27, 28, 31, 32/33**
- Can the evidence for middle and later Bronze Age settlement and land division be differentiated from the extensive Iron Age archaeology? If so, what does this tell us about the development of land-use?
    - A number of features in the assessment phases were grouped as 'undated' some may have greater potential once phasing is established.
    - Palaeoenvironmental analysis of waterlogged samples to track environmental and agricultural change.
    - Archaeobotanical and isotopic analysis of plant remains in order to reconstruct changing farming strategies.
    - Comparative spatial analysis at a landscape scale of Bronze Age and Iron Age settlement.
    - **Key TEAs: 10, 15, 32/33 Pit Alignments: 13, 15, 16**

Burial landscapes

Isolated burials and cemeteries were excavated along the route of the A14 improvement scheme. The analysis of both inhumation and cremation burials raises questions relating to burial traditions, longevity of significance of monuments/areas, and the tempo of use at monuments. The integration of the results of the analysis into broader research themes can also aid in addressing questions of demography, diet and life ways. The greatest number of burials, both inhumations and cremations, date from the Bronze Age. Our understanding of the role of early Bronze Age burial monuments in later landscapes has been greatly enhanced by the work of Cooper (2016a, 2016b & forthcoming). In the early Bronze Age, the evidence includes Barrow burials, Beaker burials, Collard Urn-associated cremation burials within pit clusters, and disarticulated human fragments in a variety of contexts. Cremation cemeteries appear to be the dominant burial rite in the middle Bronze Age, yet several excavations indicate greater diversity than previously recognized.

Middle Bronze Age inhumation burials have been found at Field End Witchford, Cambridgeshire, with fragments and formal burials occurring in ditches and waterholes across the region. While Bronze Age burials dominate the evidence from the A14, a small number of Neolithic burials were uncovered in association with monuments.

The relationship between cremations and the establishment of ceremonial complexes has been explored in terms of the establishment of place. It has been suggested that Neolithic cremations, along with henges, represent some of the earliest activity on sites, establishing their significance (Noble et al 2017). The continued significance of such locations can be seen on the A14 with cremations potentially associated with the henge in TEA2–4 and the deposition of an adult burial into the ditch of the ring-ditch monument in TEA12. The date for the construction of the ring-ditched monument should be confirmed with further dating. This would refine the relationship between the monument and the burial (dated to 1546–1415calBC at 90.3% probability; SUERC-75948). A copper alloy dagger was also found on the eastern side of the monument potentially related to the burial. A further infant burial was located on the west side of the monument, at a similar stratigraphic position to the adult. Establishing the date of the cremations, inhumations, and the development of the monument will be key to understanding this relationship. The chronological relationship between these inhumations and the six cremations in the northwestern corner of TEA12 is unclear. The analysis of the ceramic assemblage indicates they date from the early Bronze Age and appear to be located in reference to the monument. The cremations are centred around a natural hollow, thought to potentially be a barrow during the excavations, with ephemeral evidence for cremation pyres. The relationship between Bronze Age cremation cemeteries, earlier and contemporary monuments is a key research concern. The relationship between cremation cemeteries, and burials generally, to settlement should also be considered.

The cremation cemetery associated with the barrow in TEA16 provides the opportunity to use the three-dimensional stratigraphy of the site to construct a detailed chronological model. The radiocarbon dating and Bayesian modelling conducted at the site of Over, Cambridgeshire, provides an example of the potential of such an approach (Garrow et al 2014). Extensive dating combined with osteoarchaeological analysis enabled spatial and chronological patterns to be determined in the distribution of inhumation and cremation burials (ibid, 230). Importantly, a more nuanced picture of the development from inhumations to cremations was established with the inhumations being later than some of the cremations (ibid, 226). This is significant for our understanding of the relationship between inhumation and cremation burials excavated along the route of the A14 improvement scheme. Cremation and inhumation burials occur within the same area in TEAs 10, 27 and 28. The large cremation cemetery in TEA28 provides some stratigraphic resolution indicating that one of the inhumation burials was cut by two later Bronze Age cremations. The inhumation burial is undated with the radiocarbon dating of a nearby grave producing a date of 1401–1231 cal BC (95.5% probability; SUERC-76922). The relationship between the inhumations and the remaining 50 cremations is unclear, with only three cremations being urned. As at Over, there is the potential that some of the cremations may pre-date the inhumations. The further analysis of the A14 burials and the implementation of an adaptive radiocarbon dating strategy will allow for the potential of the A14 burials to be explored. Questions concerning the relationship between cremation and inhumation burials and the chronological and spatial development of sites will take priority. This approach would be most effectively applied to the barrow and cremations in TEA16 and the cemetery in TEA28.

The analysis of the inhumations across the A14 has the potential to illuminate aspects of life and death in the Bronze Age. Inhumations dating to the Bronze Age have been found in TEA 5, 7, 10, 27, 28 and 31. The burials consist of:

- a single crouched burial containing a copper-alloy hairpin in TEA5;
- a single poorly preserved crouched burial in TEA7a;
- two inhumations of an adult and an infant in the ditch of the monument in TEA12;
- a crouched burial in a tree throw in TEA15;
- two inhumations including a crouched burial with bronze awl in TEA27; and
- four inhumations in TEA28.

Identifying and exploring the shift from the more mobile Neolithic and early Bronze Age to the sedentary Bronze Age is a classic theme in prehistoric archaeology. The transition from the early to later Bronze Age, in terms of visibility of structures, informs a narrative focused on cereal cultivation and pastoralism. These developments may have resulted in changes in diet and lifestyle - the exploration of which can inform a more nuanced understanding of Bronze Age life. Isotopic analysis combined with further osteoarchaeological work on the inhumations across the A14 would aid in exploring changes in diet and lifestyle across the period. To aid in the selection of samples, radiocarbon dating is needed to confirm the date of some of the inhumations. The osteological analysis of diet compliments the further palaeoenvironmental and palynological work also proposed to provide a fuller picture of changing lifeways in the Bronze Age.

Evidence for mobility in the Bronze Age has once again come to the fore of archaeological narratives with the publication of several high-profile articles (Olalde et al 2018). The inhumation burials provide the opportunity to conduct isotopic analysis of strontium (87Sr/86Sr) to explore mobility, potentially using the ratios in teeth and bone to indicate mobility throughout the individual's life. Recent studies have shown that fully calcined bone may also reliably preserve original strontium isotope (87Sr/86Sr) indicating that isotopic analysis for mobility may be possible on the cremated remains (Snoeck et al 2018). Further investigation would be needed to explore the viability of this approach and the application of aDNA (following Olalde et al 2018). The long-distance trade of artefacts and copper in the Bronze Age is well researched with complementary metallurgical provenance studies of the artefacts also aided in establishing mobility.

Research Questions:

- What is the chronological and spatial relationship between inhumations and cremation burials in the Bronze Age?
  - Radiocarbon dating of cremation and inhumation burials across the scheme, thought to be Bronze Age or 'undated'.
  - Spatial analysis of the burials at a site and landscape level.
  - Key TEAs: 28, 12
  - Relevant TEAs: 2-4, 7a, 10, 11, 15.
- How does the distribution of burials relate to settlement and can changes in settlement pattern be linked to changes in diet?
  - Isotopic analysis of inhumation burials - Carbon and Nitrogen- and plant and animal remains.
  - Cross-period question, perhaps best explored from Bronze Age to Iron Age.
  - Relevant TEAs: 28, 12, 15, 7.
- What is the evidence for burial practices and the demography of the middle Bronze Age period?
  - Radiocarbon dating of burials.
  - Further osteological analysis of cremations and inhumations interpreted to be Bronze Age in date.
  - Relevant TEAs: all with burial and cremation evidence.
- Can we identify the longevity and tempo of use of barrows and cremation cemeteries?
  - Radiocarbon dating and Bayesian modelling following the methodology used at Over, Cambridgeshire (Garrow et al 2014).
  - Key TEAs: 16 and 28
- What is the continued significance of barrows in the middle and late Bronze Age?
  - Radiocarbon dating of cremation burials.
  - Role of barrows in the Late Bronze Age (Cooper 2016a).
  - Key TEA: 16
- Is there any evidence for migration into the region during the Bronze Age?
  - Isotopic analysis – Sulphur, Strontium and Oxygen – of radiocarbon-dated inhumations.
  - Artefactual analysis of grave goods.
  - Key TEA: 12, 27, 28.

2.2 IRON AGE

Iron Age activity was identified across the A14 and included rural farmsteads with field systems, wells and watering holes, evidence of metalworking, ritual activity and burials. The overall scale and complexity of the Iron Age remains presents both challenges and opportunities to enhance our understanding of Iron Age society. The scale of investigation combined with geological and topographic variations across the scheme provides the opportunity to explore questions of connectivity and development. The initial assessment of the Iron Age farmsteads indicates connectivity; shifting the appropriate scale of analysis from site to landscape. Preliminary landscape-scale analysis indicates that individual farmsteads potentially form part of larger units, joined by boundaries, with settlement and agricultural activity occurring at specific topographic locations. Due to this, the results of the excavations should be combined with other archaeological work and with the National Mapping Programme cropmark survey data to explore connectivity and wider landscape elements.

The development of settlement systems through the Iron Age is a key research concern which the palimpsest sites of the A14 can make a significant contribution. Evidence of Iron Age activity was found in 26 TEAs with:

- most displayed limited evidence of early Iron Age activity;
- 15 had evidence of both middle Iron Age and late Iron Age activity;
- six had middle Iron Age but no late Iron Age activity;
- two TEAs had late Iron Age but no middle Iron Age activity

Currently, the lack of chronological resolution and the stratigraphic complexity of many TEAs has resulted in features across the A14 being collectively discussed as 'Iron Age'. Chronological resolution across the Iron Age is a key research concern which is not restricted to the A14. Artefact typologies are routinely relied upon to distinguish between phases of activity but do not provide the resolution needed to discuss the tempo of change (Champion et al 2001). Radiocarbon dating combined with Bayesian modelling has been shown to be effective in exploring issues of chronology at Iron Age settlement sites (Hamilton 2010; Hamilton et al 2015). Occupation phases, including those which fall on the Hallstatt plateau, can be successfully dated and modelled where stratigraphic controls exist and rigorous sampling strategies applied (Hamilton et al 2015, 647). During the analysis phase, the application of robust dating strategies along with the detailed reassessment of the stratigraphic phasing will aid in addressing many of the revised research questions.

Revised research themes

The revised research themes focus firstly on transition and tempo of change to explore chronological issues surrounding societal development through the Iron Age. The scale of the A14 excavations

allows for questions of settlement development and dynamics to be explored, linked to questions about Iron Age communities and agricultural activities. Finally, themes of death and burial will be explored along with the potential of the skeletal remains for further analysis. Specific research questions are posed following exploration of each theme. These are not intended to be exhaustive, instead, they highlight the key questions which are believed to require the most focused resources. A list of the most relevant TEAs accompanies each question.

Transition and tempo of change

The transition from the Bronze Age into the Iron Age is traditionally seen as involving the advent of new materials, societal transformation and the intensification of agriculture. While earlier Iron Age (c 800–350 BC) activity was identified in three TEAs (27, 29 and 32/33), with residual material identified in twelve TEAs, features and finds securely dated to the earliest Iron Age (c 800–600/550 BC) are largely missing, with the possible exception of the pit from TEA 27 (see below). The 'invisibility' of the earliest Iron Age is a problem encountered across Britain (Haselgrove and Pope 2007). Across the A14, the limited identification of the latest Bronze Age and earliest Iron Age is perhaps principally due to difficulties in distinguishing features and finds of this period. Further analysis of the ceramic assemblages may help to distinguish between the wares of the Post-Deverel Rimbury (PDR) ceramic tradition. The assemblage in TEA 29 holds the greatest potential for further work. The paucity of late Bronze Age and earliest Iron Age activity may also reflect a real absence with permanent settlement only occurring in the middle Iron Age. Undoubtedly work needs to continue to untangle the late Bronze Age from the early Iron Age features across the A14 and investigate local change and continuity.

Across the region small early Iron Age settlements comprising pits, postholes, wells and four-post structures have been excavated at Peterborough Gas Compressor Station Site, Glinton (Rees 2016); Cromwell Community College, Chatteris (Atkins and Percival 2014); the Milton landfill and Park & Rides Sites, Cambridge (Philips 2015); Newmarket Road, Cambridge (Tabor 2016a) and Clay Farm, Cambridge (Phillips and Mortimer 2012) (see Brudenell forthcoming for full list). The early Iron Age features across the A14 broadly follow this pattern with settlement evidence comprising of:

- four four-post structures and pits excavated in TEA 27;
- six wells with preserved wooden linings and wooden artefacts in TEA 29 radiocarbon dated to 753–408 cal BC (95.4% probability; SUERC-75285) and 727–384 cal BC (95.4% probability; SUERC-75286); and;
- two isolated four post-structures and pits in TEA 32/33.

The evidence does not indicate sustained or intensive settlement raising the question; what does the background early Iron Age activity equate to? How does this compare with the later Bronze age evidence and developments into the middle Iron Age?

Transition is often framed in terms of transformation and change, yet at a site or local scale this is often far more nuanced. The artefact assemblage from the A14 indicates the continued use of Bronze Age toolkits into the early Iron Age. The wooden artefacts and furnishings from the wells in TEA 29 and TEA 32/33 display atypical Iron Age tools marks with the small and rounded marks more typical of those made by later Bronze Age toolkits. Further analysis of the tools would make a valuable contribution to understanding the continued use of bronze at a time when new larger iron tools were being introduced. This is of particular interest given the discovery of potentially the earliest 'metalworking' tools in the country (though the function of these remains uncertain). A spatula and a poker were discovered in a pit in TEA 27 from which animal bone was radiocarbon dated to 792–523 cal BC at (95.4% probability; SUERC-75288). Further analysis of the artefactual assemblages and the incorporation of the findings into wider narratives may aid in developing a more nuanced picture of the Bronze Age-Iron Age transition.

Many middle Iron Age settlement sites have been excavated in the region including; Colne Fen (Evans 2013), Summersfield (Patten 2012), Northstowe (Collins 2017), Bearscroft Farm (Patten 2016) and Clay Farm (Philips and Mortimer 2012), Cambridgeshire. The early to middle Iron Age transition has received comparatively little attention despite involving the breakdown of regional pottery styles, the emergence of a more restricted repertoire (dominated by plain sandy wares or scored shelly ware), the formation of pit-dominated settlement, and the construction of hillforts (Brudenell forthcoming). In term of settlement, there are indications of continuity in the development of sites with pit clusters. Middle Iron Age activity has been identified across the A14 with middle Iron Age features often overlying, or sited in relation to, earlier activity as at TEAs 12, 16, 27, 28, 29 and 32/33. In these locations we can detect hints of how earlier features may have structured the placement, form and structure of middle Iron Age activity. However, there are some other sites where activity appears to begin in the middle Iron Age. Can we view settlement in these areas as 'pioneering' resulting from different forms of architectural configuration? Establishing the differences, perhaps topographically, environmentally and archaeologically, between TEAs with evidence for seemingly continuous activity and those which begin in the middle Iron Age may aid in understanding continuity and change in settlement dynamics. Only two TEAs have evidence of late Iron Age features without middle Iron Age activity. These sites appear to represent continual development with boundaries being re-modelled as opposed to being replaced. The extent of continuity and change from the middle to later Iron Age is a key research concern with shifts in material culture and settlement patterns.

The transition between the Iron Age and the Roman period is discussed in detail within the Roman Revised Research Aims. In summary, the nature of the transition is varied with evidence for replacement, transformation and continuity. Detailed dating is required in order to assess any perceived continuity of activity within sites with both Iron Age and Roman occupation. The ceramic assemblage from TEA 7a indicates intensive activity from the late Iron Age through to the late Roman period. In TEA 10 Roman enclosures were added to the existing Iron Age ditch in the southern portion of the site, whereas to the north the Roman enclosure cut through the Iron Age features. In TEA 5, the reorganization of the landscape in the Roman period can be related to changes in agricultural practice underway locally from the late Iron Age onwards. TEA14 along with TEAs 5, 7A, 10A, 12, 20, and 38 can help enhance our understanding

of the Iron Age-Roman transition. The pattern of development uncovered across the A14 provides a valuable resource for discussing the development of farmsteads, landscape organization and utilization of resources in the Iron Age.

Research Questions:

- Can the Bronze Age-Iron Age transition be identified? If so, can aspects of continuity and change be identified and explored to contribute to our understanding of societal development?
    - Further analysis of the ceramic assemblages complimented by radiocarbon dating of transitional contexts in TEA 29.
    - Detailed stratigraphic consideration of TEAs with evidence for earliest Iron Age activity.
    - Further analysis of tool marks and tool kits.
    - Relevant TEAs: 27, 29 and 32/33
- What does the background early Iron Age activity equate to? How does this compare with the later Bronze age evidence and developments into the middle Iron Age?
    - Further assessment of TEAs with evidence for EIA and MIA activity compared to those without EIA activity.
    - Detailed stratigraphic consideration of TEAs with evidence for earlier Iron Age activity.
    - Relevant TEAs: 27, 29, 32/33
- Can we identify the tempo of technological and settlement development through the Iron Age?
    - Radiographic analysis of the ceramic assemblage from TEA 7B/C, as it is the largest from the A14, to identify technological shifts through the mid- to late Iron Age.
    - Radiocarbon dating and subsequent possible Bayesian modelling of features in TEAs with good stratigraphic information to establish the tempo of change.
    - A case study TEA could be selected (TEA 32/3?), ideally with features dating from the Bronze Age to Roman period and perhaps later, to optimize the value of this.
    - Relevant TEAs: 7B/C, 32/3

Settlement development and dynamics

Iron Age sites range in size and complexity from individual enclosures to complex agglomerations of boundaries, trackways, roundhouses and associated features. The development of enclosures throughout the Iron Age appears to have been piecemeal with those in TEAs 10a and 7C showing an expansion and development of boundaries. Despite the piecemeal development, the organization of features in TEA 10 indicates the systematic use of space and the zoning of activities. The expansion to the east during the late Iron Age involved the creation of zones for the living and the dead. In TEA 13 'working areas' with ovens were defined by curving gullies. Further evidence for the zoning of activities may be indicated by the artefactual, archaeobotanical and zooarchaeological assemblages. Such intra-site analysis of distribution patterns is advocated in regional research frameworks (Medlycott 2011, 31; Brudenell forthcoming). This may also allow for questions of community and status to be addressed (see the following research theme). The value of spatial analysis of archaeobotanical remains was highlighted at Langdale Hale (Ballantyne 2013). Systematic zoning of activities can also be seen at larger sites more typically described as rural farmsteads composed of small groupings of enclosures linked by linear boundaries as in TEAs 28, 20 and 32/33.

The collective analysis of the Iron Age evidence from the A14 allows for a model of farmstead development and organization to be proposed. The distribution of features in TEA 5 provides a case study for the organization of Iron Age settlement proposed by Brudenell. The initial discontinuous boundary ditch (5.1) was overlain by a series of four contiguous enclosures which contained eight roundhouses and associated features. A rectilinear network of ditches forming plots respected the earlier enclosures and was aligned to respect the nearby watercourse. The enclosures and features associated with the settlement of the site were located on low-lying ground neighbouring a watercourse (Areas 1 & 2). On higher ground, the boundary ditch continued with small enclosures located along its length. The enclosures adjoined a larger boundary which curved to create a central enclosure with additional pens and waterholes away from the main settlement (Area 3). It has been proposed that the floodplain may have provided summer pasture with winter pasture within the large enclosure. Stock enclosures were concentrated on high ground away from the settlement. A similar pattern to this can also be seen in the distribution of features across TEAs 28, 20, 7B and C. The locating of settlement on the lower ground may have necessitated the construction of raised structures, the identification of which is potentially problematic. The consideration of a greater variety of structures and settlement locations may in part explain the relatively few roundhouses excavated, with only 62 dating from the later Iron Age (c 350 BC to AD 50).

In contrast to the enclosed settlements, there are 'scattered' roundhouses and traces of activity indicating dispersed open settlements, eg TEA 7c. The intensity of activity at these sites is suggestive of individual families or groups frequently moving around. In exploring this, the chronology of such sites is important as some may relate to earlier and later phases of activity. In TEA 14 the late Iron Age activity is focused in two areas each containing two roundhouses, three posthole structures and pit clusters. In TEA 21 early to middle Iron Age pottery was recovered from a single unenclosed roundhouse. The roundhouse was defined by a drip gully which displayed evidence of regular maintenance with 18 pits and postholes in the interior which did not form a structurally coherent pattern. In addition to open settlements, there are discrete enclosures such as the 'banjo' enclosure in TEA 28. The circular enclosure was remodeled with the addition of parallel ditches to form a necked entrance. A series of pits were uncovered within the enclosure but no neighbouring structures, it is possible that this enclosure relates to the area of Iron Age activity to the south. The range of settlement scale across the A14 may reflect chronological,

functional or societal differences. Further work to refine the dates of features (see previous research theme) would allow for the comparative assessment within A14 sites and with those further afield, including defensive sites such as Wandlebury, War Ditches and Arbury which seem absent from the A14 landscape.

Environment undoubtedly played a key role in settlement dynamics across the Iron Age, and landscape reconstruction may well be key to understanding the distribution of features. Waterlogged deposits from wells and waterholes provide the greatest opportunities for palaeoenvironmental analysis (TEAs 10, 14, 29, 27). The waterlogged conditions have resulted in the exceptional preservation of palaeoenvironmental data including plant epidermis, stem and root fragments, leaf fragments and seeds. The reconstruction of the surrounding vegetation, including woodland, will provide evidence for variation and development in environmental conditions, availability of resources, and agricultural strategies. Complimenting this with the collation of the evidence from the assessment phase for earlier deposits, or further analysis of samples with high potential (indicated in the environmental report), will enable landscape development to be tracked through transitory periods.

Research Questions:

- What evidence is there for the zoning of activities within Iron Age settlements? Does this change over time?
    - Distributional analysis of features, artefacts and ecofacts.
    - Further dating of features – see introductory discussion.
    - Landscape-scale analysis of Iron Age features incorporating evidence from sites across the region and NMP.
    - **Relevant TEAs: 5, 7, 10, 13, 20, 28, 32/33**
- How did topography and environment influence the organization of settlement?
    - GIS analysis incorporating topography, geology and environmental data in addition to hydrological, aspect and alignment modelling.
    - Further environmental and palynological analysis of waterlogged deposits from across the scheme.
    - Landscape-scale analysis of Iron Age features incorporating evidence from sites across the region and NMP.
    - **Relevant TEAs: All with Iron Age activity – Landscape Scale**
- Can we ascertain the range of settlement scales in the Iron Age and begin to understand the societal implications of this?
    - Linked to previous research aim calling for further stratigraphic analysis complemented by systematic dating of features collectively understood as 'Iron Age'.
    - Distributional analysis of artefact types.
    - **Relevant TEAs: 5, 7, 10, 13, 14, 20, 21, 28, 32/33**

Iron Age communities and connections

The identification of linked settlements and farmsteads raises questions about how we envisage Iron Age communities. Instead of focusing on settlement hierarchy, the Regional Research Frameworks call for greater questing of settlement patterns as the basis for familial and community organization (Medlycott 2011; Brudenell forthcoming). The large aggregated settlements of the Iron Age may have been occupied by multiple household groups. The linking of smaller farmsteads such as at TEA 5 changes the scale at which we understand such sites operating. The physical linking of sites through boundaries and trackways should be explored further through aerial photography. This would aid in ascertaining the full extent of such features as many extend beyond the excavated areas. Multiple trackways were identified in TEA10 emanating from a group of enclosures. Trackways were also identified in TEA 20 and 27 with extensive linear boundaries identified across the scheme. The inter and intra-site analysis of settlement forms, artefact and ecofactual assemblages will be key to exploring Iron Age communities and cultural connections.

The ceramic assemblages indicate potentially differing external influences across the scheme and community or individual status. The assemblage from TEA 5 contained a higher number of middle-to-late Iron Age scored ware vessels, potentially indicating local influence from Peterborough and Northamptonshire (Elsdon 1992). Evidence of latest Iron Age continental connections was found in TEA 7A in the form of a small quantity terra nigra and one possible Campanian amphora, though these could have been deposited post-conquest. At some sites, it appears that the community had access to wheel made ceramics and networks across the region. This is further highlighted by the small late Iron Age coin assemblage which indicates connections to the Essex region. The finds assemblages from many sites are predominately domestic in nature including combs, spindle whorls and finds associated with textile work.

Aside from pottery, the range of other Iron Age finds is fairly limited, though does include a number of late Iron Age brooch types, the differing proportions of which between sites may indicate varying identities, settlement hierarchies and regional trends. Nauheim and Drahtfibel/filiform brooches dating to the late 2nd or 1st century BC have been identified on several sites (TEAs 11, 27, 28, 38 and 41) with the increase in closely dateable metalwork allowing for late Iron Age and early Roman features to be distinguished. The relationship between these and the pottery will also be important for understanding the pottery chronologies. Further analysis of the finds may allow for interactions and changes in land ownership and management during the Iron Age-Roman transition to be explored. The presence of Iron Age weapons or possible weapons at settlement sites in TEAs 5, 7 and 38 is unusual. The sword from TEA 5 was for inter-personal violence as an elite weapon. The other weapons may have been used for hunting, consisting of iron and possible bone spearheads and a fired clay sling shot. The assemblages from the A14 should be compared to

other sites across the region to determine the frequency of such finds in settlement contexts.

Research Questions:

- What evidence is there for difference in community or individual status? Can this be related to differences in settlement form and organization?
  - Further artefactual analysis of metalwork including brooches and weapons.
  - Further analysis of the provenance of ceramic types and the implication of the presence of such wares.
  - Distributional analysis of artefact types related to feature type and settlement form.
  - Relevant TEAs: 5, 7, 11, 27, 28, 38, 41
- What is the nature of the evidence for regional and continental connection? Can we begin to see influence or connections prior to the arrival of the Romans?
  - See above.
  - Relevant TEAs: 5, 7, 11, 27, 28, 38, 41
- In envisaging Iron Age communities, can we ascertain the most appropriate scale of analysis?
  - Combining both micro and macro scale analysis - incorporating data from household or site-based analysis and landscape scale assessments.

Agricultural activity

The middle Iron Age is seen as a period of 'increased diversification and specialization of settlement types' (Allen 2000: 10). The environmental samples from the A14 revealed a typical Iron Age cereal assemblage which included: spelt wheat (*Triticum spelta*), emmer wheat (*Triticum dicoccum*) barley (*Hordeum sp.*) oat (*Avena sp.*), free-threshing wheat (*Triticum aestivum*) and cereal indeterminate. Further analysis of selected samples has the potential to illuminate aspects of agricultural practice and environmental conditions. Specifically, the comparative assessment of assemblages from sites occupying different topographic locations and sites which extend across low and high ground will be important. This may indicate some degree of specialization and zoning of activities, as suggested for TEA 5. The assemblage from TEA 5 contained very little chaff suggesting that cereal processing occurred elsewhere with the surrounding environment dominated by open grassland and subject to periods of flooding. Periods of waterlogging may have led to the creation of raised storage areas - notably the four-post structures which are typically argued to have functioned as grain stores (Van der Veen 2007, 116; Perpetua Jones 2007, 368). Charred plant remains were recovered from the posthole fills of twelve four-post structures identified in TEA 29. The assemblage included barley, bread wheat and peas, as well as low levels of nutshells, suggesting the storage of a variety of food.

A roughly built kiln constructed of red fired clay with a wide flue and signs of repair was uncovered in TEA 10 with the pottery indicating this is potentially late Iron Age in date. The fills of certain features across the scheme provide the opportunity to explore cereal cultivation and processing. Waterlogged flax seeds and capsule fragments from an Iron Age pit in TEA 10 indicates flax processing on site. A further three narrow elongated pits were excavated and interpreted to be simple corn dryers in TEA 10. Despite typically being a Roman-period phenomenon, the pottery analysis suggests they date to the later Iron Age. Alternatively, elongated pits excavated in Cambridge by Allen Archaeology were interpreted to be waste pits with raking channels (Brennan 2019). Evidence of porridge-like or beer brewing residues was found in samples from TEA 28, this is potentially a very early example of brewing in Britain. Significant quantities of domestic waste were recovered from waterlogged contexts in deeper Iron Age ditches. The well-preserved assemblages in these deposits offer the opportunity to explore economic activity and environmental conditions on sites.

The Iron Age animal bone assemblage comprised mainly cattle, sheep/goat, pig and horse, with very small groups of dog and only a small component of fish, game and wild species. Butchery marks were noted on a number of the bones with the archaeological remains indicating the presence of large roasting pits (TEAs 5, 10A & B). As with the environmental samples, the strength of the assemblage is to analyze inter- and intra-site patterns, thus identifying local habitats and livestock management strategies. In TEA 10 the droveway has been interpreted as allowing the movement of livestock into wetter areas. Cattle husbandry may have been the focus in low-lying areas as cattle are less susceptible to infections resulting from wet ground. The presence of horse in the faunal assemblage may also indicate the selective use of pasture as horses required higher quality grazing. The layout of a number of the TEAs is more suggestive of a focus on pastoral farming (TEA 7C, 10, 12 & 13).

Evidence of metalworking and woodworking were uncovered across the A14 in wells, pits and stakeholes. This should be considered in greater detail to explore the development of Iron Age toolkits. TEA 29 produced the largest assemblage of waterlogged worked wood, including a Y crotch notched log ladder, alder planks and a possible castle restraint, a straight notched log ladder of maple, and a stirring paddle. A notched log ladder and stake were also recovered from a well in TEA 33. Potential evidence of Iron Age smithing which needs to explored further was identified in TEAs 21, 29 & 30/31. Indications of iron working were noted in TEA 27, but its relationship to the Iron Age metalworking tools is uncertain. The spatula and poker discovered in TEA 27 are nationally significant as potentially the earliest 'metalworking' tools in the country. The further analysis of the distribution of metalworking activities across the A14 has the potential to address questions regarding the zoning of activities, variation between sites in terms of hierarchy and access to resources, and the development metalworking. The assemblage should be compared to those from other sites in the region such as Colne Fen (Evans 2013) and Haddenham (Evans and Hodder 2006).

Research Questions:

- Can we ascertain the agricultural focus of settlements and the impact of this upon the surrounding environment?
  - Collective and comparative analysis of the environmental samples and the faunal assemblages.
  - **Relevant TEAs: 5, 10, 28 and others with Iron Age remain.**
- What livestock and cereal management strategies were adopted and how does this relate to the proposed settlement organization?
  - Collective and comparative analysis of the environmental samples and the faunal assemblages.
  - Further identification and understanding of the extent of features such as drove and trackways.
  - Link with previous research themes.
  - **Relevant TEAs: 5, 7C, 10, 12, 13, 28 and others with Iron Age remain.**
- Can we identify Iron Age woodworking toolkits? Does the distribution of metalworking finds and debris indicate zoning of activity, differences in settlement hierarchy or access to resources?
  - Further analysis of the tool marks on the waterlogged wooden artefacts.
  - Volumetric and distributional analysis of the metalworking debris from Iron Age contexts.
  - Further analysis of the metalworking tools.
  - Comparative analysis of metalworking assemblages from across the region.
  - **Relevant TEAs: 21, 27, 29, 30/31 and 32/33**

Death and ritual

The paucity of evidence for burial practice in the Iron Age is well established, and this is reflected in the results from the A14 excavations. Nevertheless, there are scatters of inhumations, cremations and disarticulated fragments from a range of Iron Age contexts. Burials thought to be of Iron Age date have been recovered from three TEAs (7B/C, 10, 28), with further burials (especially cremations) requiring additional chronological refinement. A 'zone for the dead' was defined in TEA10, with small pits containing burnt residue and evidence of human remains interpreted as informal burial deposits or pyre related features. Two further couched inhumation burials (yet to be dated) were uncovered within the area along with at least three 'grave' pits with no human remains. The skeleton of a young horse was recovered from one of the 'empty' graves. Disarticulated human remains were found in ditches in TEA10 and in a drip gully in TEA46, and further phasing of features will no doubt reveal additional spreads of disarticulated human bone of Iron Age date. Excarnation has been explored as a burial rite in the Iron Age, as a means of explaining the disarticulated nature of many of the remains (Madgwick 2008). It is likely that most of the evidence for Iron Age burial in the A14 sites belongs to the late Iron Age, though some middle Iron Age burials have been discerned through radiocarbon dating in TEA 28. These comprise a tightly bound inhumation (28.5) located within a pit 14m east of a roundhouse and an inhumation burial (28.6) within another roundhouse. A cremation burial from this site, thought to be Roman in date, provided a radiocarbon date of 352–95 cal BC (95%; SUERC 85558; GU50643). An adult inhumation burial in TEA 41 was radiocarbon dated to the late Iron Age/early Roman period (39 cal BC–76 cal AD; 95%; SUERC-85559; GU50643).

A small number of the burials contained grave goods including:

- Late Iron Age cremation burial with a Colchester brooch at TEA7.
- A possible Iron Age cremation with iron nails also from TEA7.
- A possible Iron Age inhumation with an undated iron shear fragment from TEA10.

Further analysis of the grave goods, the contexts of burial, and chronology may help to indicate social status, changes in burial practices and aid in inter-site comparisons. Further osteological and isotopic analysis of the inhumations would aid in exploring the diet and lifestyle of the Iron Age communities of the A14.

One of the most remarkable artefacts from the A14 is the comb made from human skull bone from TEA 38. The find is of national importance and could reveal insights into Iron Age ancestor worship and involvement in activities such as head hunting (Armit 2012). ZooMS will be used to confirm the identification of the bone as human along with radiocarbon and contextual dating to explore the time-depth of curation. The curation and modification of human bone is well known from the British Iron Age, with a number of examples from the Cambridgeshire region (eg Evans 2003; Shapland and Armit 2012; Armit 2012; Medlycott 2011, 31). Complimentary analysis should be undertaken on combs of similar form carved from unidentified skeletal material.

There is some evidence for Iron Age ritual practice on the A14 with the suggestion that the unusual double ditched enclosure 32.5 is a shrine, associated with a central pit, though this identification is somewhat speculative. Late Iron Age shrine enclosures have been identified elsewhere in southern Britain, with a particular prevalence in the east of England (Smith et al 2018, 128). The recovery of Iron Age pottery from the Bronze Age barrow in TEA 16 also suggests the continued importance of earlier prehistoric features. In TEA 13 the later Iron Age settlement is focused around an earlier pit alignment.

Overall, the remain across the A14 are consistent with our present understanding of the complexities of Iron Age ritual and mortuary behaviour. The apparent low status ordinary nature of the settlements perhaps offers an opportunity to explore everyday ritual practice, including evidence for any structured deposits. Save the unusual comb, the A14 lacks any spectacular or evocative Iron Age burials found elsewhere.

Research Questions:

- Does diet and lifestyle change through the Iron Age?
  - Further osteological and isotopic analysis of the inhumations.
  - Isotopic analysis of plant and animal remains to enable dietary modeling.
  - Complimentary radiocarbon dating of inhumations suspected to date from the Iron Age.
  - **Relevant TEAS: 7, 10, 28.**
- Can change burial practice be identified through the Iron Age?
  - Radiocarbon dating of burials (cremations and inhumations) suspected to date from the Iron Age.
  - **Relevant TEAs: 7, 10, 14, 28, 29.**
- Is the bone comb truly a unique find or is this part of a wider tradition?
  - ZooMS analysis of the bone comb and other combs of similar form carved from unidentified bone.
  - Research into Iron Age ancestor worship, headhunting, tokens and heirlooms to explore the significance of the find.
  - **Relevant TEA: 38**

2.3 ROMAN

The archaeology of the A14 scheme is dominated by settlements and landscape features dating to the Roman period, although many of these were simply continuing developments from the later Iron Age. The overall scale and complexity of Roman archaeology was largely expected given the volume of previous discoveries in this region, including large numbers of rural settlements located in the vicinity of two walled 'small towns' and a network of major roads. For this reason, the area between Cambridge and Godmanchester was chosen as a case study area (similar to this project's wider study area) in the University of Reading's Roman Rural Settlement Project, which incorporated excavation data relating to 72 farmsteads, four villas, nine nucleated settlements, five pottery production sites, two religious sites and twelve field systems (Smith et al 2016, 193). Furthermore, since this study was published, archaeological investigations have been advanced on important Iron Age and Roman sites in the vicinity of the A14, most notably the work by the Cambridge Archaeological Unit at Northstowe and North-West Cambridge, and work by Albion Archaeology at Fenstanton.

The wealth of late Iron Age and Roman archaeology in this area ensures that we can move away from fairly generic, broad regional research topics, such as the extent or not of 'Romanization' (Medlycott 2011, 47), and instead develop new more specific research questions focusing upon individual sites, landscapes and 'sub-regions' (cf Evans 2018, 2). The A14 results are particularly suitable for such an approach, due to the scale of the investigations (with Roman archaeology encountered across c 190ha of excavations) and the topographic and geological variety over the c 28km route (see Vol. 1 Figures 3 and 4). With this in mind, the relationships between wider 'settlement territories' (ie not just domestic cores but their associated trackways, fields and other agricultural features) should be explored in more depth, combining the A14 results with other archaeological work and with National Mapping Programme cropmark survey data, which have revealed significant landscape elements of likely Iron Age and Roman date (Knight et al 2018).

Fourteen 'settlement territories' of Roman date have been identified in all landscape blocks across the A14 scheme, though three of these have little evidence for any associated agricultural features (Table 2.003). Elements of a Roman agricultural landscape were also found at TEA 31, but this was not obviously associated with any one settlement (though the probable Roman roadside settlement excavated by Albion is located just c 400m to the north). In addition, there were four excavated areas (TEAs 7b/c, 10B East, 13 and 29) where there were later Iron Age settlements but which, on present evidence, had no indications of activity into the Roman period.

TABLE 2.3 Settlements 'territories' of Roman date excavated along the A14 road scheme

SETTLEMENT (TEA NO)	LANDSCAPE BLOCK	SETTLEMENT TYPE	ASSOCIATED LANDSCAPE FEATURES?	PROVISIONAL DATING*	IA ACTIVITY?	SAXON ACTIVITY?
2-4	Alconbury	Nucleated(?)	n	1st-4th (LR)	y	y
5	Alconbury	Complex farm	y	1st-4th (LR)	y	n
7a/10a	Brampton West	Unclassified farm	n	1st-4th	y	n
10a/b	Brampton West	Complex farm	y	1st-4th (E-MR)	y	y
11/12	Brampton West	Complex farm	y	1st-4th (M-LR)	n	y
14/15	West of Ouse	Complex farm	y	1st-2nd/3rd	y	y
16	West of Ouse	Unclassified farm	y	1st-4th (E-MR)	y	y
19-21	Great River Ouse	Villa?	y	1st-4th (LR)	y	n
26-7	Fenstanton Gravels	Unclassified farm	y	1st-4th	y	n
28	Fenstanton Gravels	Complex farm (specialized?)	y	1st-4th	y	n
32/3	Conington	Complex farm (specialized?)	y	1st-4th	y	y
37/8	Bar Hill	Complex farm (close to Northstowe)	y	1st-4th (E-MR)	y	n
41	Bar Hill	Complex farm	n	1st	y	n
46	Bar Hill	Enclosed Farm	y	2nd-4th (MR)	y	n

**() = apparent chronological emphasis based on pottery dates: ER=Early Roman (1st–2nd C); MR=Middle Roman (2nd–3rd C); LR=Late Roman (3–4 C)*

These settlement territories will form the main comparative units for analytical research during the next phase of work, and, as will be discussed, have considerable potential to address the revised research themes.

