



River of Life II

Written Scheme of Investigation for geophysical surveys

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Purpose of document

This document has been prepared as a written scheme of investigation for geophysical magnetic surveys undertaken as part of the River of Life II activities, for the Earth Trust. The purpose of this document is to provide the methods proposed for undertaking geophysical survey at Hurst Water Meadow, Clifton Meadow, and Church Farm, all located in South Oxfordshire.

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Project summary

OASIS ID	Digventu1-349366
DV project code and type	ROL19 Geophysical Survey
National Grid Reference	Hurst Water Meadow: 456827 194299 Clifton Meadow: 456827 194299 Church Farm: 456827 194299
County	Oxfordshire
Title:	River of Life II Written scheme of investigation for geophysical survey
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Origination date:	12/04/2019
Circulation:	Earth Trust Oxfordshire County Council South Oxford District Council Manda Forster MCIfA PhD – DigVentures Chris Casswell MCIfA – DigVentures
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Figure 1: River of Life II project sites for geophysical survey in relation to heritage assets; A: Hurst Water Meadow, B: Clifton Meadow, and C: Church Farm.



1 PROJECT BACKGROUND

- 1.1.1 DigVentures has been appointed by the Earth Trust (hereafter 'the Client') to prepare a Written Scheme of Investigation (WSI) for geophysical magnetic survey to be undertaken as part of the River of Life II Project at Hurst Water Meadow, Clifton Meadow, and Church Farm, all located in South Oxfordshire (hereafter 'the Sites'), Figure 1.
- 1.1.2 The Client is undertaking a programme of activities as part of the 'River of Life II' project, which seeks to identify opportunities for wetland creation along the River Thames in South Oxfordshire, including the creation of new ponds along the river front, enhancement of existing drainage, and creation of new backwaters. DigVentures have been appointed to ensure that any heritage assets at the sites are identified and that any impacts on those heritage assets are minimised and mitigated for.
- 1.1.3 The archaeological potential of the proposed development has been assessed with a desk-based study (REF) which will be augmented with an extended research background in a forthcoming Written Scheme of Investigation in advance of any subsurface intervention. (Atkins 2018a; 2018b; 2018c). Geophysical surveys as detailed in this WSI have been requested by the Planning Archaeologist at Oxfordshire County Council.
- 1.1.4 The work will be undertaken under the guidance of the Local Planning Authority Archaeological Advisor (South Oxford District Council).

1.2 Scope of document

- 1.2.1 This WSI sets out the strategy and methodology by which the archaeological contractor will implement the geophysical survey. In format and content, it conforms with current best practice and to the guidance outlined in the National Planning Policy Framework (NPPF; DCLG 2018), planning practice (DCLG 2014), Chartered Institute for Archaeologists (CIfA 2014), Management of Archaeological Research Projects in the Historic Environment (Historic England 2015), local planning policies (South Oxfordshire District Council 2012) and the EAC Guidelines for the Use of Geophysics in Archaeology (Schmidt et al. 2016).
- 1.2.2 This WSI is to be submitted to Richard Oram, Planning Officer, Archaeological Team at Oxfordshire County Council, for approval prior to the commencement of the archaeological programme. Oxfordshire County Council will provide archaeological advice to South Oxford District Council to communicate to the Local Planning Authority.

1.3 Site locations, topography and geology

Hurst Water Meadow

- 1.3.1 Hurst Water Meadow is located in Oxfordshire (NGR 457987 193539; Figure 1) at the confluence of the River Thame with the River Thames. The Site is immediately north of the River Thames and the River Thame skirts the meadow on the east. The Overy Conservation Area is located directly north of the Site. The Site is also directly south of Dorchester Bridge. Hurst Water Meadow comprises an 8.3ha area of open



meadow, within the floodplain and on the west bank of the River Thames, south east of Dorchester on Thames. Based on available data, the topography of Hurst Water Meadow is broadly flat, ranging from 45m to 50m above Ordnance Datum (OD) over 1km.

- 1.3.2 The British Geological Survey (BGS) digital data indicates that sub-surface geology of the Hurst Water Meadow comprises of alluvium. Alluvial deposits are expected to be immediately beneath topsoil due to the local environment previously being dominated by rivers. These sedimentary deposits are fluvial in origin. They are detrital, ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river or estuary. Alluvium is underlain by sedimentary bedrock formed approximately 101 to 113 million years ago in the Cretaceous Period. The alluvium is made of clay, silt, sand and gravel. Superficial deposits formed up to 2 million years ago in the Quaternary Period.

