Historic England

Call for Proposals for: aerial investigation and mapping to enhance local authority Historic Environment Records and address research agendas.

Project No: 7639

Date of Issue: 19/12/2023

Summary

Historic England seeks proposals for archaeological surveys using aerial photographs and lidar as a main source. This call is for projects (or project stages) lasting no more than about 12 months and which start between March 2024 and September 2024. A maximum of two proposals is sought from each organisation. Previous proposals will be accepted if they have substantially revised aims. Funding of projects will depend on Historic England grant capacity. Proposals with other sources of funding are welcomed.

The projects must use Historic England standards for aerial investigation and mapping but should also consider multi-disciplinary approaches. Projects will be chosen that make best use of resources to identify, and therefore protect, important aspects of our historic environment. Project results should champion the outstanding quality of our historic surroundings – explaining the many diverse influences in their development, inspiring their celebration as a source of local and national pride.

Mapping and recording from aerial photographs and lidar are proven techniques for identifying and analysing archaeological sites and landscapes, particularly over large areas. This information is most effective when available through Historic Environment Records (HERs) where it can directly influence planning decisions and inform further work. Proposals must be for areas with a high potential for archaeological discovery from aerial sources and where this information will have the greatest impact in terms of improved understanding and heritage protection.

Proposals must demonstrate how they will contribute to the strategic activities of Historic England as set out in the [Corporate Plan](), [Future Strategy]() and [Research Agenda](). Historic England has adopted a public value framework (PVF) to provide assurance to its stakeholders, including the taxpaying public, that it invests public money in ways that optimise value. Proposals should therefore make a convincing case that the project will make a real and positive impact on England's heritage. It should address the following questions:

- How will the project represent a good return on investment?

- Why do we need the project now? What are the consequences if it doesn't happen?

- How does the project address other strategies such as local research frameworks or local government plans?

Background

Historic England, and its predecessors, developed aerial investigation and mapping standards, formerly called the National Mapping Programme (NMP), to ensure effective use of aerial photographs and lidar to identify, map, record and better understand archaeological sites and landscapes. Area based projects, covering 100 square kilometres or more, can efficiently process large volumes of archive material to collate archaeological information into a Geographic Information System (GIS) for use in a Historic Environment Record. This provides data for strategic decision making and research. Analysis and synthesis of this archaeological information, usually in a report, communicates better understanding of the character and significance of landscapes.

Just over half of England has been covered by Historic England (and predecessors) aerial investigation and mapping surveys and these have had a significant impact on the historic environment record. Over 120,000 archaeological sites have been discovered and each year thousands more are added to the record as a result of aerial investigation and mapping projects.

New projects will examine areas where aerial investigation and mapping is most needed and where this technique will be most effective. Proposals should target areas where there are demonstrable regional priorities (identified in consultation with the relevant Local Authority) and strategic threat priorities. These may include increased pressure on land due to the need for more housing, amenities or major infrastructure; major changes in land use due to woodland creation or changes in agricultural practices; and direct/indirect climate change threats. Projects must be in areas with a high potential for archaeological discovery and improved understanding from aerial photographs and lidar. Projects can be in areas covered by older NMP projects, if there is a demonstrable need and high potential for improved information.

Aims

The main aim of the Call for Proposals is to ensure we target resources in areas where demonstrable regional priorities can be addressed through aerial investigation and mapping. These might include areas where our heritage is subject to strategic threat or where there are significant opportunities for improved heritage management.

The Call will enable Historic England to create new knowledge in areas where there is greatest archaeological potential for surveys using aerial photographs and lidar as the main sources.

The main aim of the resulting projects will be to improve planning decisions at local, regional and national levels by providing significant amounts of new and improved information for local Historic Environment Records.

Projects should address significant physical or thematic gaps in archaeological knowledge identified in regional research frameworks or other published material.

Projects should aim to cover areas not already subject to Historic England aerial investigation and mapping surveys. However, areas already covered by older (pre-digital) projects will be considered if there is a strong business case and a new project will add significantly to the knowledge of the area. See appendix 1 for map of previous and current project areas.

Projects will identify and describe local, regional and nationally significant archaeological sites or landscapes to enable appropriate levels of protection.

Project results will champion our 'hidden heritage' by making information available on previously unrecognised or poorly recorded archaeological sites and landscapes.

Project results will champion the use of archives by demonstrating the archaeological value contained in physical and online archives with aerial photographs and lidar.

The project results should demonstrate the potential to compile, improve and promote the National Heritage List for England (NHLE).

Proposers are strongly advised to consider 'added value' elements to the project and consider seeking joint funding. This could include partnerships with other conservation, heritage or academic bodies. Projects could aim to provide wider context for development-led work (including large-scale strategic projects), thematic/synthetic approaches linked to research framework objectives. Project proposers should consider a complementary fieldwork component (including community projects), landscape approaches integrating the buried resource with characterisation data, or taking forward the analysis of existing aerial investigation and mapping project data.

Business Case

There is much that we do not know about England's historic environment. Important archaeological sites and landscapes remain hidden or are poorly understood. We need to identify and better understand this archaeological resource in order to protect it effectively. Mapping and recording from aerial photographs and lidar are proven techniques for identifying and analysing archaeological sites and landscapes, particularly over large areas. This information is most effective when available through Historic

Environment Records where it can directly influence planning decisions and inform further work.