Revised research themes

The revised research themes outlined here are all obviously inter-connected and focus upon economic and social functionality, sub-regionality, and processes of change. They are framed as a series of specific questions alongside the means that may be used to address them at the analysis phase, and a list of the relevant TEAs (those most relevant in bold).

Transitions

One of the major research strengths of the A14 project is that it encompasses human activity covering a large time frame, cutting across traditional period boundaries (Bronze Age, Iron Age, Roman, Saxon etc). It is clear from the current data and from previous research in this region (eg Smith et al 2016, 195–201; Rippon 2018) that settlement and landscape features of the Roman period were generally part of longer-term developments, particularly from the middle Iron Age. Nevertheless, there is evidence for an increase in settlement numbers over this time, particularly during the late Iron Age, and also for significant settlement 'disruption' (either abandonment or transformation) during the early Roman period (1st-early 2nd century AD) (Smith et al. 2016, 196–7). Our chronological understanding of the A14 sites is currently hampered by limited dating information, but it would seem that all but one (TEA 11/12) of the 'Roman' sites had some form of preceding Iron Age activity, though this was not always in the form of settlement and it was not necessarily continuous. In at least 50% of cases there appears little or no evidence for direct continuity of activity, with, for example, the apparent abandonment of late Iron Age settlement at TEA 7b/c and new settlement established at nearby TEA 7a, possibly associated with conquest-period military activity. In the other 50% of cases there are far more convincing indications of longer continuous occupation sequences, albeit still with considerable transformation (eg TEA 20). Refining these chronological sequences and determining the nature of any settlement disruption are key to understanding the considerable changes occurring both before and post-Roman conquest in this region. Such analysis, combined with finds analysis and comparisons with other well-dated sites, may enable us to determine if there were broad horizons of change (perhaps relating to the Conquest or Boudiccan revolt) or if this was more piecemeal.

At the other 'end' of the Roman period there is far less direct evidence for continuity of activity into the 5th and 6th centuries, though 'Saxon' features were identified on six Roman settlements and ceramic assemblages including considerable proportions of 'very late Roman' pottery were found on five sites. Very few showed any indications of spatial continuity (one exception being Conington, where early Saxon boundaries re-cut Roman ditches), though Rippon's recent study (2018) of the East of England has argued for considerable correspondence of geographic social entities from the late Iron Age right through to the 5th and 6th centuries. Given the usual difficulties of dating features from this early 'post-Roman' period, it is clear that many further radiocarbon dates will be required to determine the extent of any continuity.

The theme of Transitions not only relates to traditional period boundaries as just outlined, but also evidence for significant regional changes within the Roman period, which are arguably just as important. For example, the Cambridge-Godmanchester case study within the Roman Rural Settlement Project revealed significant, albeit still piecemeal, changes during the mid-to late Roman period, with some settlements going out of use and others developing more elaborate 'villa' architecture (Smith et al. 2016, 201). Together with evidence for changes in farming practices in the region (Allen et al 2017, 147), it suggests consolidation of landholdings into larger agricultural estates during the mid to late Roman period (see Integrated economies below). In terms of the A14 sites, the apparent replacement of the farmstead with a field system during the mid/late Roman period on TEA 14/15, and the later Roman transformation of the settlement at TEA 20 into a probable villa, could be examples of such wider landscape change. There is also provisional evidence to suggest a more marked late Roman decline in activity within those settlements towards Cambridge than those further to the west nearer Godmanchester. Further chronological resolution within archaeological sequences of other A14 sites should help to understand such changes. Ultimately, the issue of synchronicity of phases of change is a key research opportunity given the common approach to the sites excavated in this project.

Research Questions:

- What evidence is there for actual continuity of activity as opposed to continuity of place between the later Iron Age and the Roman period?
  - Further chronological resolution of site sequences through ceramic and other finds dating and radiocarbon dating.
  - **Relevant TEAs:** 2–4, 7a, **10, 14/15,** 16, 20, 27, **28, 32/3, 37–8,** 41
- Can we identify the impact of the Roman conquest and/or the Boudiccan revolt on settlements or landscapes?
  - Further radiocarbon dating targeting 'conquest horizon' deposits.
  - Further analysis of 'end dates' of settlements that appear to be abandoned at 'end' of late Iron Age or early in the Roman period.
  - Identification and analysis of early Roman military 'signatures' in small finds, coins and pottery assemblages.
  - Further analysis of possible early Roman military features (eg rectangular enclosure on TEA 7a).
  - **Relevant TEAs: 7a, 7b/c** (LIA only), 13, 10, 14/15, 16, 20, **28,** 32/3, 37–8, **41**

- What evidence is there for the re-use (or not) of earlier monuments and boundaries?
    - Examination of spatial relationships between Roman and earlier features and comparative analysis of results from across scheme and further afield.
- Are there any broad horizons of change within the Roman sites that may signify more widespread developments within the Roman period (eg settlement layout transformation, architectural transformation, economic shift, abandonment, establishment, fieldscape transformation etc)
    - More refined dating of stratigraphic sequences through finds and radiocarbon dating.
    - Detailed comparative analysis of sequences of development between A14 sites and with other local well dated contemporary sites.
    - **Relevant TEAs: 7a, 14/15,** 16, **20,** 28, 32/3, 37/8, 46
- Where is the 5th century? Is there any evidence to suggest continuity of occupation into the 'post-Roman' period?
    - Further radiocarbon dating and ceramic analysis targeting latest 'Roman' horizons (eg 'dark earth' on TEA 5) and earliest 'Saxon' horizons. This should present an opportunity to recognize what the 5th century Roman looks like from a ceramic perspective.
    - **Relevant TEAs:** 2–4, **5, 7a, 11/12, 20,** 28, **32/3**

Intra-'site' analysis (how places functioned)

For all our increased knowledge of Roman rural settlements, there are still relatively few excavations that have revealed 'complete' settlement plans, and fewer still that include significant areas of the surrounding landscape. For example, of the 135 excavated farmsteads from Cambridgeshire included in the Roman Rural Settlement Project, 64% could not be classified within the project morphology typology (cf Smith et al. 2016, 17) due to insufficient areas exposed, and of those that could very few would be regarded as in any way 'complete'. This is significant in terms of our ability to understand how 'sites' functioned, with the term 'site' in this instance taken as meaning the actively managed economic and social spaces of a particular place of occupation, as far as these can be determined (see Interconnectivity below).

The scale of the A14 excavations has ensured that six Roman period settlements appear to have been revealed in a largely complete state with coherent plans, including the settlement core and surrounding landscape features. The nature and size of these sites differ markedly, from the generally smaller and simpler farmsteads on the predominantly clay lands to the east at TEAs 46, 41 and 37/8, to generally much larger complex farmsteads on the river gravels to the west at TEAs 10, 11/12 and 28. The sites provide a significant opportunity to examine differential use of space using a wide suite of evidence (eg spatial analysis of site morphology, pottery, small finds, environmental material, metallugical debris etc) to help create models of settlement functionality, including areas for domestic occupation (perhaps of differing social status), craftworking, livestock management and various stages of cereal cultivation, processing, middening and storage. In this regard, examination of apparently 'open' areas surrounding settlement cores is also important, these perhaps being used for grazing and/or hay meadows. The recent work of Macphail et al (2016) has demonstrated the use of micromorphological, broader geoarchaeological and environmental archaeology signatures to gain an understanding of settlement activities and land use, with areas divided into 'Within Settlement', 'Peripheral to Settlement' and 'The Settlement's Wider Landscape'. Such an approach may be appropriate within the complete settlements noted above, especially when integrated with other specialist fields (faunal remains, ceramics, other finds, metallurgical debris etc).

The visibility of architectural remains from Roman rural sites in the wider region is relatively poor, being found on about 60% of excavated settlements (Smith et al. 2016, 45). The A14 results largely confirm this, with buildings found on 9 of the 14 settlements (64%). These are almost entirely of timber post and occasionally beam slot construction, although of differing scales and undoubtedly functions. They include what appear to be aisled buildings on TEAs 20, 28 and 32/2 – those sites that seem to be of higher or specialized status. A fragment of possible iron window grille and architectural stonework from TEA 20 indicates the presence of higher status masonry buildings (Shaffrey Vol 2) while the exceptionally large quantities of nails from this site may also contrast with most other A14 sites, possibly suggesting quite different architectural traditions (Marshall Vol. 2). Further geophysical survey on the unexcavated part of this site may well reveal the main villa buildings, and thus enable the status and spatial organization of this important settlement to be better understood. The only other settlement with stonework indicating masonry buildings is the ashlar from TEA 32/3, where there are tentative suggestions of a mansio/mutatio, though on very little evidence. The absence of definite evidence for buildings on five settlements (including TEA 10 which spread over a large area) is not that unusual on Roman rural sites and may be because they lay elsewhere in unexcavated areas, the remains were truncated, or else no earthfast construction methods were used, buildings perhaps being raised up on ground sill beams to avoid the low-lying damp environments (cf. Evans 2013, ** for Colne Fen). The distribution of structural and domestic material will therefore be of great importance for determining the location of primary occupation areas within settlements.

Research Questions:

- How far is it possible to determine different functional areas (Domestic zones, industrial zones, water management, livestock zones, agricultural cultivation and processing zones, funerary zones, middening etc) within settlement territories, and how these may be inter-related?
    - Artefact distribution analysis (pottery, other finds divided into functional category) including volumetric analysis to show the relative density within different features and different areas of the site.

- Ecofact distribution analysis (animal and plant remains, noting evidence for concentrations of butchery waste, remains from different stages of crop-processing etc).

- Soil micromorphological analysis of relevant sites to provide insights into the anthropogenic and landscape history of the site.

- Using the above analyses, combined with a detailed understanding of the morphology and phasing of the 'complete' sites (including associated buildings, wells/ waterholes, enclosures, fields, trackways, 'open' spaces etc), to produce models of 'site' functionality, with comparisons between suitable sites across the scheme.

- **Relevant TEAs:** 5, **10, 11/12,** 20, **28, 37/8, 41,** 46

- Can we detect any social variability within settlements?

  - Spatial analysis of structural features (including geophysical survey of area of probable villa buildings at TEA 20), relevant finds categories (ceramics, personal and household objects etc), environmental evidence (eg imported foods) and burials that may reflect socio-economic variations in the inhabitants of the settlement.

  - **Relevant TEAs: 20, 28,** 10, 14/15

- Can variations in building form and scale within sites be related to differing activities?

  - Analysis of scale, form and construction methods of buildings, alongside indications of function from material and environmental evidence. Intra-site comparison of building 'types'.

  - **Relevant TEAs:** 14/15, **20, 28,** 32/3

Interconnectivity

The settlements discussed above did not exist in isolation, but were functioning within wider socio-economic networks. In recent years a number of 'big data' research projects have focused upon a broad understanding of these networks, operating at varying scales and using different datasets to explore social and economic relationships between settlements and across regions (eg Perring and Pitts 2013; Rippon et al 2015; Smith et al 2016; Allen et al 2017; Green et al 2017; Rippon 2018). Together, they act as a broad framework against which other datasets can now be tested. As noted above, the Roman Rural Settlement Project is directly relevant for the A14 project in terms of its Cambridge to Godmanchester case study, which involved comparative analysis of a range of settlements and other landscape features to draw out certain chronological and economic trends (Smith et al 2016).

The A14 data is well suited to explore more intricate patterns of connectivity between the local 'sites' as well as relationships with transport infrastructure (including the major Roman roads such as the Via Devana, which was not located and is assumed to lie directly under the modern A14), wider settlement patterns, and the surrounding physical landscapes (see Landscapes and boundaries). The scale of excavation has revealed not only the large number of Roman period settlements noted above, but also networks of contemporary trackways providing links between them and with different natural and anthropogenic landscape features. The low-lying river valley areas are particularly instructive in this regard, with fairly dense concentrations of settlement, field ditches and trackways. The physical movement between places could be explored not only through wider landscape surveys (including excavation, geophysics and cropmark data incorporated within a GIS), but also through analysis of transport items (admittedly a fairly small assemblage), and of objects found associated with trackways themselves (see Marshall et al Vol 2).

A key question is how 'sites' were inter-related. Initial assessment has revealed clear differences in scale, form and material culture that must relate to different social and economic roles within the larger communities. Furthermore, these roles undoubtedly developed over time, with some settlements possibly having increased influence from the Roman state at certain points (eg TEA 28, which may have become more integrated into state agricultural supply networks; see Integrated economies below), and others undergoing significant change during the later Roman period, in the case of TEA 20 probably developing into a villa estate, possibly as part of wider changes to land management at this time. Levels of interconnectivity between settlements nearby and further afield need to be assessed through the comparative analysis of objects and environmental material and by other scientific methods (eg isotopic analysis of plant and animal remains). In this way we may gain a broader understanding of how resources flowed between different households and communities (eg Lodwick 2018).

Inter-site relationships are likely to have varied across different landscapes, notably in this case between Great Ouse Valley gravels and the relatively higher areas of clayland further to the east (see Landscapes and Boundaries). The riverine landscape revealed at Brampton West, for instance, had a string of settlement foci, 3–400m apart, with intervening landscape features covering considerable distances. The physical and material connections between these should be explored; it is already known, for example, that most were associated with pottery production during the early to mid-Roman period (Sutton et al., this vol) and there was a relatively high concentration of objects connected with transportation (Marshall, this vol), perhaps highlighting connectivity with wider communities (see Integrated economies). Their apparent common economic basis and very close proximity also begs the question did they actually function as a single settlement with dispersed units of occupation, rather than as separate independent farmsteads? If the former, did this change in the later Roman period when pottery production ceased? These sites may also contribute towards questions about land ownership and estates. What mechanisms caused certain settlements to embark on the same kind of enterprise, here making the same kinds of pottery, unless they are responding to the demands of a single owner? Taking this as a hypothesis, there might be other characteristics shared by these settlements which make them collectively distinct from others in the vicinity.

As noted above, the Roman period settlements encountered in the clayland areas to the east towards Cambridge were generally

somewhat simpler morphologically, and more widely spaced apart, with fewer indications of connecting trackways and field ditches. However, the densely occupied Roman landscape at the CAU excavated site at Northstowe, just to the north of the TEA 37/38 settlement at Bar Hill, certainly indicates a significant population in the near vicinity, and understanding the relationships between these groups will be of key importance.

Research Questions:

- How far can we determine levels of interconnectivity between sites?
    - Analysis of settlement's relationships with the Via Devanna, assumed to lie under the modern A14, and also comparison of the settlements and landscapes of the Via Devanna with the Roman Road suspected under the modern A1 in the Ouse valley.
    - Analysis of patterns of trackways and field boundaries apparently linking sites, using plans of TEA excavation areas, alongside plans from other nearby excavations (eg Northstowe and Fenstanton), and data from existing geophysical surveys and cropmarks (within project GIS system).
    - Analysis of items associated with transport and items associated with trackways.
    - Comparative assessment of site morphology and architectural traditions.
    - Comparative analysis of material culture, plant and animal remains between A14 sites using volumetric analysis.
    - Comparative analysis of material culture with wider settlement patterns using broad volumes per ha excavated (utilizing RRSP data and data from more recent excavations in vicinity).
    - Isotopic analysis of plant and animal remains to determine levels of local vs imported resources (see Integrated economies).
    - Using above to model networks of connectivity (including possible land ownership and estates).
    - **Relevant TEAs:** All TEAs but particularly those in Brampton West (TEAs 7a/10a, 10a/b, 11/12) and Fenstanton Gravels (TEAs 26–8) landscape blocks.
- Can we define different social and economic roles between settlements and how these changed over time?
    - Comparative methods as described above, focusing upon aspects of the data that can be used to assess social and economic functions.
    - **Relevant TEAs:** All TEAs but particularly TEAs 20 and 28 for changes over time.

Landscapes and boundaries

The 28km route of the A14 excavations encompassed a variety of different physical landscapes (see vol. 1 Introduction). These undoubtedly had a significant influence on the location, form, function and development of settlement in all periods, while also being key to understanding wider landscape use, including the intensity and form of farming practices and determining routes of access through the land. The former is probably dictated largely by relative soil fertility, while the latter may be dependent on the location of crossing points over water courses (particularly in the river valley areas with many tributary streams) or large bodies of woodland.

Overall it is clear from the A14 and other excavation data that there was considerable divergence in how differing landscapes were settled and utilized. As just stated, much of this is probably down to topographical and geological factors, which are in turn associated with agricultural productivity (see Integrated economies). Using high resolution topographic and geological surveys of the area it should be possible to better understand how different areas were utilized, especially if combined with vegetation land-use models derived primarily from pollen data (see Taylor and Spurr vol 2).

The variations in landscape may have helped create, or at least reinforce, cultural boundaries. This has recently been discussed by Rippon (2018, 12) who has argued for long term territorial identities in the east of England from the Iron Age through to the early medieval period, centred at least partly upon differences in the agricultural productivity of landscapes. Determining any possible cultural boundaries within the A14 dataset, for example between riverine and clayland communities, may be attempted through comparative analysis of the likes of settlement form, development, material culture and architectural expression. In particular, comparisons should be made between Cambridge and Godmanchester's respective hinterlands, and whether they differ from the generic clay countryside as a whole. The longevity of any possible cultural boundaries (and indeed on common cultural continuities, in the use of artefacts like pottery) should be assessed through similar analyses of the prehistoric and post-Roman evidence.

Another important landscape level research focus for the A14 analysis (for all periods) is the study of empty spaces (see Campana 2017 for study of 'emptyscapes' in Italy). The overall quantity of Roman period archaeology encountered across the 28km scheme indicates a fairly intensive utilization of the land at this time, though, as just noted, the concentration of settlement is variable, and there are substantial areas (notably on the higher ground with glacial till to the east of TEA 21) where any activity seems minimal. These areas would repay further examination to determine their nature and role within the wider social and economic landscape.

Research Questions:

- How far did the physical landscape influence patterns of settlement and land use?
    - Produce detailed topographic and geological models of the A14 landscape.

- Produce vegetation land use models as relating to the Roman period (as part of study of long-term landscape changes using primarily pollen data).
- Assess settlement patterns against the landscape models.
- **Relevant TEAs:** All, using pollen data from most suitable sites.

- Is there any evidence for cultural territoriality across the landscapes of the scheme?
  - Comparative analysis of settlements and landscapes as indicated above, related to variations in the physical landscape.
  - Comparative analysis of material culture relating to possible cultural boundaries (eg Iron Age coins, regional pottery types, regional brooch types etc)

- Are there any 'empty' spaces in the landscape and how may these have been used? Is there any evidence that they formed territorial boundaries?
  - Use of existing trial trenching, excavation, cropmark and geophysical data to assess how 'empty' certain areas may have been.
  - Production of vegetation land use model as discussed above.
  - Assessment of how 'empty' areas may have functioned in relation to more actively utilized or managed landscapes.
  - Assessment of evidence for cultural territoriality as above, and how they relate to apparent 'empty' spaces.
  - **Relevant TEAs:** Those with no or minimal Roman archaeology encountered.

Integrated economies

The A14 excavations lie at the eastern end of the Roman Rural Settlement Project's Central Belt region, within the West Anglian Plain landscape zone (Smith et al 2016, 142). This is an area thought to have been part of the main 'bread basket' of Roman Britain, particularly in the mid- to late Roman period, when there is evidence for the maximum expansion of agricultural production, with an emphasis on the cultivation of spelt wheat (Allen et al 2017, 147–54). It was also a region known for economic diversity with a number of farmsteads operating a mixture of agricultural and industrial practices such as iron and/or pottery production.

The huge volume of faunal and archaeobotanical data from the A14 will enable more detailed analysis of agricultural strategies from across a range of settlement types and landscapes, which should provide a more accurate understanding of the variations and intensity of cereal cultivation and pastoral farming. Assessment results of the botanical remains have indicated a definite – and expected – emphasis on glume wheat cultivation (spelt being noted for the most part), though waterlogged remains have revealed a wider range of cultivated plants, including flax, as well as some wild food resources (Walker et al vol 2). More detailed analysis of the archaeobotanical remains should provide important information on the many different stages of arable farming and variations over time and space (cf. Lodwick in Allen et al 2017, 36–80). Millstones have been identified on at least eight settlements pointing to large scale cereal processing (especially on TEAs 20, 28 and 37; Shaffrey vol 2), though the almost complete absence of corndryers (possible simple examples at TEAs 12 and 37) is more difficult to reconcile, given their presence on over 20% of sites in the West Anglian Plain by the late Roman period and particular prevalence on large, complex farmsteads (Allen et al 2017, 151). Corndryers were found on the nearby nucleated settlement at Northstowe and it may have been that different stages of crop processing were carried out at different (though nearby and closely linked) places, as part of a more integrated agricultural system.

Evidence that points towards malting has also been found on a number of settlements (TEAs 7a, 14, 32/3), suggesting that brewing was not an uncommon activity on rural settlements at this time. The archaeobotanical evidence from TEA 7 was associated with Roman pottery kilns (Walker et al Vol 2), and there remains the possibility that these two activities were closely linked (see below).

The animal bone assessment has revealed an almost total dominance of the main domesticates (cattle, sheep and pig), with seemingly little variation across the scheme (Pipe and Ewens vol 2), though more detailed analysis of slaughter patterns, body size, pathologies and butchery practices may well reveal more pronounced distinctions. For example, were some sites receiving larger imported breeds and utilizing more 'Roman' methods of butchery, are there pathological indicators for increased stress levels on animals (especially cattle) etc. In addition, study of field/enclosure size and organization (along with a range of palaeoenvironmental indicators) may provide more information of the intensity of livestock farming, while strontium isotope analysis could help our understanding of animal transportation (cf Minniti et al 2014). An examination of the relation between animal size and isotope evidence would also be of interest for studies of animal mobility (cf. ZoomWest Project: https://zoomwest11.wixsite.com/zoomwest)

Analyses of wider landscape components should also shed light on the organization and development of farming practices. Elements of Roman period field systems were found on thirteen TEAs, most directly associated with settlements. On four sites towards the central part of the scheme (TEAs 21, 26, 27, 32/3) were the very distinctive systems of parallel bedding trenches, only really found in this part of eastern central England and thought to have been used for horticultural crops, though positive evidence remains to be found (Allen et al. 2017). Unfortunately, current assessment of the plant remains from these features on the A14 is still inconclusive. As with most other examples, however, they do appear only to have been in use during the early Roman period, and the scale of their occurrence across the region suggests some degree of official initiative. Larger fields generally appear during the mid- to late Roman period (often replacing bedding trenches), perhaps as part of the more widespread shift to extensive spelt wheat cultivation noted above. The development of the likely villa estate at TEA 20 may also have been part of this later Roman economic shift.

The group of sites on the Fenstanton gravels may also provide important evidence for the organization of farming practices. The extensive settlement at TEA 28 was interpreted on site as an agricultural distribution centre, and although positive evidence is not yet forthcoming, its scale, large number of extensive timber structures (including aisled buildings), and trackways extending out towards smaller farmsteads certainly marks it out as an important focal settlement in the local landscape (though there is also the possible roadside settlement at Fenstanton, just over 1km to the northeast, which was undoubtedly connected to TEA 28 by a trackway). A small group of military objects also hints at some level of official involvement.

Although cereal cultivation and livestock farming were certainly the major economic drivers of the Roman rural sites of the region, there is extensive evidence from the A14 sites for other industry and craftworking. Metallurgical debris suggests that iron smithing was carried out on at least nine settlements, with a possible smithy located at TEA 20 (Cubitt Vol. 2). The organization of metalworking, especially in relation to nearby nucleated centres like Northstowe which has significant evidence for smithing, needs to be further explored. More specialized activities are indicated by the notable assemblage of worked bone and antler from TEA 4, which appears to be furniture making waste (Marshall Vol. 2). Bone/antler working has had very little recent synthesis, though a broad overview indicated the activity is more common on nucleated sites (Allen et al 2017, 216), which has implications for the interpretation of this settlement, which is mostly revealed through geophysical survey.

The most important 'industrial' activity to be revealed by the A14 is pottery production (see Sutton et al. Vol. 2). Over 40 confirmed kilns were revealed at nine different sites, with most of these located across six TEAs (those in Brampton West and West of Ouse Landscape blocks) in a relatively short stretch of river gravels to the west of the River Great Ouse. Near identical greyware pottery was produced on these sites during the later first to 2nd centuries, suggesting very close economic links, perhaps, as suggested above, implying the existence of a single poly-focal community on the gravel terraces, at least during the earlier Roman period. The organization of this industry and its relationship with the agricultural cycle (the seasonality of pot production; Halkon and Millett 1999) are key research priorities for this project.

Research Questions:

- How far do the farming strategies of the A14 settlements conform to regional patterns for the Roman period (ie increasing emphasis on spelt and cattle over time, chronological patterns in fieldscapes etc)?
    - Analysis of primary archaeobotanical and faunal assemblages to determine species representation/crop choice over time (see recommendations in vol. 2 for details) and comparisons with wider regional dataset.
    - Analysis of development and form of field systems (including cultivation trenches).
    - **Relevant TEAs: 7a, 10, 11/12, 20/21,** 26–**28**, 32/3, 37/8
- Can we discern the different stages of arable farming (soil preparation, manuring, tillage, sowing, harvesting, crop processing, storage, milling/grinding, distribution), and what can we say about the spatial organization of such activities (both intra-'site' and inter-'site')?
    - Detailed analysis of archaeobotanical remains from selected sites for the different stages noted (see recommendations in vol. 2 for details).
    - Crop stable nitrogen isotope analysis (evidence for intensive manuring) on selected sites (see Bogaard et al 2016).
    - Analysis of agricultural tools (spuds, reaping hooks, rake tine, pitch forks, ox-goads), and grinding stones (querns and millstones).
    - Analysis of physical remains associated with arable farming (field systems, corndryers, possible storage structures, threshing areas etc).
    - Intra- and inter-site spatial analysis of different evidence noted above.
    - **Relevant TEAs: 7a,** 10, 11/12, **20, 28,** 37
- What evidence is there for malting and what can we discern about the organization of the brewing process?
    - Detailed analysis of archaeobotanical remains with evidence for malting and all 'beer-like' substances (see Walker et al vol 2).
    - Spatial analysis of malting evidence in relation to other features (eg kilns).
    - **Relevant TEAs: 7a,** 14, 32/3
- What evidence is there for changes in livestock farming between settlements and over time and how is this related to other agricultural changes?
    - Determine changes in species representation in selected sites.
    - Detailed analysis of slaughter patterns, pathologies, body size, and butchery practices on assemblages from selected sites.
    - Link morphological evidence for enclosures, droveways etc with faunal and palaeoenvironmental evidence.
    - Strontium isotope analysis on selected animals from selected settlements.
    - **Relevant TEAs:** 5, 7a, 10, 20, 28, 38
- How was the Brampton greyware pottery industry organized?
    - Detailed analysis of pottery, kiln furniture and other associated tools (see recommendations in vol. 2 for details).

- Analysis of wider distribution of kiln products and comparisons with other pottery industries.
- Analysis of linkages between pottery production sites.
- **Relevant TEAs: 7a, 10, 11, 14, 15, 16**

- How integrated were the different strands of agricultural farming with other 'industrial' activities (metalworking, pottery production, bone/antler working etc)?
  - Examination of 'seasonal' patterns in economic activities including pottery production and bone/antlerworking.
  - Combined spatial analysis of different economic activities (using associated material culture and environmental remains).
  - Using above to produce economic models for selected settlements.
  - **Relevant TEAs: 4,** 5, **7a, 10, 11/12, 14/15, 16,** 20, 32/3, 37/8, 46
- What can the A14 evidence contribute to wider understandings of the Roman economy of the region?
  - Comparison of A14 data with other datasets in wider project region to study matters of: relative levels of coin use (monetary economy), regional distribution networks of economic commodities, levels of state control/influence, etc.
  - **Relevant TEAs:** All, but with particular emphasis on 5, 7a, 10, 11/12, 20, 28, 32/3

Ritual behaviours

The A14 excavations did not reveal any obvious structures, features or places that would seem to be overtly religious in nature, though archaeologically recognized shrines are very rare on Roman rural settlements (noted on just 2% of excavated sites; Smith et al 2018, 148). Public acts of worship may have been largely catered for at larger settlements, with well-known shrines/temples in the walled 'small towns' at Godmanchester and Cambridge. An altar from the nearby nucleated settlement at Northstowe probably came from another shrine that served the needs of the surrounding community.

Also rare are objects of an intrinsically religious nature (figurines, sculpture, miniature objects, curse tablets etc). On the A14, these comprised a lead model tool, two pieces of lead sheet that have (very tentatively) been flagged as possible curse tablets, and the jet Medusa amulet, found in a later context. The amulet is an extremely interesting and rare find, though it doesn't necessarily reflect upon 'everyday' religious practice in this rural landscape. There are, however, a number of so-called 'structured deposits' of Roman date that were noted by the excavators across a few TEAs, including 15 late second-century vessels that had been placed in the base of a waterhole before it was backfilled in TEA 28, and various examples of articulated animal remains in wells, pits and ditches. Notwithstanding the inherent problems in interpreting such deposits (Garrow 2012; Chadwick 2012, Smith et al 2018, 123–4), further detailed contextual analysis of objects (eg complete querns; see Shaffery Vol 2) may reveal more instances of such unusual or patterned deposition.

The burial of human remains is usually among the most structured of deposits, and evidence for such burial (of Roman or probable Roman date) has been found on 13 sites – the majority of the Roman period settlements on the scheme. These c 75 burials were mostly found in very small numbers, often aligned upon outer settlement boundaries and trackways, typical of many farmsteads in the region (Smith et al 2018, 243). At three sites (TEAs 11, 28 and 37) there is evidence for small cemeteries, though nothing at the scale of some rural cemeteries further east closer to Cambridge (eg Huntingdon Road; and Vicar's Farm; Barker and Meckseper 2015; Evans and Lucas forthcoming) and further north on the Fen edge at Knobbs Farm, Somersham (Evans 2013, **). There were also 24 inhumation burials, two cremation burials and a bustum burial identified during recent excavations in the probable nucleated Roman settlement at Fenstanton, just to the north of TEA 31, the inhumations mostly clustered in two small cemeteries (Ingham 2019).

The A14 burials include the typical range of burial rites, including c 58 inhumations and c 17 cremations, and examples of flexed, prone and decapitated skeletons, and two more unusual examples of legless skeletons (see Knox and Carty Vol 2). Grave goods included the usual pottery vessels alongside examples with glass and jet beads and other jewellery. One inhumation burial on TEA 28 had 32 Roman coins scattered around the head and hips, alongside three deposits of cremated human remains, seemingly deposited at the same time.

Considering the scale of the A14 excavations and the numbers of 'complete' Roman settlements, the c 75 burials of this date still represent a remarkably small number, and certainly not representative of a 'complete' rural population. In this regard, the many deposits of disarticulated human remains become more significant, possibly relating to practices of excarnation, with the subsequent scattering of remains into cut features. Detailed contextual and spatial analysis of these remains (and isotopic analysis; see below) will be important in understanding the nature of such funerary rites and the taphonomic processes that led to the eventual deposition of body parts.

Research Questions:

- What evidence is there for unusual or patterned 'structured' deposits of Roman date within the A14 scheme and how do these vary across time and space?
  - Detailed contextual analysis of suggested 'structured' deposits.
  - Contextual analysis of other unusual or complete objects.
  - **Relevant TEAs:** All TEAs, though structured deposits currently noted on TEAs 5, 10, 11 and 28.
- What are the patterns of human burial (location, rites, grave furniture and goods etc) observed in the A14 dataset, and how does this compare with other Roman burials in the region?
  - Confirmation of Roman period dating of buried human remains through stratigraphic, artefactual and scientific methods.

- Comparative analysis of burial context, rites, grave goods (including environmental remains) and grave furniture.
- Osteological analysis of human remains, relating this to the above.
- **Relevant TEAs:** 5, 7a, 10, **11,** 14, 16, 19, 20, 27, **28,** 32/3, **38,** 41

› Can we detect any other funerary rites (eg pyre sites, evidence for graveside activity etc)?

- Analysis of context records and relevant samples to determine the existence of pyre sites (do contexts with small amounts of burnt bone represent cremation burials or pyre sites?).
- Analysis of material culture, faunal remains and environmental remains within and around graves.
- **Relevant TEAs:** 5, 7a, 10, **11,** 14, 16, 19, 20, 27, **28,** 32/3, **38,** 41

› Are we able to recognize non-burial funerary rites and can we detect any differences with the 'buried' population?

- Detailed contextual and spatial analysis of disarticulated human remains.
- Detailed osteological analysis of selected disarticulated remains from secure Roman contexts and comparisons with 'buried' population.
- Limited further radiocarbon dating of selected disarticulated human remains.
- **Relevant TEAs:** 5, 7a, 10, 20, 28, 32/3, 38, 41

The people

The landscape and settlement diversity apparent across the A14 scheme almost certainly correlates with a population and lifestyle diversity among the inhabitants. Constructing components of a 'social archaeology' within this relatively restricted geographic zone therefore forms an important research theme for the project. Variations in personal appearance (determined through dress accessories, toilet equipment etc), diet, methods of culinary preparation and consumption, recreation, literacy levels and the physical environment of people's homes can all reflect and create differing social status and cultural aspirations of individuals and communities (cf. Smith et al 2018). These are, of course, all dynamic elements, and the rich data from the A14 excavations are well suited to explore changes over time (within and beyond the Roman period). The social influences of local 'small towns' at Cambridge and Godmanchester and the military (through militaria) can also be examined, which should contribute to research questions on the levels of connectivity between communities (see above).

Analysis of the human remains themselves has much to offer on the lifestyles of the local inhabitants, or at least those that were afforded burial rites. Rohenbogner's (2018) recent study of pathologies from (generally later) Roman rural burials in central England suggests more distressed lifestyles than in selected urban and Iron Age examples, with higher rates of infection, nutritional deficiency, work-related injury and degeneration. This may have been related to the significant economic changes apparent in this region at this time; palaeopathological study of the A14 Roman burials presents a good opportunity to test these broader conclusions.

The scientific application of stable isotope analysis (particularly strontium and oxygen) on human skeletal remains has been conducted on a number of Romano-British sites (eg Chenery et al 2009; Eckardt 2010), in order to distinguish between locals and foreigners. Most of this work has been done on Roman urban sites such as Winchester, Gloucester and York and generally indicates quite a diverse population, whilst rural sites, where the expectation may be for more stable local populations, have largely been ignored. The A14 dataset represents the perfect opportunity to explore this, particularly comparisons between populations from the likes of TEA 28, which seems to have much external influence (from finds and architectural evidence) and others like TEA 38 where this is less evident. It will also be important to compare isotopic signatures from the buried population with those of disarticulated remains, which may represent elements of the majority of the population. The A14 burials could also be usefully compared with those from the recent excavations at Fenstanton, which looks to have been a minor nucleated settlement.

Research Questions:

› What evidence is there for lifestyle diversity amongst the Roman rural population along the A14 scheme and how did this change over time?

- Comparative analysis of personal objects, objects associated with literacy and recreation, domestic structures and household objects, and ceramic assemblages associated with food preparation and consumption.
- Carbon and nitrogen stable isotope analysis of selected human, animal and plant remains to note differences in diet (diet modelling).
- **Relevant TEAs:** 2-4, **5, 7a,** 10, 11/12, 14/15, **20, 28,** 32/3, **38,** 41

› What do the human remains reveal of the health and lifestyles of the Roman inhabitants?

- Palaeopathological analysis of selected human remains.
- **Relevant TEAs:** 5, 7a, 10, 11/12, 14/15, 20, **28,** 32/3, **38**

› How geographically diverse were the Roman rural populations and did this vary according to site?

- Strontium and oxygen stable isotope analysis (supplemented by lead isotope analysis) of selected human remains (burials and disarticulated) in order to indicate local or non-local origins. Comparison of results between sites.

› **Relevant TEAs:** 5, 7a, 10, 11/12, 14/15, 20, **28,** 32/3, **38**

2.4 POST-ROMAN

A wealth of new evidence for Saxon and medieval activity has been uncovered during the A14 archaeological excavations, including significant evidence for settlement, agriculture, and other activities. All phases of Saxon and medieval activity are represented, including suggestions of 5th century activity, a wealth of early/middle Saxon dispersed settlement, two consolidated middle Saxon settlements, some indication of late Saxon activity, and a post-conquest hamlet. Much of this was unexpected and provides a robust dataset to answer questions about this activity.

The Saxon and medieval periods are often considered to be when 'modern' settlement patterns started to emerge and, as such, are of great importance in understanding this development. This is reflected in the recent review within the East of England Research Agenda, which states that the middle and late Saxon period:

> *'comprise(s) one of the most fundamentally important periods in the establishment of the East Anglian landscape. This period saw the transition from the localized and largely transitory practices of the Early Anglo Saxon (AD c 410–650) period, which gave way to the emergence of the Anglo-Saxon kingdoms, the foundation of towns, bishoprics, monastic houses, churches, and almost all of the settlements which we know today.' (Hoggett 2018).*

Such evidence is, however, often hidden underneath modern villages and towns, and so there are limited opportunities to explore this in any detail. It is often investigated via smaller-scale development-led projects within village cores, or community projects such as the University of Cambridge's CORS test-pitting project (https://www.access.arch.cam.ac.uk/reports/cors). In contrast, the A14 excavations have provided an opportunity to investigate whole settlements, thereby countering the issues associated with partial excavation (when small parts of a site can give misleading impressions of their overall history).

Furthermore, the scale of the A14 excavations provides an opportunity to explore the environmental context of the post-Roman activity, including the areas between and beyond the settlements. This includes modelling the landscape in which the post-Roman activity was located, investigating the fields beyond the settlements, and the routeways which connected them.

This ties into a series of recent 'big data' projects which have looked at Saxon and medieval activity across England. In particular, the 'English Landscape and Identities' project (EngLaId) utilized a variety of evidence to analyze change and continuity in the English landscape from the middle Bronze Age to the Domesday Survey (https://englaid.wordpress.com/); the 'Fields of Britannia' project focused on agricultural land-use in the first millennium AD and used East Anglia as a case study (Rippon et al 2015); and the 'People and Places in the Anglo-Saxon Landscape' project used grey literature to develop a new model of Anglo-Saxon settlement (Blair 2018). The excavations on the A14 have the potential to provide additional information in relation to these projects, fleshing out, corroborating, and in some cases challenging, the conclusions reached.