Clifton Meadow

- 1.3.3 Clifton Meadow is located in Oxfordshire (NGR 456827 194299; Figure 1) within the parish of Long Wittenham and was historically in the county of Berkshire, until 1974 when it became part of Oxfordshire. It comprises a 17.8ha area of open field, on the south bank of the River Thames, within the floodplain, opposite Clifton Hampden. Clifton Meadow is bound to the north by the river, and to the east, west and south by open fields. The site is within the floodplain of the River Thames, 2.7km north-west of the confluence of the River Thames and River Thame.

- 1.3.4 Based on available data, the topography of Clifton Meadow is broadly flat, with a very slight incline down from 47.5m above ordnance datum (m OD) in the south of the Site to 46.5m OD in the north: a decline of 1m over 395m. The topography reflects Clifton Meadow's location in the floodplain of the River Thames. The south of the Site, which is at 47m – 47.5m OD is likely indicative of the underlying gravel terrace here (see below), whereas the northern half of the site, where levels are at 46.9m OD down to 46.4m OD, appear to show the former river basin. Localised bands of higher ground may be indicative of the banks of palaeochannels cut into natural deposits through river movement.

- 1.3.5 The British Geological Survey (BGS) digital data indicates that sub-surface geology of Clifton Meadow comprises alluvium. Alluvium comprises interleaved deposits including clays, silts, sands and gravels. Alluvial deposits can contain layers of peat or preserved reed beds, which have a high potential for palaeoenvironmental remains surviving. Alluvial deposits create anaerobic conditions which are perfect for the preservation of organic material. Alluvial deposits are expected to be immediately beneath topsoil. A historic BGS borehole to the south of Clifton Meadow (BGS ref SU59SE4) indicates 0.2m of topsoil before alluvial deposits. This overlies a Northmoor Sand and Gravel deposit, from 0.2m – 0.5m below ground level.

Church Farm

- 1.3.6 Church Farm is located in Oxfordshire (NGR 456827 194299; Figure 1). The northern third of the Site is within the parish of Long Wittenham, whilst the remainder of the Site is in the parish of Little Wittenham, which itself is within the North Wessex Area



of Outstanding Natural Beauty (AONB). It was historically in the county of Berkshire, until 1974 when it became part of Oxfordshire. Church Farm is within the floodplain of the River Thames, 1km north-west of the confluence of the River Thames and River Thame. The farm comprises a 37.7ha area of open field, on the west bank of the River Thames, north of Little Wittenham, and is bound to the north, west, and south by agricultural field.

- 1.3.7 Based on available data, the topography of the Site is broadly flat, ranging from 45m to 46m above Ordnance Datum (OD). The British Geological Survey (BGS) digital data indicates that sub-surface geology of the Church Farm site comprises alluvium. This type of sub-surface geology consists of interleaved deposits including clays, silts, sands and gravels, which can contain layers of peat or preserved reed beds; these have a high potential for palaeoenvironmental remains surviving. Alluvial deposits create anaerobic conditions which are perfect for the preservation of organic material. Alluvial deposits are expected to be immediately beneath topsoil. A historic BGS borehole to the west of the Site (BGS ref SU59SE4) indicates 0.2m of topsoil before alluvial deposits. This overlies Thames Terrace Gravels (First Terrace), from 0.2m – 0.5m below ground level.

1.4 Site backgrounds

- 1.4.1 Archaeological and historic backgrounds to the sites were researched as part of desk-based assessments (Atkins 2018a; 2018b; 2018c). Further desk-based work that is inclusive of all known archaeological and historical evidence is required in order to fully understand the significance of the designated and non-designated heritage assets of the three sites. In advance of supplementary research, a summary of the potential for archaeology identified in the Atkins reports is provided for each site, below:

Hurst Water Meadows

- 1.4.2 Hurst Water Meadows does not contain any designated heritage assets such as Scheduled Monuments or Listed Buildings. The Scheduled Monument of Dyke Hills is located just 50m of the Site, and there are two further Scheduled Monuments in the vicinity; a Neolithic period and Early Bronze Age settlement site which comprises ring ditches, cursus, enclosures and settlement site approximately 750m north-west of the Site, and the Roman site of Dorchester on Thames immediately north east of the Site. The Overy Conservation area lies within the northern borders of the Site and any potential changes will not harm the historic character or appearance of the area. This must be taken into consideration when extending the backwaters. There is a high potential for palaeoenvironmental remains to be contained with the alluvial deposits.
- 1.4.3 Archaeological survival is expected to be high due to the lack of development at Hurst Water Meadows, and its current conservation status. There is generally high potential for later prehistoric remains as the site is situated between two prehistoric sites, Dyke Hills and a Neolithic to Bronze Age ritual and settlement site. Although its location within the floodplain of the rivers Thames and Thame would have made it unsuited for extensive occupation.

