



**WRITTEN SCHEME OF
INVESTIGATION
for EARTHWORK
RECORDING AND
ARCHAEOLOGICAL
EXCAVATION**

**Land at South Caldecott,
MILTON KEYNES**

Planning App: TBA

Accession Code: AYBCM:2018.106 & TBA

JUNE 2019

**Local Planning Authority:
Milton Keynes Council**

Site centred at: SP 8920 3410

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**Issue Date:
26 June 2019**

**CgMs Ref:
JAC/23815/01**

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1.0 INTRODUCTION

1.1 Site Location and Description

- 1.1.1 This Written Scheme of Investigation has been prepared by Michael Dawson of CgMs Heritage (part of the RPS Group) on behalf of HB (South Caldecotte) Ltd.
- 1.1.2 The subject of this assessment is the proposed investigation of archaeological remains at South Caldecott located in land parcels BM239493, 2394931 (Unwin), BM288801 (Woburn) and BM403693 (Norman). Throughout this report for brevity and clarity these land parcels will be referred to by their ownership Unwin's, Woburn or Norman unless greater precision is required (Fig 1). The remains lie within a wider site area allocated in the Milton Keynes Council Plan:MK adopted 2019 and intended for commercial and employment use.
- 1.1.3 The development site comprises the allocated site at South Caldecott "*Land South of Milton Keynes: Strategic Employment Allocation*" in the MK:Plan adopted May 2019. The allocated site comprises some 57ha and the archaeological deposits some 4.6ha in three discrete areas (centred on SP 8758 4573).
- 1.1.4 The solid geology of the survey area comprises Jurassic mudstone formations, predominantly of Oxford Clay which is overlain by West Walton formation in the southeast. This solid geology is covered in part by discrete drift deposits of river terrace gravels in the west, towards the River Ouzel, and heads of sands or gravels across the west and centre (BGS 2018). The north east of site has no recorded superficial geology.

1.2 Project Background

- 1.2.1 Planning permission is sought for the development of a mix of Class B2 and B8 employment space with a minimum of 195,000m² of Class B2/B8 and ancillary B1 employment floorspace.
- 1.2.2 This WSI has been written in accordance with Policy SD 14. It marks the culmination of a process which began with the preparation of a desktop Archaeological Assessment, to understand the likely presence of archaeological remains within the site, followed by geophysical survey and trial trench evaluation to refine that understanding.
- 1.2.3 This WSI has been written to define a programme of archaeological excavation and earthwork recording in light of the results of assessment and evaluation (MoLA 2015; 2018).

1.3 **Archaeological Background and Assessment of Significance**

1.3.1 The significance of a heritage asset is defined in published guidance (NPPF 2019, English Heritage 2008) as the sum of all its heritage values, including any contribution made by its setting. Heritage values are considered under four categories, not all of which will necessarily apply to any given site:

- **Evidential value:** the potential of the Roman deposits to yield evidence about past human activity through physical remains and archaeological deposits;
- **Historical value:** the ways in which past people, events and aspects of life can be connected through the development site to the present, either illustratively (by aiding interpretation of the past) or associatively (through direct links with famous people or events);
- **Aesthetic value:** the ways in which people draw sensory and intellectual stimulation from the remains; and
- **Communal value:** the meanings of the Roman remains for the people who relate to it, or for whom it figures in their collective experience or memory.

1.3.2 The archaeological potential of the development site has been addressed in a geophysical survey (MOLA report 18/51) which informed a scheme of archaeological trial trenching (MoLA 2018 Report 18/169). These investigations revealed three areas of below ground archaeological deposits comprising Roman and Iron Age deposits and an area of ridge and furrow. The Roman deposits lie close to the carriageway of the diverted A5 where earlier investigation had recorded a small cremation cemetery (MMK 5975) the line of a Roman road running north from Magiovinium (MMK 5974) as well as Roman period stone buildings (MK 686) and Roman period ceramics (MMK 5509). The deposits on the line of the diverted A5 were subject to excavation by D S Neal in the 1980s. The deposits found beneath the carriageway were beyond the scope of the geophysical survey in 2018, however the anomalies provided a clear indication that the character and morphology of deposits immediately to the east of the A5 road and within the western section of the development continued the trends noted in the earlier excavations. Trial trench evaluation in 2018, which followed the geophysical survey, confirmed the character of the archaeology as the remains of activities on the periphery of the Roman small town of Magiovinium.

1.3.3 The below ground evidence dating to the Roman period (Unwins and Woburn) is sealed beneath pasture fields in which ridge and furrow of medieval, and possibly later date,

remain as earthworks. Iron Age enclosures immediately to the east of the Roman street and the isolated Iron Age enclosure on Norman's land are heavily plough eroded.

1.4 **The Roman Period Evidence (Unwins, Normans and Woburn)**

1.4.1 The principal focus of the Roman period archaeology which is the subject of this proposal lies within the area indicated on Fig 4 (Unwin's, Norman's and Woburn). In this location the evidence survives primarily as archaeological sites of buried archaeological deposits from the Roman era whilst the earthwork remains at both Unwin's and Woburn comprise the upstanding remnants of agriculture from the Medieval Period. The full extent of archaeology within the South Caldecott Strategic Employment Allocation includes enclosures of Iron Age on high ground to the east; a street running out from the core area of the Roman town, an area of enclosures further to the east beyond a small brook which flows westwards to the River Ouzel¹ and an enclosure (Woburn) close to the southern roundabout on the A5 and the earthwork remains of medieval framing (ridge and furrow). This section relates to (1) Unwin's, an area of street running north east from the Roman small town of Magiovinium, (2) Woburn an enclosure of Roman date to the south and (3) ridge and furrow earthworks in both Unwin's and Woburn and (4) Iron Age/Roman enclosures east of the brook and within Norman's land.

1.4.2 **Evidential value**

1.4.3 The spatial disposition of the below ground archaeology at South Caldecott indicates that it represents the periphery of the Roman small town of Magiovinium. Evaluation indicates in (1) Unwins a short stretch of metalled Roman period street leads north eastwards away from the urban core of the Roman small town towards the open countryside. Initially passing through an area of gravel quarrying, active in the 1st century AD, pressure on the settlement area to the west of the A5 seems to have led to the development of dwellings on plots flanking the street in the later Roman period. The regularity of the plots within which the houses sit suggests some form of land allotment or enclosure. This area was occupied possibly throughout the 3rd and 4th centuries. The gravel metalled street may have led initially through the area of gravel quarrying to several enclosures east of the brook today identified as (4) Normans' land.

1.4.4 In area (2) Woburns an enclosure of Roman date extends the area of enclosures identified by Neal (1987, site 17) in 1978-80.

¹ To the north-east of the Roman street Trenches 14 and 25 were positioned to examine two rectilinear enclosures revealing the enclosure ditches and a further possible curvilinear ditch beyond the northern enclosure. Several internal features were also identified. The enclosures contained both Iron Age and Roman period ceramics and although plough eroded have the potential to reveal further evidence of early occupation.