The results from the A14 excavations can also feed into current large-scale post-Roman research projects. The most notable of these is the 'FeedSax' project, which is analyzing bioarchaeological data to address questions about the expansion of arable farming between the 8th and 13th centuries (https://feedsax.arch.ox.ac.uk/index.html).

In-depth analysis of this dataset should focus on those sites where there is definitive evidence for Saxon and medieval activity – for the Saxon period, these are the sites around Brampton (TEAs 2, 7C, 10, 11, 12, 14, 15, and 16), and Conington (TEA 32/33). For the medieval and post-medieval periods, this is the deserted medieval hamlet and 19th century brick kilns at TEA 7C.

Table 2.4 highlights the TEAs with potential for analysis in relation to post-Roman archaeology. These will be the focus for analytical research during the next phase of work, and, as will be discussed, have considerable potential to address the revised research themes.

TABLE 2.4 TEAs with potential for analysis in relation to the post-Roman archaeology

TEA	LANDSCAPE BLOCK	5TH CENTURY?	EARLY – MIDDLE SAXON SETTLEMENT	MIDDLE SAXON SETTLEMENT	LATER SAXON ACTIVITY	SAXON AGRICULTURE	MEDIEVAL SETTLEMENT	POST-MEDIEVAL INDUSTRY
2–4	Alconbury		Y					
5	Alconbury	Y?						
7a	Brampton West	Y?						
7c	Brampton West		Y	Y	Y	Y	Y	Y
10	Brampton West		Y			Y		
11	Brampton West		Y					
12	Brampton West		Y					
14	West of Ouse		Y					
15	West of Ouse		Y					
16	West of Ouse		Y					
20	River Ouse	Y?						
32/3	Conington	Y?	Y	Y		Y		

Revised research themes

The revised research themes outlined here are framed as a series of specific questions alongside the means that may be used to address them at the analysis phase. They have been divided into four categories ('Transitions', 'Settlement', 'Economy, Agriculture and Industry', and 'Society and the People'), with a series of sub-areas within them. They are, however, all connected, and much of the analysis needed to answer questions for one will contribute to questions in other areas.

Transitions

The scale of the A14 excavations means that there is potential to gain a more nuanced understanding of transitions over time – what happened, when, why, how, and how and why this (potentially) varied between different areas. It should be noted that settlement change (growth/shrinkage) is a constant and fluctuating phenomenon, so the phases of 'Transition' which have been outlined here are, in some senses, arbitrary, and should be considered simply as a framework within which the changes can be understood.

The A14 excavations present a particular opportunity to explore this in relation to the post-Roman period, as all phases within this are represented. For example, on TEA 7C there is evidence for settlement from the 7th century through to the 15th century - this site alone has huge potential to understand settlement and landscape changes over almost 1000 years.

This is highlighted in the Regional Research Agenda as a key area of research:

> *"The region would benefit from a detailed study of the changes in settlement types and forms over time during the early, middle and late Anglo-Saxon periods, highlighting some of the distinctive changes which take place. This also needs to be considered on a broader scale, particularly with reference to the way that Anglo-Saxon settlements and organization of the landscape influenced the medieval landscape." (Medlycott 2011, 58).*

Before these questions can be tackled, it is necessary to get clearer chronological resolution for the Saxon and medieval activity. There is a particular need for this in relation to the early and middle Saxon settlement (phasing the SFBs and other buildings at both Conington and Brampton), and the later Saxon activity (ascertaining the date of the postulated 'late Saxon' area in TEA 7C). This will require a significant radiocarbon dating programme (focused on samples which are not residual), alongside consideration of the pottery and other finds, stratigraphic analysis, and historical research (for the deserted medieval hamlet). Care must be taken with the radiocarbon dating programme, particularly in relation to the type of material to be dated (focusing on charred material and articulated bone groups from primary fills). The calibration curve will also be borne in mind, particularly in relation to the issues with this in the 5th century.

Once this has been achieved, it will be possible to answer questions concerning the nature of the transitions over time. This will also be the basis for tackling questions discussed in other sections, about the development of settlement types, building structures, and agriculture, and how this relates to wider changes within the country.

ROMANO-BRITISH/ANGLO-SAXON TRANSITION?

Eight sites on the A14 contained evidence for both Roman and Saxon settlement, however there were often chronological and geographical 'gaps' between these (eg TEAs 10, 11, 12, 16), such that they do not represent continuity of activity from the Roman into the Saxon period. This is similar to many other sites in East Anglia, where sites occupied in the Roman period did not continue into the Saxon period (eg Billingford (Norfolk) and Heybridge (Essex)).

Possible 5th century activity was identified on four sites (TEAs 5, 7A, 20, and 32), mainly in the form of individual finds. All of these sites contained evidence for significant Roman activity, suggesting that there was a blurring of boundaries between the late Roman and early Saxon activity. It may be that, as suggested in the 'Rural Settlement of Roman Britain' project (Smith et al 2016), the decline in settlement and population in the 5th century was the continuation of a trend begun whilst Britain was still part of the Roman Empire, and so it is more helpful to look at 5th century activity in the same context as late Roman activity.

Only TEA 32 demonstrated evidence for Roman occupation, possible 5th century activity, and continued Saxon settlement beyond this.

Any information that can be gained about the 4th/5th century transition will be invaluable, as this period is not well-understood within Cambridgeshire (Dr Catherine Hills and Dr Sam Lucy pers comm).

Is there any evidence for 5th century activity?

- Radiocarbon dating of key contexts on sites where there may be 5th century activity (late Roman field system on TEA 20, dark earth on TEA 5, late Roman features on TEAs 7A and 32).
- Analysis of finds and pottery which may be of earlier Saxon/5th century date (pottery from TEAs 5, 20, and 32; the narrow annular brooch from TEA 5), in conjunction with site plans and radiocarbon dates.
- Research into the Portable Antiquity Scheme and fieldwalking data, to identify other 5th century finds in the area.

Is there any evidence for continuation of Roman activity into the early Saxon period (5th century onwards)?

- Analysis of site plans where there is both Roman and Saxon activity (particularly TEA 32). Is there any evidence for continuity of occupation into the post-Roman period, and in what form (field systems, settlement)?
- Analysis of very late Roman sites (TEAs 5, 7A, 20) to identify when these sites were abandoned, and whether there was any continuity into the 5th century or beyond.
- Radiocarbon dating of 4th century contexts, to understand the late Roman chronologies.
- Analysis of contexts where there is both late Roman and early Saxon pottery (TEAs 5, 20, 32), including analysis of pottery breakage patterns.
- Pollen analysis of sites spanning the late Roman to early Saxon period to understand changes in land use (part of scheme-wide landscape vegetation model).
- Radiocarbon dates on spelt and emmer wheat, to see if there is any in the 5th/6th century (suggesting possible continuity of farming).

› Analysis of the 23 Roman finds which were found within Saxon contexts (particularly the Medusa pendant from TEA 12), in conjunction with the site plan and radiocarbon dates.

Why was there an apparent disconnect between the late Roman activity and Saxon settlement?

› Research into comparative sites spanning the Roman/Saxon transition.

› Palaeoenvironmental analysis of late Roman and early Saxon contexts, to understand if there was anything environmental which may have caused this disconnect.

EARLY/MIDDLE SAXON DISPERSED SETTLEMENT INTO MIDDLE SAXON CONSOLIDATED SETTLEMENT?

Both the sites around Brampton and Conington witnessed significant changes in settlement in the 'middle Saxon' period (c 7th century). At Conington (TEA 32/33), there was a move from an unenclosed (semi)-dispersed settlement into the consolidated and enclosed middle Saxon settlement. At Brampton, there was a change from the dispersed settlement (across TEAs 2, 7, 10, 11, 12, 14, 15, and 16) into the consolidated middle Saxon settlement at TEA 7C.

When did this change happen (at Conington and Brampton)? Was it at the same time in the different locations? Was there any overlap in time between the different types of settlement?

› Targeted radiocarbon dates of sunken-featured buildings and associated features around Brampton.

› Targeted radiocarbon dates of the middle Saxon consolidated settlement at TEA 7C.

› Targeted radiocarbon dates of the TEA 32/33 unenclosed early Saxon settlement and enclosed middle Saxon settlement.

› Stratigraphic analysis, where useful (most likely for TEA 32/33), to tease out whether there was any chronological overlap between the different types of settlements.

Why did this change happen?

› Comparison of early-middle and middle Saxon settlements (using all information – contextual, finds and environmental) to see how activity in the different periods differed, and whether this suggests anything about why this change happened.

› Comparison with similar sites in the area, to see when these changes happened elsewhere and what this suggests.

› Pollen/environmental analysis, to see if environmental changes played a part.

› Documentary research, to consider whether any social/political decisions may have led to the development of the site (particularly for Conington which may have had royal associations, see discussion below).

CONTRACTION/ABANDONMENT IN THE LATER SAXON PERIOD?

The settlement at Conington appears to have been abandoned at some point during the 8th or early 9th century, certainly before the middle of the 9th century (based on the absence of late Saxon pottery types). There was also an apparent contraction in activity at TEA 7C in the later Saxon period (based on pottery dates), when it is suggested that the middle Saxon settlement was abandoned and activity was concentrated in a far smaller area to the east.

This conforms to a widespread pattern of 9th century settlement contraction in eastern England, witnessed on other sites such as West Fen Road in Ely and Higham Ferrers in Northamptonshire. The reasons behind this are unclear – it may partly be because buildings from this period are more difficult to identify, or because of the Scandinavian presence in the region (suggested by historical and place name evidence, but not currently demonstrated in the archaeological record), or because of royal administrative changes (the collapse of the Mercian monarchy and take-over by the kingdom of Wessex). Alternatively, it may be that people were actually relocating (into nearby Brampton?), at this time.

What date was the settlement at Conington abandoned, and did activity move directly to the modern village of Conington?

› Radiocarbon dates of latest phases of activity at Conington.

› Research into the modern village of Conington, including excavations in the village core, finds (PAS, HER data), and historical research, to ascertain when settlement started here.

Did the settlement around Brampton contract in the later Saxon period, and at what date?

› Radiocarbon dates of latest phases of activity within the 'middle Saxon' settlement and the earliest phases of activity within the 'later Saxon' area.

› Plan and finds analysis of the area of late Saxon activity, to identify any 'archaeologically invisible' buildings (tents, buildings constructed of cob or turf).

› Contextual and dating analysis of other areas within TEA 7C (particularly the area of the middle Saxon settlement and the deserted medieval hamlet), to identify any hidden later Saxon settlement.

Why was there this phase of contraction/abandonment?

› Brampton: comparison of activity in the middle and later Saxon areas, to understand if there were any differences, and whether this suggests anything about why there was a contraction.

› Palaeoenvironmental/pollen analysis, to identify any environmental changes.

› Analysis of archaeobotanical evidence for crop husbandry practices, identifying any evidence for soil stress/decrease in fertility?

- Finds analysis, to see if there is any evidence for Scandinavian influence (the assessment only identified one find - the Anglo-Scandinavian stirrup mount from TEA 7C).

- Documentary research (particularly for Conington), to understand whether changes in royal administration (such as the collapse of the Mercian monarchy) may have caused the cessation of this settlement.

- Research into Brampton in the later Saxon period – were people moving from this settlement across to the larger settlement at Brampton?

- Research into other sites in the area (particularly Higham Ferrers), to see if there was a similar 9th/10th century contraction in other places.

LATER SAXON INTO THE MEDIEVAL (POST-CONQUEST) SETTLEMENT?

Evidence for late Saxon activity and post-conquest (medieval) activity (the hamlet of Houghton) was identified on TEA 7C. The medieval hamlet was in a slightly different location from the Saxon settlement and takes an entirely different form. There is therefore some potential, with this particular site, to gain information about the later Saxon – medieval transition.

This will hinge on ascertaining the date of the suggested later Saxon area of activity (as discussed above) and confirming the 'start' date of the medieval hamlet (based on pottery evidence, this is thought to be the mid-11th century), to ascertain whether there was continuous activity on this site.

It is important to understand why the settlement moved in TEA 7C and why the hamlet was established. Recent work suggests that the Norman Conquest had little or no influence on rural settlements (Creighton and Rippon 2017), but instead that other factors (such as population growth, the formation of open field systems, or the development of lordship) may have been more instrumental in the creation and development of medieval villages. This complicated process is one of intense interest, with projects such as the 'Whittlewood Project' taking a multidisciplinary approach to understand this (Dyer et al 2005). The A14 excavations have the potential to add another layer of understanding to this.

What date did activity within the medieval hamlet start? Did it follow directly on from the late Saxon activity?

- Radiocarbon dates of earliest phases of medieval settlement.

- Documentary research into the hamlet, focusing on its creation.

Why did the hamlet develop?

- Documentary research (particularly legal documents, hundred rolls, etc), focusing on information about why the hamlet developed then and what its function was.

- What evidence is there for the association of the village with the surrounding woodlands, particularly Brampton Wood. Could this be a reason for the development of the hamlet at this time?

- Is there any evidence for changes in agriculture, and the development of the open-field system, contributing to the development of the hamlet?

- Is there any evidence for lordship or the manorial system (documentary sources, village layout), which might suggest this had an influence over the creation of the hamlet?

DESERTION OF THE MEDIEVAL HAMLET OF HOUGHTON

The date of the desertion of Houghton has been tricky to understand. The pottery assessment suggests that the peak of activity within the settlement was between the mid-11th and mid-13th centuries, but with a relatively large resurgence in the later 14th/15th century (539 sherds of later 14th/15th century pottery). This pattern fits with many other medieval villages in the area, where there was often expansion in the 13th century, shrinkage in the 14th century (often connected to the Black Death), but with some level of occupation until final depopulation in the later medieval/post-medieval period (Stuart Wrathmell pers comm).

It is crucial that we get a clearer idea of how Houghton changed over the medieval period, refine the date of its' desertion, and get a clearer understanding of the nature and scale of this later phase of activity. Once this has been achieved, we can consider the possible reasons behind these fluctuations in activity levels within the hamlet, tying this into events which were happening in the country. A study by Oosthuizen has suggested that numerous different reasons accounted for changes in population sizes and the desertion of villages across Cambridgeshire, including market grants, changes to the volumes of traffic, emparkment, and settlement mobility (Oosthuizen 2009). The reasons behind the desertion of this particular settlement will be considered (was it because it was small, lacked the cohesion of community life, because of the downturn in agricultural life at the end of the 13th century, or because of changes to woodland rights), and compared to others in the area.

When was the settlement deserted?

- Radiocarbon dates of latest phases of medieval settlement.

- Pottery and small finds analysis, to tighten up dates of activity (reconciling the dates suggested by the pottery assemblage of mid-11th to mid-13th century, in comparison with the dates suggested by the dress accessories of 1300-1350).

- Documentary research, identifying any documentary records for the desertion of the settlement.

What about the possible later phase of activity (later 14th/15th century), suggested by the pottery assemblage?

- Targeted radiocarbon dates to corroborate this.

- Pottery distribution analysis to identify where this was located.

- Stratigraphic analysis to identify what type of activity this was associated with.

- Analysis (stratigraphic, finds, and C14) to ascertain whether there really was a hiatus in activity between the mid-13th century and the later 14th century.

Why was the settlement deserted?

- Documentary research into the status and function of the settlement and the villagers. This will include consideration of the well-being and wealth of the villagers, and the relationship of the settlement with the surrounding woodlands.

- Analysis of the latest phases of the medieval village, considering whether this activity was any different (or of a different scale) from the earlier phases.

- Analysis of the surrounding fields (using all sources of evidence), to understand whether changes in farming practices may have contributed to the hamlet's desertion.

- Palaeoenvironmental analysis of the latest phases of medieval hamlet, identifying any environmental changes at this time.

- Micromorphological analysis, to inform about the character/ tempo of the desertion.

- Research into surrounding sites (deserted and non-deserted), considering when they were deserted, why, and why others survived.

Settlement

The greatest evidence for post-Roman activity across the A14 scheme comprised settlements and settlement-related features, most notably the early/middle Saxon sunken-featured buildings, the middle Saxon settlements at Brampton and Conington, and the deserted medieval hamlet of Houghton.

These excavations therefore hold huge potential to understand the character and intensity of settlement throughout the post-Roman period, and this is arguably the area where the A14 excavations can contribute most to our knowledge. This is a key area highlighted in the recent review of the research agenda:

> *'We would benefit from a detailed study of the changes in settlement types and forms over time during the Early, Middle and Late Anglo-Saxon periods' (Hoggett 2018).*

EARLY – MIDDLE DISPERSED SAXON SETTLEMENT (THE SUNKEN-FEATURED BUILDINGS)

Significant evidence for dispersed early – middle Saxon settlement has been uncovered during the A14 excavations – the largest and densest so-far recorded in the area and on a scale comparative to the excavations at West Stow and Bloodmoor Hill.

This mainly comprises the sunken-featured buildings (SFBs). 58 of these buildings were excavated – 34 in the area around Brampton (TEAs 2, 7C, 10, 11, 12, 14, 15, and 16), and 24 in the Conington area (TEA 32/33). Our current understanding of sunken-featured buildings in this area is best exemplified in Jess Tipper's work (Tipper 2004) and the A14 dataset has the potential to increase our understanding of these structures, particularly in relation to their function (although the difficulty in assigning functions to these buildings, which are only reflected in their primary fills, should be acknowledged).

Wide areas around the sunken-featured buildings were also excavated, and a range of other Saxon settlement features (primarily post-built buildings, pits and wells) were identified. This will allow a more nuanced understanding of Saxon settlement, beyond the SFBs, to be gained.

What can we learn about the sunken-featured buildings?

- Date and phasing?
  - Radiocarbon dating of all SFBs (focusing on primary fills).
  - Analysis into the 'lifespan' of these structures (when constructed and when abandoned?)
  - Grouping SFBs into 'sets' of contemporaneous structures, suggesting a likely start and end date for their construction and use – using the phasing of the SFBs at Bloodmoor Hill as an example of this (Lucy, Tipper and Dickens, 2009).
- Form, structure, and morphology?
  - Full analysis of all SFBs, comparing:
    - Size
    - Shape
    - Number of postholes
  - Micromorphological analysis of fills within SFBs.
- Function?
  - Full analysis of all finds from the SFBs. Including distribution analysis of the finds (between fills and different SFBs), and chronological analysis.
  - Full environmental analysis of samples from the SFBs.
  - Analysis of larger SFBs (particularly 10.3), to consider their function.
  - Comparative research into other SFBs in the area.
- Location?
  - GIS maps plotting all SFBs, transport networks (roads and rivers), geology, and topography, alongside earlier (prehistoric and Roman) features.
  - Research into other SFBs in the area, to plot these onto the maps.

- Comparison of those SFBs located on their own vs those in small groups – were they a different date/did they have different functions?
- Consideration of how Saxon peoples viewed their prehistoric and Roman ancestors?

What can we learn from other evidence for dispersed early – middle Saxon settlement?

- Identify all other features of early – middle Saxon date in the areas surrounding the SFBs (particularly in TEAs 7C, 10, and 32/33, where we believe there are contemporary features and there may be more – we just need to identify them!):
  - Full stratigraphic analysis of these areas.
  - Radiocarbon dating.
  - Distributional analysis of finds and pottery, on site plans.
- Post-built buildings (TEAs 10, 12, and 32/33)
  - Radiocarbon dating of buildings.
  - Contextual, finds, and environmental analysis focusing on their function, and how they worked with the SFBs.
- Pits and Wells
  - Radiocarbon dating.
  - Contextual, finds, and environmental analysis of their function, and how they worked with the SFBs. Including wood analysis of the dugout well lining and log ladder from TEA 10.
- No burials?
  - Contextual analysis to check if any Saxon human remains were identified (aside from the Conington burial in the gateway).
  - Research into other sites in the area, to identify where the burials were (particularly MOLA's recent site at Brampton).

MIDDLE SAXON SETTLEMENTS: TEA 7C AND TEA 32/33

Two significant middle Saxon settlements were excavated during the A14 excavations – the unenclosed settlement at TEA 7C and the enclosed settlement at TEA 32/33.

The settlement at TEA 7C covered an area of c 3.4ha and contained at least 38 post-built buildings and 19 pits/wells. Preliminary dating suggests there was activity here from the 7th century onwards, with this settlement likely falling out of use in the later Saxon period (9th/10th century?). This is a relatively large settlement and has the potential to answer research questions concerning settlement form, building construction, and life within settlements, and will tie into recent work on this (Blair 2018, Hamerow 2012).

The TEA 32/33 settlement was enclosed with two gated entrances. Preliminary dating evidence suggests that there was activity here from the 6th/7th century into the 8th century. This is potentially a slightly 'different' type of settlement, as the place-name 'Conington' ('king's enclosure') and location on the border of two Middle Anglian kingdoms suggests it may have had an official function. A recent study analyzed 70 surviving 'Kingston' place-names to try to answer the question 'What is a Kingston' (Bourne 2017) and suggested that they were located on borders or roads to aid the Mercian expansion.

What can we learn about middle Saxon settlement types, forms, and layout (TEA 7C and TEA 32/33)?

- Analysis of site plans, identifying evidence for deliberate and organized settlement planning (such as the 'short perch' grid system). Can we prove that the buildings on the grid-plan are of the same date?
- Analysis of site plans, finds, and environmental evidence, identifying any other features within the settlements (animal pens, yards, ritual structures).
- Analysis of site plans, finds, and environmental evidence, to ascertain whether there was any 'zoning' of activities within the settlements?
- Consideration of why no burials were identified in the TEA 7C settlement, and only one in the TEA 32/33 settlement. Research into comparative sites to gain a greater understanding of what this means.

What can we learn about middle Saxon buildings (TEA 7C and TEA 32/33)?

- Analysis of site plans, focusing on post-holes, to identify further buildings or fence-lines. Use computer programme which detects rectangular structures in post-excavation plans (https://download.cnet.com/Posthole/3000-18499_4-75712249.html) to help with this.
- Radiocarbon dating of post-hole buildings, to phase structures and ascertain the life-span of the settlements.
- Analysis of building form, in conjunction with absolute dating of structures, to (attempt to) create a typological sequence for the timber buildings.
- Analysis of individual building layouts, identifying entrances, subdivisions, hearths, and internal features.
- Analysis of buildings, identifying evidence for their repair, replacement, or evolution.
- Finds and environmental analysis, identifying materials used in building construction (timber, thatch, daub)?
- Analysis of buildings, finds, and environmental samples to identify any functions of the buildings (including the spatial organization of activities within buildings).

What can we learn about middle Saxon activities and the 'function' of

these settlements (TEA 7C and TEA 32/33)?

- Contextual, finds and environmental analysis of pits and wells, to identify their functions.
- Finds analysis, focusing on activities taking place within the settlements.
- Research into other 'Kings' Enclosures', using Bourne's 2017 work.
- Documentary research into 'Conington' – its location, the Middle Anglian kingdoms it straddled, and anything about its history (eg Tribal Hidage). Can we correlate the different phases of activity at Conington with different Mercian kings (potentially demonstrating that the function of Conington was to aid the Mercian expansion?)

LATE SAXON SETTLEMENT: TEA 7C

The smaller area of possible later Saxon activity on TEA 7C included some evidence for settlement (Building 7B.1 and the suggestion of four other buildings). This is of a completely different scale and character from both the middle Saxon settlement and the post-conquest hamlet within TEA 7C.

What can we learn about later Saxon settlement types, forms, and layout?

- Plan analysis of the settlement area, to ascertain how this area was laid-out and functioned.
- Analysis of finds and environmental samples from the settlement, to ascertain the type of activities taking place within the settlement.

What can we learn about later Saxon buildings?

- Contextual and finds distribution analysis to identify further buildings (including possible transitory/tent-type structures).
- Analysis of the morphology of Building 7B.1 (rectangular beam-slot building).
- Radiocarbon dating of Building 7B.1 (and potentially other 'structural features').
- Analysis of finds and environmental samples from Building 7B.1.
- Comparison with other known late Saxon buildings (eg those from Raunds).

MEDIEVAL HAMLET: TEA 7C

One medieval settlement was excavated in the A14 excavations - the hamlet of Houghton on TEA 7C. This site has huge potential to answer questions about medieval rural settlement, including questions concerning the development of settlements over time, their layout, and the buildings within them.

This hamlet covered an area of approximately 2.5ha and comprised a trackway, plot divisions, buildings, and evidence for industrial activity. Preliminary dating evidence suggests that activity was concentrated between the mid-11th and mid-13th century, with a resurgence in the later 14th/15th century.

There are some documentary records for Houghton, including the 1279 Hundred Rolls which records 34 holdings within Houghton, 20 of which held messuages (inhabited houses). It was a hamlet of Brampton (a large royal manor), and all community life would have been centred in Brampton.

What can we learn about medieval settlement type, form, and layout?

- Full documentary research, including court rolls, hundred rolls, and legal documents, to understand the character and function of the medieval hamlet.
- Documentary research into how Houghton worked in conjunction with Brampton. Was it an outlier to the main settlement at Brampton, and how were the two connected?
- Analysis of the village plan – was it planned or organic in its growth? Would it be classified as a fully nucleated village, or polyfocal? In particular, analysis of the southern area (was it contemporary with the rest of the village, and how did it work with it?) and the way in which the settlement appears to 'wrap' around the middle Saxon settlement (was this the village green?)
- Distributional analysis of medieval finds, to identify locations of specific activities within the settlement.

What can we learn about medieval buildings?

- Contextual and finds distribution analysis, to identify further buildings. In particular, consideration of the 'structural features' (groups of post-holes and beam-slots) to ascertain whether these formed buildings, and looking at the 'gaps' and alignments of boundary ditches to identify where other buildings may have been located.
- Targeted radiocarbon dating of medieval buildings.
- Contextual, finds and environmental analysis to identify the functions of the buildings. How many were houses, vs how many were 'industrial' buildings?
- Analysis of building form, in conjunction with absolute dating of structures, to identify building techniques and how they changed over time.
- Analysis of environmental samples and finds, identifying materials used in building construction (timber, thatch, daub).
- Analysis of buildings, identifying their lifespan and any evidence for repairs.
- Consideration of the building traditions on this site, in their regional context.

Economy, agriculture and industry

The landscape nature of the A14 excavations provides an opportunity to analyze the post-Roman economy, particularly agriculture and industry. This is inextricably linked to the settlements, most of which were, for the duration of the Saxon and medieval periods, farming communities. We cannot, therefore, hope to understand the settlements without understanding the surrounding agricultural economy.

The A14 excavations provide the opportunity to increase our understanding of how this agricultural economy was organized and developed. This will tie into recent work which has concentrated on Saxon farming practices, such as Banham and Faith's synthesis of Anglo-Saxon farms and farming practices (Banham and Faith 2014), McKerracher's work on the transformation of farming practices in the 8th century (McKerracher 2018), and the current 'FeedSax' project discussed above.

This is an area of interest highlighted in the revised East of England's research framework:

> *"Within excavated sites, priority should be given to the detailed examination of good animal bone, charred cereal deposits and palaeoenvironmental data, which has the potential to inform emerging models of Anglo-Saxon agricultural practices" (Hoggett 2018)*

Furthermore, the medieval hamlet of Houghton contained significant evidence for 'industrial' activity, including metalworking, retting, and woodland-based industries. This is different from many other medieval settlements, and therefore has the potential to increase our understanding of this (potentially specialized) type of settlement.

The two 19th century brick kilns also have the potential to answer questions concerning post-medieval rural brick-making (the only area of post-medieval archaeology recommended to look at in analysis).

AGRICULTURE

The excavation of large areas of land between the Saxon and medieval settlements provides an unprecedented opportunity to study the wider farming landscapes surrounding the post-Roman settlements. The collection of paleoenvironmental evidence and animal bone assemblages will also enable inter- and intra– site analysis of agriculture, and the long chronological span of activity means that there is the potential to understand how this developed over time.

Can we identify the fields?

- Contextual analysis, combined with finds analysis and targeted radiocarbon dating, to identify the field systems and enclosures surrounding the post-Roman settlements. Focus on TEAs 7C, 10, and 32/33.

What type of agriculture was carried out in the different periods?

- Analysis of the animal bone assemblage from all Saxon and medieval features, identifying which animals were used in different periods, and how this changed over time.
- Analysis of the palaeoenvironmental evidence (charred grain assemblages) from all Saxon and medieval features. Identifying which crops were grown over the different periods, and how this changed over time.
- Soil micromorphology and/or pollen analysis to identify whether fields were used for arable or pastoral farming.
- Comparison of this (the different proportions of arable/pastoral farming, and different crops or animals) across the different periods.
- Comparison of this (the different proportions of arable/pastoral farming, and different crops or animals) across the different sites.

Can we learn anything about crop/animal specialization, farming regimes, and how it changed over different periods? Is there any evidence for the agricultural changes postulated to have taken place in the 'long eighth century' (McKerracher 2018), or the later 13th century agricultural downturn?

- Statistical comparisons of the quantities of different crops and animals from the different periods (any specialization?)
- Distributional analysis of where the cereal remains and animal bone assemblages were found within and away from settlements – does this tell us anything about farming practices?
- Analysis of animal bone, looking for butchery/burning/other post-death processes?
- Analysis of animal bone age-at-death data, considering what this tells us about how animals were used (for ploughing or eating?)
- Analysis of the quantities and densities of chaff in the Saxon and medieval samples. Distributional analysis to identify areas where there were higher proportions of chaff, where grain may have been processed, related to the different stages of crop-processing and storage.
- Estimates, from the size of fields, animal bone assemblage, and palaeoenvironmental evidence, about the scale of agricultural production across the different periods.

Can the ridge-and-furrow cultivation inform us on agricultural regimes in the medieval (or later) period, particularly in relation to the hamlet of Houghton?

- Analysis of alignments and layout of ridge-and-furrow cultivation, in relation to the hamlet of Houghton, to identify which (if any) field systems worked with the medieval settlement, and which post-dated it.
- Documentary research into the medieval agricultural practices in this area, to aid interpretation of the archaeological evidence (particularly concerning crop choices and the arable/pastoral balance).

SAXON 'CRAFT-WORKING'/INDUSTRY

Although agriculture was the main focus of the Saxon economy, there are also suggestions that other smaller-scale 'craft'/industrial activities were carried out, most notably with the suggestion that sunken-featured buildings were used for weaving.

What can we learn about weaving on these sites?

- Contextual analysis of the sunken-featured buildings – is there anything in the structure of these which suggests they were used for weaving?
- Analysis of all finds associated with weaving (loom weights, bone pins, thread pickers), focusing on their distribution (inter and intra-site), date, and what they suggest about the scale and character of activity (centralized?)
- Petrological and chemical analysis of loom weights, looking at their forms, fabrics, and marks.
- Analysis of the distribution and form of unfired clay 'blobs' (unfired loom weights) found within many of the sunken featured buildings.
- Analysis of the shears from TEA 32/33, which suggests that people were working with finished cloth.
- Distributional analysis of ked puperae within Saxon features (which indicates the presence of processing of fleeces and wool).

What evidence is there for other 'craft' activities?

- Analysis of Saxon pits (particularly within the middle Saxon settlements at TEA 7C and TEA 32/33). Including analysis of finds and environmental information (were they rubbish pits for any particular activity? Were they quarry pits for particular materials?)
- Metallurgical analysis of Saxon finds, to understand the manufacturing process.
- Petrological analysis of the pottery, identifying local handmade pottery and to understand the manufacturing process.
- Analysis of all bone objects, determining their source material and understanding the manufacturing process.
- Distributional analysis, identifying whether there were 'functional zones' within the settlements where different 'craft activities' were undertaken.

MEDIEVAL INDUSTRY

The archaeological evidence suggests that the medieval hamlet of Houghton had a significant 'industrial' element, with the presence of the blacksmiths, retting pits, and numerous pits containing burnt waste. This may have been because of the proximity of the settlement to Brampton Wood, such that woodland-based industrial activities were being undertaken. Alternatively, the settlement was located close to the crossroads of two major roads (the A1 and the A14), and so it may have functioned as a 'service station' for traffic along the roads (the forerunner to the modern 'Brampton Hut' services?!).

What can we learn about smithing (techniques, duration and scale of activity)?

- Radiocarbon dating of blacksmiths (Building 7C.39).
- Analysis of structure (looking for hearth, anvil, water container, storage).
- Distributional and chronological analysis of finds from the site which are related to smithing, including the horseshoes, horseshoe nails, locks and keys, and the unusual iron arrowhead.
- Analysis of slag.
- Analysis of smithing hearth bottoms.
- Spatial analysis of the hammerscale, to produce a spatial layout of the activities taking place.
- Research into comparative examples of medieval blacksmiths, including Goltho and Cheveley (Cambridgeshire), and the Cambridgeshire Bourn medieval ironworking project (Medlycott 2011, 67).
- Documentary research into Houghton and evidence for the blacksmiths.

What activities do the 'burnt pits' derive from?

- Targeted radiocarbon dating of the burnt pits.
- Contextual and stratigraphic analysis of the burnt pits – which contained evidence for burning in situ, and which were pits later filled with burnt waste.
- Finds and environmental analysis of the burnt pits – is there anything to suggest what activities were taking place?
- Documentary research into Houghton, identifying whether there is any information about the type of industrial activities undertaken.

Was retting taking place, and what can we learn about this?

- Radiocarbon dating of the retting pits.
- Contextual analysis of the ten pits identified in the assessment as 'retting' pits.
- Analysis of the paleoenvironmental evidence from these retting pits, to further understand the nature of this activity.

What antler-working was taking place here, and what does this suggest about the status of the settlement?

- Analysis of antler-working waste (including species identification).

- Radiocarbon dating of this.
- Contextual analysis – is there an area of the hamlet where this activity was taking place?
- Research into comparative examples of medieval antler-working.

What evidence is there for woodland-based industrial activities?

- Pollen analysis, identifying the type of woodland in the area, and how this may have been used within the hamlet.
- Palaeoenvironmental analysis, identifying any use of 'woodland' resources such as nuts, berries, and charcoal.
- Analysis of the animal bone assemblage, particularly the presence/quantity of 'game' species and other species typically found in woodlands.
- Documentary and cartographic research, to plot the previous extents of woodland (using work already undertaken by Jason Peters for his forthcoming monograph "The lost forests of Huntingdonshire"), and any information about how the hamlet utilized the woodland.
- Comparison with other 'woodland' settlements, such as those in Rockingham Forest (Liveden, Stanion).

Is there any evidence for the settlement functioning as a 'service station' for traffic along the nearby roads?

- Documentary research to see if there is mention of this.
- Analysis of quantities of 'products' being produced in the hamlet (particularly the smithy), to ascertain whether there was a surplus, potentially for passing traffic.
- Analysis of finds, looking for objects brought in from other areas.

19TH CENTURY RURAL BRICK MAKING INDUSTRY

The presence of two 19th century brick kilns in TEA 7C has the potential to increase our understanding of rural small-scale brick production in this area.

What can we learn about this activity – size, duration, process?

- Documentary and cartographic research into brick making in this area.
- Analysis of products from brick kilns and the structure of the kilns.
- Comparative examples of brick kilns (focusing on those in use in the Cambridgeshire area in the 19th century)
- Comparison of brick products with nearby structures (including Grove Farm which is currently being excavated).

Society and the People

The A14 excavations hold some potential to gain information about the actual lives of people in the post-Roman period, and society more generally. This includes estimates of population sizes, the impact of external influences, and the social status of individuals and settlements.

This is particularly the case with the medieval hamlet, as preliminary documentary research has identified the names of the inhabitants living in Houghton in 1279 (the 1279 Hundred Roll). It is possible that this could be traced further through the documentary records, identifying individuals and families living in the area, where they moved from/to, and their occupations. This could be related to the archaeological evidence, providing a solid insight into the lives of the people living within the settlement.

The lack of post-Roman burials (aside from the young female buried over the gateway at Conington) limits the amount that can be understood about the actual individuals (particularly from the Saxon period). The results from the A14 excavations can, however, be compared to known Saxon and medieval cemeteries in the area, including the recent excavations of a Saxon cemetery at Brampton, c 750m to the east of TEA 7C (MOLA forthcoming); the genetic studies that have been undertaken on the Early Saxon graves from Oakington, Hinxton and Linton (Schiffels et al 2016); and the work at Edix Hill Barrington (Malim and Hines 1998)

POPULATION SIZE

Can we make useful estimations about the population sizes in this area throughout the Saxon and medieval periods?

- Absolute dating of Saxon and medieval structures, to enable a clearer idea of the 'lifespans' of the settlements.
- Documentary research into the medieval hamlet (how many inhabitants lived there at any one time).
- Comparisons with known cemeteries and other settlements in the area.
- Extension of this (using predictive modelling/statistical analysis) to a wider area.

SOCIAL STATUS

Is there any evidence for the status and function of the settlements?

- Documentary research into Conington (in relation to the place-name meaning 'king's enclosure') – both in the middle Saxon period and in later periods, identifying any evidence for royal benefaction.
- Documentary research into Houghton, particularly in relation to its connection with the forests and position under 'forest law', its position as a royal manor, and the social status of the inhabitants (were they all 'soke' men?).
- Finds analysis (quantity and quality), considering if they provide any information about the status of the settlements. Compare this with settlements of a similar date (eg Brandon and Flixborough).

Is there any evidence for internal social ranking within the settlements?

› Analysis of site plans, looking for boundaries within settlements, differences in size/type of buildings.

› Finds analysis (in comparison with site plans), looking for 'higher status' finds in particular areas or associated with particular structures.

Is there any evidence for collective investment within the settlements?

› Analysis of site plans, finds and environmental assemblage, looking for evidence for cooperation within the settlements (certain activities focused in certain areas, coordinated maintenance of trackways and fields, husbandry strategies, etc).

EXTENAL INFLUENCES OVER SOCIETY

What evidence is there for post-Roman 'British' influences over the settlements (particularly over the early and middle Saxon settlements?)

› Analysis of site plans, particularly building constructions, looking for any 'British' traditions such as 'round' elements within buildings.

› Analysis of finds, looking for any with typical 'British' influences?

What evidence is there for 'continental' influences over the settlements (particularly over the Saxon settlements?)

› Analysis of site plans, particularly building constructions, looking for any 'continental' traditions such as annexes and double-plank construction, within buildings.

› Analysis of finds, looking for any with typical 'continental' influences, or imported items (such as the pottery from TEA 32/33 and the bead from TEA 32)?

Is there any evidence for the influence of the church over the settlements?

› Overlay a grid of 4.57m over the site plan of the middle Saxon settlement at TEA 7C, to establish whether it was set out on the 'short perch' grid system (argued to have been associated with monastic settlements).

› Finds and contextual analysis, identifying any other evidence for religious activity within the settlements.