Clifton Meadow

- 1.4.4 Clifton Meadow does not contain any statutorily designated assets such as Scheduled Monuments or Listed Buildings. The settlement site at Northfield Farm is immediately south of the Site and is a Scheduled Monument. The Clifton Hampden Conservation Area is 420m west of the Site.
- 1.4.5 Archaeological survival is expected to be high owing to the lack of development on the Site, and the unsuitability of the Site for intensive agricultural practice, although remains will have been locally truncated by the excavation of drainage ditches in the post-medieval period. Trial trenching on the Site in 2006 recorded a possible Bronze Age field boundary, and the physical remains of a Roman trackway observed through aerial photographs extending from the Scheduled Monument to the south. It is likely that any further remains are contained to the south of the Site, on the area of the gravel terrace. These remains would ordinarily be of Low significance based on their evidential value but may be considered Very High owing to their demonstrable associated value with features that comprise the Scheduled Monument. There is a high potential for palaeoenvironmental remains to be contained within the alluvial deposits. The proposals comprise the excavation of eight new ponds, four new backwaters and two bays along the bank of the River Thames, which would entail the graded excavation of 1.5m-2.0m of material within the footprint of each feature. This would entirely remove any remains and extend well into natural gravels (Northmoor Gravel terrace), although remains would survive in increasingly truncated states along the grading.

Church Farm

- 1.4.6 Church Farm does not contain any statutorily designated assets such as Scheduled Monuments or Listed Buildings. The Scheduled Monument of Dyke Hills is on the adjacent bank of the River Thames to the south-east, and two further scheduled monuments: a settlement site at Northfield Farm, 580m to the west; and the Roman town of Dorchester-on-Thames, 650m to the east. The Dorchester-on-Thames conservation area is 675m east of the Site, and the Little Wittenham conservation area is 710m south of the Site.
- 1.4.7 Archaeological survival is expected to be high owing to the lack of development on the Site, although the tops of remains may have been truncated by ploughing. There is a generally high potential for agricultural features dating to the prehistoric and Roman periods, as the Site is located on the periphery of the settlement site at Northfield Farm, although its location within the floodplain of the River Thames would have made it unsuited to extensive occupation. There is a high potential for palaeoenvironmental remains to be contained within the alluvial deposits. The proposals entail the creation of new floodplain woodland in the north of the Site, three areas of backwater, and seven ponds in the centre of the Site. Whilst detailed designs for this would be informed by the outcomes of this report, it is assumed these would be similar in nature to the designs for the Clifton Meadow Site, which would entail the graded excavation of 1.5m-2.0m of material within the footprint of each feature. This would entirely remove any remains and extend well into natural gravels (Gravel Terrace One), although remains would survive in increasingly truncated states along the grading. Excavation of tree bowls would remove remains within the footprint of each bowl typically between 0.5m – 1.0m in diameter and of

similar depth. Excavation for planting shrubland is likely to be contained within topsoil deposits.

2 AIMS AND OBJECTIVES

2.1 Geophysical magnetic survey

2.1.1 The principal aim of the magnetometry survey is to provide further information concerning the presence/absence, date, nature and extent of any buried archaeological remains and to investigate and record these within the three sites. This will include:

- Verification of the archaeological potential of the site.
- Identification of the potential for remains not anticipated by previous research or record.

3 METHODOLOGY

3.1 Geophysical magnetic survey

3.1.1 An area of 8.3ha be subject to geophysical magnetic survey at Hurst Water Meadow, 17.8ha at Clifton Meadow, and 37.7ha at Church Farm, Figure 1.

3.1.2 To carry out the magnetic survey Phase Site Investigations Ltd will use a MACS (multi-sensor array cart system). The MACS utilises eight Foerster 4.032 Ferex CON 650 gradiometers with a control unit and data logger. The gradiometers are carried on a non-magnetic cart and usually have a spacing of 0.5m, although other intervals can be adopted. Readings are generally taken generally at between 10cm and 15cm intervals, depending on the speed the cart is pulled at. A MACS utilises an RTK GNSS system which means that survey grids do not have to be established. Instead an area is surveyed over a series of continuous profiles and the position of each data point is recorded using an RTK GNSS system. The survey will be referenced direct to Ordnance Survey (OS) National Grid and so temporary survey stations (wooden stakes) will not be established unless specifically asked for prior to the commencement of the survey.