- 1.4.5 The evaluation of the Roman street area revealed a ceramics assemblage which confirmed the local character of the majority of the pottery but with important regional elements including Nene Valley Colour coat and Gaulish Samian ware imported in the 1st century. Much of the remaining material culture was unexceptional with brick, kiln bars, querns stone, fired clay, iron slag and nails. These groups represent the normal range of activities familiar from Roman small towns, from pottery production to food production (Burnham, Wachter 1990, 46-50). The animal bone and charred plant remains indicate a diet perhaps dominated by beef (cattle at 60%) with sheep and goat bones comprising some 24% of the assemblage. Oats, wheat and barley were evident in the roadside ditches of Trench 87 whilst horse bones, likely to represent the remains of draught animals, comprised 13% of the bone assemblage.
- 1.4.6 No human remains were recovered from the trenches.
- 1.4.7 In summary the areas of Roman activity retain significant evidence in the form of archaeological deposits relating to the 1st to 4th centuries. In relation to periodisation the later Iron Age pottery hints at the location elsewhere of an earlier settlement whilst the Roman pottery suggests that the street was first occupied in the pre-Flavian period² until at least the late 2nd century, when the flanking ditches may have been allowed to silt up. The earliest activity at the Unwin's site may have been quarrying alongside the road before any settlement activity occurred. Enclosures seem to have been established here after the quarry period from the late 1st century onwards and occupied into the 3rd century before the town began to contract in the 3rd and 4th centuries. This is a situation comparable that identified during David Neal's excavation along the route of the A5 (Neal 1987).
- 1.4.8 The evidential value of the area is, however, threatened and to some extent eroded by the illegal use of metal detectors evident during the evaluation in 2018 and experienced by the landowner.
- 1.4.9 In addition to the below ground archaeology both areas, (1) Unwin's and (2) Woburn, are characterised by ridge and furrow, the remains of medieval and possibly later ploughing.
- 1.4.10 **Historical Value**
- 1.4.11 The Unwin and Woburn areas of Roman archaeology are of historical value for a number of reasons, both illustrative and associative:

² Before 69AD

1.4.12 ***Illustrative***

- 1.4.13 The area is a common survival of archaeology peripheral to a small Roman town. It comprises the type of activities which might be expected of such areas, from the initial gravel quarrying through the construction and metalling of the street to the late 1st and 2nd century until the final ribbon-like development of enclosures and habitation. The enclosures east of the brook, which flows through Unwin's, are an interesting example of settlement transition from urban periphery to rural landscape.
- 1.4.14 The small town of Magiovinium has long been considered to have its origins in a small fort, adjacent to the roundabout on the A5, which attracted settlement further north and close to Dropshort Farm. This developmental model is represented by the Scheduled Monument Area. The evidence at South Caldecott shows how the military dispositions of the early invasion period evolved into economic centres.
- 1.4.15 The evidence also suggests that the conclusions by Neal from his excavations in the late 1980s (Site 17) that a series of five deep fairly narrow north-south gullies '*indicates a certain uniformity. Most of the plots were about 19m wide and correspond to similar enclosures found at Towcester*' (Neal 1987, 9)³ suggesting a planned settlement of land allotments. The line of the street found in Unwin's at South Caldecott continues the line of the road discovered by Neal (Site 18) where he argued the road led towards the main gate into Magiovinium, although its northern route was at that time uncertain. Possibly, he speculated, it may have led towards Harrold in Bedfordshire. The wayside ditches at Site 18 and to the south at Site 17 were allowed to silt up in the later 2nd century suggesting the street changed character during its period of use.
- 1.4.16 In summary the Roman archaeology at South Caldecott, Unwin's and Woburn, further illustrates aspects of the model proposed in the 1980 by Neal that the civil settlement at Magiovinium may have been a planned settlement beyond an earlier Roman fort. The dating from the evaluation suggest this may have taken place in the Pre-Flavian period (before 69AD). The model of economic development has been taken further by Millett and endorsed recently by Allen et al., who have proposed that the later economic development of planned small towns was related to their function as locations for tax collection based perhaps on market centres and trade.⁴
- 1.4.17 The enclosures to the east of the Brook (4) Normans land are of landscape interest interdigitating the area of peripheral activity into the countryside

³Deal D S 1987 Excavations at Magiovinium, Buckinghamshire, 1978-80 *Records of Buckinghamshire*, 29, 1-115

⁴ Allen et al., 2017, 174-177, 237-80; Millett 1992, 123-6, 190-5

1.4.18 **Associative**

1.4.19 The Roman remains have limited associative value in three ways. Firstly, it is an area of surviving, though truncated, Roman activity on the periphery of a small town. This dates from a period when the town was expanding. Its greatest extent was characterised in Neal's terms by ribbon development along a street leading to the core of the small town (the SAM).⁵ Secondly, it is associated with a recognised period of decline in the 3rd and 4th centuries which appears to have affected some small towns in the south and Midlands. This occurred at the same time that some of the major urban sites were developing significant defences and experiencing a change in focus and function. Some towns during this period saw the enlargement and improvement of public buildings whilst others experienced growth led by economic factors such as the establishment of markets.

1.4.20 There is also some significance in that the evidence represents the periphery of a small town in an area which might be considered to be especially sensitive to a variety of factors such as economic growth, proximity to Watling Street, existing facilities and proximity to other centres of population and resources. The Iron Age dating of the peripheral enclosures hints at an earlier settlement pattern, possibly subsumed within the Roman period landscape.

1.4.21 **Aesthetic value**

1.4.22 The Iron Age and Roman archaeology and the earthworks of the medieval ridge and furrow at the South Caldecott site has little aesthetic value in its current form, as it is private agricultural land adjacent to the A5. It is effectively hidden from public view and has not been the focus of research until the present round of evaluation.

1.4.23 **Communal value**

1.4.24 The archaeology of Magiovinium as a whole has some communal significance. The site is a focus of interest for the public. It is cited by the Council in the Core Strategy (2013) when characterising the historic environment (para 15.3) and similarly in the MK Proposed Submission Plan 2017 para 19.9. In the community the Buckinghamshire Archaeological Society has been the principal source of articles on excavations at the Roman small town and the small town is cited in the UK & European Metal detecting Forum and a focus for the Milton Keynes Metal Detecting Club.

⁵ Official encouragement of settlements like Magiovinium and Towcester was described as a new model by Burnham and Wachter in 1990 to distinguish it from the military, economically driven or developmental models, characterised by settlements (vici) outside Roman forts (Burnham and Wachter 1990, 9)

1.4.25 There is currently no public access and the site lies adjacent to a heavily used modern A road (A5 dual carriageway). Understandably there is nothing on site to inform passers-by of the history or function of the site.

1.4.26 **Status**

1.4.27 The Roman archaeology in both Unwin's and Woburn has no formal status though it may be considered to be within the setting of the Scheduled Ancient Monument to the west. The scheduled monument cannot be seen from the South Caldecott site which lies east of the A5 in locations (Unwin's and Woburn) where the road carriageway and hedging block any line of sight. However, the site can be experienced as part of the SAM due to the results of the recent geophysical survey and trial trenching as well as an awareness of Neal's excavations in the late 1980s.