CONNECTIONS BETWEEN THE SETTLEMENTS

One of the real strengths of the A14 excavations has been the opportunity to investigate the areas around and between the various post-Roman settlements. This has enabled an understanding of how the different sites were connected across the wider landscape.

How were the different sites physically connected?

› Produce maps of routeways (roads, tracks, rivers, etc), in relation to the post-Roman settlements.

› Include other sources of information (Cropmarks, Lidar, and other excavated sites), to produce a fuller representation of how the post-Roman settlements were connected.

How were the sites connected through trade and exchange?

› Analysis of finds and materials distributions, to plot trading connections. Focus on the stone hones and glass from the Saxon period, and stone finds from the medieval period.

› Include other sources of information (PAS data, HER data, and other excavated sites), to produce a fuller representation of this.

How were the settlements connected to the nearby towns?

› Research into documentary and archaeological evidence for activity within Brampton and Huntingdon (particularly in the medieval period), to consider what connections there may have been with the village of Houghton.

› Analysis of finds and materials from the settlements, to ascertain whether any of this came from nearby urban centres, or whether any of the goods produced were produced for the 'urban' market?

THE PEOPLE THEMSELVES

What can we learn about the actual people who lived and worked in this area in the Saxon and medieval period?

› Documentary research into the medieval hamlet of Houghton, including the Hundred Rolls which name the inhabitants. Follow any leads through all documentary sources.

› Analysis of the 'personal' items within the finds assemblage, including the Saxon bone flute and the Saxon and medieval dress accessories.

› Analysis of the single female buried over the gateway at Conington, including osteological analysis and potentially isotope analysis.

› Research into the Saxon cemetery identified to the northwest of Brampton (MOLA forthcoming).

› Consideration of what all the information (site plans, finds, environmental samples) can tell us about peoples' lives.

2.5 LANDSCAPE

Whole landscapes have been excavated along the A14, including entire settlements, their surrounding agricultural land, monumental landscapes, and the infrastructure network which connected these areas. This is particularly noticeable with the larger blocks of land such as 'Brampton West' (TEAs 7–12) and 'Fenstanton Gravels' (TEAs 27–29). This enables a more holistic and nuanced understanding of how the whole landscape was used across the different periods.

The results from the A14 excavations can also be related to other large-scale projects in the area (particularly the work at Northstowe

and North-West Cambridge), and, potentially, with the forthcoming archaeological work along the A428.

In order to fully understand how past activity worked within this landscape, it is necessary to reconstruct, as best as possible, the past 'natural' and 'human' landscape of the area. Although they have been arbitrarily divided here, they are intimately connected, with humans modifying the 'natural' landscape and the 'natural' landscape directly impacting on human activity.

The research questions outlined below highlight the work required to understand this. This will also be the basis for the period-specific research questions discussed in the following sections.

Reconstructing the past 'natural' landscape

Before the past human activity across the A14 scheme can be understood, it is necessary to understand the natural landscape in which this past activity operated. This includes the ecological landscape (geology, topography, and soils), river-systems, and vegetation cover. This is not a passive 'backdrop' to the human activity, but directly impacted on the types of activity taking place within certain areas, and the development of this over time.

The importance of the environment on human activity is clear on some sites along the scheme, such as the prehistoric monument at TEA 16 which was located on a gravel spur adjacent to the River Great Ouse floodplain; the Iron Age enclosures in TEA 7C which were deliberately positioned in association with a network of palaeochannels; and the medieval hamlet of Houghton in TEA 7C which may have developed as a settlement because of the resources of the nearby Brampton Wood. Although the importance of the surrounding environment is not as obvious on other sites, it would have always been an important aspect of people's daily lives and impacted on what they were doing where.

This is particularly important because, in many places across the scheme, the past environment would have been markedly different from that which we experience today. This is noticeable in TEA 19, now a wide flat area of agricultural land between the River Great Ouse and the East Coast Mainline, but once crisscrossed by rivers with smaller gravel islands between.

In order to place the archaeological results in their proper environmental and landscape context, and to provide another angle with which to understand why certain activities developed in certain areas, we will undertake a landscape reconstruction across the entire scheme for all periods. This will follow the model adopted in the A13 work (Stafford et al 2012), and may include an online interactive 'Story Map' similar to that produced for the Tyburn River in London (http://molarchaeology.maps.arcgis.com/apps/Cascade/index.html?appid=6b00daa1acac4df7a2fcde06104bac1a).

The following research questions will enable this landscape reconstruction to be produced.

Can we reconstruct the past 'ecological landscape' (grassland, woodland, wet land) across the scheme?

- Production of detailed geological and topographical maps of the scheme.
- Collection of borehole data from across the A14 scheme, to produce a deposit model.
- Pollen analysis to identify ecological landscapes (grassland vs woodland vs wet land) at different periods.
- Targeted analysis of insect remains, to supplement the pollen data.

Can we reconstruct the past river-systems?

- Plot the routes of the palaeochannels identified in the excavations, alongside those known from other sources.
- Contextual analysis of the palaeochannels.
- Radiocarbon dating of palaeochannel sequences, particularly that through TEA 19.
- Full analysis of the monoliths, augers, and pollen from TEA 19 (River Great Ouse floodplain).
- Pollen analysis to identify areas of 'damp ground' (TEAs 32, 37, 41).

Can we reconstruct the past vegetation cover (including woodlands and hedges)?

- Pollen analysis to identify woodland species across the scheme.
- Species identification of the worked wood.
- Targeted charcoal analysis, to supplement the pollen and wood data.
- Contextual analysis of 'tree throws' identified in excavations, focusing on their date (potentially inferring episodes of tree clearance across the landscape).
- Documentary and cartographic research into past woodlands, drawing on work done by Jason Peters in his forthcoming monograph "Reconstructing the lost forests of Huntingdonshire".

Reconstructing the past 'human' landscape (routeways, areas between settlements)

The A14 excavations provide the opportunity to understand the areas ***between*** past settlements and the routeways which connected them. Understanding how this wider landscape was connected and worked enables a more holistic understanding of past human use of the entire landscape.

This is mentioned briefly here, as has been discussed further in each of the period-specific revised research questions.

Can we reconstruct past routeways and connections through the landscape?

- Create a GIS plan of all settlements, trackways, roads, and rivers, utilizing A14 excavation plans, HER data, data from the EngLaid project (https://englaid.arch.ox.ac.uk/), and data from other excavations. Produce this for all periods.
- Finds distribution analysis across the landscape.

Can we categorize what the areas between the settlements were used for (farmland (pastoral or arable), woodland, grassland, floodplain, or other), how this worked with the settlements, and how this changed over time?

- Basic classification of areas between settlements, using contextual information, finds distribution, environmental samples, and pollen data. Draw on trial trenching information where not excavated in full. Create GIS plan showing this, across all periods.

3 PROJECT OUTPUTS

The following section details the proposed project outputs. This includes 'academic' outputs (digital reports, monographs, journal articles, masters courses), 'popular' outputs (popular book, outreach events, digital interactive), and the archive. The following outputs are proposed and discussed in more detail below:

- Digital Archive and Reports
- Internet Archaeology Monograph
- Print Monograph
- Journal Articles
- Popular Print Book
- Community Engagement
- Communications
- Digital Interactive
- Masters Courses
- Digital Ceramic Collection

3.1 DIGITAL ARCHIVE AND REPORTS

The primary output for the A14 archaeological investigations will be the digital archive. This will enable full access to all the stratigraphic, scientific, finds and environmental data, along with the site reports and specialist reports. The overall structure of the digital archive is, divided into 'parent' and 'child' collections:

Project level parent archive

- Introduction - to overarching A14 project.
- Overview - to overarching A14 project, including list of full project team (fieldwork and PX).
- Downloads - of scheme-wide data split into:
  - Reports - scheme-wide overviews of finds and environmental material (including integrated isotope analysis report), MHI trial trenching reports, WSI, etc.
  - Plans – scheme-wide plans (geology, topography etc).
  - Photos - selected multi-site images, team photos etc.
  - GIS - scheme-wide layers
  - Geophysics - scheme-wide survey
  - Spreadsheets - scheme-wide registers, databases etc,
- Site/Investigation List - of child collections (see below)
- Map - of the A14 investigations.
- Query - facility to search the data across all the collections.
- Metadata - of the project as a whole including links to all associated publications (monograph and journal reports)
- Usage statistics.

Site/Investigation List (child collections)

The eight child collections will be based on the eight landscape blocks within the A14 Scheme:

- Alconbury
- Brampton West
- Brampton South
- West of Ouse
- River Great Ouse
- Fenstanton Gravels
- Conington
- Bar Hill

The structure of each child collection will follow the same pattern as the parent collection:

- Introduction - to landscape block (and summary of results)
- Downloads - of data related to the landscape block, split into appropriate data types:

- Landscape Reports - landscape block specific reports (see structure below), linked to OASIS records.
- Spreadsheets - landscape block specific data ie finds registers, context information, specialist data.
- GIS - landscape block specific layers.

- Geophysics - landscape block specific surveys.
- Map - link to main map search.
- Query - link to the query facility to search the data across all the collections.
- Metadata - landscape block specific metadata and associated publications.
- Usage statistics.

Structure of Digital Landscape Reports (PDF)

- Summary
- Acknowledgements
- Introduction
- Fieldwork methodology
- Presentation of results
  - Stratigraphic description by period (eg Report for Brampton West would start with descriptions of Neolithic pits in TEA 7b/c and Neolithic 'henge' in TEA 12). Each period description to be accompanied by appropriate plans and sections. Finds and environmental data will be integrated, where appropriate, within the reports.
- Finds reports
- Environmental reports
- Discussion and conclusions
- Bibliography

The digital landscape reports will be accompanied by full sets of illustrations and refereed by members of the project's academic panel. The final reports will be typeset and sit within the ADS A14 project structure. This should enable access to a wide audience – far more than traditional published outputs.

3.2 INTERNET ARCHAEOLOGY MONOGRAPH

The results of the A14 investigations will be brought together in an Internet Archaeology peer-reviewed monograph publication. This will be structured by period and then focused upon the main research themes outlined in the UPD.

- Introduction
- Mesolithic to Bronze Age
  - 'Persistent places' in the Mesolithic and Neolithic
  - Monuments as lasting landmarks
  - Dividing and enclosing the landscape
  - Burial Landscapes
- Iron Age
  - Transitions
  - Settlement development and dynamics
  - Communities and connections
  - Agricultural activity
- Roman
  - Transitions
  - Settlement functionality
  - Interconnectivity
  - Landscapes and boundaries
  - Integrated economies (including whole section on the local pottery industry)
  - Ritual behaviours
  - The people
- Saxon and medieval
  - From Roman farms to medieval villages: changes in settlement and landscape
  - Economy, Agriculture and Industry
  - Society and the people
- The post-medieval and modern landscapes

This monograph will feature high levels of interactivity back to the project archive and the GIS, as well as featuring videos, 3D scans of selected objects and reconstructions of sites and landscapes. Digital maps of the A14 site will be placed in their contemporary contexts through data from the Cambridgshire HER. Estimated 60–80,000 words.

3.3 PRINT MONOGRAPH

The principle academic printed output of the A14 project will be a monograph that takes the results of the A14 investigations and examines long term processes of change across the landscape of the scheme. It will also place the results in the context of the wider study area to examine broad economic and social developments from early prehistory to the medieval period, taking into account other large-scale recent work in the area such as at Northstowe, North-West Cambridge and Fenstanton.

- Introduction
- The A14 landscape over time
- Early prehistoric landscapes
- Iron Age and Roman landscapes
- Saxon and medieval landscapes
- Conclusion

It is expected that this will be published as an MHI monograph and will be fully peer-reviewed. After a set period of time (to be discussed) it is anticipated that an Open Access PDF of this monograph would be available as part of the ADS digital archive. Estimated 100,000 words.

3.4 JOURNAL ARTICLES

The scale of the A14 project ensures that there are many elements of great specialist interest that should be highlighted in reports prepared for specific peer-reviewed journals. In most cases these short reports are intended to 'signpost' the main digital reports to respective specialist audiences. These are listed below:

Journal of Roman pottery studies: Small 'signpost' note on the Brampton Kilns and associated industry

Journal of archaeological science: Small 'signpost' report on the integrated isotope analysis

Journal of archaeological science: Short article on evidence for beer and bread in archaeological record

Proceedings of the Cambridge Antiquarian Society: Short 'signpost' article highlighting principle results of the project, co-authored by CAU presenting summary of results from Northstowe

Proceedings of the Cambridge Antiquarian Society: Short research paper on A14 quernstones (development of quern morphology and interplay between 'Romanized' and non 'Romanized' forms as well as relationship between different stone types)

Numismatic Chronicle and Money and Medals: Small 'signpost' articles on the coin results

Proceedings of the Prehistoric Society: illustrated journal article on the Iron Age comb made from human bone and surveying wider parallels for the type and for the modification of human bone. Also a preliminary note in Later Prehistoric Finds Group Newsletter.

Post-medieval Archaeology: Summary article on post-medieval brick kilns

Antiquity/Archaeological Journal: Short paper with appraisal of excavation and post-excavation programme of A14 and methodological 'lessons learnt' for future large scale infrastructure projects – how does the combination of 'big data' research projects and 'big data' landscape excavations (like the A14) change the way we do things and enable us to ask new questions? It is anticipated that this would have a number of co-authors including the principal A14 archaeologist and the Cambridgeshire County Archaeologist.

In addition it is proposed that two of the pottery 'projects' (one the late Iron Age forms and fabrics; the other on the 5th century ceramic traditions) be published in appropriate journals, yet to be decided. Open access would be a key requirement for these reports.

3.5 POPULAR PRINT BOOK

The popular book will be aimed at the general interested reader and present the findings from the A14 archaeological investigations through a series of period-based chapters from Mesolithic to post-medieval.

The book will be informed, interesting, well-illustrated, and attractive and produced with high production values. The popular book will draw on the wealth of research, and analysis that will take place on the project.

The book will be in full colour, Quarto size, up to c 20,000 words, c 150 images, up to c 100 pages. The book will have a print run of 2,000 and a portion of these could be given to stakeholders (eg Highways England), local schools and libraries with the remainder distributed for sale through Oxbow Books. A digital version will also be created (as pdf) and when the book is out of print the pdf version will be made available for free download.

3.6 COMMUNITY ENGAGEMENT

During the 2017–18 program of engagement MHI undertook 34 events reaching over 5,000 individuals. The high level of interest in the archaeology of the A14 project was coupled with an overwhelmingly positive experience by those people who attended and took part.

There are clearly engaged audiences in the communities around the A14 and far beyond; individuals and groups who are keen to learn more about the process and findings of the archaeological work. The post-excavation analysis phase offers excellent opportunities to engage with a range of audiences and to keep communicating about the new knowledge being generated by the archaeological works. A programme of community engagement will be delivered during the analysis stage of the product and will include:

Events

- 30 Lectures to local groups
- Presence at and participation in 15 local events

Participation and Training

› 12 Post-excavation masterclasses

In addition, it is anticipated that school sessions will be conducted through the new Northstowe heritage centre, alongside the production of school teaching legacy packs.

3.7 COMMUNICATIONS

The communications proposal for the A14 archaeological analysis aims to do the following:

› Build on the success and maintain profile and momentum for communications of the A14 archaeology programme.

› Develop communications that respond to Highways England and the A14 scheme's audiences, priorities and milestones.

› Play to the strengths and storytelling potential of the analysis phase, showcase creative research outputs and continued community involvement in the archaeological programme.

› Digital engagement.

› Media engagement.

› Support and publicize the community programme.

› Promote and assist with the development of a digital interactive.

3.8 DIGITAL INTERACTIVE

We will work with an external website developer and in-house specialist teams to devise, deliver and promote a digital interactive that explores the archaeology of the A14, using a map of the route as the main interactive element. The web-based interactive will be visual and engaging and highlight important sites, discoveries, artefacts and findings along the route. Aimed at a non-specialist audience, using appropriate language and visual cues, the interactive could also feature in installations, events or exhibitions, at relevant locations along the route.

3.9 MASTERS TOPICS

MHI are proposing to run four Masters courses, in conjunction with the University of Reading, on topics relating to the A14 excavations and using A14 material. These will be the MHI A14 Highways England Scholars. These aim to focus on areas which would not be covered by the main analysis work, but which have archaeological value in undertaking.

It is proposed that these Masters courses would start in Summer 2020, and would last one year. Students would spend some time in the University of Reading and, depending on the topic of their course, time with specialists within MHI.

The following four topics have been suggested as the subjects of the Masters courses.

The effects of sub-sampling Roman pottery assemblages from large infrastructure projects (2020)

Eniko Hudak (PCA) and Adam Sutton (MOLA) and Mike Fulford (University of Reading)

The aim of the project would be to investigate the possible effects of sampling and sub-sampling strategies of Roman pottery assemblages employed on extensive archaeological investigations due to a variety of constraints (time, finances etc), using the A14 as a case study. This may lead to suggestions that there should be revisions to our current collection and retention policies resulting in more effective use of available resources; or that the 100% collection policy is fit for purpose and sub-sampling heavily affects the results of pottery research. The results would provide invaluable feedback and guidelines for future infrastructure projects, which should also be taken to CIfA for consideration.

The objective of the project would include the extension to full analysis of several of the TEA or landscape group assemblages, following the analysis of the sub-sample of the pottery assemblages. This would allow the comparison of the results of the sample analysis and the full analysis to see whether the targeted analysis of stratigraphically important pottery groups changes the interpretation of the site assemblage. The added benefit of the study would be the full recording of the selected TEA of landscape groups that otherwise would be out of the scope.

This opportunity would benefit students or young professionals of the area who already have some experience with working with pottery and preferably some knowledge of the Roman pottery of Cambridgeshire. It would be recommended to run this project as a collaborative research between MHI/COPA/PCA and the university, to be able to provide specialist support to the candidate undertaking the research.

Nails, craft traditions and taphonomy (2020/21)

Michael Marshall (MOLA) and Hella Eckardt (University of Reading)

Nails are often overlooked within post-excavation work and detailed study has rarely been considered to be an effective use of resources. However, part of the problem is precisely that they are understudied. Insufficient typological, metric and comparative work has been undertaken for us to fully understand their research potential or the best ways of analyzing them and to recognize what a typical or atypical nail assemblage might look like. Work in other parts of the world (eg North American historical archaeology), suggest that nails provide important evidence for past architectural traditions which are otherwise almost invisible and that nails can help to date and characterize activity on a site. We have planned some basic analysis of the assemblage, but a student placement could help us develop this further by:

› Recording more detail about the types and sizes of nails used. Comparing these between sites and periods may reveal differences in architectural traditions or in the character of the above ground elements of buildings.

- The distribution of nails may help us recognize the position of decayed or dismantled buildings that are too ephemeral to be recognized otherwise.
- The quantity of nails used and discarded might tell us about the availability of iron and its value.
- This would also be an excellent opportunity to bring together the sparse examples of well-recorded comparative material in the literature and try and establish broader patterns eg what the fundamental differences between medieval and Roman or urban and rural nail assemblages are.
- Feeding into important national discussions surrounding nail retention/discard and storage.

Large-scale qualitative analysis of non-ferrous metal objects from excavations

Michael Marshall (MOLA), David Dungworth (external) and Hella Eckardt or John Creighton (University of Reading)

Recent work in the Netherlands has highlighted the potential of XRF for large-scale compositional survey of non-ferrous artefacts: https://www.academia.edu/36601182/A_Non-Destructive_survey_of_early_Roman_copper-alloy_brooches_using_portable_X-ray_Fluorescence_Spectrometry.

While surface analyses do not provide the same analytical precision or accuracy of other methods, they are cheap and fast enough that they can be applied at a large scale and could conceivably be routinely applied to entire assemblages from developer-funded archaeology.

The Dutch study suggests that this approach provides useful information that can contribute to our understanding of ancient technology, workshop organization and economies, especially if combined with more targeted quantitative analysis.

This option would require discussion with, and support from, an appropriate archaeological scientist (from University of Reading) who would provide technical advice to the student, access to the equipment and training in its safe usage and the interpretation of results. MHI could provide access to A14 assemblages and information about object typology and date. Access to comparative assemblages of different periods, origins or states of preservation from MOLA and/or Headland sites could be negotiated.

A regional and landscape approach to material culture: Setting the A14 assemblages in their social context

Julie Franklin (Headland), Claire Christie (Headland) and appropriate staff from University of Reading depending on period chosen

MHI specialists already plan to record the A14 small finds in full and to place them in context through comparisons with other local excavated assemblages. However, assistance from a student could allow us to do this work on a more ambitious scale producing a wider or more comprehensive/definitive survey of the material culture of Cambridgeshire (and potentially certain parts of adjacent areas) across a given period (Roman or Iron Age are obvious options but Saxon, Medieval or Bronze Age are possibilities). This option would be somewhat less 'hands-on' than the previous three and would involve compiling and analyzing data from published site reports, the PAS and data from Cambridgeshire County Council. However, it should give any student a very good grounding in the material culture of their chosen period and there would certainly be opportunities to look at and work on the A14 finds in more detail as part of such a study. We could give them training, bibliographic support and guidance; they could help us with data gathering and then go on to write up or co-author discrete sections of the publication.

3.10 DIGITAL CERAMIC COLLECTION

The availability of the A14 Roman ceramic fabric Type Series as an online resource with a regional emphasis will aid in the identification of a comprehensive range of pottery fabrics by other specialists, researchers, commercial organizations, students, local societies and non-professionals (citizen scientists) with a particular interest in the ceramics of the region. It will form a significant and readily accessible resource both within Cambridgeshire and beyond. By including a concordance of comparable resources this will greatly facilitate research between and across regional boundaries.

- To create a comprehensive, publicly accessible and updatable digital database of type sherds for external use.
- To enhance identification of the principal fabrics from the Roman period with images of fresh sherd breaks under magnification.
- To create a visual database of major fabric types.
- To enable comparison of the A14 fabric reference collection with other major online resources, eg Worcestershire Ceramics Online Database (https://www.worcestershireceramics.org/), and the National Roman Fabric Reference Collection (http://romanpotterystudy.org/nrfrc/base/index.php).

Output

- A digital database of the Roman period regional ceramic fabric types made and used on the A14 project (on ADS as part of digital archive).
- A visual guide to these fabric types illustrating both fresh sherd breaks and surface appearance (on ADS as part of digital archive).

4 METHOD STATEMENT

This section provides a summary of the various methodologies that will be utilized to address the research aims outlined above, in order to produce the varied outputs of the project. The finds and environmental method statements can be found in more detail within the various sections of volume 3.

4.1 SITE SEQUENCES

The stratigraphic analysis will be the first part of the analysis work undertaken, before most of the specialist work commences, but after the bulk of the radiocarbon results have been returned. This will involve revisiting all of the contexts in light of the dates provided by the pottery assessments, finds assessments, and radiocarbon dates. The Geographic Information System (GIS) for the project will contain all of this information and will be utilized in this process.

This will be done in relation to the eight landscape blocks, with single stratigraphic authors being responsible for entire landscape blocks (with the exception of 'Brampton West' which, because of its size, will be divided between three people). The contexts will be attributed to sub-groups, groups, and land-uses within these landscape blocks, and assigned to a period (consistent across the entire scheme). This information will be entered into the oracle database, and refereed digital reports written for each landscape block. Full training and a detailed data guidance document will be produced for the stratigraphic authors prior to their start.

The outline methodology for this will be as follows:

1. Attribute contexts to sub-group, group, and land-use:

- Sub-groups:
    - Sub-group contexts, where needed, based on when and how individual contexts were created. This may separate contexts relating to a feature's construction, contexts relating to a feature's use, and contexts relating to a feature's disuse, and will allow a more nuanced understanding of the history of individual features and the overall landscape.
    - These sub-groups will be given identifying numbers unique within the context of the TEA.
    - This level of sub-grouping will only be carried out where there is the information to do so, and where this level of detail will aid interpretation and understanding of the site (it will not be necessary for all groups).
- Groups:
    - Put the contexts (and sub-groups, where applicable) into groups, combining all of the cuts and fills of individual features into one group (eg all cuts and fills within one ditch would be one group).
    - Assign these unique numbers within the context of each TEA. Thus groups (and subgroups) can start from 1 within each individual TEA, so that, for example, there will be a Group 1 on A14-14 and a Group 1 on A14-38. When analyses take place, any elements that share numbers – ie subgroups and groups – are rendered unique because they are always referenced within the context of a sitecode (eg Group 14.1; Group 38.1 etc).
- Land-Use:
    - Assign groups to different 'land-uses', where applicable. This will be an upper level of interpretation, eg combining all grouped burials to form a 'Cemetery', a number of ditches into an 'Enclosure' or 'Field System', etc.
    - These will be named and referred to in the landscape reports and database by the initial of their name and number, within each landscape block (eg Cemetery 1 = C1).
    - As land-uses are sometimes spread across TEAs (eg elements of the same cemetery may appear on a number of TEAs within the landscape block), the land-use interpretation should start from 1 within each landscape block and not each TEA.
    - The following are examples of these – we will produce a full list of land uses, and their definitions, before the stratigraphic analysis starts:
        - Cemetery (C)
        - Field System (F)
        - Enclosure (E)
        - Road/Trackway (R)
        - Boundary (B)
        - Monument (M)
    - The term 'Settlement' will also be used as a label (within the landscape reports and in the database). This is a higher level of interpretation than the land-uses (as different 'land-uses', such as 'Cemetery', 'Enclosure', and 'Road/Trackway', could together form a 'Settlement'). The application of this label will enable comparisons of different settlements across the scheme.

2. Assign groups and sub-groups to periods:

- Periods:
- Assign each of the groups and sub-groups to periods. This will utilize the dating information from the finds and radiocarbon dates, alongside the stratigraphic information.
- The overall archaeological periods will be numbered 1–10, as outlined below:
    - PERIOD 1: Palaeolithic (pre- 10,000 BC)
    - PERIOD 2: Mesolithic (10,000–4,000 BC)
    - PERIOD 3: Neolithic (4,000–2,400 BC)
    - PERIOD 4: Bronze Age (2,400–800 BC)
    - PERIOD 5: Iron Age (800 BC–43 AD)

- PERIOD 6: Roman (AD 43–410)
- PERIOD 7: Anglo-Saxon (AD 410–1066)
- PERIOD 8: Medieval (AD 1066–1485)
- PERIOD 9: Post-medieval (AD 1485–1750)
- PERIOD 10: Modern (AD 1750–present)

- These periods will also be subdivided. This will be consistent across the scheme and will be defined using input from the pottery (or lithics) specialists (before stratigraphic analysis starts). Wherever possible, actual dates (either centuries or years) will be assigned to these. They will use the overall period numberings, with .1, .2, .3, etc added to the period number. For example:

PERIOD	EXPLANATION NAME	DATES
1	Palaeolithic	Pre–10,000 BC
1.1	Lower Palaeolithic	To 180,000 BC
1.2	Middle Palaeolithic	180,000–40,000 BC
1.3	Upper Palaeolithic	40,000–10,000 BC
2	Mesolithic	10,000–4,000 BC
2.1	Early Mesolithic	10,000–6,000 BC
2.2	late Mesolithic	6,000–4,0000 BC

  Where groups or sub-groups cannot be assigned to a closely-defined 'period', they will be assigned to the overall 'Period' (eg Period 6 (Roman) rather than 6.1, 6.2, 6.3, etc).

- Where different phases of activity happen within the same 'period' (ie a quarry pit is replaced by a building, which is then replaced by a field-system, within a timespan of c 100 years, ie one 'period'), this will be identified by the different group/sub-group numbers, and will be discussed within the landscape reports.
- The groups and sub-groups will be assigned to a single 'period' (and cannot cross 'periods'). However, the land-uses can be assigned to more than one 'period' (ie Roman boundaries which last into the Saxon period).

3. Oracle Database:

- Input the group, sub-group, land-use, and period information onto the oracle database, where it can be freely accessed by specialists. Specific columns will be added to the oracle database for this.

4. Landscape Reports:

- Update the 'Post-Excavation Assessment' text and graphics, with these new groupings and periods, to produce the basis of final digital 'Landscape Reports' (one for each landscape block).

4.2 SCIENTIFIC DATING

Radiocarbon dating

Many of the revised research aims for the project outlined in this UPD are dependent upon an increased chronological resolution for the phased site sequences. Although much of this, particularly for the Roman and medieval periods, may achieved through further analysis of chronologically diagnostic finds (pottery, coins etc), it is anticipated that a significant programme of radiocarbon dating will be required.

During fieldwork and assessment phase a total of 47 samples were submitted to SUERC (Scottish Universities Environmental Research Centre) for radiocarbon dating. The results of these are presented in Table 2.005 and have been integrated into the stratigraphic assessments (nb: results from nine samples (from sample ID 2038 onwards) were submitted late in the assessment programme, with results coming in July 2019, too late to be incorporated into the assessments).

TABLE 2.005 Radiocarbon dates

SITE	SAMPLE TYPE	SPECIES DATED	SAMPLE ID	CXT ID	LAB CODE	DATE (BP)	DATE (95.4%)	NOTES/FEATURE
ARFM-A14TEA 2	Cereal grain	Glume wheat	12	20063	SUERC-75283 (GU45477)	3488±34	1901–1695 cal BC	Pit truncating northern terminal of henge
ARFM-A14TEA 10	Cereal grain	Barley	10003	100062	GU45478	date failed	–	–
ARFM-A14TEA 12	Human bone	R Tibia	–	122219	SUERC-75948 (GU45923)	3213±35	1607–1415 cal BC	1546–1415 cal BC (90.3%)
ARFM-A14TEA 19	Sediment	–	AH9/2.30	–	SUERC-82511 (GU49250)	2104 ± 30	201–46 cal BC	Material subsampled from the auger holes in the field
ARFM-A14TEA 19	Sediment	–	AH9/4.70	–	GU49251	date failed	–	Material subsampled from the auger holes in the field
ARFM-A14TEA 20	Waterlogged wood	Elm	20537	204054	SUERC-75947 (GU45921)	1829±35	84–317 cal AD	Aisled building - 84-255 cal AD (93%)
ARFM-A14TEA 7A	Human bone	–	–	723735	SUERC-81194 (GU48511)	1709 ± 26	253–396 cal AD	Legless skeleton

SITE	SAMPLE TYPE	SPECIES DATED	SAMPLE ID	CXT ID	LAB CODE	DATE (BP)	DATE (95.4%)	NOTES/FEATURE
ARFM-A14TEA 7A	Human bone	–	–	723739	SUERC-81195 (GU48512)	1692 ± 26	257–410 cal AD	Legless skeleton
ARFM-A14TEA 32	Charcoal	–	532386	322454	SUERC-80244 (GU48279)	1466 ± 28	550–645 cal AD	COPA date from posthole in Building 32.9
ARFM-A14TEA 32	Human bone	Phalanx and rib	–	320836	SUERC-75287 (GU45482)	1242 ± 34	680–879 cal AD	Burial of a young adult female in settlement gateway
ARFM-A14TEA 27	Burnt animal bone	–	27063	270968	SUERC-75288 (GU45483)	2507 ± 34	792–523 cal BC	EIA metalwork in Pit 270967
ARFM-A14TEA 27	Waterlogged wood	–	27024	271057	SUERC-75284 (GU45479)	2505 ± 34	791–521 cal BC	Context d'base says posthole fill of [271056] - structure?
ARFM-A14TEA 28	Human bone	L. Femur	SK1	280494	SUERC-76922 (GU46443)	3052 ± 25	1401–1231 cal BC	Skeleton 28.2 with amber beads
ARFM-A14TEA 28	Human bone	R Femur	SK1	280494	GU45922	date failed	–	Skeleton 28.2 with amber beads
ARFM-A14TEA 29	Waterlogged wood	–	F29087	290030	SUERC-75285 (GU45480)	2441 ± 34	753–408 cal BC	Log ladder fragment from well 29.1 (290012)
ARFM-A14TEA 29	Waterlogged wood	Birch	F29034	?	SUERC-75286 (GU45481)	2369 ± 34	727–384 cal BC	Y-crotch section from well 29.5 (290586) (542–384 (93.2%))
ARFM-A14TEA 2	Charcoal	Corylus avellana	2015	20078	SUERC-85531 (GU50624)	3427 ± 24	1871–1659 cal BC	To refine date of henge
ARFM-A14TEA 7C	Cereal grain	Triticum sp.	7141	710747	SUERC-85532 (GU50625)	899 ± 24	1041–1210 cal AD	Building 7B.1- late Saxon 'link' between the middle Saxon settlement and the DMV?
ARFM-A14TEA 7C	Cereal grain	Triticum aestivum	73504	735927	SUERC-85533 (GU50626)	1245 ± 24	682–868 cal AD	SFB 7C.1 - largest SFB - contemp with posthole buildings?
ARFM-A14TEA 7C	Charcoal	Corylus avellana	73657	738342	SUERC-85537 (GU50627)	1161 ± 24	775–962 cal AD	Building 7C.3 - middle Saxon building, in a row
ARFM-A14TEA 7C	Charcoal	Quercus sp	76308	761199	SUERC-85538 (GU50628)	1294 ± 24	665–769 cal AD	Building 7C.39 - Early Norman 'blacksmiths' - major building
ARFM-A14TEA 7C	Cereal grain	Triticum sp.	73259	734713	SUERC-85539 (GU50629)	1160 ± 24	775–963 cal AD	Building 7C.20 - middle Saxon building - diff construction with beam slots
ARFM-A14TEA 9	Cremated bone	Human Tibia	–	90010	SUERC-85540 (GU50630)	3146 ± 24	1496–1319 cal BC	Single undated and unurned cremation burial
AFRM-A14TEA 12	Charcoal	Quercus sp	12571	122230	SUERC-85541 (GU50631)	3548 ± 24	1955–1774 cal BC	Basal fills of Ring Ditch (henge)
AFRM-A14TEA 14	Cereal grain	Triticum sp.	14133	142362	SUERC-85542 (GU50632)	551 ± 24	1316–1430 cal AD	SFB 14.1
AFRM-A14TEA 15	Bone	Human femur	–	151594	GU50633	date failed	–	Crouched burial 15.4
AFRM-A14TEA 16	Cremated bone	Longbone fragment	16261	161780	SUERC-85543 (GU50634)	3141 ± 24	1495–1310 cal BC	Burial in Cremation Cemetery 16.6
AFRM-A14TEA 19	Bone	Human longbone	19017	190173	SUERC-85547 (GU50635)	1685 ± 24	260–415 cal AD	Single inhumation burial (probably Roman)
AFRM-A14TEA 20	Charcoal	Quercus sp	20130	201193	SUERC-85548 (GU50636)	3405 ± 24	1754–1632 cal BC	5 post thing (timber circle)
AFRM-A14TEA 20	Bone	Human- R. Femur	–	204136	SUERC-85549 (GU50637)	1738 ± 24	242–381 cal AD	Burial truncated by late Roman ditch
AFRM-A14TEA 27	Cremated bone	Longbone fragment	27043	270869	SUERC-85550 (GU50638)	3096 ± 24	1423–1291 cal BC	Undated cremation
AFRM-A14TEA 27	Cremated bone	Tibia	27039	270850	SUERC-85551 (GU50639)	3079 ± 24	1414–1277 cal BC	Undated cremation
AFRM-A14TEA 28	Human bone	Tibia	–	281064	SUERC-85552 (GU50640)	2247 ± 24	390–208 cal BC	Inhumation tightly bound
AFRM-A14TEA 28	Human bone	Human- L Femur	–	281210	SUERC-85553 (GU50641)	2246 ± 24	390–208 cal BC	Inhumation inside roundhouse
AFRM-A14TEA 28	Human bone	–	28033	280354	SUERC-85557 (GU50642)	2939 ± 24	1219–1052 cal BC	?Possible BA cremation?
AFRM-A14TEA 28	Human bone	–	28654	285607	SUERC-85558 (GU50643)	2145 ± 24	352–95 cal BC	?Possible RB cremation?

SITE	SAMPLE TYPE	SPECIES DATED	SAMPLE ID	CXT ID	LAB CODE	DATE (BP)	DATE (95.4%)	NOTES/FEATURE
AFRM-A14TEA 31	Human bone	–	–	310215	GU50644	date failed	–	Skull from well
AFRM-A14TEA 41	Human bone	–	–	410448	SUERC-85559 (GU50645)	1971 ± 24	39 cal BC–76 cal AD	Iron Age or Roman inhumation
AFRM-A14TEA 2	Charcoal	Prunus avium	2038	20144	SUERC-87207 (GU51485)	1629 ± 20	355–534 cal AD	Sunken Featured Building 2.1
AFRM-A14TEA 7C	Cereal grain	Triticum sp.	76446	760916	SUERC-87208 (GU51486)	1254 ± 24	674–863 cal AD	Largest middle Saxon Building 7C.22
AFRM-A14TEA 7C	Cereal grain	Bread/club wheat	76331	739580	SUERC-87209 (GU51487)	807 ± 21	1191–1269 cal AD	Medieval retting pits (Pit Group 7C.41)
AFRM-A14TEA 10	Cereal grain	Avena sp.	10266	103365	SUERC-87210 (GU51488)	1284 ± 24	669–770 cal AD	'BA' cremation burial 10.1
AFRM-A14TEA 11	Charcoal	Corylus avellana	11045	110627	SUERC-87214 (GU51489)	1395 ± 20	612–664 cal AD	SFB 11.3 (biggest on site)
AFRM-A14TEA 12	Charcoal	Quercus sp.	12343	121534	SUERC-87215 (GU51490)	1573 ± 20	424–540 cal AD	SFB 12.9
AFRM-A14TEA 12	Charcoal/Grass seed	Quercus sp. Poaceae sp	12407	121727	SUERC-87216 (GU51491)	3490 ± 24	1886–1746 cal BC	BA cremation cemetery 12.1
AFRM- A14TEA 20	Cereal grain	Triticum dicoccum	20895	207420	SUERC-87217 (GU51492)	1669 ± 24	265–422 cal AD	late Roman field systems 20.1
AFRM- A14TEA 32	Charcoal	Quercus sp.	32638	324022	SUERC-87218 (GU51493)	1309 ± 24	659–768 cal AD	'Neolithic' Pit Group 32.2

It is anticipated that c 450 further radiocarbon dates will be required at the analysis stage. Four hundred of these are outlined below divided by landscape block, TEA (targeted excavation area) and period, and with reference to project research aims. The remaining 50 dates will be left 'floating' in order to target specific research questions/queries that arise during the course of the analysis. The application of Bayesian modelling will aid in refining the dates and allow for more nuanced chronological questions to be asked. There is a need to select, locate, prepare and submit the 400 samples as soon as possible so that the resulting dates can be returned prior to the start of stratigraphic analysis. Modelling of these dates will be carried out by SUERC with help from the stratigraphic authors.