3.1.3 Data is collected on zig-zag profiles along the full length or width of a field, although fields can be sub-divided if they are particularly large. Marker canes are set-out along field boundaries at set intervals and these are used to align the profiles. The survey profiles are usually offset from field boundaries, buildings and other metallic features several metres to reduce the detrimental effect that these surface magnetic features have on the data. The Foerster gradiometers have a resolution of 0.2 nT but the stability of the cart system significantly reduces noise caused by instrument tilt and movement when compared with a traditional hand-held gradiometer system and the increased data intervals provide a higher resolution data set. The sensors have a range of $\pm 10,000\text{nT}$.

3.1.4 The data is downloaded from the instrument at the end of each day's survey, usually using bespoke software specific to that instrument. The data is then imported into a gridding and interpolation software package, such as Archaeosurveyor (DW consulting) or Surfer (Golden Software). Magnetic data rarely requires detailed



processing although filtering can be applied in some cases to reduce background noise or enhance weaker anomalies. The processing steps that are used will be detailed in the technical report. A plot of the data will be exported from the gridding software, usually in bitmap or jpeg format. This will be imported into AutoCAD where it will be displayed relative to the available map detail. An interpretation of the anomalies identified in the magnetic data will be presented in AutoCAD and an accompanying technical report will also be produced (see below).

4 REPORTING AND ARCHIVING

4.1 Geophysical magnetic survey report

4.1.1 A report presenting the results of the survey and their interpretation will be produced within 3 months of the completion of the survey. The report will include:

- The name(s) of the investigators / contractors, title, date, report reference number and client name;
- A summary of the results;
- Introduction - site location including a plan demonstrating that the survey has been accurately geo-located on the ground (minimum scale 1:2500), OS grid reference, SM/NHLE number, rationale, site history (summary of past work, HER records, land use history), site description (geology and soils, ground conditions and land use at time of survey), and setting out the survey objectives;
- Methodology explaining the techniques used, equipment configurations, sampling intervals, methods of data capture and processing, variables used for the above and method of data presentation;
- Greyscale plots of minimally enhanced data (raw data must be retained and archived) and processed data (with details) at minimum scale of 1:1000; X-Y trace plots of improved magnetic data will be provided to support the specific interpretation of anomalies identified from greyscale images. Plots will be appropriately sized for presentation, including use of A3 plots where necessary;
- Description and interpretation of results, including interpretative plans/diagrams (minimum scale 1:1000); and,
- Conclusions including an assessment of the achievement (or not) of the survey objectives, a summary of the results, implications of the survey, discussion of research value, and recommendations (if appropriate) for any further work.

4.1.2 A draft of the geophysical survey report will be submitted to Oxfordshire County Council for comment, with any feedback addressed and a final version agreed before submission as part of the planning application. Hard and digital copies of the final, approved, report will be sent to the Oxfordshire County Council Historic Environment Record, with a copyright licence granted to Oxfordshire County Council to use the report for the purposes of the HER. A copy of the final, approved, report will be attached to the River of Life II OASIS record (digventu1-349366).



5 PROJECT MANAGEMENT AND STAFFING

5.1 Quality and code of practice

5.1.1 DigVentures is a Registered Organisation with the Chartered Institute for Archaeologists. All senior managers are MCIfA registered. The company endorses the Code of Practice and the Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology of The Chartered Institute for Archaeologists.

5.1.2 All core staff employed by DigVentures are appropriately qualified CfA members, and employed in line with The Chartered Institute for Archaeologists Codes of Practice. DigVentures operates a Project Management System. All projects are undertaken under the direction of the Project Manager who is responsible to a Section Head, who ensures the maintenance of quality standards within the organisation. The Managing Director has ultimate responsibility for all of the company's work.

5.1.3 The geophysical survey will be provided by Mark Whittingham, MCIfA, Phase Site Investigations Ltd on behalf of DigVentures.