1.4.28 When assessed against the criteria used in scheduling, group value, survival (extent), potential, documentation and condition the Roman period archaeology is significant. It has value as part of the Roman small town (group value) and has a high level of survival though it is not waterlogged and the upper horizons have been eroded by medieval ploughing. Its potential when assessed on a scale of high, moderate or low, is moderate as demonstrated by the depth of stratigraphy and range of artefactual and environmental data. The condition of the archaeology similarly when assessed in terms of high, moderate or low is moderate. It does not survive as above ground earthworks, it is not waterlogged and the early plough erosion has resulted in the removal of any historic surfaces such as floors or working areas.

1.4.29 The extent, character and relationship of the Roman archaeology to Magiovinium suggests that it is important archaeology though not of schedulable quality.

1.4.30 **Summary**

1.4.31 The significance of the archaeological deposits in at Unwin's, Noman's and Woburn has been assessed above and found to be moderate. The Roman period archaeology evidence of 1st to 4th century development on the periphery of a Roman small town capable of the informing the Research Frameworks⁶ objectives in relation to crafts trade and industries (12.11) and settlement (12.6). In addition research objectives for the east counties are relevant with respect to informing the development of small towns in relation to changes in their internal layouts and housing densities, role as centres of supply and demand; character of late Roman towns in the region, the morphology of small towns.⁷ To the research objectives of the eastern counties could be added the

⁶ Fulford 2014, 179-184 in Hey and Hind 2014,

⁷ Medleycott 2011, 47-48

research objectives of the East Midlands⁸ 5B Dissemination, 5e Diet and Health 5G Secondary Urban Centres and making a minor contribution to 5H Landscape Context. The ridge and furrow is of lesser significance with the potential to contribute in a minor way to Research Objective 7I Development of the Open Field System. It is the retention of this potential and the elements of the archaeology's significance, set out above, comprise the values which the WSC is intended to retain.

1.5 Ridge and Furrow (Unwins and Woburn)

1.5.1 The ridge and furrow at Unwin's and Woburn was once part of wider area of similar earthworks. They are the remains of medieval and possibly later ploughing in the parish of Bow Brickhill. The ridge and furrow was first recorded by the Desk Based Assessment (MOLA 2015 15/151) and it was illustrated in Fig 21 described as '*feint north-south-aligned earthworks*'.

1.5.2 The ridge and furrow at Unwin's and Woburn represent small surviving areas of medieval earthworks from Bow Brickhill parish. The land use and resources available to a medieval township⁹ comprise four main types, arable, meadow, woodland and waste (often referred to as heath or moor, fen). In the Midlands many townships were characterised by having some 90% arable land. This was divided into open fields and subject to crop rotation, often referred to as the three-field system. Ridge and furrow represents a cultivated ridge of land, a strip field or furlong, flanked by furrows for ease of identification and drainage. Evaluation in 2018 confirmed that some ridge and furrow survived as low earthworks in both Unwin's and Woburn.

1.5.3 Analysis of the ridge and furrow was carried out in 2001 when English Heritage¹⁰ undertook a survey of ridge and furrow in parts of 9 counties which included Milton Keynes (Hall 2001, Fig 4). The English Heritage survey mapped and assessed the ridge and furrow in the whole of the South Midlands, East of Birmingham based on the extent of survival, and the quality of historic documentation within each township. Each township (of 1577) was scored on a four-point system based on:

- Poor: little or no ridge and furrow
- Fair: some ridge and furrow
- Good: fair quantity of ridge and furrow with *vill* and other associations

⁸ Knight et al 2012, as updated by <https://archaeologydataservice.ac.uk/researchframeworks/eastmidlands/wiki/>

⁹ The term township or vill was the basic economic unit in the countryside before the industrial revolution. It contained all the essential resources needed by an agricultural community. It contained all the essential resources needed by an agricultural community water supply, arable, pasture (had its own field system), meadow land, access to woodland for timber and fuel and a mill. It was the area occupied by a distinct community and is not to be confused with a manor (area of secular jurisdiction) or parish (area of religious practice served by a parish church supported by tithes), although these sometime occupy the same area.

¹⁰ English Heritage 2001 *Turning the Plough Midland Open fields: landscape character and proposals for management*, Hall D

- Outstanding: a large area of ridge and furrow, usually with associations

- 1.5.4 From this assessment 140 townships were identified which had, by area, more than 18% survival of ridge and furrow. This sample was examined county by county with each county archaeologist taking into account fragmentation, village earthworks, and other historic associations. From this sub-sample 43 townships in 40 civil parishes were identified as priority townships. No priority townships were identified in the Milton Keynes area, though Passenham on the Northamptonshire border was included. The priority townships were identified based on scheduling criteria: group value, survival (extent), potential, documentation and condition.
- 1.5.5 In addition to this extensive survey, which did not identify the ridge and furrow of Bow Brickhill as significant, the development site has been evaluated by geophysical survey. The surveyors concluded that *“parallel linear anomalies relating to medieval and early post-medieval ridge and furrow cultivation are very widespread across the survey area. The furrows are typically spaced at 5m to 8m intervals, and often follow gentle reversed-S curves rather than running straight. They occur in coherent blocks (furlongs) the ends of which (headlands) are sometimes followed by modern field boundaries. The clearest anomalies occur in the southern pasture fields where the ridge and furrow is best preserved, still surviving as earthworks. Elsewhere the anomalies vary from weak to very weak. This variation will principally reflect broad scale variations in the magnetism of the ploughsoil and subsoil, although the degree of truncation by later ploughing may also be a factor”*.
- 1.5.6 There is no available quantification of the extent to which the ridge and furrow survives as earthworks in the parish. Bow Brickhill was excluded from the priority townships of the Turning the Plough project (Hall 2001) as it had less than 18% survival.
- 1.5.7 The earthwork remains of ridge and furrow are similarly non-designated. They comprise a small surviving proportion of a much larger area of such earthworks and consequently they have only low value in terms of group value; their survival over a small area is high, but their extent is low, their potential to illuminate more than a restricted range of site formation processes is limited. Their significance is therefore moderate to low.
- 1.6 **Iron Age (Norman’s Land):**
- 1.6.1 The trial trenching in 2018 of an enclosure identified by geophysical surveyed revealed archaeology of Iron Age date on a slightly prominent rise in the eastern part of the site (MoLA 2018). The D-shaped enclosure evaluated by trenches 33 and 34 revealed two ditches associated with the enclosure ditch which were both heavily truncated by

modern ploughing, earlier furrows and land drains. Small fragments of Iron Age/Romano pottery were found within the ditches. The only internal feature noted was the remains of a shallow posthole from which fragments of Iron Age/Romano British pottery were recovered from the upper fill.

- 1.6.2 While a good correlation was generally observed with the geophysical survey results, the scale of plough erosion was unexpectedly high. The significance of this enclosure is very limited. It has evidential value as part of the pre-Roman and Roman period landscape; it retains evidential value through the survival of ceramics and the slight possibility of further internal features. However its historic value is limited to archaeological appreciation of its landscape value. Its significance is local though its aesthetic value remains in the potential of the enclosures to illuminate the landscape transition from late Iron Age to Roman period. The potential for identifying coherent occupation or settlement remains within the enclosure is, however, limited.