TABLE 2.006 Proposed radiocarbon dates for analysis phase

LANDSCAPE BLOCK	TEA	PERIOD	RESEARCH QUESTION	FEATURES DATED	ESTIMATED NO. DATES	SPOT DATE/ MODELLING
Alconbury	2–4	Early prehist	Establish relationship between cremation burials and the 'henge' monument	Cremation burials	6	Spot date
	5	RB	Identification of possible 5th century activity	Samples within 'dark earth' spread over large part of site. Infant burial.	10	Model
Brampton West	7a	Early prehist	Dating of prehistoric burials and possible relationship with BA field systems	Inhumation burials; Field ditches	2	Spot date
	7a	RB	Chronological resolution of earliest RB horizons (Roman conquest and/or the Boudiccan revolt) & latest horizons (5th century)	Features stratigraphically 'earliest Roman' (early 'military' enclosure ditch) and 'latest Roman' (enclosure ditches, pits and postholes/beamslots of buildings)	10	Model
	7b/c	LIA	Chronological resolution of latest 'LIA' horizons (Roman conquest and/or the Boudiccan revolt)	latest modifications to LIA dicthed enclosure systems and ditches and pits which truncated the main Iron Age enclosures	8	–
	7b/c	Early-Mid Saxon	Chronological resolution of early/middle Saxon dispersed settlement into middle Saxon consolidated settlement (one large short-lived 'phase' of occupation or smaller settlement over longer period?); dating of apparently associated agriculture/field-systems	Variety of sunken-featured buildings and post-built structures; associated pits/wells; any secure contexts from field ditches	40	Model
	7b/c	Late Saxon	Chronological resolution of contraction/ abandonment in the later Saxon period (latest phases of activity within the 'middle Saxon' settlement and the earliest phases of activity within the 'Later Saxon' area)	Variety of 'latest' structures from mid Saxon settlement; ditches, pits, wells and structures associated with late Saxon settlement	15	–

LANDSCAPE BLOCK	TEA	PERIOD	RESEARCH QUESTION	FEATURES DATED	ESTIMATED NO. DATES	SPOT DATE/ MODELLING
	7b/c	Medieval	What date did activity within the medieval village start?; possible later phase of activity (later 14th/15th century)?; Dates of medieval industry?	Contexts belonging to earliest and latest phases of medieval village - mainly structural features (esp blacksmiths), burnt pits, retting pits, antler-working waste.	15	–
	7b/c	Geoarch	Characterise the landscape change during the existence of the palaeochannel.	Pollen subsamples from monolith.	9	–
	10	Early prehist	Chronological and spatial relationship between inhumations and cremation burials in the Bronze Age.	Inhumation burial and cremation burials; barrow ditch.	10	Model
	10	LIA-RB	Evidence for continuity of activity (as opposed to continuity of place) between the later Iron Age and the Roman period; Dating of burials.	Features stratigraphically 'latest LIA' (ditches, pits) and 'earliest Roman' (ditches, pits), especially those in vicinity of spine ditch (Ditch 10.20); cremation and inhumation burials.	12	Model
	10	Early-Mid Saxon	Dating of early/middle Saxon dispersed settlement.	Sunken-featured buildings and post-built structures, field-system ditches.	12	Model
	11	Early prehist	Dating of burials.	Cremation burials.	2	Spot date
	11	RB	Analysis of architecture (dating of apparently late Roman buildings); Dating of burials; Identification of possible 5th century activity (significant latest RB pot).	Post-built structures (RB or Saxon?); inhumation burials; latest 'Roman' features (pits).	10	Model
	11	Early-Mid Saxon	Dating of early/middle Saxon dispersed settlement.	Sunken-featured buildings, pits.	8	Model
	12	Early prehist	Determine the function and significance of ring ditched monument; relationship between Bronze Age cremation cemeteries, earlier and contemporary monuments; chronological and spatial relationship between inhumations and cremation burials.	Ring ditched monument (full sequence through monument); cremation and inhumation burials.	16	Model
	12	Early-Mid Saxon	Dating of early/middle Saxon dispersed settlement.	Sunken-featured buildings and post-built structures.	12	Model
Brampton South	13	LIA	Chronological resolution of latest 'LIA' horizons (Roman conquest and/or the Boudiccan revolt).	Secure contexts from sub-rectangular ditched 'ladder' enclosures.	2	Spot date
West of Ouse	14	RB	Evidence for continuity of activity (as opposed to continuity of place) between the later Iron Age and the Roman period; Broad horizons of change within the Roman sites (abandonment of settlement and imposition of field systems); dating of burials.	LIA 'waterholes, 'early Roman' waterholes; features stratigraphically late within phase 2 of RB settlement (waterholes, pottery kilns and 'workshop'); later field ditches; inhumation burials.	10	Model
	15	Early prehist	Understanding Bronze Age settlement.	Posthole structure, pit alignment.	8	Spot dates
	16	Early prehist	Relationship between Bronze Age features and earlier monuments; identifying the longevity and tempo of use of barrows and cremation cemeteries.	Cremation cemetery and monuments (Bayesian modelling?).	25	Model
	16	Geoarch	Determine whether the palaeochannel is contemporary with the early Bronze Age or Roman phases of the site.	Pollen subsamples from monolith.	9	–
River Great Ouse	19	Geoarch	Dating palaeochannel sequence for pollen analysis.	Pollen subsamples from monolith.	15	–
	20	RB	Chronological resolution of transformation to villa; identifying the 5th century.	Features early in stratigraphic sequence of Roman phase 2 (ditches, pits); latest 'Roman' features (field ditches).	6	Spot date

LANDSCAPE BLOCK	TEA	PERIOD	RESEARCH QUESTION	FEATURES DATED	ESTIMATED NO. DATES	SPOT DATE/ MODELLING
Fenstanton Gravels	27	Early prehist	Dating of burial with bronze awl.	Inhumation burial.	1	Spot date
	27	RB	Dating of burials.	Inhumation burials.	2	Spot date
	28	Early prehist	Chronological and spatial relationship between inhumations and cremation burials; identifying the longevity and tempo of use of cremation cemeteries.	Cremation and inhumation burials (Bayesian modelling?).	20	Model (if necessary)
	28	RB	Evidence for continuity of activity between the later Iron Age and the Roman period; dating of burials.	Latest IA and earliest RB features (ditches, pits, post-built structures etc); cremation and inhumation burials.	12	Model
	28	Geoarch	Dating pond sequence for pollen analysis.	Pollen subsamples from monolith.	5	–
	29	IA	Dating of burials; early-later IA transitions.	Cremation burials; selection of contexts (boundary ditches, four-post structures, wells) spanning EIA to LIA.	7	Spot date
	31	IA	Dating of burials.	Cremation and inhumation burials.	2	Spot date
Conington	32/3	Early prehist	Refinement of Neolithic and Bronze Age occupation, including chronological relationship of barrows and settlement/agricultural features.	Selected pits, boundary/enclosure ditches and ring-ditches.	8	Spot date
	32/3	IA	Transitions (Refining chronological sequence LBA - EIA - MIA - LIA).	Selected pits and enclosure ditches.	6	Spot date
	32/3	RB	Refinement of establishment of early Roman settlement (possible official status?); identifying the 5th century; dating of burials.	Selected early Roman enclosure ditches, post-built structure, 'early' cremation burials; selected latest Roman contexts (esp those with late Roman and early Saxon pottery), 'late' inhumation burials.	8	Spot date
	32/3	Early-Mid Saxon	Refinement of move from an unenclosed (semi)-dispersed settlement into the consolidated and enclosed middle Saxon settlement; abandonment of settlement.	Selected sunken-featured buildings, posthole structures, boundary ditches and pits.	40	Model
Bar Hill	37/8	LIA/RB	Evidence for continuity of activity between the later Iron Age and the Roman period; dating of burials (cemetery and non-cemetery).	Selected enclosure ditches, pits and waterholes; inhumation burials and cremation burial.	10	Model
	41	IA	Refinement of change from unenclosed to enclosed settlement.	Selected roundhouse ditches and boundary ditches; infant burial from roundhouse.	5	Spot date
	41	Geoarch	Dating ditch sequence for pollen analysis.	Pollen subsample from monolith.	2	–
Total					400	

Dendrochronology

A total of 14 samples from timbers from excavations along the A14 Cambridge to Huntingdon improvement scheme were supplied for dendrochronological analysis during the assessment phase. These timbers were located within a range of features strung along the length of this long road improvement scheme. The material is from a range of dates, and a range of wood types. Samples from 9 timbers contained between 30 & 78 rings and each was dendrochronologically analyzed. No dating evidence was obtained, 3 timbers from a Roman well feature were found to cross-match each other.

4.3 DATABASE/GIS

The A14 excavations have generated huge quantities of digital data (see digital archive section), and the appropriate utilization of these data is crucial in addressing many of the research aims outlined in this UPD. The following section outlines the tasks required for the analysis stage on different aspects of the digital data.

Oracle Database

MHI utilizes a cross team archaeological database created using Oracle Cloud technologies, and this has been populated during the A14 excavations. This same system is being used during the post-excavation phases where the data therein will be enhanced, extended and analyzed. The system enables team members, whether they are in the JV or contracted to it (COPA, PCA and external specialists), and wherever they are physically located, to use a shared, validated central data source, enforcing uniform and disciplined input, and providing high levels of data security. As the system supports the post-excavation analysis effort, it will become even more useful to the project, allowing data to be analyzed and quantified, and for useful approaches to be shared amongst team

members. It will also deliver a crucial element of the analysis, which is to enable the spatial data to be thoroughly interrogated alongside the non-spatial data. MOLA has been using Oracle based relational database system in conjunction with GIS for more than two decades and will bring this standard practice to the A14 PX works. Training will be provided for all new users of the Oracle database.

The Oracle database holds a core data set for all contexts, but the cost of data-entry for detailed descriptive information would have been prohibitive at this scale of work. To allow wider access to these detailed records for the analysis process, we will undertake a programme of bulk-scanning the context record sheets. This will offer several outputs and benefits:

› PDF copies of each context record. These will be made available via the Oracle database and so can be viewed by anyone involved in the analysis work. This has also removed the need for a data assistant role on the project as there will be far fewer requests for access to the paper record.

› Automated digitization of selected fields (tick boxes) from the context record sheets. This will provide information that will allow for some more detailed analyses – for example helping us to refine the accuracy of volumetric sample analysis by taking into account the profile of cut features.

› The potential for archiving more of the primary record digitally to allow even wider access.

Further work is required in revising Oracle forms for the context data (final grouping and phasing) and for certain specialist areas. This will involve transferring tables and forms from Oracle 11g (existing Mola database) to 12c (Cloud-based database), the creation of relevant VB reports for reporting on the same, and time for testing, specialist liaison and support. There are four new (or revised) forms needed and nine forms yet to be transferred. This work will need to be completed prior to the start of the stratigraphic and specialist analysis, alongside the scanning of the context sheets.

Preparation and dissemination of spatial data on Geographic Information System (GIS)

› MHI will make spatial data available using ArcGIS Online, an industry-standard GIS server platform. This will afford varying levels of access:

› Direct data access to desktop GIS users within MHI for detailed analysis

› A detailed web-based map experience with basic analysis capability for specialists and other stakeholders

› Summary web-based maps for wider access, if required.

Data to be provided:

› Audited survey data in polyline format (the final result of the fieldwork phase)

› Centroids showing a representative location for each context, for intra- and inter-site analysis of specialist data (to be generated)

› Derived datasets containing specialist information as appropriate (to be generated)

› Aerial imagery, where available (to be finalized)

› Other relevant background information.

It is proposed to assess the survey and spatial data management methodology as part of the overall reporting for the project.

Volumetric Analysis

MHI intends to pioneer the application at scale of volumetric corrections to finds and environmental data, as this is a key methodological requirement of many of the research aims outlined in this UPD. By taking into account the overall volume of an archaeological feature, and the volume sampled, it is possible to normalize densities of eco- and artefactual remains, and improve comparisons within and between sites. Although not a new concept, this has never been attempted on a major archaeological project. A basic methodology has been established, which will be refined and assessed during the analysis project. The data required is derived from a combination of sources, including detailed survey data, digitized records and specialist databases. It is expected that this will provide sufficient data for all sites, and so help inform the entire analysis process. This will also provide a significant methodological precedent and a rich comparator for other projects in the area and beyond.

Preparation of images

In order to make site photography available to the entire analysis team, it is proposed to connect the images directly to the existing project database. This will maximize the value of this vital asset by allowing direct and easy access from the existing primary data portal. A degree of data preparation is required to enable this. It is proposed to assess the overall photography and photo management methodology as part of the overall reporting for the project.

Oracle database and GIS/Data management and support

The project team will require regular support to access and understand the available data, learn the necessary skills and to facilitate more complex analysis. MHI will provide dedicated database and GIS/data support for the duration of the works.

4.4 GRAPHICS

The A14 post-excavation analysis programme will involve an extensive graphics component, which will be required for the multiple proposed outputs. Illustration requirements will be as follows:

Landscape report illustrations

The digital reports for each landscape block will require a selection of detailed phase plans, appropriate section drawings, photographs, detailed figures of specific features and structures and, where appropriate, more analytic illustrations to help with site interpretation (distributions, site/feature models etc).

Finds illustrations

Almost all of the artefact categories will require some element of illustration, provisionally identified as the following:

ARTEFACT TYPE	APPROXIMATE NUMBER OF ILLUSTRATIONS	ILLUSTRATION TYPE
Coins	104	photograph
Small finds	947	photograph, line drawing, section, group
Flint	10	line drawing
Worked stone	30	photograph, line drawing, section
Glass	18	photograph, section
Worked wood	21	photograph, line drawing, section
CBM/kiln furniture	129	photograph
Pottery	750	photograph, line drawing, section

Approximately 290 of the finds will have to be cleaned by a conservator prior to illustration.

Environmental and osteological illustrations

A certain number of illustrations will be required for the environmental analysis, including pollen diagrams, figures for geoarchaeological landscape and vegetation modelling and occasional photographs of rare plant remains. The osteological analysis will ale require some illustrations and digital photographs of human remains.

Monograph illustrations

The Internet Archaeology A14 monograph will be structured around the research themes outlined in this document. As the monograph is intended to bring together the results of the entire A14 excavations, new landscape scale and comparative illustrations will be required. This monograph will also be highly interactive and this will include a number (10–15) of photogrammetric products - 2D georeferenced orthomosaics and 3D georeferenced models. These will include selected finds, pottery kilns, the brick kiln and burials.

The print landscape monograph will also require additional illustration in terms of mapping, modelling and comparative plans of sites and structures. It is furthermore intended to produce a number (7–8) of reconstruction illustrations of landscapes and buildings from different sites and periods. These could be used in both the print and digital monographs where appropriate

Other illustrations

The considerable number of journal articles and the popular publication will mostly make use of existing illustration (especially the reconstructions for the popular book), though most of these will have to be adapted for the format of the particular journal or book. A few new illustrations will also be required and some figures simplified for the popular book. Some further illustration will also be needed for the digital interactive.

4.5 FINDS

The method statements for all A14 finds categories are presented below, taken from the full assessments found in Volume 3. During analysis, finds specialists/teams will identify artefacts/groups that have significance or are relevant to display and highlight these so that they can be easily retrieved if necessary.

Ceramics

The A14 excavations produced just over 2.8 tons of pottery, comprising over 216,000 sherds. The vast majority of this pottery was datable to the Iron Age and Roman periods, although just over 5,000 sherds of earlier prehistoric pottery, and just over 10,000 sherds of post-Roman pottery, was also recorded.

Earlier prehistoric and post-Roman assemblage

Full recording and analysis will be carried out of all earlier prehistoric, early Iron Age, and post-Roman (Saxon and medieval) pottery. This will integrate the results of the final stratigraphic analysis, phasing, and land-use interpretations. There will also be landscape-scale synthesis of these pottery assemblages.

Iron Age and Roman assemblage

For the Iron Age and Roman pottery, full recording and analysis will be carried out on a significant sample of key groups of pottery, integrating the results of the final stratigraphic analysis, phasing, and land-use interpretations, and utilizing any further radiocarbon determinations. There will also be landscape-scale synthesis of the Iron Age and Roman pottery assemblages.

The sampling strategy will follow that outlined in the 'pottery assessment' (see vol 3.2). This outlines that c 60% of the total assemblage will be fully recorded and analyzed, guided by a flexible sampling 'policy'. This policy will be based on a set of advisory criteria driven by the project research aims, which the pottery specialists can apply as necessary. These criteria will be:

- The level at which assemblage 'components' are selected for inclusion in the sample should be the feature/deposit group (unstratified pottery will not be included in the sample unless a particularly good reason can be found for doing so).

- Sampling should be conducted in liaison with the stratigraphic author(s) dealing with the site.

- The total sample allocated for analysis should not exceed 60% of the overall assemblage total (calculated based on sherd count).

- The requirement to select contexts directly relevant to the wider project aims (these being dictated by the period-specific project aims laid out in the UPD, and the pottery-specific recommendations laid out earlier in this volume) and to the wider interpretation of the specific site (these being communicated by the site stratigraphic author) can also be considered here.

Other work on the Iron Age and Roman pottery assemblage will include:

- Radiographic study of a sample of substantial profiles of late Iron Age date, to collect technological data on changing forming techniques.

- Petrographic analysis of later Iron Age fabrics. This will involve petrographic assessment of the main fabric groups, cross-referenced with background literature on the local geology and the results of analysis of clay samples from the scheme. Geochemical analysis may also verify and/or expand upon the results of the petrographic work.

- Synthetic characterization study of the late Iron Age Aylesford-Swarling vessel types, incorporating vessel types found on other south Cambridgeshire sites.

- Full analysis of the pottery industry uncovered on the TEAs to the west of Brampton, including:

    - Full recording of all production-related groups, including recording of all evidence for firing faults;

    - Fabric analysis – characterization of pottery fabrics and analysis by petrography and geochemistry. Scientific work augmented by the study of clay samples taken from various contexts along the route of the A14 excavations in this area;

    - Petrographic and geochemical analysis of kiln structure remains;

    - Analysis of seed impressions found on the surfaces of kiln structural remains;

    - Full analysis of botanical assemblages associated with kilns;

    - Analysis of kiln structures themselves, including comparison with the OAE Brampton kilns and – where necessary – the seeking of parallels elsewhere.

    - Consideration of any registered finds able to be contextually associated with pottery production, in attempt to identify finds which may have been used in a pottery production role.

- Full analysis of other pottery production evidence (Horningsea kiln on TEA 38; kiln on TEA 20; kiln on TEA 28; LIA kiln groups on TEA 10)

- Consideration of the nature of late Roman pottery deposition and the dating of these contexts.

- Petrographic and geochemical analysis of a sample of shelly wares from TEA 20, and comparison with results from Camp Ground site at Earith.

Recording methodology

Recording will be conducted in the Oracle database system. A custom version of the pottery recording form will be set up, based upon extensive consultation and trialing by the pottery specialist team, and with a project-wide coding system for pottery fabrics, forms, and decorations.

Focused Research Projects and Analysis

There will be four focused research areas within the pottery work (three carried out within the main pottery analysis programme, and one as a Masters Course). Further details about each of these can be found in the Pottery Assessment (vol 3). These areas of research are:

Later Iron Age Ceramic Traditions improved characterization of the late Iron Age potting tradition

Specific methods which have been scoped out as part of this study are:

- Collation and synthesis of late Iron Age ('Aylesford-Swarling') types represented on A14 sites, and on major sites excavated in southern Cambridgeshire since 1980. Illustration of a representative selection of these types will also be a feature of the work, as will contextualization in terms of the geographical and likely cultural affinities of the different types. This work will be conducted by pottery specialists (both in-house MHI and external contractors) on the project team.

- Fabric (incorporating petrographic and complimentary geochemical) analysis of samples of common fabric types found on A14 sites, with the aim of ascertaining provenance determinations for the different fabric categories. This will contribute significantly towards the aim of assessing the degree to which pottery was moving into/around southern Cambridgeshire during this period. Fabric analysis will be conducted at the Department of Archaeology, University College London.

- Radiography of a selection of substantial profiles. Radiographic analysis can allow determination of forming methods employed in pottery production, and thus assist in the characterization of technological/stylistic change through time. Specifically in relation to the LIA, it can gather data on the specific modes of employment of the potter's wheel. The venue for this work is yet to be confirmed.

Pottery Production in the Lower Ouse Valley the A14 excavations have produced one of the largest groups of associated pottery kilns discovered in recent decades and offer us the potential to investigate the industrial history of this part of Cambridgeshire.

Specific methods as part of this study are:

- Full recording of all production-related groups.

- Formal (macroscopic) description of fabrics for all wares likely to have been produced in the kilns.
- Illustration of a representative selection of vessels being produced in the kilns, acknowledging distinctions between vessels being produced on different TEAs or in different kilns/ groups of kilns.
- Fabric (petrographic and complementary geochemical) analysis of fabrics defined in the analysis of production groups. Comparison between fabric samples and clay samples collected from A14 production sites and nearby geological contexts.
- Analysis of kiln structural material, including botanical analysis of organic impressions in the surfaces of some of these.
- Analysis of kiln structures themselves, including technological assessments and seeking of parallels on other contemporary pottery production sites.
- Full analysis of archaeobotanical assemblages from inside the kilns, as well as detailed consideration of the stratigraphic situation of the samples from which these assemblages derived.
- Consideration of any registered finds contextually associated with pottery production which may have been used as potters' tools.

The Fifth Century the investigation of potential 5th century pottery assemblages is significant in relation to the overall project aims. Investigation will be carried out of the ceramic assemblages from the four sites with considerable latest Roman activity (TEAs 5, 7A, 20 and 32–33), combined with a significant programme of radiocarbon dating and consideration of other finds and the site stratigraphy. Well-dated pottery groups will be fully recorded, discussed, and published.

Testing the Sampling Strategy (Masters Project) the sampling approach taken for the Iron Age and Roman pottery assemblages will be tested against full quantification of several of the assemblages. This will involve the post-analysis recording of the unselected 40% of a small number of the A14 assemblages and comparing the resulting site-level data against those derived purely from the analysis of the sampled 'key group' material. It is proposed to conduct this recording and analysis work in the form of a masters-level dissertation project undertaken at the Department of Archaeology, University of Reading (see 'Masters Courses' in 'Outputs' section).

Retention/Discard

All pottery of early Iron Age date and earlier, and Anglo-Saxon period and later, will be retained in full. All ceramic small finds will also be retained.

A retention limit of 40% of the Iron Age and Roman pottery has been set. This quantity will be divided evenly between the Landscape Blocks of the A14 scheme, so that (initially, at least) each Landscape Block is provided with a 40% 'budget' for the retention of Iron Age and Roman pottery. In practice, though, these 'budgets' will be applied flexibly.

The assumption is that the 60% of the Iron Age and Roman pottery that is not to be retained in the archive is the same 60% that was selected for inclusion in the fully-recorded sample – effectively this will be material preserved by record. If this is not to be the case then a separate Advisory Document will be produced by the pottery specialist (in consultation with the site stratigraphic author), justifying why the fully-recorded pottery is to be retained.

A Reserve List will also be established by which pottery groups can be earmarked for retention at a higher level, due to their categorically clear and intrinsic value to the research themes of the project and/ or wider agendas. A preliminary version of the Reserve List includes:

- fabric samples to be included in a physical fabric reference collection.
- all illustrated pottery.
- all pottery groups considered to relate to pottery production, ie kiln groups, waster dumps, etc.
- any pottery groups identified as being of fifth century date.

All effort will be made to find constructive use for the pottery discarded from the archaeological archive. This will involve consultation with the Cambridgeshire Heritage Environment Team (CHET).

Outcomes

- A pottery database stored with the ADS and will include context-level and spot-date data recorded at the assessment stage, as well as full records of all pottery dating to the early Iron Age or earlier, and the early Anglo-Saxon period and later, and all later Iron Age and Roman pottery included in the sample;
- Supplementary data, results, and documentation associated with a project designed to test the validity of the sampling strategy;
- Documentation in the form of:
  - Full reports for each period of each Landscape Block;
  - All pottery illustrations and photography;
  - A written sampling strategy for each Landscape Block;
  - A written Retention Advisory Document for each Landscape Block – this should be produced in brief even if this is just a statement that the pottery included in the 60% sample is that which is to be kept.
- A physical fabric reference collection, as well as an associated online resource;
- A physical archive satisfying the conditions of this document.
- A digital ceramic collection.

Coins and tokens

122 coins were unidentifiable in the assessment stage (although most could be tentatively assigned to "Roman", "medieval, etc"). Further study of these is recommended, including research into them. See table in 'Coins Report' for list of these. Any missing coins will also be identified and catalogued.

Research into numismatic data for the area around the A14 will be undertaken, to place the coins in their regional context.

104 coins have been recommended for photography. These are the coins which are uncommon or in superb condition. Nine coins require additional conservation/cleaning. See tables in 'Coins Report' for lists of these.

A coin report for the whole project will be produced, in reference to the revised research aims. Specific journal articles, targeted at the numismatic audience, will also be produced, highlighting the coin assemblage and signposting the full report (in 'Numismatic Chronicle' and 'Money and Medals').

All coins will be retained.

Registered finds

A total of 2606 registered small finds and 4168 registered iron nails were recovered. These are predominantly of metalwork, with other of finds of stone (including shale, jet and amber), ceramic, bone and other skeletal materials. The following lays out recommendations for the post-excavation analysis and publication of the small finds and nails from the A14. These tasks have been divided by period, due to the quantity of finds involved.

These tasks will be carried out in order to feed into the online database, contribute to the digital landscape block reports, and produce thematic finds contributions to the project publications. Several short stand-alone finds publications/reports are also recommended, such as on the Iron Age bone comb; a landscape study looking at trends of artefact distribution, taphonomy, and material culture; and the patterns of nail use.

GENERAL TASKS (ALL PERIODS)

MHI SPECIALIST TASKS
COMPLETE BASIC FINDS RECORDING
Ensure all relevant finds seen by appropriate specialist and data complete. Clean data, improve consistency and explore uncertain and void context numbers
The finds database for each TEA will require updating and edited/finalised for the analysis stage in light of the research aims, further analytical work on the artefacts and improved contextual information. Feedback about dating will be passed to the project members.
Photograph remaining x-ray plates at 50 plates/day. 114 existing plates + 65 plates for remaining nails (see below)
X-ray analysis of objects where this was not possible during (JF), amend catalogue where necessary
Locate missing finds: Circulate list of outstanding/missing objects to all MHI and project finds staff and undertake appropriate searches; record successfully located objects; re-check the original registers for information about missing or (?) non-existent objects and formally declare them lost/exclude them from further work if appropriate.
Identify evaluation finds whose fids spots fall within the TEAs. Many diagnostic finds were recovered from the evaluations, particularly Roman artefacts. Though the contexts of these finds is likely to be poorly understood, some are of significance and should be considered with the rest of the assemblage. These finds should be archaeologically located and if relevant, physically located and examined and catalogued by an appropriate specialist
Assess & catalogue new Cotswold finds (Headland – JF) – 4 finds
Assess & catalogue new Cotswold finds (MoLA – M/LB) – c 120 nails, c 40 other finds, mostly iron, with single bone bead, worked antler, worked shell
X-ray analysis of Cotswold finds – 155 iron, 3 copper alloy
MATERIAL IDENTIFICATION/SCIENTIFIC ANALYSIS
Objects requiring additional material identification or scientific analysis will be extracted, repackaged and provided to the appropriate specialists. Catalogue entries will be updated as appropriate with new information
Bone objects (up to 216 objects)
Antler objects (deposit of medieval antler-working waste and Roman antler-working waste, ZooMS ID of selection of samples from each to identify species)
Stone objects (up to 91 objects)
Ceramic objects (up to 186 objects)
Ceramic objects thin section and ICP analysis (35 objects)

Scientific analysis: copper-alloy objects metals (up to 94 prehistoric objects, 35 Saxon objects, 50 medieval objects)

Jet and jet-like objects. 12 objects. X-radiography, XRF and individual assessment under a microscope. Gemma Cruikshanks, Fraser Hunter, Alison Sheridan & Mary Davis, National Museum of Scotland

MPO (mineral-preserved organic) analysis by Margarita Gleba, U of Cambridge. 3 samples (Saxon buckle & two Roman bracelets) SEM fibre analysis x 3 samples.

NAILS

X-ray and fully assess/quantify all remaining iron nails, c 1608 nails

Catalogue and measure all nails from funerary contexts

Catalogue and measure nails from selected contexts at TEAs 05, 07, 20 and 28 and any unique nails from other sites. Final selection to make after stratigraphic phasing complete

To photograph the remaining X-Ray plates. 114 plates (remaining unphotographed X-ray plates) and 65 plates for the remaining nails.

ADDITIONAL BASIC TYPOLOGICAL RESEARCH AND COMPLETION OF CATALOGUE

Diagnostic or potentially diagnostic objects that have been recorded to only a basic level and/or are flagged for further research will be re-examined by an appropriate period specialist once preliminary phasing information phasing is complete.

Edit and proof-read small finds database. Data fields and catalogue text will be standardised, edited and finalised

LIAISON

Liaison with illustrators

Conservation: Objects requiring investigative conservation will be extracted, repackaged and provided to the conservation team. Objects will be re-examined after conservation and catalogue entries/ identifications on the database will be updated as appropriate

Liaison between finds specialists and excavators

Attend project meetings

PREPARATION OF INTEGRATED FINDS/STRATIGRAPHIC NARRATIVES FOR EACH LANDSCAPE BLOCK (ALL PERIODS)

MHI Specialist tasks

PHASING/DATING CHECKS AND CHANGES

Results of initial phasing/spot-dating will be checked against finds dating for discrepancies and any problems will be highlighted and investigated, with objects and stratigraphy being re-dated if appropriate.

After basic finds recording is complete and the site phasing is finalised, undatable material may be assigned a date on contextual grounds where appropriate.

PREPARE SITE OVERVIEW DATA AND PUBLICATION TEXT

Final data cleaning/check and generation of integrated stratigraphic/finds data for analysis

Prepare basic summary statistics tables/charts and analysis GIS layers for each site assemblage, broken down by stratigraphic phase/period and by period/material/function.

Prepare a concise finds narrative for integration with the stratigraphic text with summaries at period and land-use level and more detailed mention of finds/deposits of very high intrinsic interest. NB More detailed analytical text (eg comparative analysis of sites, detailed discussion of buildings of graves etc) should be related to a period-specific research question and accounted for separately below.

Edit site report text.

BRONZE AGE

MHI Specialist tasks

Additional post-conservation research of the Bronze Age metalwork to refine identifications

Research Bronze Age funerary material culture and rites in the region and produce text for integration with wider stratigraphic and osteological analysis

Research and write a short introduction/overview to the entire Bronze Age small finds assemblage to accompany the digital dataset, placing it in its regional context through reference to other local assemblages. Automatically generate an accompanying pdf form catalogue

EXTERNAL TASKS

Report on the amber necklace from TEA 12, by Dr Alison Sheridan, NMS

IRON AGE

MHI SPECIALIST TASKS

OVERVIEW

Research and write an introduction/overview to the entire Iron Age small finds assemblage to accompany the digital dataset, placing it in its regional context through reference to other local assemblages. Automatically generate an accompanying pdf form catalogue

AGRICULTURE AND ECONOMY

Re-examine and research Iron Age craft working tools and waste (49 dated; 27 undated in (?)IA contexts); integrate results of scientific analysis, plot distributions through space and time and write synthetic discussion

Research Early Iron Age hearth tool F27020–1

Research undated (?) Iron Age spud F29023

DRESS

Re-examine and research Iron Age dress and toilet assemblage (91 objects): re-examine the finds and finalise/enhance data, collate regional comparative evidence from published sources and the Portable Antiquities Scheme, undertake mapping and quantitative analysis at both inter and intra-site level and write discussion of regional evidence for Iron Age dress

FUNERARY/BURIAL FINDS

Research into human bone comb F38165 and preparation of short stand-alone article, visit National Museum of Scotland to examine key parallels

Check context details of finds from possible grave(s). Produce burial catalogue where appropriate

WEAPONRY

Survey regional evidence for weaponry in the Iron Age and late Iron Age building on existing corpora (eg Stead 2006; Inall 2015) and researching site/types and contexts in more detail. Produce a spatial and contextual analysis of distribution and deposition and write a discussion of the context of violence in the local Iron Age

EXTERNAL TASKS

Analysis of Iron Age fibre/cordage by Dr Susanna Harris, U of Glasgow

ROMAN

MHI FINDS SPECIALISTS

LATE IRON AGE/ROMAN TRANSITION

Research the artefactual evidence for conquest-era imports and incomers (especially soldiers) across the scheme and in the local area, particularly the distribution of early militaria and mid-1st-century Continental brooch types

Research the local evidence for continuity in material culture between the late Iron Age and Roman period. What classes of finds continue through the transition and on what sites?

SETTLEMENT

Quantitative comparison/ characterisation of finds assemblages across the site hierarchy, include A14 sites and other sites from the region

Detailed spatial analysis and discussion of larger Roman small finds assemblages from TEAs 02–04, 05, 07, 10, 20, 28 and 38 aimed at revealing large-scale patterning in systemic activity and deposition

POTTERY PRODUCTION

Research types of tools found at other pottery production sites

In conjunction with pottery specialists review tools and objects of unknown function as candidates for potting tools and all objects found in close association with kilns

Research and write summary of evidence for potting tools

ROMAN INDUSTRY AND INFRASTRUCTURE

After finds recording and initial site phasing are complete the Roman tools and waste assemblage data should be re-assessed and functional classifications sub-divided (eg wood working, stone working, metal etc) or revised as appropriate to allow for systematic analysis

Research other tools from the region

Research the tool and waste assemblage in terms of specific nuances of practice. Liaise with other project team members working on complementary evidence

Research and write analysis of the distribution of tools and waste across the A14 landscape and through time

BURIAL EVIDENCE

Liaise with osteologists and stratigraphic analysts and produce burial catalogues/summaries for all appropriate sites. Integrate MPO report if results are positive

Research other regional grave goods/coffin furniture assemblages and look for parallels/differences

Write contribution to analysis of identity and burial rites

ROMAN ARMY

Research other sites in the region and the PAS to determine what kinds of militaria appear and on what sites. Collate data

Explore distribution of A14 militaria in relation to the wider regional dataset

Liaise with other specialist for any insights into military consumption patterns etc and compare results

Write summary of the military assemblage and its significance

ROMAN-SAXON TRANSITION

Compare phased assemblages from transitional sites (Roman/transition/Saxon)

Examine Roman objects in Saxon contexts for signs of extended use/object biographies

Research the jet Medusa amulet F12006 looking at its context and wear patterns and comparing these to other known examples

Liaison with Saxon finds specialist

DEPOSITIONAL PRACTICE

Consider site summary/narrative data from across the scheme in terms of broad patterns of material and deposition. What was entering the ground, when and wear

Using common classes of artefact (eg brooches, hones, spindle whorls) try to establish if there are meaningful norms as to the condition artefacts are in and where they are deposited

Draw together evidence for deposits believed to be placed/structure

Write summary of depositional practice

INDIVIDUAL OBJECTS OF IMPORTANCE (PRINCIPALLY LIBRARY VISITS)

Research unusual shale (?)Roman (?)armlet

Research scalpel from TEA 20

Research clasp knife fragments from TEA 28

Research possible potter's flywheel from TEA 11

Research possible vehicle fitting from TEA 15

EXTERNAL TASKS
Dr Roger Tomlin to provide epigraphy report for bone from TEA 04 and two lead curses
Dr Stephen Greep to advise on bone-working waste assemblage from TEA 04

SAXON

MHI FINDS SPECIALISTS
TEAs 10, 11, 12, 16: Record stone artefacts (not yet seen)
TEA 32 Analyze distribution of finds in SFB fills
TEAs 10, 11, 12, 16, 32: Analyze and report on spinning/weaving equipment and prepare thematic report
All sites: Study and report on dress accessories, including results of metallurgical and MPO analysis
All sites: Study and report on other categories of finds
All sites: Write thematic text on manufacturing, trade and exchange

EXTERNAL TASKS
TEAs 05, 12: Discussion of possible brooches and other problematic Anglo-Saxon metalwork finds with Leslie Webster, Barry Ager and other specialists:
TEA 10: Check fossil inclusion in loom weight (and any others found during analysis stage) at Natural History Museum
TEA 10: Research and write up bone pipe F10085, specialist Graeme Lawson

MEDIEVAL AND POST-MEDIEVAL

MHI FINDS SPECIALISTS
TEA 07 research into blacksmith's forges and their associated fids assemblages. Research into rural smithying and ironworking in Cambridgeshire.
Research into post-Conquest antler-working, regarding remains at TEA 07 (assuming dating confirmed)
Follow up on evaluation find of seal matrix, does this find spot fall within TEA 37–38 and if so, is it worth publishing, either as part of the main project publication or as a stand-alone (eg Medieval Archaeology notes and news or Finds Research Group newsletter)

EXTERNAL TASKS
C14 analysis of poss fallow deer antler working remains from TEA 07 (assuming the species ID is confirmed)
C14 dating of disarticulated human bone associated with possible coffin handle at TEA 41 to investigate whether this is of recent date

NAILS

MHI FINDS SPECIALISTS
Calculate nail densities by site and period in relation to excavated area and proxy measures (eg quantities of pottery or other finds)
In conjunction with stratigraphic authors and woodworking specialist, consider range of nail types (and sizes where possible) present in the different assemblages and their likely functions/relationships to architectural traditions. Write thematic text for inclusion into A14 Monographs
Write final archive nail report summarizing assemblage by type and comparing nail use across sites and period. Extract the final selection of nails for retention and illustration (estimated 20 nails)
Edit nail texts/reports and check drawings

UNDATED AND CROSS-PERIOD

CROSS-PERIOD
Characterise and discuss broad patterns of deposition in the longue durée. Are there any patterns to distribution in relation to the landscape/topography/settlement/agriculture? What was the taphonomy of these different types of objects over different periods, eg chance losses/refuse disposal. What types of finds were regularly lost and why? How did communities dispose of their rubbish? Is it possible to recognize middening, off-site disposal, on-site household or communal rubbish pits/dumps or votive deposition?
What are the fundamental differences between prehistoric, Roman, Saxon and medieval finds assemblages? How does the materiality and range of material culture shift through time? Can we think of way that these trends can be effectively communicated to the public and contribute to a long-term historical perspective on life in the Cambridgeshire landscape?