6 INSURANCE, HEALTH AND SAFETY

6.1 Policy and risk assessment

6.1.1 Health and safety considerations will be of paramount importance in conducting all fieldwork. Safe working practises will override archaeological considerations at all times. DigVentures shall undertake the works in accordance with South Oxfordshire County Council Health and Safety requirements and Health and Safety Plan. This document should take account of any design information pertaining to above ground hazards such as buildings and structures and below ground hazards such as services, utilities and infrastructure. Risk Assessments should also consider below ground contaminants such as unexploded ordnance.

6.1.2 DigVentures will ensure that all work is carried out in accordance with its company Health and Safety Policy, to standards defined in The Health and Safety at Work etc. Act 1974, and The Management of Health and Safety Regulations 1992, and in accordance with the SCAUM (Standing Conference of Archaeological Unit Managers) health and safety manual Health and Safety in Field Archaeology (1996). Trench excavation and design shall conform to Health and Safety legislation, incorporating current best engineering practice where possible.

6.1.3 DigVentures holds public liability insurance (£5,000,000), employer's liability insurance (£10,000,000) and professional indemnity insurance (£1,000,000).

7 BIBLIOGRAPHY

Atkins, 2018a. River of Life: Hurst Water Meadows. Detailed Desk-Based Assessment. Unpublished report for job number 5163795

Atkins, 2018b. River of Life: Clifton Meadows. Detailed Desk-Based Assessment. Unpublished report for job number 5163795



Atkins, 2018c. River of Life: Church Farm. Detailed Desk-Based Assessment. Unpublished report for job number 5163795

British Geological Survey, accessed 9/4/19: <http://www.mapapps.bgs.ac.uk/>

Chartered Institute for Archaeologists (CIfA), 2014. Standard and guidance for archaeological field evaluation

Department of Communities and Local Government (DCLG), July 2018. National Planning Policy Framework

Department of Communities and Local Government (DCLG), 2014. Conserving and Enhancing the Historic Environment: Planning Practice Guide

Historic England (HE), 2015. Management of Research Projects in the Historic Environment: The MoRPHE Project Managers' Guide

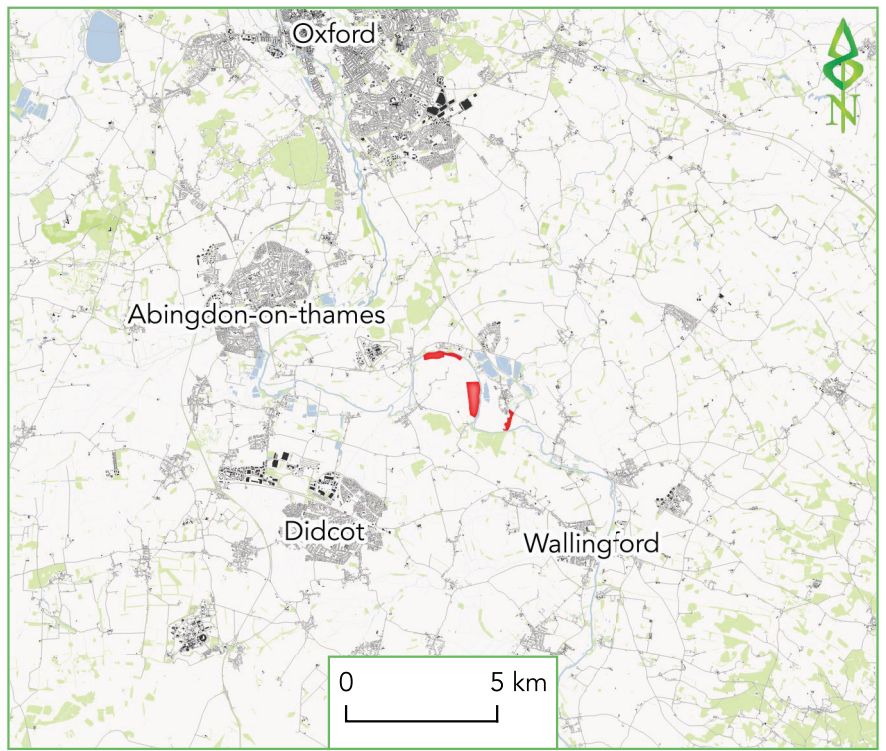
Schmidt, A., Linford, P., Linford, N., David, A., Gaffney, C., Sarris, A. and Fassbinder, J. 2016. EAC Guidelines for the Use of Geophysics in Archaeology. Questions to Ask and Points to Consider. EAC Guidelines 2

South Oxfordshire District Council, 2012. Core Strategy. Adopted December 2012: Part of the Local Plan Planning Policy Team





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