2.0 AIMS & OBJECTIVES

2.1 The aims of the earthwork recording and archaeological excavation are as follows:

- To verify and further explore the results of the trial trenching
- To determine the extent, date, character, condition, significance and quality of the archaeological remains within the areas of identified by desk-based assessment, geophysical survey and trial trenching.
- Develop an understanding of the economy of the site, through analysis of recovered artefacts and ecofacts.
- Examine the environmental setting of the site, including the impact of human action on the local environment.
- Contribute to an understanding of the pattern and development of Iron Age and Romano-British settlement/agriculture in the Milton Keynes area, with reference to evidence for contemporary sites in this landscape
- To record the earthwork remains of medieval agriculture
- To produce a site archive for deposition with an appropriate museum and to provide information for accession to the Milton Keynes Historic Environment Record.

2.2 The programme of archaeological investigation will be conducted within the general research parameters and objectives defined by Solent-Thames Research Framework for the Historic Environment Resource Assessments and (Hey and Hind 2014). Where appropriate because of the geographical location of Milton Keynes reference may be had to the East of England Research Frameworks (Medleycott 2011). Key research aims include:¹¹

- The characterisation of Iron Age and Roman rural settlements and the development of the agrarian landscape;
- The investigation of sites with well-preserved deposits of both late Iron Age and Roman date in order to examine continuity of local tradition.
- Investigation of urban expansion and contraction
- Investigate the relationship between town and country from the inception of the Roman town to its demise in the early medieval period.

¹¹ See Fulford 2014 pages 180-181 in Hey and Hind 2014

- 2.3 The investigation will also take account of the national research programmes outlined in Historic England/English Heritage's '*Strategic Framework for Environment Activities and Programmes in English Heritage (SHAPE)*' first published in 2008.
- 2.4 This specification conforms to the requirements of the National Planning Policy Framework (NPPF). It has been designed in accordance with current best archaeological practice and the appropriate national standards and guidelines including:
- *Management of Archaeological Projects* (English Heritage, 1991);
 - *Code of Conduct* (Chartered Institute for Archaeologists, 2014);
 - *Standard and Guidance. Archaeological Excavation* (Chartered Institute for Archaeologists, 2014);

3.0 INVESTIGATION STRATEGY

- 3.1 In order to meet the aims and objectives detailed above, a programme of earthwork recording and archaeological area excavation will be carried out.
- 3.2 The programme of earthwork survey will involve either drone or ground based survey of the area of ridge and furrow identified in Fig 7. Archaeological works will entail machine stripping and excavation in advance of development in the four areas illustrated in Fig 5. Both elements of the investigation will look to verify and build upon the desk-based, geophysical survey and trial trenching results.
- 3.3 The fieldwork progress and results will be reviewed and discussed with the Archaeological Officer for Milton Keynes Council (the Planning Archaeologist).
- 3.4 On completion of all fieldwork, the field data will be assessed. The results of the assessment and detailed proposals for analysis of the field data will be agreed with the Planning Archaeologist.
- 3.5 A written final report will be prepared detailing the findings of the archaeological investigation. A project archive will be created and deposited with the appropriate museum store, subject to the agreement of the landowner, to ensure the long-term preservation of the archaeological information.
- 3.6 Any variations to this strategy will be discussed and agreed with the Planning Archaeologist prior to their implementation, unless necessary for Health and safety concerns or due to impact upon a constraint such as ecology or services.

4.0 METHOD STATEMENT

4.1 Pre-Commencement

- 4.1.1 In order that the investigation supplies information of the required quality, the Codes and Standards and Guidance issued by the Chartered Institute for Archaeologists (CIfA) form a requirement of this specification
- 4.1.2 An accession number will be sought for the earthwork recording and excavation unless otherwise agreed that the accession number for the evaluation can be used during the mitigation works/archaeological excavation. This number is currently AYBCM:2018.106, and should be used on all documentation.
- 4.1.3 The Planning Archaeologist will be given a minimum of 1 weeks' notice prior to the commencement of site works.

4.2 Earthwork Survey¹²

- 4.2.1 Earthwork survey may be undertaken using either Drone survey or differential ground survey using ground based Global Positioning Systems (GPS) and an Electronic Distance Measuring (EDM). The ground survey will be undertaken using a combination of objective and subjective survey techniques. The objective, systematic part of the survey will be carried out using the Real-time Kinematic DGPS systems with 2m transects surveyed across the site perpendicular to the edges of the survey areas. Transects will be controlled and recordings automatically taken every 0.5 metres to a tolerance level of $\pm 10\text{mm}$.
- 4.2.2 Drone photography, alternatively, may be used to create a digital model of the earthworks. The image matching based on pixel patterns will be analysed through photogrammetric multi-view stereo algorithms to form a digital model of three-dimensional space and create a digital surface model of the earthworks.
- 4.2.3 Whichever methodology is used the area plan will be produced in MapInfo and Vertical Mapper software, drawn to English Heritage conventions and survey data combined with Ordnance Survey digital Terrain Models to study the site in its wider landscape context. All data will be processed in MapInfo Geographic Information Systems (GIS) to create a nearest neighbour interpolation model to project the site in 3D.

¹² Due to advances in software and technology this survey methodology may be refined prior to the start of recording. Any non-material variation of this kind will be agreed with the local authority.

4.2.4 A walkover survey will also be undertaken using a hand-held GPS and computer to give coordinates for the site together with a photographic record and written description. The results will be integrated with the report on the below ground investigations.

4.3 Archaeological Investigation (Below Ground Archaeology)

4.3.1 Figures 5 indicates the anticipated areas that will be stripped in order to meet the project objectives. The precise limits of excavation may be altered slightly on site in response to the extent and nature of archaeological features exposed or onsite constraints.

4.3.2 All plant movement will be via access routes agreed with the Client or their appointed site agent/principal contractor. The excavation area will be scanned with a Cable Avoidance Tool (CAT) prior to excavation by a competent person holding up to date training certificate. Care should also be taken to avoid all overhead wiring with passing zones identified and an exclusion zone fenced off in accordance with HSE guidelines.

4.3.3 Ploughsoil and subsoil will be removed by mechanical excavator using a toothless ditching bucket (c.1.8m wide), under continuous archaeological supervision. The spoil generated during the excavation will be removed by dumper and mounded away from the edges of the stripped areas.

4.3.4 Mechanical excavation will cease at either undisturbed natural deposits or the top of archaeological deposits. The nature of these deposits will be assessed by hand excavation. Upcast and spoil from mechanical excavation will be scanned by eye and by metal detector to aid the recovery of topsoil artefacts.

4.3.5 Following the initial soil strip, priority will be given to the cleaning of features as required to produce a pre-excavation plan.