SPECIFIC UNDATED OBJECTS IN NEED OF FURTHER RESEARCH
Research bone beads (multiple sites)
Research unidentified ?pendant or chatelaine fitting F72030
Research tubular (?)silver object F107635
Research iron vessel or tank fragment from TEA 12

ILLUSTRATIONS

PERIOD	PRELIMINARY NO OF FINDS RECOMMENDED FOR ILLUSTRATION
Prehistoric	16
Bronze Age	22
Iron Age	45
Late Iron Age/Roman	46
Roman	335
Saxon	164
Medieval	58
Medieval/post-medieval	23
Post-medieval	14
Undated objects	224
Total	947

CONSERVATION

Preliminary suggestions for conservation have been flagged in the MOLA CDE Oracle registered finds database. Some are clearly higher priority than others and choices will be subject to change once research priorities and display/archive issues are more closely defined (eg conservation of post-medieval finds may be deemed unnecessary). Some undated finds have been flagged for conservation in order to determine their antiquity and if these prove to be of recent origin then cleaning can cease. Stratigraphic analysis will have bearing on whether some finds are a priority or not. The numbers broken down by period are as follows:

PERIOD	PRELIMINARY NO OF FINDS RECOMMENDED FOR CONSERVATION
Prehistoric	5
Bronze Age	19
Iron Age	17
Late Iron Age/Roman	51
Roman	226
Saxon	59
Medieval	54
Medieval/post-medieval	16
Post-medieval	12
Undated objects	432
Total	891

DISCARD

All finds need to be kept until after analysis has been completed. A number of finds can be discarded after analysis.

Given the large quantity of nails and their very modest research potential, we recommend discarding most of them. Key exceptions will be Iron Age nails, Roman hobnails, medieval horseshoe nails and any nails from burials or other contexts of specific importance. Well-preserved complete examples of specific types represented on the scheme will be extracted and preserved. We estimate that under these guidelines more than 85% of the nail assemblage will be discarded.

Some poorly stratified and very modern material may discarded. Completely corroded small metal fragments could also be discarded. A sample of the Anglo-Saxon loom weights might be considered for discard, but this should only be carried out if there are record

drawings and photographs and if a sample from discarded examples is kept for future fabric analyses.

Lithics (flint and other chipped stone)

A total of 5,045 pieces of worked flint and 3,611 fragments of burnt unworked flint were recovered from the excavations along the route of the A14. The worked flint assemblage from the A14 provides a significant body of material that demonstrates continuous human activity in the area from the early Mesolithic through to the Bronze Age.

All of the worked flint from the larger assemblages will be recorded in more detail. Excluding all chips and irregular waste and the smaller assemblages from TEAs 08–09, 21, 26, 29, 34 and 46, this is a total of 4,157 pieces of worked flint. This will include:

- Assessment of post-depositional damage and surface alteration (cortication or staining).
- Full technological and metrical analysis:
  - Recording of butt type, termination type, hammer mode, and flake type.
  - Recording of platform edge abrasion and dorsal blade scars.

Further study will be carried out of microliths and flaked axes. This will also include analysis of their context data and comparison to published examples.

Time will spent gaining a better understanding of the depositional contexts of the larger groups of material, particularly the potential Neolithic pits; and scheme-wide spatial analysis will provide a fuller interpretation of the phasing and activity across the sites.

The assessment report will form the basis of the final report. Some time will be needed to compare the assemblage to other published flint assemblages from the region.

A small number of flints should be illustrated, potentially the flaked axes, the large leaf shaped arrowhead (F310586) from TEA 31, at least one example each of the plano-convex and scale-flaked knives, and one example each of the chisel and oblique arrowheads.

All burnt unworked flint may be discarded. All worked flint should be kept and archived according to standard local practice.

Worked stone

In total, 1840 fragments of stone were submitted for analysis. The majority of these (348 represented by 1531 fragments) are from querns - saddle querns, rubbers, rotary querns and millstones. The total assemblage of querns from the A14 is highly significant as it is unusual to find so many complete or substantially complete examples in a single assemblage. The range of stone types offers the potential to significantly expand our knowledge of the patterns of production and distribution of querns in the region, the development of quern morphology, different processing tasks (through analysis of wear patterns), structured deposition, and the agricultural economy.

Particularly interesting examples of worked stone include the post-Roman miniature quern from TEA 27 which is likely to have been used to grind nuts or spices rather than grain; the millstones from TEA 28 (suggesting that some grain was being ground or dehusked prior to onward distribution); and the querns and millstones from TEA 38 (potentially indicating the presence of a crop processing centre).

Full recording of the assemblage of querns, millstones, and building stone will be carried out. Some querns will be subject to further analysis to determine their lithology and provenance, including:

- Puddingstone querns of probable French origin that will need to be compared to French specimens;
- Lava querns of likely German origin that should undergo XRF analysis;
- Querns of unidentified 'Millstone Grit' types that should be examined in thin section to closer identify their mineralogy.

A review will be carried out of all the querns and millstones in the region, including plotting the distribution and density of querns and millstones, and linking this with evidence from the grain processing centre at Earith. This will develop a picture of how grain processing and flour production were organized in the Roman economy.

30 worked stone objects are recommended for illustration.

All unworked stone can be discarded, and the undiagnostic lava quern fragments can be discarded after they have been fully recorded and any samples retained for XRF analysis. The remaining querns should be retained.

Glass vessels

A total of 338 fragments of vessel glass were recovered. Most of the vessel glass is Roman or post-medieval in date but a possible Saxon fragment came from TEA 10 and small quantities of undated/undatable material were present on several sites. The Roman glass assemblage include some important vessels but is generally modest in character. It will be reported on, as part of an integrated finds narrative for each site, and as an A14-wide specialist report (treating the material synthetically).

The high-status vessels from TEA 10, TEA 20 and TEA 32 will be published, particularly given the use of some of them as deliberately placed deposits. This will be done as a site report, and as a short note in an appropriate specialist biannual publication such as Glass News or Lucerna.

No further work is recommended for the Saxon or post-medieval glass.

Eighteen Roman vessels merit illustration (see table in 'Glass Report' for list of these).

No conservation is required for the glass. The small chips of undated glass and post-medieval glass can be discarded.

Clay tobacco pipe

The excavations along the route of the A14 Cambridge to Huntingdon Link Road produced a small group of 67 clay tobacco pipe fragments, comprising seven complete or fragmented pipe-bowls and 60 plain stem fragments, which together span the mid-17th to early 19th century. No further work recommended for the clay pipes, and they can all be discarded from the archive, perhaps for use in a handling collection.

Leather

A total of 7 very fragmentary groups/finds of leather were recovered. The leather assemblage has modest potential, due to its small size and poor preservation. It does not merit stand-alone publication, but the material should be included in site-reporting and integrated into the Roman and Saxon small finds reporting. This will particularly focus on the Roman leather from TEA 14 and TEA 28 (which make a modest contribution to our understanding of Roman dress traditions and their adoption in the Romano-British countryside), including exploring other proxy measures for leather shoes (eg iron hobnails); and the Saxon shoe from TEA 20.

No finds are recommended for illustration, with the possible exception of the Saxon shoe from TEA 20. Conservation has already been done. All leather finds will be retained.

Worked wood

Worked wood was recovered from 12 TEAs. The worked wood assemblage dates from the early Iron Age through to the Saxon period and displays a range of woodworking styles and materials. This assemblage is comparatively rare so justifies intensive targeted study, focusing on the best-preserved examples, to answer questions about tool kits, woodworking technologies, activities, the status and culture of the populations, and regions of ancient treeland. Comparative material from the region, particularly utilizing CAU's work in the area, will be considered.

Of particular interest is the elm timber from TEA 20, which is unique in Roman Britain and offers opportunities for testing recent theories of the Roman introduction of the iconic common field elm as an Italian clone for the first time. This will be analyzed fully.

Radiocarbon dating, tree-ring study, genetic study, and microscopic wood species checking is recommended for the following items:

Priority C14 samples

- TEA 10 - weathered knotty oak notched log ladder (F10133), late prehistoric or ?Saxon, from outer part of log
- TEA 19 - sample from stake [19002]
- TEA 28 - cattle poke (F78122), Roman
- TEA 29 - sample from stake (F29113) (from well pit with undated notched log ladder and stirring paddle)
- TEA 33 - oak notched log ladder (F33146), not yet dated, late prehistoric?
- TEA 38 - part worked oak crotch (F38297), late Iron Age or Roman?

Priority tree-ring study ('dendro dating') samples: all oak with over c 50 annual rings

- TEA 07 - 4 samples from oak plank box well (F72595) (some double nos but all from same unique box well lining, Roman, but with sap date may be tight?
- TEA 07 - left half log (F73131) c 50 rings with full sapwood, Saxon?
- TEA 10 - a dugout well timber [604762] 2 overlapping samples narrow rings c 70 + with bark on one sample, Saxon?
- TEA 19 - timber [19001], late prehistoric?

Samples for possible genetic study

- Two samples retained from Roman elm structure in TEA 20 to see if of possible Italian Roman origin?

Samples for microscopic wood species checking

- TEA 19 - Stake [19002] BA?
- TEA 20 - Poss elder branch (F70038), was ID'd as ?hazel but has woolly pith and elder characteristics, please check species
- TEA 28 – F78122, Y shaped possible cattle poke, Roman, no species ID listed
- TEA 29 – F29060, twisted withy, IA?
- TEA 29 – F29087, Y crotch ladder, C14 done, species ID not

21 items are recommended for illustration.

In consultation with Cambridgeshire Council, a number of timbers have already been discarded after recording and sampling for dendro, species ID or C14. A total of 29 timbers (currently in tanks) have been kept.

It is recommended that the oak ladders from TEA 10 and TEA 29, the paddle from TEA 29, and a selection of plank well lining from TEA 07 (marked * in above table) are retained for the archaeological archive and the remainder discarded from the archive post-analysis. This preservation will be digital (with 3-D scans and creation of VR models). Any physical retention (which would require conservation at the Mary Rose Trust facilities) will be decided during the PXA review and costed at that stage.

Building material

A large assemblage (c 670kg) of building material and a lesser quantity of kiln furniture was recovered from the A14 excavations. Of particular interest are the Roman tile from TEA 20; and the 19th century brick clamps on TEA 7C.

The building material and kiln furniture will be compared with the detailed stratigraphic sequence and dating evidence. A scheme-wide overview of the assemblages from all TEAs should prove

information on the use and distribution of certain fabric types, which in turn may provide clues as to the likely geographic origin of certain brick and tile types.

For the purposes of the assessment a relatively small proportion, around 5–15%, of the building material and fired clay from each crate of most TEAs was recorded. For the analysis phase of the project, further sample recording (c 25%) will be carried out. This will involve recording material from a wider range of contexts, thereby increasing the percentage of building material and kiln material recorded. Priority will be given to:

- Roman brick and tile – particularly from TEA 05 and TEA 20.
- Post-medieval brick and tile – particularly from TEA 07. The majority of post-medieval brick and tile from TEA 20 and TEA 28 still requires recording.
- Iron Age/Roman kiln structure and kiln furniture – particularly from TEA 07 and TEA 11. The majority of daub and fire clay from TEA 28 still requires recording.

The building material assemblage includes a considerable amount of what appears to be shelly pottery in certain sequence 2 and sequence 3 TEAs. The building material assemblage will be examined by a pottery expert to confirm what shelly material is actually pottery and to determine whether this requires to be recorded.

The CBM material that was not recorded during the assessment or in the targeted sample recording will be rapidly scanned. Any significant items will be extracted and recorded.

The A14 assemblage will be compared with other Roman tile recorded in the same area of Cambridgeshire, particularly if this can help date the fabric types present. In particular, priority should be given to comparison with any Roman ceramic tile fabric reference collections which may exist in Cambridgeshire or surrounding counties.

A particularly distinctive Roman tile group are characterized by frequent very small black iron oxide inclusions (fabric CA2). It would be interesting to know if the products of this tilery have been found elsewhere in Cambridgeshire or surrounding counties.

The unusually small rectangular bricks would also benefit from further investigation.

Scientific analysis (eg XRF) on the fine sandy tiles with very distinctive white rod like inclusions (fabrics CA41 and CA49) to establish their source. It will also be useful to establish if tiles which exhibit slight variations in fabric are in fact from the same tilery but made from slightly difference sources of clay.

Research will be required on the chronological difference in the date range of each fabric type and the similarities and differences in their chronological distribution.

The types of kiln furniture and kiln structure present will be shown to a finds specialist with experience of the types of kiln material present in Cambridgeshire. Further research using published sources will also be required.

Any publication report will examine the different methods of kiln construction and any differences based on chronology or function.

Various stone types will require identification by a trained geologist with specialist knowledge of Cambridgeshire stone types and the location of possible quarries exploiting each stone type (see worked stone).

Further research is need on the form of clamp fired brick kilns in use in the Cambridgeshire area during the 19th century. Further research on clamp firing using published sources will also be required.

It is recommended that 42 pieces of brick/tile are illustrated for publication (either by drawings or photography), and 27 pieces of daub/kiln furniture/kiln structure.

It is envisaged that, with targeted further recording and scanning the remainder, some c 70% material could be safely discarded. Certain classes of building material are always retained (Roman/Saxon keyed and unkeyed box-flue and voussoirs tiles, unusually small rectangular bricks, signature marks, accidental marks such as paw and finger marks, and tiles covering the range of form and fabric types present). The fired ceramic items of medieval and post-medieval date retained from the A14 include a possible floor tile, brick 'wasters', roof tiles with nail holes, and any deliberate or accidental markings present (the latter are normally rarer than on Roman tile).

Industrial waste

Material interpreted as archaeometallurgical debris was recovered from 24 sites along the A14 Cambridge to Huntingdon Improvement Scheme, totaling c 239kg. It provides abundant evidence for iron smithing from the Iron Age to the medieval period. This comprises diagnostic iron smithing slags (smithing slag cakes and hammerscale). The non-diagnostic iron working slags can be confidently ascribed to iron smithing due to the absence of any iron smelting slags. This assemblage has great potential to provide information on iron smithing technology and practice in a rural setting over two millennia

The evidence for Iron Age, Roman, Saxon and medieval metalworking will be analyzed (the post-medieval industrial waste is not considered worthy of further analysis). This will include intra-site spatial distribution (comparing the range and volume of evidence for metalworking between different types of sites, and of different dates), and the inter-site analysis (identifying zonation of industrial activities, and of the discard of waste). Analysis of the smithing hearth bottoms and hammerscale will also be carried out, to gain an understanding of the types of working being carried out. These will also be considered in relation to the wider area, including (for example) comparison with the Roman RRSP sites with evidence for smithing.

Analysis will focus particularly on the medieval smithy from TEA 7C. This will be compared with other known smithies, and fine detail spatial analysis will be carried out on the hammerscale and slag (to gain an understanding of the spatial analysis of activity). The slag

and smithing hearth bottoms from this area will be analyzed, to understand the types of smithing activities and scale of work.

The only finds that may be worth illustrating are the tuyere fragments.

All the material should be retained until after analysis. Once the material is fully recorded it is likely that only diagnostic residues and those from well-stratified contexts that can be tied to specific periods of metalworking activity need be retained in the archaeological archive.

The morphological classification of the ironworking debris will be achieved primarily through the data generated by Cubitt (2018) during the assessment of the assemblage. This will be supplemented in two ways. Firstly, selected items will be re-examined following Cubitt's recommendations. Secondly, the stratified and phased diagnostic iron smithing slags (smithing slag cakes) will be re-examined and classified using Serneels and Perret (2003). The opportunity will also be taken to determine slag density (using Archimedes principle).

A selection of the stratified and phased smithing slag cakes will be sectioned to determine microstructure and chemical composition (as well as any variation of this within a single sample). Particular attention will be paid to any 'stratigraphic' evidence within individual smithing slag cakes that might be related to changes in smithing activity. This will be achieved by embedding sections in resin. These sections will be polished and examined using a scanning electron microscope (SEM). The energy dispersive spectrometer (EDS) attached to the SEM will be used to collect extensive area analyses as well as data on the chemical composition of individual phases.

All of the data will be reviewed and analyzed using MS Excel which will provide publication ready charts of various types (depending on the nature of the data).

All of the work will be carried out by David Dungworth who has 28 years' experience of archaeometallurgy, including updating the Historic England (2015) guidance. Sample preparation and analysis will be facilitated by existing relationships with the Open University (sample polishing) and the universities of Portsmouth and Southampton (access to SEM-EDS).

Conservation

The substantial finds assemblage from the A14 excavations ensures that there is a significant need for conservation. All conservation work will be carried out in accordance with currently accepted standards of best practice (as defined in MAP2, now incorporated within MoRPHE) and the requirements laid out in Cambridgeshire County Councils guidelines for deposition of archaeological archives (2017).

Conservation work at the analysis stage will include the cleaning of objects to answer questions asked by the finds specialists, such as what is the material? Is the object decorated? What is the cross section? It will also include preparing objects for photography and illustration.

With the iron small finds, conservation will aim to reveal the basic shape and any sections required by only removing loose soil/ corrosion but will not undertake full conservation of the complete object. The copper alloy patinas from most of the TEAs appear to be fragile and require consolidation.

A number of TEAs produced waterlogged material. The large structural timbers will be conserved by external specialists, once a decision has been taken about what is to be retained. If required, this will be an additional cost.

X-radiography will need to be completed before any analysis phase is started and the material fully catalogued. It is likely that a number of objects will be identified at that point as requiring conservation input to clarify detail.

All conserved objects will be packed in archive quality materials and stored in suitable environmental conditions. All object treatment work will be recorded on record cards, with additional conservation or analytical reports filed in the site project directory.

Conservation will also be part of the preparation for archive deposition and will need to liaise with MOLA Northampton archivists to ensure the smooth transfer of material to the receiving body. This may include discussions about disposal or simply to advise on the safe storage of material. Maintaining the archive needs to be done during the length of the whole project; the silica gel which produces the desiccated environment for the metal small finds will need to regenerated every year.

The table below lists the items that have been identified as requiring investigative conservation to clarify form and decoration and to assist with identification by the finds specialists, and a list of objects recommended for photography and illustration.

	TOTAL NO. OF SMALL FINDS	TOTAL NO. ALREADY CONSERVED	TOTAL NO. FOR INVESTIGATION	TOTAL NO. FOR ILLUSTRATION
TEA 02–04	150	42	10	21
TEA 08–09	1	0	0	0
TEA 13	3	2	0	0
TEA 19	34	5	2	1 + 1 bulk
TEA 21	3	3	0	0
TEA 26	1	1	0	0
TEA 27	52	9	5	5
TEA 29	47	6	6	2 + 1 bulk
TEA 34	0	0	0	0
TEA 37-38	318	13	29	24 + 2 bulk
TEA 41	45	1	4	12
TEA 46	103	12	6	2
TEA 5	870	170	63	20
TEA 10	321	21	40	34
TEA 10B (east)	10	2	2	0

	TOTAL NO. OF SMALL FINDS	TOTAL NO. ALREADY CONSERVED	TOTAL NO. FOR INVESTIGATION	TOTAL NO. FOR ILLUSTRATION
TEA 14	96	5	10	8
TEA 15	61	2	5	4
TEA 28	1042	96	77	35
TEA 32-33	493	59	36	31
TEA 07	1085	90	134	25 + 3 bulk
TEA 11	123	16	11	9
TEA 12	217	15 + 5 bulk	33	1
TEA 16	59	2	2	5 + 4 bulk
TEA 20	2576	340	129	103
TEA 30-31	30	4	3	3

Note that it is proposed to undertake the iron x-ray and investigative conservation on finds from five landscape blocks (Brampton South, Alconbury, Bar Hill, West of Ouse and Connington) during the mobilization phase, in order to streamline the process by which finds can then be analyzed.

4.6 ENVIRONMENTAL

Plant remains

Over 9,000 samples were taken for the retrieval of environmental material from across the A14 road scheme. These come from a large variety of features and from contexts with a range of dates, though with Iron Age and Roman features being most common. At this assessment stage there are still considerable numbers of samples from undated contexts

The results of the assessment study of the charred and waterlogged plant remains from each TEA were considered alongside stratigraphic information, phasing data and the potential of each assemblage to address archaeobotanical and wider archaeological research themes. Samples were selected for analysis based on the following criteria:

- Abundant concentrations of well-preserved plant remains;
- Assemblages belonging to a context of high significance, as defined within the stratigraphic assessment report;
- Samples containing unusual species and food remains;
- Assemblages from deposits for which information on this type of deposit and/or period is scarce;
- Charcoal fragments where of a size suitable for identification;
- Material with secure radiocarbon dating potential;

This has identified 906 samples recommended for full analysis, though this is dependent on secure dating of the current unphased samples. These are shown in the table below.

LANDSCAPE/TEA	NEOLITHIC	BRONZE AGE	IRON AGE	ROMAN	SAXON	MEDIEVAL	POST-MEDIEVAL	UNDATED	TOTAL
ALCONBURY	**10**	–	**8**	**14**	**3**	–	–	**5**	**40**
A14-2	10	–	–	–	3	–	–	–	13
A14-4	–	–	1	3	–	–	–	–	4
A14-5	–	–	7	11	–	–	–	5	23
BAR HILL	**–**	**–**	**17**	**15**	**–**	**–**	**–**	**10**	**42**
A14-41	–	–	6	–	–	–	–	2	8
A14-46	–	–	–	1	–	–	–	–	1
TEA 38	–	–	11	14	–	–	–	8	33
BRAMPTON SOUTH	**–**	**1**	**6**	**–**	**–**	**–**	**–**	**3**	**10**
A14-10B East	–	–	2	–	–	–	–	2	4
A14-13	–	1	4	–	–	–	–	1	6
BRAMPTON WEST	**2**	**4**	**52**	**133**	**74**	**49**	**3**	**54**	**371**
A14-10	–	1	19	15	4	–	1	8	48
A14-11	–	–	–	17	5	–	–	2	24
A14-12	2	3	–	4	11	–	2	8	30
A14-7	–	–	33	97	54	49	–	36	269

LANDSCAPE/TEA	NEOLITHIC	BRONZE AGE	IRON AGE	ROMAN	SAXON	MEDIEVAL	POST-MEDIEVAL	UNDATED	TOTAL
CONINGTON	**4**	**3**	**5**	**17**	**17**	**–**	**–**	**3**	**49**
A14-32	4	1	–	7	17	–	–	2	31
A14-33	–	2	5	10	–	–	–	1	18
FENSTANTON GRAVELS	**–**	**–**	**46**	**127**	**–**	**–**	**–**	**22**	**197**
A14-26	–	–	–	–	–	–	–	2	2
A14-27	–	–	–	3	–	–	–	2	5
A14-28	–	–	17	122	–	–	–	17	156
A14-29	–	–	16	–	–	–	–		16
A14-31	–	–	13	2	–	–	–	3	18
RIVER GREAT OUSE	**–**	**–**	**8**	**109**	**–**	**–**	**–**	**24**	**141**
A14-20	–	–	6	109	–	–	–	24	139
A14-21	–	–	2	–	–	–	–	–	2
WEST OF OUSE	**1**	**8**	**11**	**23**	**6**	**–**	**–**	**7**	**56**
A14-14	–	–	5	8	–	–	–	1	14
A14-15	–	–	1	7	–	–	–	3	11
A14-16	1	8	5	8	6	–	–	3	31
Total	17	16	153	438	100	49	3	130	906

These samples will be analyzed for charred and waterlogged plant remains and charcoal as follows:

LANDSCAPE BLOCK	CPR	CHARCOAL	WATERLOGGED
Alconbury	20	10	10
Brampton West	246	87	38
Brampton South	2	8	–
West of Ouse	35	16	5
River Great Ouse	101	23	17
Fenstanton Gravels	148	35	14
Conington	36	13	–
Bar Hill	28	10	4

During analysis charred and waterlogged plant remains will be identified to the highest taxonomic level possible by comparison to modern reference material housed at MOLAHeadland and seed atlases including Cappers et al (2006) and Zohary et al (2012). Nomenclature for wild taxa will follow Stace (2010).

A minimum of ten charcoal fragments will be randomly selected from each sample for species identification with a minimum fragment size of 2mm. Wood charcoal fragments will be fractured manually, and the resultant anatomical features will be observed in transverse (TS), radial (RLS) and tangential planes TLS), using high power binocular reflected light (episcopic) microscopy at magnifications of x 50, x 100 and x 400. Identifications will be carried out to as high a taxonomic level as possible by comparison with material in the reference collections at MOLAHeadland, and various reference works (eg Schweingruber 1978; 1990; Hather 2000). Where possible a record will be made, of the ring curvature of the wood as well as details of the ligneous structure, in order to determine the part of the woody plant which had been burnt and the state of wood before charring (Marguerie and Hunot 2007). The charcoal will also be examined for evidence of biological degradation in the form of fungal hyphae. It will also be inspected visually for any irregular patterns of channels which could result from boring insect or woodworm degradation (Marguerie and Hunot 2007).

Analysis results will be recorded onto the ORACLE analysis database. The analysis data will remain standardized in order to allow comparison to be made between plant remains from sites across the A14 scheme and sites across the UK. An integrated methodological approach will be applied in order to focus on areas which will include:

› Identification of crop choices and characterization of botanical assemblages per period and landscape type.

› Identification of crop processing stages and practices to be determined through ratio analysis, discriminant analysis and the physical characteristics of weed seeds.

- The investigation of cultivation practices including intensification, land preparation, manuring and tillage using a range of methods including the Functional Interpretation of Botanical Surveys (FIBS) looking at the functional attributes of weeds, and comparison of the A14 data to known weed floras associated with different husbandry regimes. This will also include a review of supporting archaeological evidence such as artefactual remains, field systems and marks.

- Spatial plotting using of analysis and assessment data to look for patterns in species distribution to inform nature of local environment, the utilization of resources, areas of activity on a site and areas of activity in buildings.

- Landscape characterization: local and wider landscape for all sites/all periods using charred and waterlogged plant remains including charcoal.

- The investigation of the seasonal use of kilns and the relationship between the agricultural cycle, food preparation and the pottery industry.

- The analysis of wood species used for structural features, domestic and industrial fuel as well as cremation pyre practices.

The main outputs for publication and dissemination include:

- Archaeobotanical contribution to developing the narrative for each landscape block, addressing research themes set at site, landscape, period, regional and UK wide levels

- Contribution to major project publications

- Contribution to peer-reviewed journals

- Creation of an online digital open-access archive of archaeobotanical data tables

- Contribution to the A14 Isotope analysis project

Following the completion of the identification and analysis of the plant remains the intention is to select and retain botanical specimens that characterize assemblages associated with specific period types and ecological groups in order to create a comprehensive reference collection. It is intended for this reference material to be openly accessible for anyone to use.

Given the number of samples taken and the size and diversity of the archaeobotanical assemblage it would be worthwhile contacting Universities to determine if material could be utilized in current research projects or as part of Undergraduate or Postgraduate thesis projects.

The material could also be used as a teaching resource for environmental field schools targeted to participants from a range of backgrounds and academic levels ranging from undergraduate students, schools and general interest groups.

Cereal-based foods

A separate project, focusing on the analysis of the archaeological remains of cereal-based foods, is also proposed. This will involve systematic observation under Scanning Electronic Microscope (SEM) and comparison with experimentally prepared cereal-based foods. These analyses will investigate different plant (cereals, pulses, wild seeds, etc) and animal (milk, honey, animal fat, etc) ingredients used for the preparation of cereal meals, in addition to the possible cooking methods which led to these preparations. Please see 'Plant Remains' report for full details of this project.

Insect remains

Eight samples from waterlogged deposits in TEA 5 and TEA 10 were submitted for assessment of insect remains. Two of the deposits were Iron Age in date, two Roman, and the rest are currently undated. Seven samples were identified as suitable for analysis of insect remains (from TEAs 5 and 10), containing substantial assemblages of beetles and bugs. This is reliant on these contexts being dated. These should provide information on vegetation, the local environment, land use, waste disposal practices, and craft activities.

It is proposed that 20 extra samples, where good preservation of waterlogged plant material has been demonstrated, are examined for insects during the analysis stage. These will likely come from TEAs 5, 7, 10, 14, 20, 28 and 29. Separate sub-samples of sediment (3–5 litres) would be processed for this, scanned, and samples that are likely to produce the most useful information can be selected for detailed analysis.

Sample selection at all stages will be in consultation with the post-excavation and environmental managers to cover particular periods and areas of activity and features of interest.

4.7 GEOARCHAEOLOGY (INCLUDING POLLEN)

A total of 76 Monolith samples were collected during the course of the A14 works from a wide variety of features including palaeochannels, ring ditch monuments, ditches, pits, waterholes, wells and buildings. The samples were taken in accordance with the individual research questions for each TEA. 120 kubiena samples were also collected for micromorphology analysis. The kubiena samples were from a wide variety of features and horizons such as pits, ditches, buildings, surfaces and dark earth deposits. Two sites, TEA19 and TEA28, contained features that warranted the collection of auger samples.

The following geoarchaeological work is proposed for analysis. This is with the aim of producing a scheme-wide model of past vegetational landcover, including borehole data from across the scheme. This will be published as an interactive online 'story map'.

Monoliths

Full analysis of:

- Monolith samples through the TEA 12 ring ditch monument.
- Monolith samples through ditches relating to field systems.
- Monolith and auger samples through palaeochannels, ponds, and floodplain deposits.

Soil Micromorphology

Full analysis of the majority of samples, focusing on the SFBs, understanding dark earth and alluvial sequences, and floor/barrow/midden deposits. Soil micromorphology will be carried out on TEAs 5, 7A, 7B+C, 10, 11, 12, 16 and 20.

Pollen

Pollen is well-preserved across the scheme and will enable ecological reconstruction of the different landscape zones, and of the evidence for arable activity. The woodland sequence data, through the palaeochannels, will be concentrated on, including getting radiocarbon dates for these sequences.

Ostracods

Ostracod survival is poor across the scheme, and so no further work is proposed for this.

The table below highlights how much material needs to be analyzed per TEA with regards pollen, soil micromorphology and radiocarbon analysis.

TEA	NUMBER OF MONOLITH TINS/ AUGER SAMPLES ASSESSED BEING PUT FORWARD TO ANALYSIS		NUMBER OF ADDITIONAL MONOLITHS/ AUGER SAMPLES FOR ANALYSIS		FURTHER WORK RECOMMENDED FOR SOIL MICROMORPHOLOGY		ADDITIONAL KUBIENA TINS TO BE LOOKED AT	RECOMMENDED POLLEN SUBSAMPLES BASED ON ASSESSMENT	ADDITIONAL POLLEN SUBSAMPLES	RADIOCARBON DATES	EXTRA BULK CHEMISTRY
	MONOLITH	AUGER	MONOLITH	AUGER	THIN SECTION	BULK	THIN SECTION				
5	1	–	2	–	9	9	0	10	8	2	3
7A	0	–	0	–	1	1	0	0	0	–	–
7B & C	1	–	7	–	2	4	0	10	7	3	–
10	1	–	2	–	9	9	2	6	8	–	–
10B East	0	–	1	–	0	0	0	0	4	–	–
11	0	–	0	–	2	–	0	0	0	–	–
12	1	–	1	–	2	–	2	4	4	–	–
13	1	–	0	–	0	0	0	6	0	–	–
14	1	–	2	–	0	0	0	6	2	–	80
16	1	–	1	–	5	5	0	10	6	3	–
19	0	1	1	3	0	0	0	40	4	6	–
20	2	–	3	–	7	7	0	20	10	–	49
28	0	1	1	–	0	0	0	8	4	2	11
29	0	–	8	–	0	0	0	0	32	–	–
33	0	–	0	–	0	0	0	0	0	–	–
38	1	–	0	–	0	0	0	6	0	–	–
41	1	–	0	–	0	0	0	6	0	–	–
46	1	–	0	–	0	0	0	0	0	–	–
Totals	12	2	29	3	37	35	4	132	89	17	143

4.8 FAUNAL REMAINS

A total of 7381 hand collected contexts and wet-sieved samples were examined, which contained 152,268 animal bone fragments, weighing 1943kg. Only a sample of the animal bone assemblage was recorded at assessment stage (100% of Sequence 1, 40% of Sequence 2, and 30% of Sequence 3). At the analysis stage previously unselected context and sample groups will be visually inspected, rapidly recorded ('scanned'), and data inputted onto the ORACLE database to determine their potential and suitability for full analysis.

In principle, 100% of all pre-Iron Age and Saxon context and sample groups will be fully recorded onto the Oracle database. Some degree of selection will be needed for the Iron Age and Romano-British context groups (due to the quantities involved), aiming towards complete recording of up to 60% of these groups.

The selection of contexts for full recording will be made after the full stratigraphic analysis has been carried out and contexts are assigned to a land use and period. The selection will be made based on assessment of the animal bone, the stratigraphic priority contexts and the potential value of the animal bone assemblages.

Hand-collected and wet-sieved context and sample groups selected for analysis will be recorded onto the ORACLE database in terms of:

- Preservation
- Fragmentation
- Species
- Skeletal element
- Body side
- Age
- Modification
- Epiphyseal fusion
- Dental eruption
- Wear

Fully-fused well-preserved fragments will be measured following von den Driesch 1976. Stature estimates will be calculated using conversion factors summarized in von den Driesch & Boessneck 1974. In general, each fragment will be identified to species-, or at least genus-, level using available reference collections and in-house resources, and then recorded as individual fragments unless only identifiable to an approximate category, particularly 'cattle-sized' mammal and 'sheep-sized' mammal, in which case multiple records may be made of otherwise unidentifiable skull, vertebra and rib fragments.

For the purposes of interpretation, the analysis will focus particularly on species, skeletal element, body side, age-at-death, modification and estimated stature, in an effort to identify temporal and geographical variation in meat diet, patterns of animal exploitation and waste disposal.

The results of the animal bone analysis will be included on the online database and incorporated into the digital landscape reports. In addition there will be a summary overview of the faunal remains from the scheme and thematic contributions will be made to the project publications; there will also be an animal bone contribution to the isotope analysis project.

All unidentifiable fragments of skull, rib and long bone mid-shaft will be discarded. When recording is completed, further organized discard of all fully-recorded groups will be undertaken, with the exception of groups or skeletal elements selected and retained for specific additional work such as C14 dating and trace element analysis.

Molluscs

The mollusc groups submitted for assessment produced an overall estimated shell count of 14,262 identifiable shells derived from five marine species, and at least 18 land and freshwater species. Identification, quantification and analysis will concentrate on shells of land and freshwater molluscan species. Identification will follow Cameron and Redfern 1976; Killeen, Aldridge and Oliver 2004; and Macan 1969. Analysis and Interpretation will largely follow Kerney 1999; and Davies 2008.

Each shell will be identified, as far as possible, to species or at least genus level, using in-house reference collections and resources. An attempt will be made to identify all shells that are at least 50% complete, together with all morphologically distinct fragments, particularly those associated with the mouth, umbilicus and apex.

The following information for each sample group will be recorded onto the ORACLE database:

- Counts of species
- Preservation and completeness
- Occurrence of juveniles.

The assemblages will then be interpreted in terms of known ecological characteristics, distribution and habitat requirements of each identified species or genus, to enable interpretation of the physical, temporal, chemical and ecological characteristics of the source deposits (eg Pipe 2019, 61–3).

The results of this will be included on the online database, incorporated into the analysis reports, and thematic mollusc contributions will be made to the project publications.

Marine/estuarine mollusc shells will be visually inspected to confirm species identification and quantified. This information will be integrated into the report text. No further analysis or recording will then be done on this group.

No further work will be done on invertebrate and vertebrate fossils from wet-sieved samples, as their recovery is likely to reflect the predominant local geology rather than human activity.

All shell fragments not identifiable to at least family level will be discarded from each sample group.

4.9 HUMAN REMAINS

A total of 293 cremations, 143 inhumations and 39 contexts with disarticulated human remains were assessed from the A14 excavations. Full analysis of all inhumation and cremation burials will be carried out. All information will be recorded onto the Oracle CDE database, and a full report produced providing a comprehensive account of the osteological data.

For the articulated burials, this will include:

- Full inventory of bone present
- Estimates of age and sex
- Metric and non-metric data
- Dental and vertebral anomalies
- Detailed recording of dental disease and skeletal pathology – descriptions, records, illustration, digital photography (pathological conditions recorded with publication-level photography).

For the cremation burials, this will comprise the following:

- Full details on identifiable fragments
- Recovered weight by mesh size
- Any recordable pathology.

Additional scientific analysis will be carried out by external specialists where necessary. This will include:

- Strontium and oxygen stable isotopes, supplemented by lead isotope analysis, of those with sufficiently preserved teeth (establish whether these individuals were local to the Cambridgeshire area)
- Further radiocarbon dating of human bone (refine the age and deposition of the burial contexts).

Reports will be produced on the human remains from each landscape block as well as a detailed overview from the scheme.

4.10 ISOTOPE ANALYSIS

The isotope project will investigate human mobility and migration, diet, seasonality, and crop and animal husbandry from the late Prehistoric to the Medieval period in Cambridgeshire. The study of isotopic values from human, animal and plant remains provides the means for the investigation into dietary habits, people's mobility and agricultural practices in an integrated multiproxy project. The stable isotope analysis of human and animal remains will allow us to reconstruct what was actually consumed on a regular basis by the individual and by the animals; similarly stable isotope analysis of plant remains will allow us to establish the intensiveness of crop management by past societies across the A14 scheme.

For this purpose, stable carbon and nitrogen isotope measurements of archaeological plant remains will be used to assess the types of soils in which the ancient crops were cultivated and their management by past communities, especially in regards to water availability, irrigation and manuring. Similarly, stable carbon and nitrogen isotope measurements of humans and animals are employed to identify major contributors to these individuals' diets (plants, terrestrial animals or aquatic resources), in combination with stable carbon and oxygen isotope values of tooth enamel which will be used to study the seasonal dietary and mobility patterns of these populations and their domestic herbivores. In addition, oxygen, strontium and lead isotope values are used to assess long-distance mobility patterns of humans and animals during the early years of their lives.

The insights gained from the analysis of stable isotope measurements of charred plants, human and animal bone collagen, and sequential tooth enamel will be considered in light of previous work on the composition of the archaeobotanical, zooarchaeological and osteoarchaeological assemblages, reconstruction of the surrounding landscapes, spatial analysis, etc.

Work Package 1: Human remains – stable isotopes analyses and micro-organic analyses of dental calculus (University of York/University of Durham)

Stable Isotopes Analysis

The human skeleton records many of the events and processes that an individual goes through in life. The measurement of the stable isotopes present in the human bones can provide direct data at the individual level regarding, for example, subsistence, actual consumption of specific foodstuffs, breastfeeding patterns, mobility, migration, and contact with other groups. In this sense, strontium and oxygen stable isotopes supplemented by lead and sulphur isotope analysis of those individuals with sufficiently preserved bone collagen and teeth may help to establish whether these individuals were local to the Cambridgeshire area or were raised elsewhere, and may also measure their exposure to anthropogenic pollution (Montgomery et al 2010).

In addition, specific dietary patterns can potentially be inferred from the analysis of nitrogen and carbon isotopic signatures present in the collagen of the human bones. Differences in the consumption of specific resources, eg the ratio of terrestrial/water resources, can be established by the measurement of nitrogen (δ15N) and carbon (δ13C) isotopic composition of human bones (Eriksson 2013). As a general rule, carbon isotope ratios can potentially distinguish between terrestrial and marine foods and/or C3 and C4 pathway plants. Nitrogen isotope ratios are used to infer the trophic level

of food based on increases in δ15N values up the food chain, herbivores having distinctly higher values than the plants that they eat (Bogaard et al. 2007).