4.3.6 The following sampling levels are anticipated to form the standard to be applied to features and deposits identified as contributing to the project objectives and any additional specific objectives identified:

Feature Class	Proportion to be excavated
Pre-modern linear features not associated with structural remains	10% of fill
Domestic ring ditches or roundhouse gullies	50% of fill initially
Pits associated with agricultural & other activities	50% of fill
Layers/ deposits/horizontal stratigraphy relating to domestic/industrial activity [e.g. hearths, floor surfaces, floor make-up deposits...]	100% of deposit
Post-built structures of pre-modern date	100% of each post-hole fill
Linear features (ditches/gullies...) associated with structural remains	20% of fill
Enclosure Ditches (prehistoric)	10% of fill
Human burials, cremations & other deposits relating to funerary activity	100% of fill/deposit
Prehistoric discrete pits	100% of fill/deposit

4.3.7 Excavation will be driven by the research strategy with the provision for refinement during fieldwork. This will involve a characterisation of the archaeology across the excavation site, followed by more closely targeted excavation, focussed on features/locations likely to contribute most to an understanding of the site. Environmental and scientific sampling strategies will also be refined on site in this phase and throughout the project in consultation with specialists, as appropriate.

4.3.8 Should archaeological remains extend to more than 1.2m below ground level, it may be necessary to step or shore the sides of the excavation area locally in order to enable safe working.

4.4 Recording

4.4.1 A site grid will be established relative to Ordnance Survey National Grid. Data capture for site plans will be by GPS/Total Station, electronic distance measurement, measured survey or a combination of techniques. Data-capture for site plans will as standard be capable of reproduction at a scale of 1:100; more complex features or areas of complex archaeological remains will be recorded at greater resolution (for reproduction at 1:10, 1:20, 1:50 as necessary). The sections of excavated archaeological features will be recorded by measured drawing at an appropriate scale (normally 1:10 or 1:20). Spot heights and those of individual features will be recorded relative to Ordnance Datum.

4.4.2 All archaeological features or deposits encountered will be described fully on pro-forma individual context recording sheets, using standard methods of the archaeological contractor appointed. A stratigraphic matrix will be compiled to record the relationships of any archaeological features or deposits encountered and to indicate those features or deposits requiring further stratigraphic clarification by excavation.

4.4.3 A photographic record, utilising black and white negative film, supplemented by high resolution digital data capture, will be maintained during the course of the fieldwork and will include:

- the site prior to commencement of fieldwork;
- the site during work, showing specific stages of fieldwork;
- the layout of archaeological features;
- individual features and, where appropriate, their sections;
- groups of features where their relationship is important.

4.4.4 Photographs will be taken utilising digital cameras of no less than 10 megapixels and in RAW format. All photography will follow the archaeological contractor's guidance which conforms to industry best practice (ADS 2013). Images will be converted to uncompressed baseline v.6 TIFF for archiving. All images will have accompanying metadata specifying; photo ID, capture device, converting software, colour space, bit depth, resolution, date of capture, photographer, caption, and any alterations made to the image.

4.5 Artefact Recovery

4.5.1 The finds retrieved from the site will be treated in accordance with industry best practice and guidance (English Heritage 2005, 2006b and Watkinson and Neal 1998).

4.5.2 All artefacts from excavated contexts will be retained by the archaeological contractor, except for unstratified modern material. Artefacts will be bagged and labelled according to the individual deposit from which they were recovered, ready for later cleaning and analysis.

4.5.3 All finds as a minimum will be cleaned, weighed, counted and identified. Any artefacts requiring immediate stabilisation will be done so in line with First Aid for Finds (Watkinson and Neal 1998). Where warranted, metallic artefacts and residues will be submitted for X-radiography and stabilisation, in accordance with industry best practice (English Heritage, 2006b).

4.5.4 If finds are made of gold, silver or other items of possible treasure these will if possible be archaeologically excavated and removed to a safe place. Such finds will also be reported immediately to the local Coroner (within 14 days, in accordance with the 1997 Treasure Act). Should it not be possible to remove the finds that day suitable security will be arranged.

4.6 Human Remains

4.6.1 Any human remains encountered will be cleaned with minimal disturbance, recorded and left in situ and only removed if necessary. Any human remains requiring removal will be done so following receipt of a Ministry of Justice licence. Investigation and excavation of human remains will be undertaken by, or under supervision of, suitably experienced specialist staff and in accordance with IFA Guidelines (*"Excavation and Post-excavation Treatment of Cremated and Inhumed Human Remains"* Roberts, C & McKinley, J 1993 – IFA Technical Paper 13; *"Guidelines to the standards for recording human remains"* ed Brickley, M & McKinley, J 2004 – IFA Paper 7). Assessment of excavated human remains will be undertaken in line with current English Heritage Guidelines (*"Human Bones from archaeological sites: Guidelines for the production of assessment documents and analytical reports"* Centre for Archaeology Guidelines 2004). The archaeological contractor will comply with all reasonable requests of interested parties as to the method of removal, re-interment or disposal of the remains or associated items. Every effort will be made, at all times, not to cause offence to any interested parties. The Planning Archaeologist will be informed immediately if human remains are discovered.

4.7 Environmental Samples

4.7.1 The environmental sampling strategy will include the routine sampling of deposits for the retrieval and assessment of the preservation conditions and potential for analysis of all biological remains, including mollusc remains, and will be developed in consultation with an environmental specialist and the Planning Archaeologist. The resulting site-specific environmental sampling strategy will be documented and reviewed as the project progresses.

4.7.2 The environmental specialist will conduct or commission, as appropriate, programmes of scientific investigation in conjunction with the fieldwork, the results of which will be presented in the final publication or report. They will also ensure that, where time allows, the strategy evolves on site by seeking to ensure that bulk samples taken in the initial stages of the project are processed quickly and the results fed back to inform the excavation strategy. All environmental work will be undertaken in accordance with current Historic England guidelines (see *Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post-excavation*, Centre for Archaeology Guidelines 2011).

4.7.3 Sample sizes will normally be 40-60 litres unless the deposit is smaller in volume. Samples will be directed to a representative range of context type from each phase, and examine:

- Survival of material
- Key archaeological contexts
- Potential

4.7.4 A suitable specialist will, if necessary, make a site visit to advise on deposits suitable for environmental sampling and/or geoarchaeological assessment.

4.7.5 Charred plant samples will be wet sieved with flotation using a 0.5mm mesh. All residues will be checked.

4.7.6 Should waterlogged deposits be encountered they will be left in situ until such time as further mitigation works are required. If this is not possible then further consultation with a suitable specialist will determine methods for recovery.

4.8 Other Samples

4.8.1 Samples will be taken for scientific dating (principally radiocarbon ¹⁴C dating), where dating by artefacts is insecure and where dating is necessary in order to characterise the site or for development of the subsequent mitigation strategy.

4.8.2 Should in situ timbers be found to survive in good condition, samples will be taken for dendrochronological determination following procedures presented in the English Heritage document 'Dendrochronology: guidelines on producing and interpreting dendrochronological dates'.

4.8.3 Where there is evidence for industrial activity, macroscopic technological residues (or a sample of them) should be collected by hand. Separate samples (c.10ml) should be collected for micro-slugs (hammer-scale and spherical droplets). Excavation and sampling of such deposits will be in accordance with the Centre for Archaeology Guideline on Archaeometallurgy.

5.0 REPORTING AND ARCHIVING

5.1 General

5.1.1 Both the Planning Archaeologist and the relevant museum curator will be informed in writing of the completion of the fieldwork. The archaeological fieldwork contractor will also provide an estimate of the size of the archive and programme for deposition. The archive will be prepared in accordance with the museum guidelines and the Planning Archaeologist will be informed in writing of final deposition of the archive.

5.1.2 A brief initial site summary will be made available within 4 weeks of the completion of site works.

5.2 Post Excavation Assessment

5.2.1 Following the completion of the field work a programme of post-excavation assessment and reporting, in line with English Heritage "MoRPHE" procedures, will be undertaken. Initial Post excavation work will comprise the following:

- checking of drawn and written records during and on completion of fieldwork;
- production of a stratigraphic matrix of the archaeological deposits and features present on the site, if appropriate;
- cataloguing of photographic material;
- cleaning, marking, bagging and labelling of finds according to the individual deposits from which they were recovered. Any finds requiring specialist treatment and conservation will be sent for appropriate treatment. Finds will be identified and dated by appropriate specialists;
- Where artefacts are recovered from archaeological features they shall be quantified by date, class and type.
- The processing and analysis of soil samples.

5.2.2 An assessment report will be produced. This will comprise an integrated illustrated site narrative together with specialist assessment of artefact assemblages and palaeo-environmental samples, together with recommendations for further analysis.

5.2.3 Following completion of this assessment a review of the post-excavation programme will be held in consultation with the Planning Archaeologist. A timetable including the aims of specialist research and intended final report format ('grey literature'/journal article/other medium) will be presented in an Updated Project Design. The timetable will include agreed monitoring points. [This stage may be omitted if the fieldwork results are less complex]

5.3 Post Excavation Analysis and Reporting

- 5.3.1 Following the review a full post-excavation programme will be implemented including specialist reports, to be completed within 1 year, leading to the production of an archive report and draft publication.
- 5.3.2 The report will seek present the results of the archaeological fieldwork including where necessary the results of any specialist and scientific assessment/analysis and place the results within their local, regional and national context.
- 5.3.3 The report will look to identify any potential research priorities where applicable.
- 5.3.4 The final format(s) of reporting will be confirmed as part of the post-excavation assessment process (5.2 above)

5.4 Dissemination

- 5.4.1 Copies of the final report will be sent to the client for approval, and then the Planning Archaeologist and the LPA.
- 5.4.2 The OASIS online report form for the fieldwork will be updated and completed. A digital copy of the report will be uploaded to the OASIS site.

5.5 Archive

- 5.5.1 An integrated project archive (including both artefacts/ecofacts and project documentation) will be prepared upon completion of the project. The integrated archive will be deposited with the Buckinghamshire County Museum.
- 5.5.2 All works will be archived under the accession number obtained at Project Initiation stage (AYBCM:2019.23), and the archaeological contractor will complete the required archive deposition forms.
- 5.5.3 The archive of finds and records generated during the project will be kept secure at all stages of the project. All records and materials produced will be archived in accordance with industry best practice (English Heritage 2006, ClfA 2014g, and SMA 1993).
- 5.5.4 Notes or articles describing the results of the archaeological fieldwork will be submitted for publication to an appropriate local journal and/or national journals, dependant on the nature of the results.
- 5.5.5 OASIS (**O**nline **A**cces**S** to the **I**ndex of archaeological investigation**S**) data capture forms will also be completed and submitted on completion of the project.

6.0 TIMETABLE & PERSONNEL

- 6.1 The works will be undertaken on behalf of the developer by professional archaeological contractor. Details of the contractor and key personnel will be provided to the Planning Archaeologist prior to the start of work. CgMs Heritage will oversee implementation of the project on behalf of the developer. CgMs Heritage is a Registered Organisation with the Chartered Institute for Archaeologists.
- 6.2 Dr Michael Dawson MCI^fA FSA of CgMs Heritage will be in overall charge of the archaeological project. Work on site will be led by a Project Officer/Project Supervisor from the appointed archaeological contractor, assisted by a team of assistants drawn from their permanent and temporary staff. Actual staff resources will be managed to ensure successful implementation of the programme of works.
- 6.3 The date of fieldwork has yet to be determined but is anticipated during the year 2019/2020. The fieldwork is likely to be completed within 2-3 months.
- 6.4 An initial summary of results will be prepared
- 6.5 The assessment report will be available within 6 months of completion of fieldwork
- 6.6 The final report on the investigation will be completed within 2 years of the end of fieldwork. and a report produced within 3 months of completion of fieldwork. This reporting programme is subject to review.

7.0 MONITORING

- 7.1 The aims of monitoring are to ensure that the archaeological works are undertaken within the limits set by this specification, and to the satisfaction of Planning Archaeologist (on behalf of the Local Planning Authority).
- 7.2 CgMs will monitor implementation of the programme of works on behalf of the developer.
- 7.3 The Planning Archaeologist will be given notice of when work is due to commence and will be free to visit the site by prior arrangement with CgMs. The Planning Archaeologist will monitor implementation of the programme of works on behalf of the Local Planning Authority and evaluate the work being undertaken on site against the methodology detailed in this specification.
- 7.4 The Planning Archaeologist will also be responsible for considering any changes to the specification of works; any such alterations should be agreed in writing with the relevant parties prior to commencement of onsite works, or at the earliest available opportunity, unless there is a direct risk to health and safety of the onsite team or impact upon a site constraint such as ecology or services.

8.0 INSURANCE and HEALTH AND SAFETY

- 8.1 The archaeological contractor will produce evidence of Public Liability Insurance to the minimum value of £5m and Professional Indemnity Insurance to the minimum of £5m and Profession.
- 8.2 All works will be in compliance with the Health and Safety at Work Act (1974) and all applicable regulations and Codes of Practice and the Construction Design Management Regulations 2015.
- 8.3 All archaeological staff will undertake their operations in accordance with safe working practices.
- 8.4 A site-specific risk assessment will be undertaken and recorded prior to the commencement of work on site.
- 8.5 A continuous process of dynamic risk assessment will be undertaken and if significant hazards are identified a specific risk assessment will be undertaken and recorded. Control measures will be implemented as required in response to specific hazards.
- 8.6 Safe working will take priority over the desire to record archaeological features or remains, and where it is considered that recording is dangerous, any such features or remains will be recorded by photography, at a safe distance.
-

9.0 **SOURCES CONSULTED**

1. **General**

2. **Internet**

British Geological Survey –

<http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html>

British History Online – <http://www.british-history.ac.uk/>

Domesday Online – <http://www.domesdaybook.co.uk/>

Historic England: The National Heritage List for England –

3. **Bibliographic**

Allen M 2017 *The Rural Economy of Roman Britain*, London: Britannia Monograph 30

Burke J 2018 *Archaeological trial trench evaluation on land at South Caldecott Milton Keynes Buckinghamshire October 2018* (EMK 1365; AYBCM:2018.106)