Main research questions:

- Is there any evidence for migration into the region during the Bronze Age, late Iron Age, Roman, or post-Roman periods, and can this be inferred from strontium, oxygen and lead stable isotopes analysis?
- Can we infer populations' regional mobility or/and seasonality patterns through time or/and among sites across the scheme?
- Is there any evidence of specific dietary practices through time and how can we infer it from stable Nitrogen and Carbon stable isotopes analysis?
- Can we determine variable levels of exposure to anthropogenic pollution within different populations?
- Are there differences in diet among chronological periods and sites? If so, are there any specific patterns in the use of aquatic and terrestrial resources among populations through time?
- How important was the consumption of C3 and C4 plants in the diets of these past communities?
- Despite the low amounts of freshwater fish recovered from the archaeological record, is there isotopic evidence for the consumption of local freshwater resources?

A total of 40 bone samples from inhumation (and well phased, contextually secure disarticulated bone) contexts will be selected for these analyses. These will be selected from TEAs with the highest concentration of skeletal remains and/or targeted burial grounds recovered from specific excavation areas (TEAs 5, 7A, 10, 20, 28 and 38 in particular).

Dental Calculus Analysis

Dental calculus (tartar, calcified plaque) is a mineralized biofilm created by a wide range of microscopic organisms residing in the oral cavity. As the plaque biofilm is mineralized, it entraps and preserves the organic content from bacteria as well as human dietary and inhaled microdebris within the matrix (Mackie et al. 2017). These analyses can provide insights into diet and disease among other aspects, and these can be narrowed down to specific resources, geographical areas and chronological periods.

One of the main aims of the analysis of dental calculus from skeletal remains from the A14 Project is to characterize the oral bacteria within the human skeletons, to identify exposure to infectious pathogens, to identify inhaled micro-debris and respiratory irritants, and to explore air quality and particulate exposure. In addition, this project seeks to identify lifestyle factors influencing health and disease through the analysis of organic compounds entrapped in calculus.

A total of 20 teeth samples from inhumation contexts will be selected for these analyses. These will be selected from TEAs with the highest concentration of skeletal remains and/or targeted burial grounds recovered from specific excavation areas (TEAs 28 and 38 in particular, including Roman burials).

Work Package 2: Zooarchaeological remains – stable isotopes analyses: 300 samples (University of Oxford)

This work package will focus on carbon and nitrogen isotope values as evidence of diet in order to understand the relative proportions of plants and animals in the diet of domestic animals present at the time of occupation across the A14 scheme. This will be investigated through the measurement of Nitrogen (δ15N) and Carbon (δ13C) isotopic composition of the collagen contained in selected animal bones.

A main aim of this project is to elucidate long-term fodder-provision patterns or grazing patterns among the main herbivores species identified from the zooarchaeological record. The widespread archaeobotanical evidence of C3 (cereals and pulses) and C4 plants (sedges, reeds, etc) across the scheme indicates that both types of plants were available for consumption in the Cambridgeshire area. However, the amount of these types of plants consumed by the animals might differ from species to species as well as through time and amongst sites. In general, C4 plants contain a higher fibre and silica content than C3 plants and certain herbivores will tend to avoid such plants, except when they are the only ones available in the area as it could be the case for late summer when the harvest has been completed (Pearson et al. 2015). Similarly, pigs would normally avoid C4 plants as they require more digestive processing than C3 plants (Heckathorn et al. 1999).

A second aim of this work package is to assess the mobility of the domestic animals, in relation to grazing or migration patterns. Oxygen isotope values (δ18O) in animal tissue are related to water availability and intake, both related to latitude, altitude and temperature in the regions where these animals were born and kept. In addition, strontium and lead isotope values are used to assess long-distance mobility patterns of animals during the early years of their lives. In this sense, the measurement of oxygen and strontium and lead isotope values of cattle, sheep, and horse teeth enamel will be used to investigate local origin or introduction of animals to the Cambridgeshire area as well as migration and seasonal mobility patterns.

Main research questions:

- How did cattle, sheep and pig management differ at different sites and through time?
- Did these animals graze in local pastures, were they taken to more distant locations in search of fresh vegetation, or were they foddered on cultivated crops or collected fodder to a significant extent?
- Can we infer dietary patterns and differences among domestic animal species across the A14 scheme through time?
- How important was the consumption of C3 and C4 plants in the domestic animal diets?

› Were domestic animals across the sites original to the Cambridgeshire area?

A total of 300 samples (depending on preservation) will be selected for these analyses. The samples will be selected from a range of prehistoric, Roman, Saxon and medieval contexts from the main TEAs (TEAs 7, 10, 12, 20, 28, 32/3 and 37 in particular).

Work Package 3: Archaeobotanical remains – bulk and stable isotopes analyses: 300 samples (University of Oxford)

Although, traditionally, high nitrogen (δ15N) values from human remains have been associated with a largely animal-based diet suggesting that C3 plants played a limited dietary role in past societies, recent investigations show that there is a potential range in variability in plant and crops δ15N values which could affect the reconstruction of human diet and crop husbandry practices. Plants, and especially crops (cereal and pulses), stable isotope values may be affected by alterations to the growing environment in particular related to water economy, irrigation in arid environments and manuring (Bogaard et al. 2007). In this sense, this work package aims to establish if high nitrogen (δ15N) values from human remains and animals are the result of an animal-based diet or, in contrast, these are linked to high nitrogen values from consumed plants as a consequence of nitrogen soil-enrichment due to environmental factors or crop management practices such as manuring.

In addition, this work package aims to investigate the intensity of crop husbandry practices using stable isotope analysis of plant remains from the A14 sites and assess the implications of water management and water availability in combination with crop manuring practices. The intention is to determine whether past societies in Cambridgeshire intensively managed their crops through manuring and irrigation, and elaborate on ancient agricultural practices.

Main research questions:

› How distinct were farming methods employed by farmers across the different sites/locations and through time in Cambridgeshire?

› What was the level of crop management practiced by farmers across the A14 scheme through time?

› Can we identify water availability patterns across the scheme and through time?

› Is there evidence for irrigation and/or manuring practices across the scheme and through time?

A total of 300 samples (depending on preservation) will be selected for these analyses. The samples will be selected from a range of prehistoric, Roman, Saxon and medieval contexts from the main TEAs (TEAs 7, 10, 12, 20, 28, 32/3 and 37 in particular). In addition, a small number of samples will be submitted to the FeedSax project for isotope analysis (see below).

4.11 ACADEMIC PROJECTS

In addition to the above proposed work, the project intends to collaborate on two major academic research projects. This work will provide great benefit for the A14 project.

Feedsax Project, Universities of Oxford and Leicester

Feeding Anglo-Saxon England ('FeedSax') is an ERC-funded research project led by Professor Helena Hamerow that is generating new evidence to address age-old questions concerning the development of cereal farming in early medieval England by using new methods of analyzing bioarchaeological data such as preserved medieval seeds, animal bones and pollen. The A14 project will submit c 20 samples belonging to Anglo-Saxon and medieval phases from the site at Brampton which contain an abundance of charred cereal grain. From these, the Feedsax project team would need to subsample 5–10 grains per taxon per sample for stable isotope analysis, and a further 2–3 grains per sample for radiocarbon dating.

1,000 Genomes Project, The Crick Institute

The A14 analysis project will be contributing human bone samples to the 1,000 Genomes Project run by The Crick Institute. This is a major project to generate a large scale ancient DNA data set to understand human disease in the UK over the past few millennia. This would use the fact that the UK Biobank, with 500,000 participants, is the best human genetics resource in the world for understanding human biology and disease, but does not currently have an ancient DNA counterpart data set for understanding temporal patterns of diversity and evolution. The project will initially screen upwards of 3,000 skeletons across the UK and the Holocene to identify skeletal material with suitable preservation. Ideally this will target the otic capsule of the petrosal bone (for human DNA) and/or teeth (which also provide the potential to retrieve pathogen DNA).It is likely that 80% of all screened individuals will have favourable enough preservation to be able to deliver the following information directly to osteological, archaeological, and historian collaborators:

1. Biological sex

2. Relatedness (sibling/parent-offspring/first cousins)

3. Ancestry affinities within the UK/Europe/worldwide

4. Presence of any pathogen DNA

Skeletal material with very favourable DNA preservation will be chosen for further 'production' sequencing for the study of disease evolution in the UK over the past 4,000 years. The results of this aDNA analysis will be feedback into the A14 project to contribute to answering the research questions.

4.12 OUTREACH AND PUBLIC ENGAGEMENT

Outreach

This proposal has been prepared in response to the 'A14 Development Consent Order (DCO) Application WSI' (October 2015) and the 'Archaeology Outreach Briefing Note' (October 2016), and follows on from the extensive A14 Public Community Engagement work associated with the main fieldwork phase, largely during 2017–2018 (reported on in A14 Community Archaeology Final Report – February 2019).

During the 2017–18 program of engagement, MHI undertook 34 events reaching over 5,000 individuals. The high level of interest in the archaeology of the A14 project was coupled with an overwhelmingly positive experience by those people who attended and took part.

There are clearly engaged audiences in the communities around the A14 and far beyond; individuals and groups who are keen to learn more about the process and findings of the archaeological work. The post-excavation analysis phase offers excellent opportunities to engage with a range of audiences and to keep communicating about the new knowledge being generated by the archaeological works.

The engagement strategy goals identified in the 2016 Briefing Note which have informed all of MHI's engagement are:

- Creating and sharing knowledge
- Community engagement
- Legacy

The target audiences for the post-excavation engagement programme are:

- Neighbours (residents, businesses and local communities) to the scheme
- Local primary and secondary schools
- Local societies with an interest in heritage and history
- The academic community
- The wider national and international audience with an interest in archaeology, including those who have been following the fieldwork communication around the project.

The table below sets out the key components of the post-excavation community engagement programme and responds to the DCO outreach components where still appropriate. The main activities consist of a comprehensive programme of public events and lectures and opportunities for training and participation.

COMPONENT	BRIEF DESCRIPTION OF ACTIVITY
PX ENGAGEMENT MANAGEMENT ACROSS 36 MONTHS	
Project Management (PM)	Budget management, oversight of H&S, reporting to client and team
Community liaison meetings (PO)	Discussions with local schools, local archaeological societies and other groups to inform planning and scheduling of the 2 programmes
Preparation of RAMS (PO)	RAMS for engagement activities
Community Engagement Project Officer (PO)	Coordination and preparation of detailed proposals throughout the PX programme and support at selected events
EVENTS	
Lectures to local groups	Archaeologists and specialists involved in the project giving lectures to local societies and groups
Presence at and participation in local events	MHI Gazebo, tables and displays at appropriate events and conferences
PARTICIPATION AND TRAINING	
Post-excavation masterclasses	A Number of half-day sessions per year for 2 years with different specialists explaining how they work on the material with opportunities participants to contribute to the final archive and learn PX skills. Can be based in local museums or other appropriate facilities

Any school sessions and production of school teaching legacy packs will need to be resourced through the new Northstowe heritage centre .

Communications

The communications proposal for the A14 archaeological analysis aims to do the following:

- Build on the success and maintain profile and momentum for communications of the A14 archaeology programme;
- Develop communications that respond to Highways England and the A14 scheme's audiences, priorities and milestones;
- Play to the strengths and storytelling potential of the analysis phase, showcase creative research outputs and continued community involvement in the archaeological programme.

Activities

To meet the above objectives, we propose to work with Highways England to deliver the following communications plans.

Digital Engagement Building on the corpus of engaging digital content that has been created throughout the fieldwork and assessment phases of the programme, we propose to continue blogging at a rate of one blog every other month. The focus of these blogs will be to share the fascinating knowledge and stories that are coming out of analysis. Where possible, these blogs will be penned by specialists, with the support of the comms team. This content will be shared across a range of social media channels to extend its impact and, where appropriate, shared with local media outlets.

We also propose to support media engagement and community engagement with content across MOLA Headland's and the A14's digital channels.

Media Engagement Given the reach and success of media engagement around the A14 archaeology programme, we propose to work with Highways England on a further four campaigns over the three-year period. These campaigns would tie in with Highways England and the analysis programmes milestones, for example: opening of the scheme, final publication of the research, creative research and community outputs and projects, with a focus on the nationally significant findings from the programme.

The comms team will support through content development, specialist comms support in terms of facilitating and delivering campaigns, and our specialists will provide expert input for content development and as spokespeople for these campaigns.

To support media campaigns we will have professional photographs taken by our in-house team.

As well as supporting with these media campaigns we'd be happy to work with Digging for Britain to pitch a post-ex focused segment on the programme and facilitate filming with our experts and the material.

Support and publicize the Community Programme We'll support the community engagement programme working alongside Highway's England communications team to promote events and outputs to relevant audiences through a range of digital and traditional media channels, as well as copy-editing and working on creative design of community engagement outputs, including presentations and interpretative and display materials.

Promote and assist with the development of a digital interactive The comms team will work with an external website developer and in-house specialist teams to devise, deliver and promote a digital interactive that explores the archaeology of the A14, using a map of the route as the main interactive element. The web-based interactive will be very visual and engaging and highlight important sites, discoveries, artefacts and findings along the route. Aimed at a non-specialist audience, using appropriate language and visual cues, the interactive could also feature in installations, events or exhibitions, at relevant locations along the route.

4.13 ARCHIVE

Digital Archive

The A14 excavations produced a massive digital archive that will form an integral output of the project (for structure see Outputs above). It will form a primary and accessible resource for future researchers and will be deposited with the Archaeology Data Service (ADS). The ADS is the best long-term repository for digital data and ensures a much wider audience than conventional means. For example the University of Reading's Roman Rural Settlement Research Project has received 38,162 visits, 38,052 downloads and 235,661 page views since it was first put on-line with the ADS in April 2015 (data from: https://archaeologydataservice.ac.uk/archives/view/romangl/stats.cfm).

The digital archive is quantified as:

- 145–150000 images (TIF format), including x-rays
- large site database (CSV format)
- Site GIS deposited as in SHP format
- 40 site plans (DWG/DXF format)
- 102,000 contexts sheets (PDF format)
- 8 large reports (by landscape block) (PDF format)
- 5 CT scans

This section provides a brief outline of the digital archaeological archive Deposition Plan for the A14 Improvement Scheme. Deposition of the digital archaeological archive with the Archaeology Data Service (ADS) by MOLA Headland Infrastructure will ensure the preservation of and access to the digital archaeological data in the long-term.

Objectives

This plan will:

- ensure that all deposited digital data are accompanied by consistent, accurate and high quality metadata that will facilitate re-use;
- guarantee that all digital data captured during the programme of works will form a high-quality digital archive;
- enable all digital data to be efficiently linked with the appropriate physical archive;
- ensure that all digital data will be disseminated appropriately and as quickly and efficiently as possible to the public.

The Workflow

To achieve these objectives the following measures will be implemented:

DATA PREPARATION

- The ADS will provide a primary contact to MOLA Headland who will be available throughout the deposition process to provide help and guidance with data preparation.
- The ADS will provide MOLA Headland with the appropriate guidelines and requirements for deposition.
- The ADS and MOLA Headland will agree a folder structure for data deposition.
- MOLA Headland will provide the ADS with a deposition schedule for the data collections to be deposited. Collections will be determined by landscape block.
- MOLA Headland will carry out selection on the data to deposited to ensure the deposited data is an accessible reusable and appropriate archaeological archive.
- MOLA Headland will sign a deposit license prior to the start of the project so a parent collection can be initiated.
- MOLA Headland will provide collection level metadata at the same time as the deposit license for the project as a whole so the ADS can issue a DOI for the main parent collection.
- The ADS will MINT a DOI and provide it to MOLA Headland for the main parent collection as soon as collection metadata is received.
- The ADS and MOLA Headland will agree to a design specification for the map and query interfaces within the first few months of the project to ensure the data deposited will facilitate the interface requirements.

DATA SUBMISSION

- MOLA Headland will submit data to the ADS following the agreed deposit schedule so the ADS can allocate staffing accordingly. The ADS will be informed of any delays to this schedule as soon as possible.
- MOLA Headland will submit data to the ADS in accepted file formats, prepared in accordance with ADS Guidelines for Depositors, and accompanied by appropriate file-level and collection-level metadata.
- MOLA Headland will provide data to ADS in a completed form.
- MOLA Headland will transfer the data to the ADS by email, a digital transfer method of their choice such as Dropbox, or by sending the data to ADS on an appropriate storage medium such as a hard drive.
- MOLA Headland will not delete any data until the archiving of the data has been officially signed off by the ADS.
- The ADS will provide MOLA Headland with a deposit receipt per deposited collection to confirm all data has been transferred to the ADS before work begins on the archiving of the data.
- The ADS will provide MOLA Headland with an expected release time for each collection once the data has been deposited.

DATA PRESERVATION

- The ADS will preserve the data in accordance with the OAIS ISO standard and in line with the Core Trust Seal guidelines.
- The ADS will archive the data according to the time frame provided to MOLA Headland at deposit. MOLA Headland will be notified of any delays to this timeframe.
- The ADS will notify MOLA Headland once archiving of the collection has been completed.
- The ADS will provide MOLA Headland with a DOI for each data collection on complete of the archiving. Early DOI's can be negotiated if required. Collection level metadata must be provided before a DOI can be issued.

DATA DISSEMINATION

- The ADS will disseminate the data as described in the Interface Outline in the Outputs section of this UPD.
- All reports will enter the ADS Library and receive individual DOIs which can be used in publications.
- MOLA Headland will provide query specification to ADS at the outset of the project.
- The ADS will build a Map and Query Interface following the agreed specifications.
- All map layers will be provided to ADS as Shapefiles with the appropriate attribute information held within the data to allow for the search/layer options MOLA Headland require.
- The ADS will provide MOLA Headland with the opportunity to make changes to the collection interfaces (not files) once archiving has been completed.
- MOLA Headland will respond to this notification within 30 days before the collection is marked as complete and, if MOLA Headland wish, be released to the public.

DATA RELEASE

- The ADS will release the collections to the public on the date/schedule requested by MOLA Headland, most likely in landscape blocks.
- The ADS will promote the release of individual and project level collections on the ADS Social Media channels.
- The ADS will facilitate the issuing of early DOIs for publication purposes where possible.
- The ADS will help facilitate the promotion of the collection where possible.

In the data preparation, submission and preservation stages, consultation will be required between MHI, ADS and CHET, in order that the DOI of each portion of digital archive can be cross referenced against the relevant physical archive catalogue.

INTERFACE OUTLINE

The web interface for the archive will follow the traditional ADS archive structure as described in the outputs section above and will also include a query interface and map. The interface will be able to retrieve relevant HER event references as part of the site level information recorded for each collection (DOI/land parcel). CHET will be consulted on the design specification to ensure that the data collected by MHI and provided to ADS will facilitate their requirements.

Map Interface

The map interface will be built that will show all the archaeological investigations from the A14 Improvement Scheme in one map. Initially this map will contain a single layer of site points that will link to the child collections as can been seen in the example below. As sites are archives and released the links will become live.

When all the data from the project has been deposited, site level information will be added so that the map will allow information to be displayed in a similar manner to the Ipswich Backlog Project Archive (https://doi.org/10.5284/1034376).

The exact requirements of the map layers will be decided at the outset of the project in negotiation with ADS and MOLA Headland. This will be recorded in a design specification document to ensure that the data collected by MOLA Headland and provided to ADS will facilitate the requirements. The design specification document will also detail a schedule for the development, data provision, testing, and release of the map interface.

Search Query Interface

A search query interface will be designed. An example of how this may appear can be seen in Figure 2.015, however it is expected that the search queries will be more complex than this example. The search query facility will only be made available at the end of the archiving process, once all the data has been submitted to the ADS. The exact requirements of the search query fields and the results page will be decided at the outset of the project in negotiation with ADS and MOLA Headland. This will be recorded in a design specification document to ensure that the data collected by MOLA Headland and provided to ADS will facilitate the requirements.

The results pages of the search interface will all have unique URI that can be linked to from an Internet Archaeology article.

Physical Archive

The A14 excavations have generated a huge Working Project Archive, defined by CIFA as all the project records and materials gathered during an archaeological project and retained for analysis prior to selection for the Archaeological Archive.

The Working Project Archive for the A14 excavations is set out here.

TABLE 2.007 Quantification of Physical Archive

MATERIAL	COUNT	WEIGHT (G)
Pottery – Early Prehistoric	5,082	33,586
Pottery – Iron Age	56,806	703,830
Pottery – Roman	143,570	1,913,454
Pottery – Post-Roman	9,572	152,631
Coins	987	–
Registered Finds	6,690	–
Lithics – worked	5,044	–
Lithics – burnt	3,614	–
Worked Stone	1,579	–
Glass	298	–
Clay Tobacco Pipe	62	–
Leather	7	–
Wood	175	–
Building Material*	47,461	5,524,870
Metalworking Residues	9,103	269,105
Inhumations	141	–
Cremations	290	–
Disarticulated bone contexts	38	–
Animal Bone*	294,731	4,360,431
Environmental Samples – bulk	9,176	–
Environmental Samples – waterlogged	36	–
Environmental Samples – kubiena tins	114	–
Environmental Samples – monoliths	81	–

* Ceramic Building Material and Animal Bone has been estimated from sample assessed

TYPE	COUNT
Context Sheets	92,198
Drawings – Plans	1,656
Drawings - Sections	15,413

An important part of the assessment process has been to define strategies for the retention of the different materials within the Working Project Archive, as the new CIFA toolkit for selecting archaeological archives (http://cifa.heritech.net/selection-toolkit) states that *'It is widely accepted that not all the records and materials collected or created during the course of an Archaeological Project require preservation in perpetuity'*.

The selection and discard recommendations for all materials are set out within the specialist assessment reports and highlighted in

the method statements within this UPD. These recommendations have been designed to create an Archaeological Archive that will be able to support future research, outreach, engagement, display and learning activities.

Based upon the specialist recommendations, it is proposed that the following be retained for the A14 Archaeological Archive.

TYPE OF MATERIAL	BOXES RETAINED FOR ARCHIVE*	% MATERIAL RETAINED FOR ARCHIVE
Pottery - Prehistoric	5	100%
Pottery - Iron Age	47	40%
Pottery - Roman	139	40%
Pottery - Post-Roman ++	25	100%
Animal bone	199	30%
Flint (worked)	1	100%
Glass	1	50%
CBM	86	30%
Slag	18	41%
Human Bone	282	100%**
Environmental (flots)	60	51%
Worked stone	56	80%
Small finds in Stewart boxes	160	80%
Documentary archive	307	100%

*Cambridge CC standard finds wire-stitched boxes (internal 500 x 250 x 160 mm)

** A14 burial licences stipulate all remains to be deposited with Cambridge archive rather than reburial

Considerable preparation time will be needed to prepare the Archaeological Archive for deposition, as set out below. This will include time for:

- Checking and indexing finds and document boxes per TEA
- Barcoding (Deepstore) finds and document boxes
- Logging the above to CHET spreadsheet
- Filling bulk finds boxes with Plastazote and labelling
- Preparing pallets for Deepstore collection

In addition, archive management, administration and logistics time will be required.

The transfer of title needs to be completed well prior to any archaive preparation.

4.14 PUBLICATIONS

The A14 project proposes a number of different outputs as outlined in this UPD. These comprise:

- 8 digital landscape reports
- Digital Internet Archaeology monograph
- Print A14 wider landscape MHI monograph
- Print popular publication
- 9 print journal articles

Each of these outputs will have different product-specific methodologies, though most will follow the same broad stages:

Stage 1: Creation of draft content

The author(s) will compile the text for the output based on the publication outlines. The broad outlines for each output are presented in this volume, and more detailed synopses and guidance will be produced prior to creation of content. The author(s) will brief an MHI Illustrator and Photographer on all illustration requirements.

All outputs will undergo an internal edit prior to submission for review

Stage 2: Review of draft output

All text and a full set of draft illustrations for all of the above outputs will be sent to Highways England for their review and comment. In addition, the draft digital landscape reports, Internet Archaeology monograph and print monograph will be sent to the A14 academic panel and CHET (Cambridgeshire Heritage Environment Team) for review (see Project Team for details of the academic panel). Internet Archaeology also has its own peer-review process as do all of the proposed journals.

This review process will ensure that the different outputs of the A14 project will be of the highest academic standard. It will also ensure that the digital landscape reports, hosted by the ADS, will not be viewed merely as 'grey literature' reports, but as defined and important publications that will be closely linked to the Internet Archaeology monograph. This will draw upon the reports to discuss broader academic themes as outlined in the research aims of this UPD.

Any changes and amendments proposed by the referees will be addressed and presented to the relevant body for a formal sign-off of the content.

Stage 3: Production

All text will undergo a full copy-edit, with detailed checking of language usage, formatting and style. All text will be fully indexed after the copy edit. Any external images required will be purchased as high-resolution files and with the appropriate rights for reproduction both print and digital. The copy-editing and layout for the Internet Archaeology and journal outputs will be carried out by the publishers.

For the popular publication and the print monograph, the layout of the books will be to a design framework agreed with Highways England. Highways England to supply text for the Forewords of both. The book covers will be designed to be eye-catching and in keeping with the aim and content of the books. A full set of typeset first proofs will be sent to Highways England for their review and comment. Any changes and amends to the proofs required by the Highways England will be addressed. A full set of typeset first proofs will be presented to the Highways England for a formal sign-off of the layout.

Stage 4: Printing/Dissemination

The digital landscape reports may be released sequentially, once the above reviews have been conducted, during the latter stages of the project, along with the relevant parts of the project's digital archive. These will be followed by the on-line publication of the Internet Archaeology monograph.

For the printed volumes, print-ready digital files will be created to the selected printer's specifications and submitted. Printers proofs to be checked and approved before proceeding to printing.

5 PROJECT TEAM

The table below lists the proposed project team. The availability of these individuals has been checked.

TABLE 2.008 Proposed Project Team for the analysis

NAME	ORGANISATION	PROJECT ROLE
GENERAL MANAGEMENT		
Sophie Jackson	MHI	Post-Ex Director (monitoring)
Russel Coleman	MHI	Commercial Director (monitoring)
Mark Haldane	MHI	QS
Alex Smith	MHI	Post-Ex Director
David Bowsher	MHI	Post-Ex Director
Mark Holmes	MHI	Post-Ex Manager
Liz Popescu	COPA (OAE)	Post-Ex Manager
Daniel Stansbie	COPA (Cotswold)	Post-Ex Manager
Mark Hinman	PCA	Post-Ex Manager
Emma Jeffery	MHI	Post-Ex Manager
Antony Walsh	MHI	Post-Ex Manager (consultation and review)
Gary Brogan	MHI	Post-Ex Manager (consultation and review)
STRATIGRAPHIC AUTHORS		
Alexander Pullen	PCA	Stratigraphic author (Alconbury)
Emma Jeffery	MHI	Stratigraphic author (TEA 7B/C)
Jeremy Mordue	MHI	Stratigraphic author (TEA 7A and 10)
Claire Christie	MHI	Stratigraphic author (West of Ouse, Brampton South)
Adam Douthwaite	MHI	Stratigraphic author (River Great Ouse)
Simon Markus	MHI	Stratigraphic author (Fenstanton Gravels)
Anthony Haskins	COPA	Stratigraphic author (Conington)
Owain Scholma-Mason	MHI	Stratigraphic author (Bar Hill)
POTTERY SPECIALISTS		
Adam Sutton	MHI	Lead Pottery Specialist (Iron Age and Roman)
Sara Machin	MHI	Pottery specialist (Roman)
Sarah Percival	Freelance	Pottery specialist (Prehistoric)
Pete Banks	COPA	Pottery specialist (Iron Age and Roman)
Rob Perrin	Freelance	Pottery specialist (Iron Age and Roman)
Matt Brudenell	COPA	Pottery specialist (Iron Age)
Katie Anderson	PCA	Pottery specialist (Roman)
Eniko Hudak	PCA	Pottery specialist (Roman)
Alice Lyons	Freelance	Pottery specialist (Roman)
Paul Blinkhorn	Freelance	Pottery specialist (Post-Roman)
Gwladys Monteil	Freelance	Pottery specialist (samian)
Anna Rebisz-Niziolek	MHI	Pottery trainee
Charlotte Burns	MHI	Pottery trainee
Fiona Seeley	MHI	Pottery manager (mentoring)
Isobel Thompson	Freelance	Regional pottery specialist
Imogen Wood	Freelance	Thin section and petrology
FINDS SPECIALISTS		
Julie Franklin	MHI	Lead Finds Specialist and Registered Finds – Medieval
Julian Bowsher	MHI	Coins
David Dungworth	Freelance	Metalworking Residues
Owen Humphreys	MHI	Registered Finds
Michael Marshall	MHI	Registered Finds – Roman
Lynn Blackmore	MHI	Registered Finds - Saxon
Rebecca Devaney	Freelance	Lithics

NAME	ORGANISATION	PROJECT ROLE
Ruth Shaffrey	COPA	Worked Stone
Kevin Hayward	PCA	Worked Stone (architecture)
Damian Goodburn	MHI	Worked Wood
Ian Betts	MHI	Building Materials
Sara Machin	MHI	Ceramic Building Materials / XRF/thin section
Liz Goodman	MHI	Conservation
SCIENTIFIC DATING		
Derek Hamilton	SUERC	Radiocarbon dating and modelling
Claire Christie	MHI	Assistance with C14 modelling
OSTEOLOGISTS		
Elizabeth L Knox	MHI	Lead Osteologist
Niamh Carty	MHI	Osteologist
Natasha Dodwell	COPA	Regional advisor
ARCHAEOBOTANISTS		
Angela Walker	MHI	Lead Archaeobotanist
Lara Carretero	MHI	Archaeobotanist
Laura Bailey	MHI	Archaeobotanist
Rachel Fosberry	COPA (OA East)	Archaeobotanist
Emma Aitken	COPA (Cotswold)	Archaeobotanist
Enid Allison	Canterbury Archaeological Trust	Insect Remains
ANIMAL BONE SPECIALIST		
Alan Pipe	MHI	Lead Animal Bone Specialist
Vicki Ewans	MHI	Animal Bone Specialist
Laura Bailey	MHI	Animal Bone Specialist
GEOARCHAEOLOGISTS		
Graham Spurr	MHI	Lead Geoarchaeologist
David Taylor	MHI	Geoarchaeologist
Richard Macphail	UCL	Soil Micromorphology
Michael Grant	University of Southampton	Pollen
DATA		
Jurgen van Wessel	MHI	Data Management
Peter Rauxloh	MHI	Data Management
Szymon Drobiazgiewicz	MHI	Oracle Support
Edward Caswell	MHI	Data Support/ADS liaison
GRAPHICS		
Julia Bastek-Michalska	MHI	Graphics Manager
Beata Wieczorek-Oleksy	MHI	Lead Illustrator
Eleanor Winter	MHI	Illustrator (reconstructions)
Rafael Maya Torcelly	MHI	Illustrator (photogrammetry)
ARCHIVE		
Theodora Anastasiadou	MHI	Archivist
OUTREACH AND COMMUNICATIONS		
Magnus Copps	MHI	Head of Outreach and Engagement
Nicola Kalimeris	MHI	Head of Communications
Emma Bakel	MHI	Communications Officer
ACADEMIC PANEL*		
John Blair	University of Oxford	Academic Panel
Helena Hamerow	University of Oxford	Academic Panel
Stuart Wrathmell	Independent	Academic Panel
Chris Dyer	University of Leicester	Academic Panel and Documentary Research
Hella Eckardt	University of Reading	Academic Panel
Duncan Garrow	University of Reading	Academic Panel
Martin Millett	University of Cambridge	Academic Panel
Lisa Lodwick	University of Oxford	Academic Panel
Colin Haselgrove	University of Leicester	Academic Panel

*Other relevant academic input will be sought as appropriate

6 PROGRAMME

The proposed programme of works is designed to complete the analysis efficiently, while also minimising risk of slippage. Many of the tasks need to be completed sequentially, particularly the following:

› The main phase of radiocarbon dating and data/finds preparation need to be completed before the start of the stratigraphic analysis and final phasing.

› The final phasing and oracle data entry needs to be completed before much of the specialist work can begin, especially those where sampling strategies are involved (eg pottery, animal bone).

› The specialist work needs to be completed before the final programme of synthesis (leading to production of outputs) can start.

PDFs of the MS Project Gantt chart are appended to this document. This sets out the programme in the following main stages:

1. Mobilization phase (Sept 2019 – Feb 2020): This includes selecting, retrieving, preparing and submitting samples for radiocarbon dating and the time taken to obtain the dates;

data preparation; investigative conservation on finds from five Landscape blocks; and some initial specialist tasks.

2. **Stratigraphic analysis and report writing (March 2020 – Jan 2021)**: Finalized phasing and updating Oracle, then analysis, draft report writing and illustration for landscape block reports.

3. **Specialist work (Feb 2020 – Jan 2022)**: Completion of specialist work, much of which can only be started after the first of the Landscape Blocks has had finalized phasing (April-May 2020). The specialist work will progress in line with the completion of Landscape Block phasing.

4. **Output preparation (Jan 2022 – Jul 2023)**: Preparing draft outputs to the point where they can be submitted to review/ referee. Note that the various outputs will be completed to this stage at various times. The duration of the review process will be variable.

5. **Final production and archive (Jan 2022 – Dec 2023)** – Archive preparation will begin after completion of the specialist work. It is expected that final production (ie post-referee) of the various outputs will occur from August 2022 to December 2023.

6.1 PROJECT REVIEW

A post-excavation project of this length and complexity will necessitate a regular series of review stages to ensure that the proposed methodologies outlined in this UPD are continuing to succeed in achieving their objectives. The principal academic objectives are those outlined within the 'Research Aims' section of this UPD, alongside those noted in the specialist assessments of volume 3. Other objectives relating to public outreach and communications are discussed in the 'Project Outputs' section of this UPD.

Such a review process would enable an iterative approach to the post-excavation programme, whereby certain tasks could be terminated early if they do not appear to be achieving their objective. At the same time, more resources could be directed towards other approaches that appear to be more beneficial. For example, if the archaeobotanical analysis of remains of cereal-based foods (see Method Statement above) does not appear to be producing diagnostic results after initial sampling, this task could be halted and, if required, resources re-allocated to other areas where initial results were proving highly successful (eg aDNA, plant isotopes etc). Over the course of a 3.5 year project, there may also be new analytical techniques, and this flexible approach should allow for greater scope for innovation within the overall programme.

It is proposed that this review process takes two forms:

› A regular monthly review incorporated within the monthly progress report. This will enable all tasks to be reviewed when they reach critical stages (ie when initial work/results are available to be judged against objectives). These would be discussed in the monthly progress meeting with A14 IDT.

A more formal review stage at the end of each of the milestones as outlined above, which would include the Cambridgeshire Historic Environment Team (CHET). At the end of the final milestone, a general project review would take place to assess the 'lessons learned'.

7 BIBLIOGRAPHY

Adkins R & Percival S (2014) ***Cromwell Community College, Chatteris, Cambridgeshire: Further Evidence for Early Iron Age Ceramic Chronology*** Proceedings of the Cambridge Antiquarian Society 103, 27–37

Allen T (2000) 'The Iron Age background'. In M Henig, M & Booth P (eds) ***Roman Oxfordshire*** 1–33. Stroud: Sutton.

Allen M, Lodwick L, Brindle T, Fulford M & Smith A (2017) ***The Rural Economy of Roman Britain*** Vol. 2 Britannia Monograph Series 30, London

Armit, I (2012) ***Headhunting and the Body in Iron Age Europe*** Cambridge.

Ballantyne R M (2013) 'Charred plant remains and small artefactual debris', in C. Evans, G. Appleby, S. Lucy & R. Regan (eds) ***Process and History. Romano-British Communities at Colne Fen, Earith*** Cambridge Archaeological Unit, Cambridge, 391–413

Barker J & Meckseper C (2015) ***Huntingdon Road/NIAB (Darwin Green), Cambridge, Cambridgeshire. Assessment of Potential and Updated Project Design*** Albion Archaeology Report 2015/48

Barton R N E, Berridge P J, Walker M J C & Bevins R E (1995) ***Persistent Places in the Mesolithic Landscape: an example from the Black Mountain uplands of South Wales*** Proceedings of the Prehistoric Society 61, 81–116

Billington L P (2016) ***Lithic Scatters and Landscape Occupation in the Late Upper Palaeolithic and Mesolithic: A Case Study from Eastern England*** Unpublished PhD Thesis: The University of Manchester

Bishop R R (2015) ***Did Late Neolithic farming fail or flourish? A Scottish perspective on the evidence for Late Neolithic arable cultivation in the British Isles*** World Archaeology, 47:5, 834-855,

Blair J (2018) ***Building Anglo-Saxon England*** Princeton

Bogaard A, Heaton TH, Poulton P & Merbach I (2007) The impact of manuring on nitrogen isotope ratios in cereals: archaeological implications for reconstruction of diet and crop management practices. ***Journal of Archaeological Science*** 34(3) pp.335–343.

Bogaard A, Hodgson J, Nitsch E, Jones G, Styring A,Diffey C, Pouncett J, Herbig C, Charles M, Ertug F, Tugay O, Filipovic D & Fraser R (2016) 'Combining functional weed ecology and crop stable isotope ratios to identify cultivation intensity: a comparison of cereal production regimes in HauteProvence, France and Asturias, Spain' ***Vegetation History and Archaeobotany*** 25.1, 57–73

Bourne J (2017) ***The place-name Kingston and Royal Power in Middle Anglo-Saxon England.***

Brennan R (2019) ***Cambridge Feature: Corn Dryer? Oven? Kiln? Something else?*** Allen Archaeology Blog. Available Online: http://www.allenarchaeology.co.uk/cambridge-feature-corn-dryer-oven-kiln-something-else/ accessed 25/4/2019

Brück J (2000) ***Settlement, Landscape and Social Identity: The Early-Middle Bronze Age Transition in Wessex, Sussex and the Thames Valley*** Oxford Journal of Archaeology, 19: 273–300.

Brundenell M. forthcoming ***Late Bronze Age to Middle Iron Age, c 1150 –100 BC*** Draft East England Regional Research Framework Document.

Campana S (2017) ***Emptyscapes: Filling an 'empty' Mediterranean landscape at Rusellae, Italy*** Antiquity, 91(359), 1223–1240.

Chadwick A M (2012) ***Routine magic, mundane ritual: towards a unified notion of depositional practice*** Oxford Journal of Archaeology 31(3) 283–315

Champion T C, Haselgrove C, Armit I, Creighton J & Gwilt A (2001) ***Understanding the British Iron Age: an agenda for action*** A Report for the Iron Age Research Seminar and the Council of the Prehistoric Society, Salisbury, UK, Trust for Wessex Archaeology, 52.