Burnham B, Wachter J 1990 *The 'Small Towns' of Roman Britain*, London: Batsford

Chartered Institute for Archaeologists Standard & Guidance for Historic Environment Desk Based Assessment 2014, revised 2017

Davies M J *et al.*, 2004 *Mitigation of Construction Impact on Archaeological Remains*, London: English Heritage

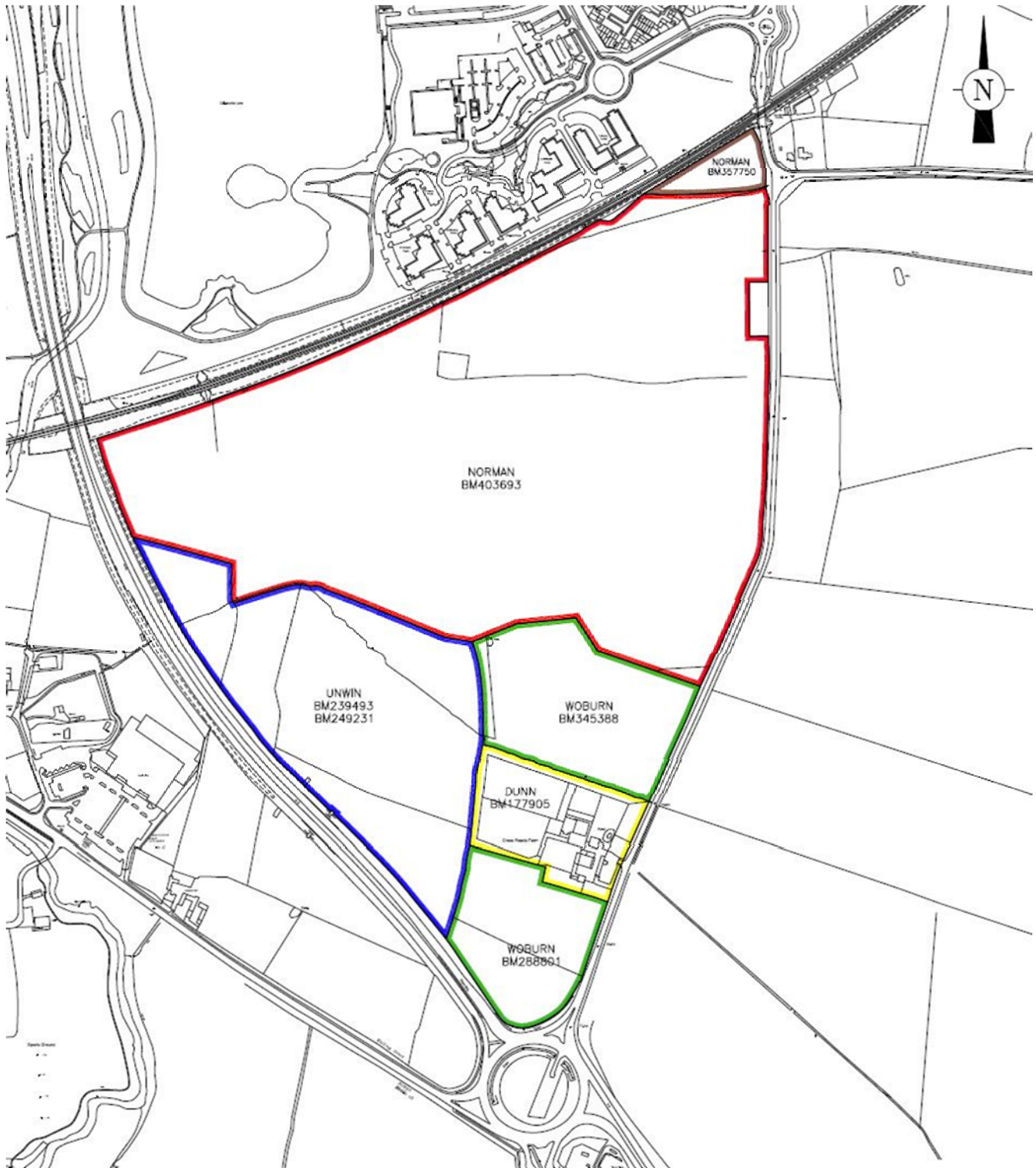
Department of Communities and Local Government *National Planning Policy Framework* 2019

Dodd A *et al.*, 2014 *Early Medieval Research Agenda*, in Hey and Hind 2014, 233-237

English Heritage (Historic England) 2006 *Developing Methodologies, The Soil Stack Project, Research News, Newsletter of English heritage's Research Department*, 3 2006, 14-15

Fulford M 2014 *Roman Period Research Agenda*, in Hey and Hind 2014, 179-184

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- Hey G, Hind J 2014 *Solent Thames Research Framework for the Historic Environment Resource Assessments and Research Agendas*, Oxford: Oxford Wessex Monograph No 6.
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- Historic England Historic Environment Good Practice Advice in Planning: 1 The Historic Environment in Local Plans July 2015
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- Kaiser A 2011 *Roman Urban Street Networks*, London: Routledge
- Medleycott M 2011 *Research and Archaeology Revisited A revised framework for the East of England*, EAA24
- Millet M 1992 *The Romanisation of Britain, An Essay in Archaeological Interpretation*, Cambridge: CUP
- Neal D S 1987 Excavations at Magiovinium, Buckinghamshire, 1978-80 *Records of Buckinghamshire, Vol 29 1987*.



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Fig 1 South Caldecott Ownership Plan

South Caldecott

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Fig 2 Geophysical Survey

South Caldecott

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Fig 3 Trial trenches at South Caldecott overlying the geophysical survey

South Caldecott

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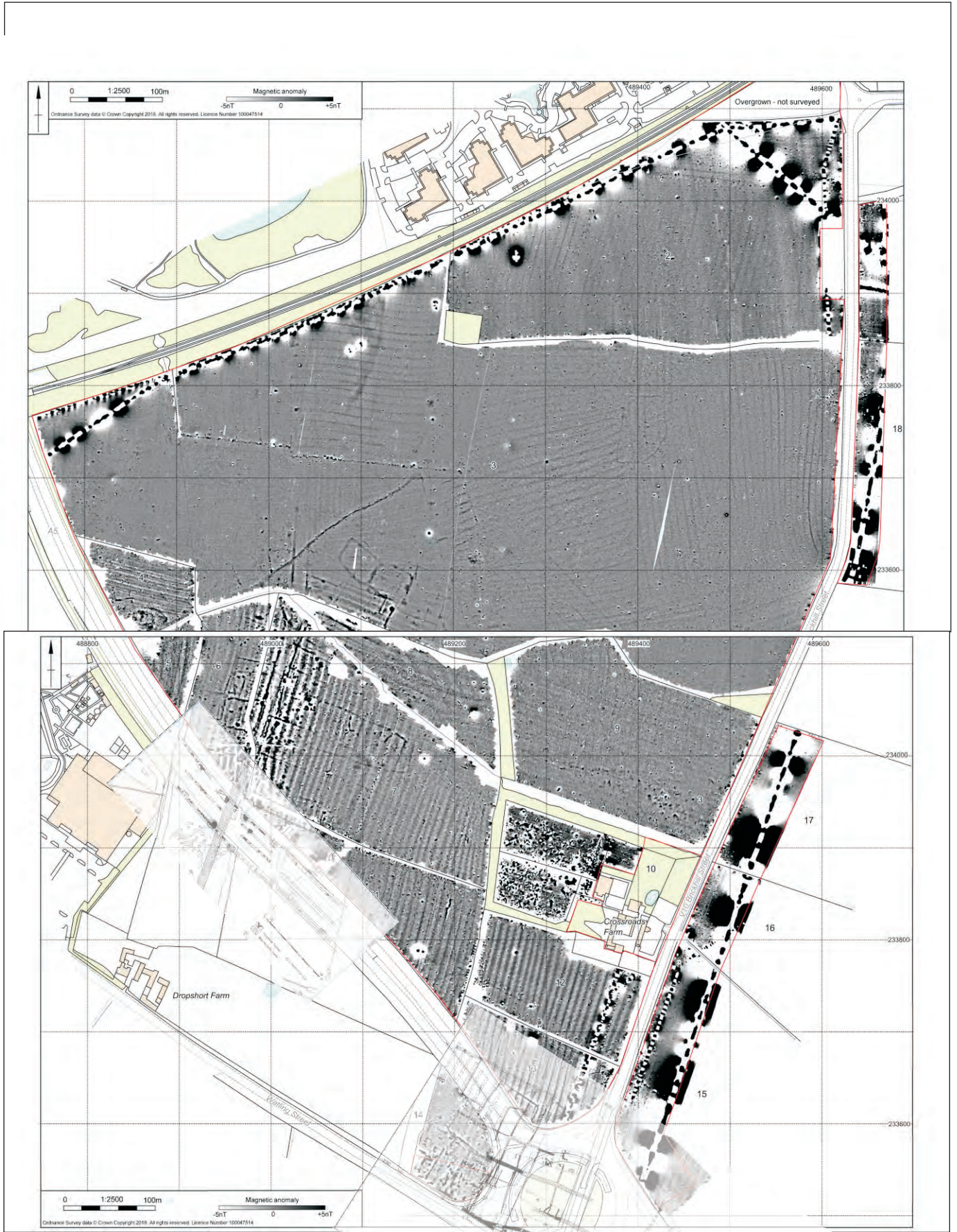


Fig 4 Archaeological evidence- DS Neal excavation of 1987, Geophysics 2018

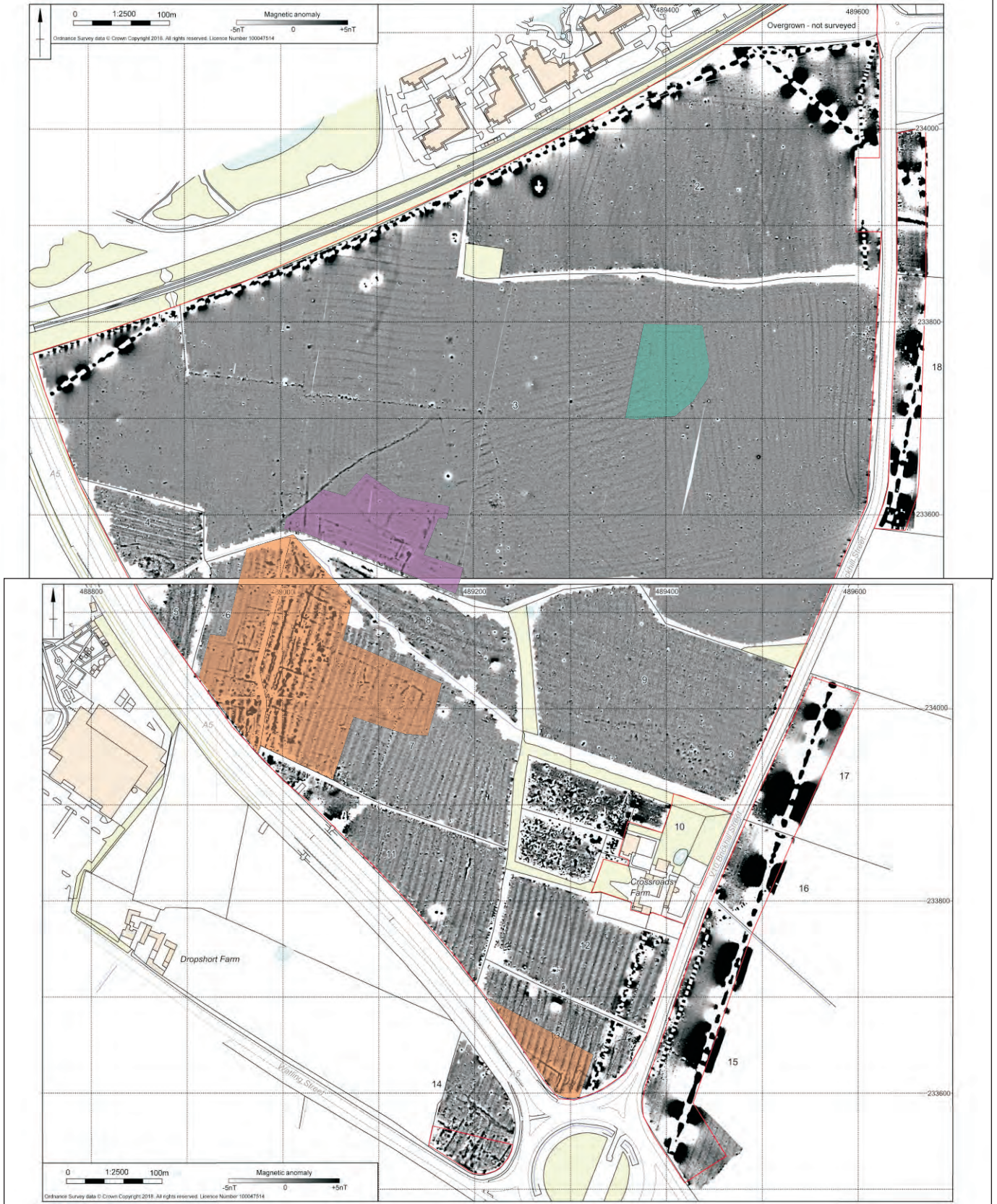
South Caldecott

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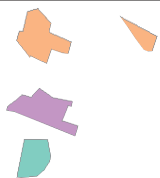


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Fig 5 Excavation Areas
 Roman period archaeology
 (beneath ridge and furrow)

Iron Age & Roman Enclosures

Iron Age enclosure



South Caldecott

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Fig 6 Upper - Ridge and furrow in 2007 (google Ertah)
Lower - Trench through the riidge and furrow


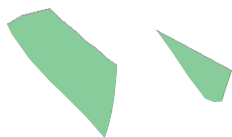
South Caldecott		 <p>London Cheltenham Kettering Newark Birmingham</p> <p><small>PART OF RPS</small> www.cgms.co.uk</p> <p><i>Planning & Development Archaeology & Historic Buildings</i></p>
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Fig 7 Areas of proposed recording of ridge and furrow



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