Chenery C, Müldner G, Evans J, Eckardt H & Lewis, M (2009) 'Strontium and stable isotope evidence for diet and mobility in Roman Gloucester, UK', ***Journal of Archaeological Science*** 37, 150–63

Christie N & Stamper P (2012) ***Medieval Rural Settlement: Britain and Ireland AD800–1600*** Oxford

Clark J, Higgs E & Longworth I (1960) ***Excavations at the Neolithic Site at Hurst Fen, Mildenhall, Suffolk (1954, 1957 and 1958)*** Proceedings of the Prehistoric Society, 26, 202–245.

Collins M 2017 ***Northstowe, Phase 1 Cambridgeshire. Archaeological Post Excavation Assessment (Vol. 3). Area M*** Unpublished Report: Cambridge Archaeological Unit Report 1363

Cooper A (2016a) 'Held in Place': Round Barrows in the Later Bronze Age of Lowland Britain ***Proceedings of the Prehistoric Society*** 82, 291–322

Cooper A (2016b) ***Other types of meaning: Relationships between round barrows and landscapes from 1500 BC–AD 1086*** Cambridge Archaeological Journal 26(4), 665–96

Cooper A (2018) ***Early to Middle Bronze Age 2500–1150 BC*** Draft East of England Region Research Framework Document.

Creigton C & Rippon S (2017) 'Conquest, colonisation and the countryside: archaeology and the mid-11th- to mid-12th-century rural landscape' in Hadley & Dyer (ed) ***The Archaeology of the 11th Century: Continuities and Transformations.***

Donaldson P, Kinnes I & Wells C (1977) ***The Excavation of a Multiple Round Barrow at Barnack, Cambridgeshire 1974–1976*** The Antiquaries Journal, 57(2), 197–231.

Dyer, Jones & Page (2005) ***The Whittlewood Project: Medieval Settlements and Landscapes in the Whittlewood Area.***

Eckardt H (ed) (2010) ***Roman Diasporas. Archaeological Approaches to Mobility and Diversity in the Roman Empire*** Journal of Roman Archaeology Supplementary Series 78, Portsmouth, RI

Ellis C J (2004) ***A prehistoric ritual complex at Eynesbury, Cambridgeshire*** East Anglian Archaeology Occasional Papers 17

Elsdon S M (1992) ***East Midlands Scored Ware. Trans. Leicestershire*** Archaeol. and Hist. Soc. 66, 83–91

Eriksson G (2013) Stable isotope analysis of humans. In: ***The Oxford Handbook of the Archaeology of Death and Burial (eds.)*** Tarlow, S & Nilsson Stutz, L. 123–146. Oxford

Evans C & Knight M (2001) The 'community of builders': The Barleycroft post alignments. In J. Brück (ed) ***Bronze Age Landscapes: Tradition and Transformation*** 83–98. Oxford:

Evans C & Hodder I (2006) ***The Haddenham Project. Marshland Communities and Cultural Landscapes from the Bronze Age to Present Day*** (vol. 2). Cambridge: McDonald Institute for Archaeological Research

Evans C & Patten R (2011) ***An Inland Bronze Age: Excavations at Striplands Farm, West Longstanton*** Proceedings of the Cambridge Antiquarian Society100: 7–46

Evans C (2013a) ***Process and History: Prehistoric Fen-edge Communities at Colne Fen, Earith*** Cambridge: McDonald Institute Monograph

Evans C (2013b) ***Delivering Bodies unto Waters: A Late Bronze Age Mid-Stream Midden Settlement and Iron Age Ritual Complex in the Fens*** The Antiquaries Journal, 93, 55–79.

Evans C (2015) ***North West Cambridge Archaeology University of Cambridge 2013–14 Excavations - Traveller's Rest Sub-site*** Unpublished Report: Cambridge Archaeological Unit.

Evans C with Tabor J & Vander Linden M (2016) ***Twice-Crossed River. Prehistoric and Palaeoenvironmental Investigations at Barleycroft Farm/Over, Cambridgeshire*** Cambridge Archaeological Unit Landscape Archives Series. The Archaeology of the Lower Ouse Valley Volume III. Cambridge: McDonald Institute

Evans C, Lucy S & Patten R (2018) ***Riversides: Neolithic Barrows, a Beaker Grave, Iron Age Burials and Settlement at Trumpington*** McDonald Institute for Archaeological Research.

Evans C (2018) ***Late Iron Age and Roman*** [unpublished draft document] East Anglian Research Framework Review

Evans C & Lucas G (forthcoming) Hinterlands (Pt. 1) ***The Archaeology of West Cambridge and Roman Cambridge revisited*** CAU Landscape Archives: New Archaeologies of the Cambridge Region Series (3), Cambridge

Garrow D, Beadsmoore E, & Knight M (2005) ***Pit Clusters and the Temporality of Occupation: An Earlier Neolithic Site at Kilverstone, Thetford, Norfolk*** Proceedings of the Prehistoric Society, 71, 139–157.

Garwood P (2007) Before the hills in order stood: Chronology, time and history in the interpretation of Early Bronze Age round barrows. In J. Last (ed.) ***Beyond the Grave – New Perspectives on Barrows. Oxford: Oxbow.***

Garrow D (2012) ***'Odd deposits and average practice. A critical history of the concept of structured deposition'*** Archaeological Dialogues 19(2), 85–115

Garrow D, Meadows J, Evans C & Tabor J (2014) ***Dating the Dead: A High-Resolution Radiocarbon Chronology of Burial Within an Early Bronze Age Barrow Cemetery at Over, Cambridgeshire*** Proceedings of the Prehistoric Society, 80, 207–236.

Green C, Gosden C, Cooper A, Franconi T, Ten Harkel L, Kamash Z & Lowerre A (2017) ***Understanding the spatial patterning of English archaeology: modelling mass data from England, 1500BC to AD1086*** Archaeological Journal 174(1), 244–280

Halkon P & Millett M (1999) ***Rural settlement and industry: Studies in the Iron Age and Roman archaeology of lowland East Yorkshire*** Leeds

Hamerow H (2012) ***Rural Settlements and Society in Anglo-Saxon England*** Oxford

Hamilton W D (2010) ***The use of Radiocarbon and Bayesian Modelling to (re)write Later Iron Age Settlement Histories in East-Central Britain.*** Unpublished PhD Thesis: University of Leicester

Hamilton W D, Haselgrove C & Gosden C (2015) ***The impact of Bayesian chronologies on the British Iron Age*** World Archaeology.

Haselgrove C C & Pope R E (2007) Characterising the Earlier Iron Age. In C.C. Haselgrove and R.E. Pope (eds) ***The Earlier Iron Age in Britain and the near Continent*** Oxford: Oxbow. 1–23

Healy F (1988) ***The Anglo-Saxon Cemetery at Spong Hill, North Elmham, Part VI: Occupation during the Seventh to Second Millennia BC*** East Anglian Archaeology 39.

Heckathorn S A, McNaughton S J & Coleman J S (1999) ***C4 plants and herbivory.*** C4 plant biology, pp.285–312.

Hoggett R (2018) ***Middle and Late Anglo-Saxon*** [unpublished draft document] Regional Research Framework

Ingham D (2019) ***Land South of Cambridge Road, Fenstanton, Cambridgeshire: Assessment of Archaeological Potential and Updated Project Design*** [unpublished report], Albion Archaeology

Knight D, Last J, Evans S & Oakey M (2018) ***National Archaeological Identification Survey: South West Cambridgeshire Aerial Investigation & Mapping Report*** Historic England Research Report Series no. 67–2018

Ladd S (2014) ***Archaeological Evaluation at Land east of New Road, Melbourn*** Project Report. Oxford Archaeology Ltd., Bar Hill. (Unpublished)

Lodwick L (2018) ***'Arable weed seeds as indicators of regional cereal provenance: a case study from Iron Age and Roman central-southern Britain' Vegetation History and Archaeobotany*** https://doi.org/10.1007/s00334-018-0674-y [accessed May 2019]

Lucy S, Tipper J & Dickens A (2009) ***The Anglo-Saxon Settlement and Cemetery at Bloodmoor Hill, Carlton Colville, Suffolk.***

Luke M (2016) ***Close to the Loop: landscape and settlement evolution beside the Biddenham Loop, west of Bedford*** East Anglian Archaeology 156

Mackie M, Hendy J, Lowe A D, Sperduti A, Holst M, Collins M J & Speller C F (2017) ***Preservation of the metaproteome: variability of protein preservation in ancient dental calculus.*** STAR: Science & Technology of Archaeological Research, 3(1), pp.58–70.

Macphail R I, Bill J, Crowther J, Haită C, Linderholm J, Popovici D, & Rødsrud C L (2017) ***'European ancient settlements – a guide to their composition and morphology based on soil micromorphology and associated geoarchaeological techniques; introducing the contrasting sites of Chalcolithic Borduşani-Popină, Borcea River, Romania and the Viking Age Heimdaljordet, Vestfold, Norway'*** Quaternary International v. 460, 30–47

Madgwick R (2008). Patterns in the modification of animal and human bones in Iron Age Wessex: revisiting the excarnation debate. In: O. Davis, N. Sharples, and K. Waddington (eds) ***Changing Perspectives on the First Millennium BC: Proceedings of the Iron Age Research Student Seminar 2006*** Oxford: Oxbow. 99–118.

Malim & Hines (1998) ***The Anglo-Saxon Cemetery at Edix Hill (Barrington A), Cambridgeshire.***

Malim T (2001) Place and space in the Cambridgeshire Bronze Age. In J. Brück (ed.) ***Bronze Age Landscapes: transition and transformation, 9–21*** Oxford: Oxbow Books

McKerracher M (2018) ***Farming Transformed in Anglo-Saxon England: Agriculture in the Long Eighth Century*** Havertown

Medlycott M (ed) (2011) ***Archaeology Revisited: A Revised Framework for the East of England East Anglian Archaeology Occasional Papers 24*** East of England

Minniti C, Valenzuela-Lamas S, Evams J & Albarella U (2014) ***Widening the market. Strontium isotope analysis on cattle teeth from Owslebury (Hampshire, UK) highlights changes in livestock supply between the Iron Age and the Roman period*** Journal of Archaeological Science 42, 305–14

Montgomery J, Evans J A, Chenery S R, Pashley V & Killgrove K (2010) ***'Gleaming, white and deadly': using lead to track human exposure and geographic origins in the Roman period in Britain*** Journal of Roman archaeology suppl ser 78, 199–226.

Olalde et al. (2018) ***The Beaker phenomenon and the genomic transformation of northwest Europe*** Nature. 555, 190–196

Oosthuizen S (2009) ***The Deserted Medieval Settlements of Cambridgeshire: A Gazetteer*** Medieval Settlement Research 24.

Patten R (2012) ***An Iron Age and Roman Settlement at Summersfield, Papworth Everard*** Proceedings of the Cambridge Antiquarian Society 101, 115–142

Patten R (2016) ***Bearscroft Farm, Godmanchester: An Archaeological Excavation*** [unpublished report] Cambridge Archaeological Unit Excavation Report 1340

Pearson J A, Bogaard A, Charles M, Hillson S W, Larsen C S, Russell N & Twiss K (2015) ***Stable carbon and nitrogen isotope analysis at Neolithic Çatalhöyük: evidence for human and animal diet and their relationship to households.*** Journal of Archaeological Science 57, pp.69–79.

Perring, D & Pitts, M (2013) ***Alien Cities. Consumption and the Origins of Urbanism in Roman Britain*** Spoilheap Publications Monograph 7, Portslade

Phillips Y (2015) ***Bronze Age and Iron Age settlement and land-use at the Milton Landfill and Park & Ride Sites, Cambridgeshire*** Proceedings of the Cambridge Antiquarian Society 104, 7–30

Phillips T & Mortimer R (2012) ***Clay Farm, Trumpington, Cambridgeshire. Post-excavation Assessment and Updated Project Design*** [unpublished report] Oxford Archaeology East Report 1294

Rees G 2016. ***Iron Age, Roman and Middle Saxon Settlement at the site of the Peterborough Gas Compressor Station, Glinton*** Archaeological Excavation Report and Updated Project Design for Publication. Unpublished Oxford Archaeology East Report 1936.

Rippon S, Smart C, Pears B (2015) ***The Fields of Britannia*** Oxford

Rippon S (2018) ***Kingdom Civitas and County: The Evolution of Territorial Identity in the English Landscape*** Oxford

Rohnbogner A (2018) ***'The Rural Population'*** in Smith et al. 2018, 281-345

Schiffels, Haak, Paajanen, Llamas, Popescu, Loe, Clarke, Lyons, Mortimer, Sayer, Tyler-Smith, Cooper & Durbi (2016) ***Iron Age and Anglo-Saxon genomes from East England reveal British migration history*** Nature Communications 7

Shapland F & Armit I (2012) ***The Useful Dead: Bodies as Objects in Iron Age and Norse Atlantic Scotland*** European Journal of Archaeology, 15(1), 98–116

Smith A, Allen M, Brindle T & Fulford M (2016) ***The Rural Settlement of Roman Britain, New Visions of the Countryside of Roman Britain*** Vol 1, Britannia Monograph 29, London

Smith A, Allen M, Brindle T, Fulford M, Lodwick L & Rohnbogner A (2018) ***Life and Death in the Countryside of Roman Britain, New Visions of the Countryside of Roman Britain*** Vol. 3, Britannia Monograph Series 31, London

Stafford E, Goodburn D, & Bates M (2012) ***Landscape and Prehistory of the East London Wetlands.***

Stevens C & Fuller D 2012 ***Did Neolithic farming fail? The case for a Bronze Age agricultural revolution in the British Isles*** Antiquity, 86(333), 707–722

Tabor J (2014b) ***Archaeological Investigations at Broom Quarry, Bedfordshire: Phases 11–13. Post Excavation Assessment Volume 1*** [unpublished report] Cambridge Archaeological Unit.

Tabor J, Billington L, Healy F & Knight M (2016) ***Early Neolithic Pits and Artefact Scatters at North Fen, Sutton Gault, Cambridgeshire*** Proceedings of the Prehistoric Society, 82, 161–191.

Tipper J (2004) ***The Grubenhaus in Anglo-Saxon England: An analysis and interpretation of the evidence from a distinctive building type*** Yedingham

Wainwright G, Dimbleby G, Evans A & Evans J (1972) ***The Excavation of a Neolithic Settlement on Broome Heath, Ditchingham, Norfolk, England*** Proceedings of the Prehistoric Society, 38, 1–97.

Van der Veen M (2007) Food as an Instrument of Social Change: Feasting in Iron Age and Early Roman Southern Britain. In K.C Twiss (ed) ***The archaeology of food and identity. Illinois: Center for*** Archaeological Investigations. 122–129

Yates D (2007) ***Land, Power and Prestige: Bronze Age Field Systems in Southern England*** Oxford.

Internet Resources

Access Cambridge Archaeology ***The University of Cambridge Currently Occupied Rural Settlement (CORS) Project:*** https://www.access.arch.cam.ac.uk/reports/cors

University of Oxford ***English Landscape and Identities:*** https://englaid.wordpress.com/

Feeding Anglo-Saxon England: The Bioarchaeology of an Agricultural Revolution: https://feedsax.arch.ox.ac.uk/index.html

Museum of London Archaeology ***London's lost river: The Tyburn:*** http://molarchaeology.maps.arcgis.com/apps/Cascade/index.html?appid=6b00daa1acac4df7a2fcde06104bac1a

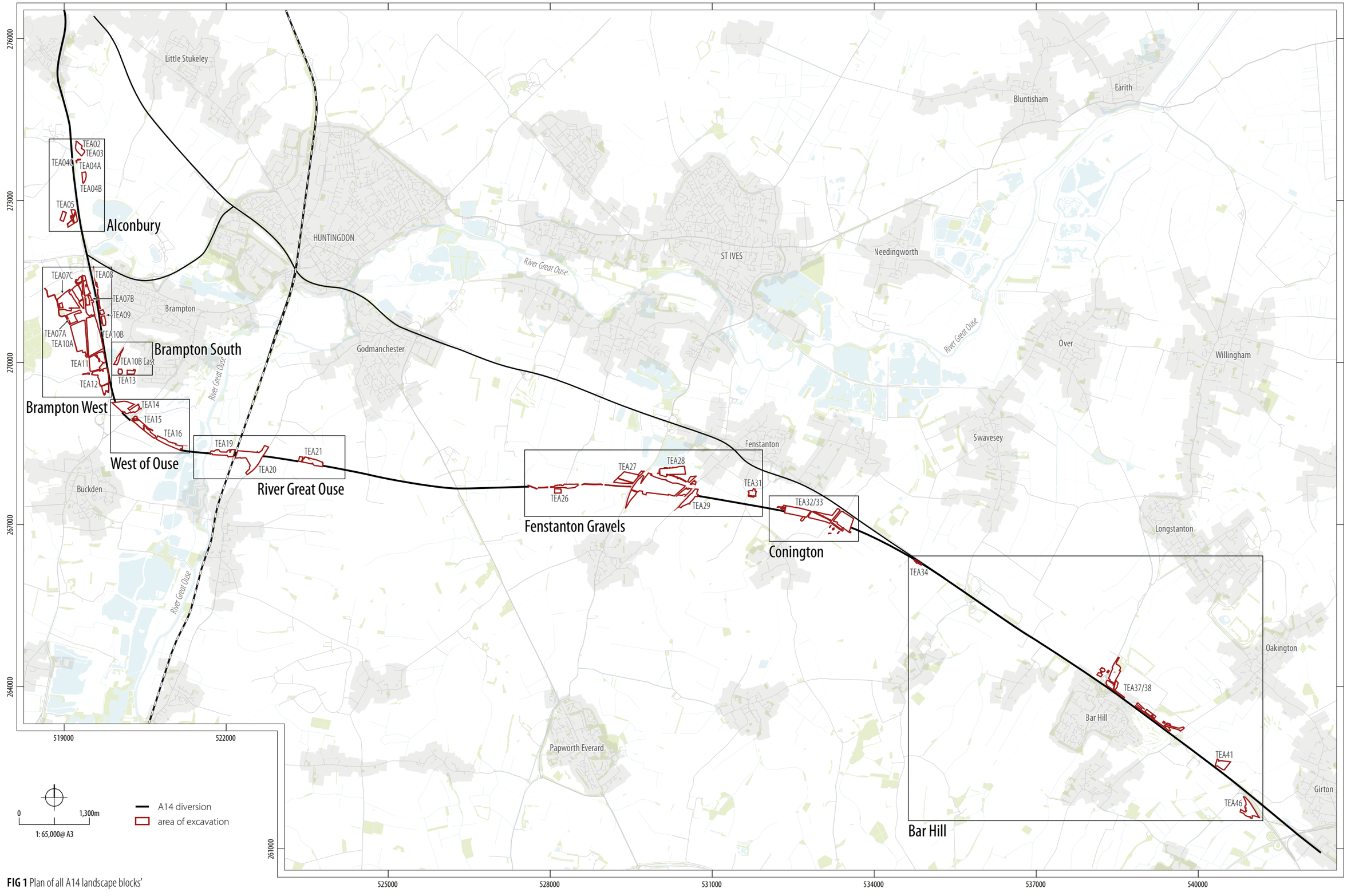

FIG 1 Plan of all A14 landscape blocks'

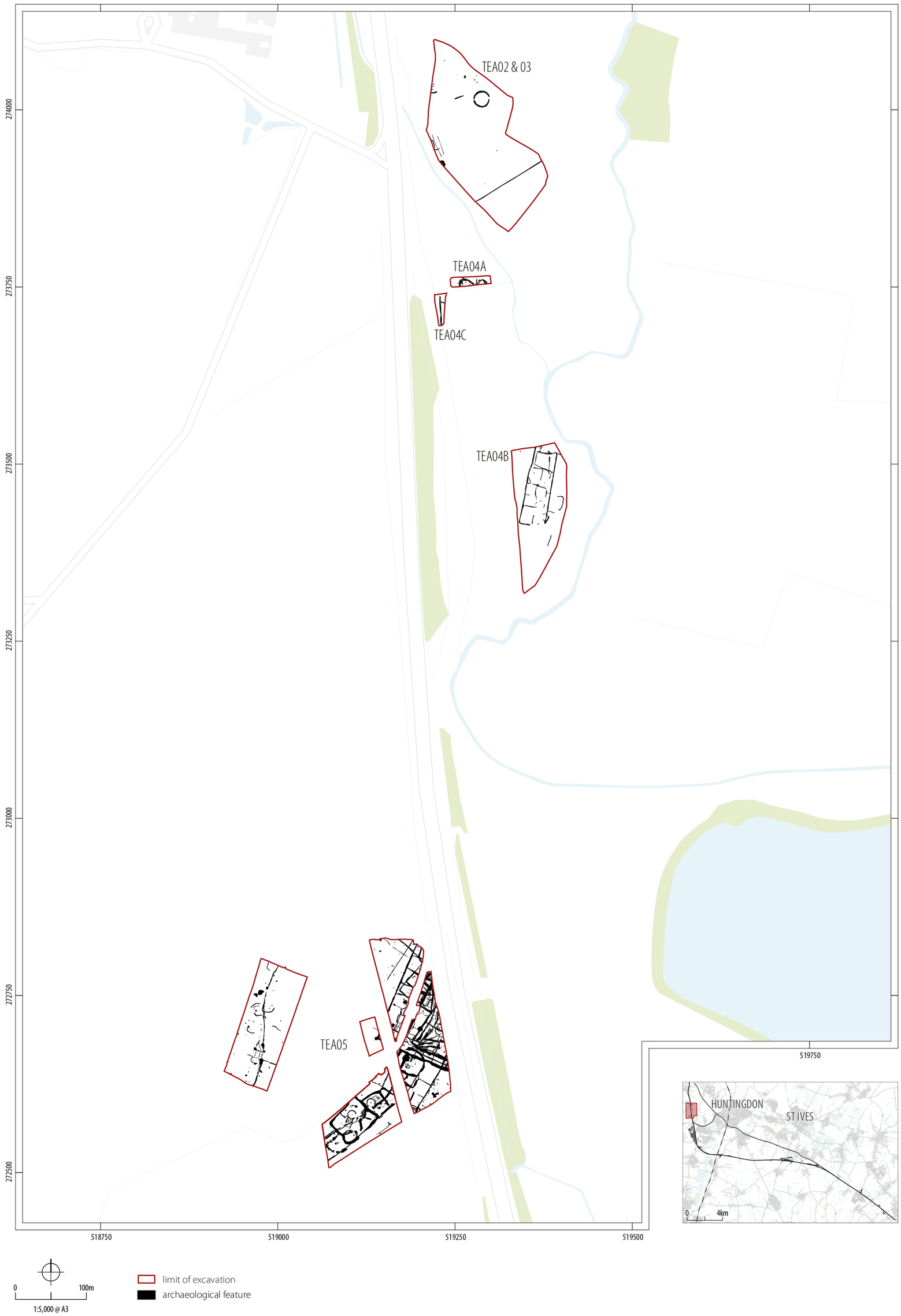

FIG 2 Plan of archaeology: 'Alconbury'

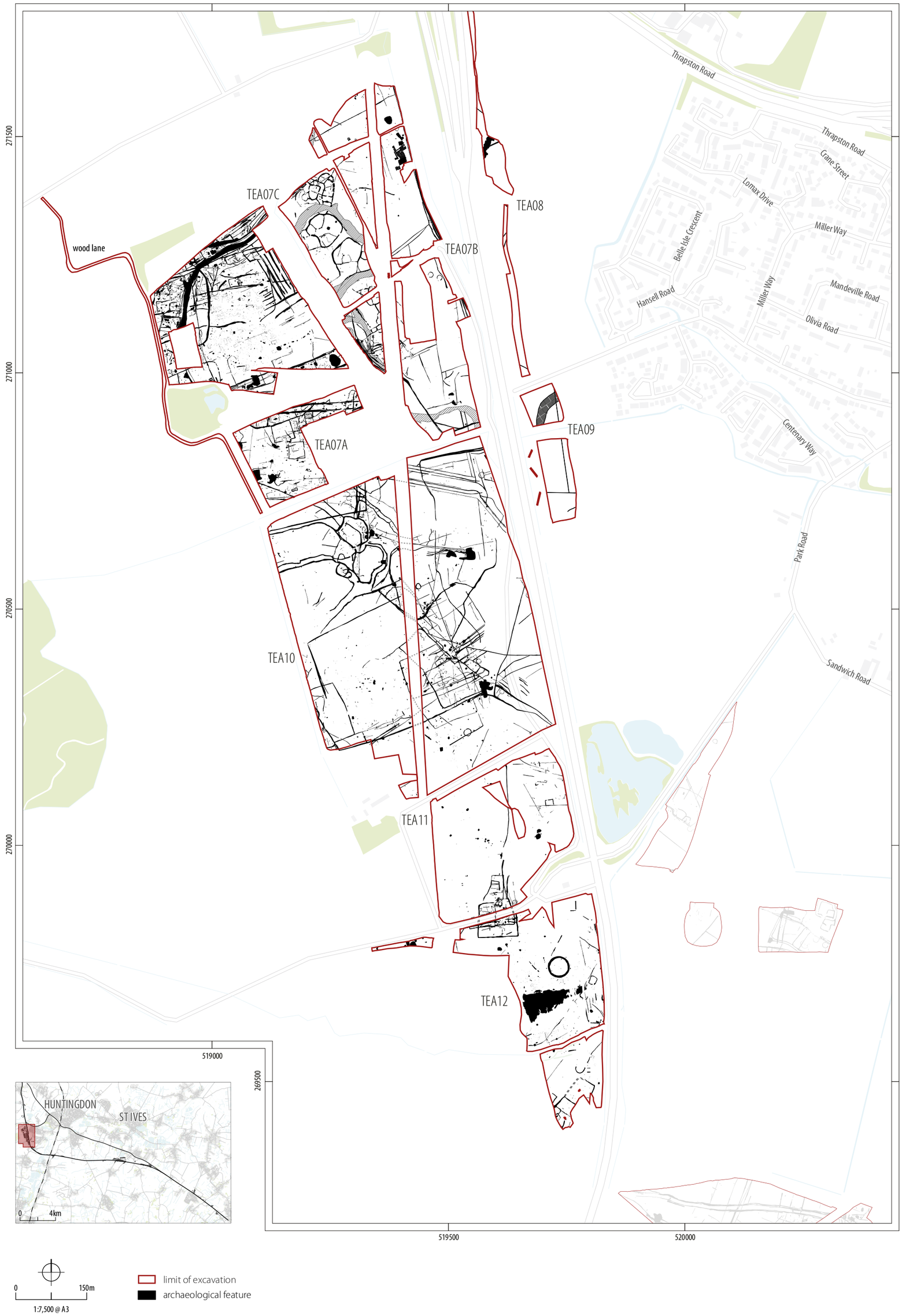

FIG 3 Plan of archaeology: 'Brampton West'

FIG 4 Plan of archaeology: 'Brampton South'

TEA14

TEA15

TEA16

Buckden Road

Buckden Road

Buckden Road

Brampton Road

Great North Road

269200

268800

268400

520000

520400

520800

521200

HUNTINGDON

ST IVES

0 4km

0 100m

1:5,000 @ A3

limit of excavation

archaeological feature

FIG 5 Plan of archaeology: 'West of Ouse'

FIG 6 Plan of archaeology: 'River Great Ouse'

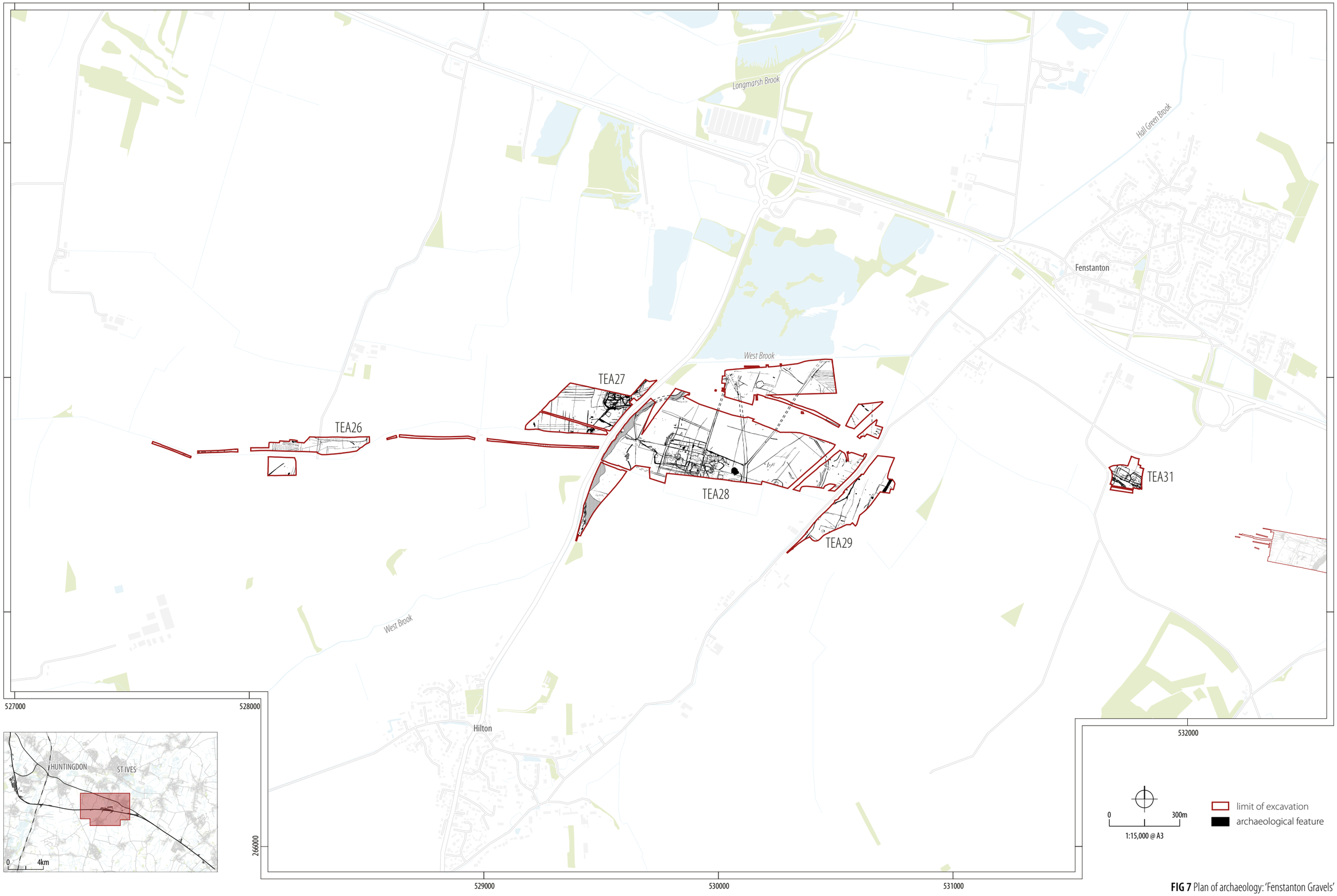

FIG 7 Plan of archaeology: 'Fenstanton Gravels'

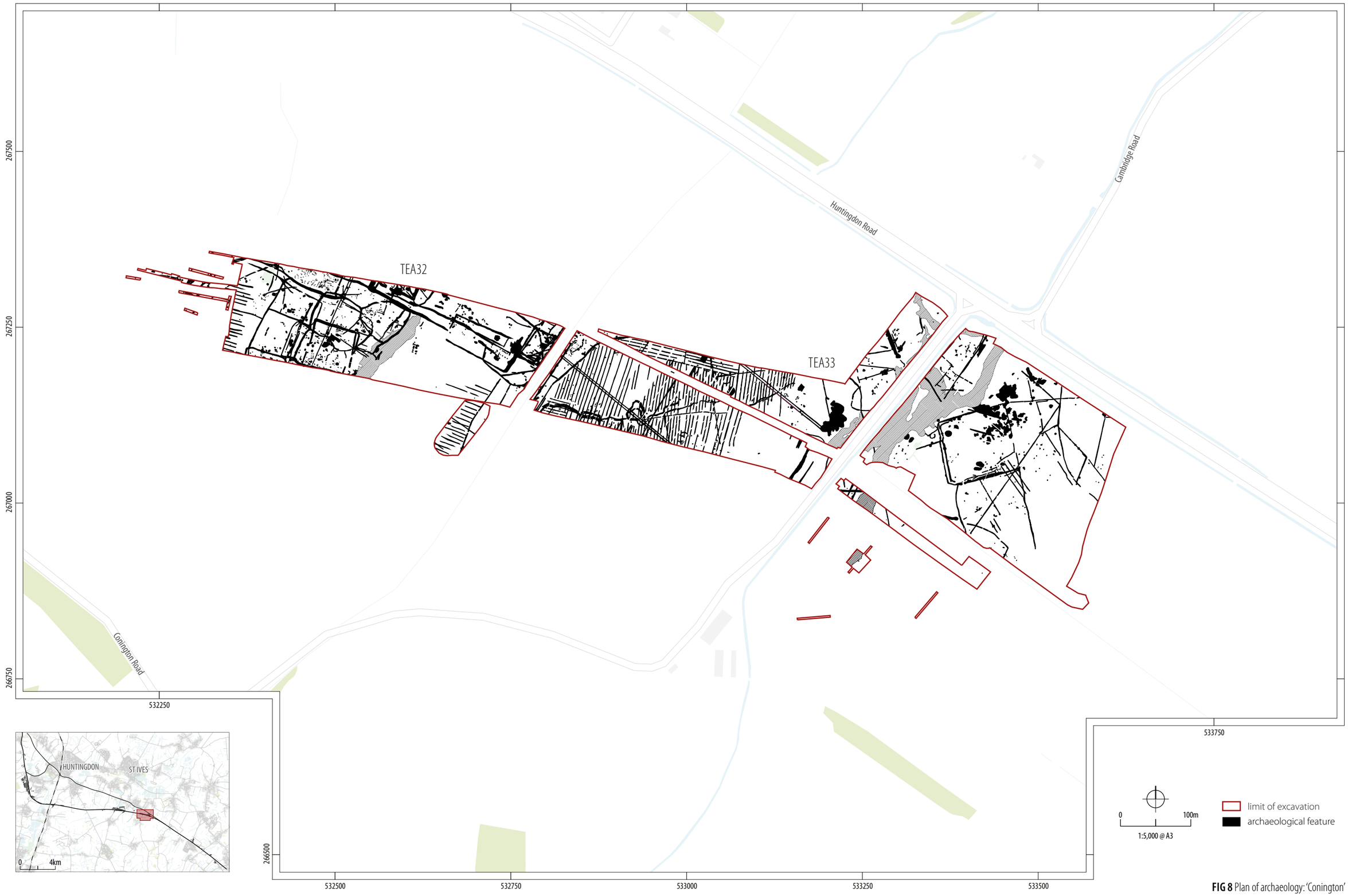

FIG 8 Plan of archaeology: 'Conington'

FIG 9 Plan of archaeology: 'Bar Hill'

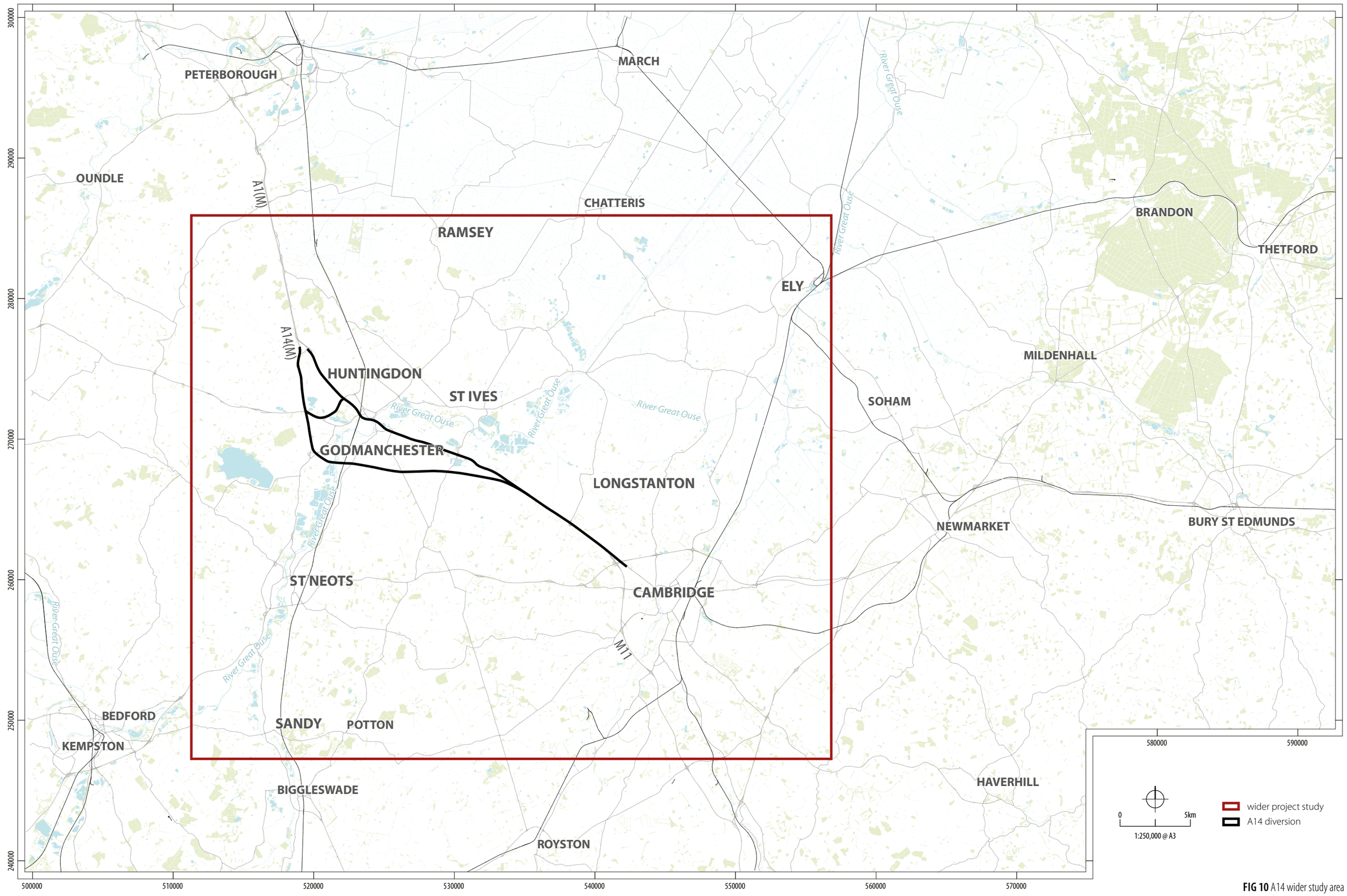

FIG 10 A14 wider study area

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