We need to identify those areas most in need of aerial investigation and mapping. These must be areas where this technique will significantly improve our knowledge and understanding of the historic environment. Proposals should demonstrate how effective aerial investigation and mapping would be in identifying and improving our understanding of the archaeological resource in the proposed area.

Each project proposal should identify potential strategic threats or opportunities to archaeological remains in the suggested area and explain how the survey will address these. Potential survey areas must be subject to one or more of the following criteria:

- Demonstrable and specific threats to archaeology from the direct or indirect effects of climate change (eg dewatering, erosion, changes in agricultural practices).
- Demonstrable and specific threats to, or potential impacts on archaeology from climate change mitigation measures (eg rewilding, forestry, flood mitigation).
- Significant knowledge gaps which have a clear impact on the ability to manage the historic environment.
- Significant or complex development pressures (eg major infrastructure, growth areas).
- Regional, thematic or period-based research questions that will significantly enhance landscape-scale understanding and subsequently improve protection of the historic environment.
- Opportunities to develop methods for the application of airborne remote sensing techniques to record, understand and manage the historic environment.
- Opportunities to engage communities with the heritage in the project area.

Project proposals must demonstrate how they meet the purpose, values and strategic objectives set out in the [Historic England Corporate Plan](). In particular, how the project will improve people's lives by championing and protecting the historic environment.

Proposals will be assessed on the business case including the following:

- Brevity and clarity of information provided and compliance with guidance on Management of Research Projects in the Historic Environment (MoRPHE).
- Realistic costs, timescale and value for money. This should include evidence for how timescale was calculated, including the potential impact of type and quantity of aerial sources and the density and complexity of known archaeological sites in the proposed area.
- Potential of the project to address key threats/opportunities in national and local contexts.

- Potential of the project to significantly improve understanding and appreciation of the historic environment and contribute to research frameworks.
- Ability of the project team to deliver high quality work to agreed timescale and cost.
- A strategy to communicate project results to a diverse range of people in inclusive ways.

Project proposals received in the last Call (February 2023) will only be considered if significantly repurposed to meet current priorities.

Stakeholders

The key stakeholders in aerial investigation and mapping projects are local planning authority historic environment services. Project proposals must demonstrate that they were prepared in close consultation with the relevant local authority staff to identify key priorities in the area proposed.

Proposals must include an agreed mechanism for incorporation of textual monument record data into the Historic Environment Record. This should ideally be direct entry into the HER. Where this is not possible, a cost-effective means of data exchange and full incorporation must have been agreed with the relevant HER(s).

The relevant Historic England regional team, in particular the Inspector of Ancient Monuments, must be consulted to discuss priority areas and topics.

The Historic England Archive is a major stakeholder and air photo loans for aerial investigation and mapping projects are subject to terms and conditions. See the appendix 4 for further details. Cover search requests should be made well in advance to allow time for analysis. Cover search requests should make it clear that they are for project planning purposes only and not an indication of a future loan request as proposed project areas may change.

Partnerships are encouraged with universities, protected landscapes (Areas of Outstanding Natural Beauty, National Parks) and other heritage organisations (eg National Trust, National Lottery Heritage Fund) especially if they bring funding for some, or all, of the aerial investigation and mapping.

Methods

Proposals must be laid out using the MoRPHE Project Planning template in appendix 2 – proposals in other formats will be rejected.

Projects must be planned using MoRPHE Project Planning Note 7: Interpretation and mapping from aerial photographs and other aerial remote sensed data – *see* appendix 3.

Projects must use the Historic England aerial investigation and mapping standards in appendix 4.

Projects must contact the Historic England Archive for a cover search to inform timetable assessment.

Proposals should describe the likely methods for disseminating and communicating project results to professionals and the general public.

Products, Communication and Engagement, and Archiving

The main products will be digital mapping, records in the relevant local authority Historic Environment Record, a report, and material for the Historic England website (including the [Aerial Archaeology Mapping Explorer](#)).

Regular communication with key stakeholders should be scheduled throughout the project.

The project will follow Historic England grants processes and will be monitored by a Project Assurance Officer. Progress updates are supplied as brief statistics each quarter and in highlight reports. Historic England's Aerial Survey team will carry out quality control on all projects.

Projects may include a stage for liaison with the relevant Historic England Listing team to discuss requirements for communicating potential updates on relevant scheduled monuments as well as providing information to inform potential assessment of archaeological sites of possible national importance.

A strategy to communicate project results to a diverse range of people in inclusive ways must be considered and included in the proposal. This could be through publication, events, social media or other means and must include consideration of how the project may contribute to [Missing Pieces](#) through links to the final project report.

Copyright for the mapping remains with the grant recipient but Historic England are licenced to use the data as set out in the funding agreement. This will include release of the data under the Open Government Licence v3 via Historic England's Open Date Hub. Monument records and mapping must be integrated into the relevant local Historic Environment Record as part of the project. Mapping data will be added to the Aerial Archaeology Mapping Explorer.

Historic England air photograph loans must only be used for the agreed project. Scans of Historic England Archive aerial photographs must be deleted on completion of the project.

The project report will be Historic England copyright and will be issued as part of the [Historic England Research Report Series](#).

Assessing Impact

Impact assessment is a means of measuring the effectiveness of activities and projects and judging the significance of the changes or benefits brought about by these actions. Impact can be gauged in terms of reach (how many people/organisations were influenced by the work) and significance (the difference it made to these people/organisations). Gathering and assessing evidence of impact should be considered in proposals.

Historic England has adopted a public value framework (PVF) to provide assurance to its stakeholders, including the taxpaying public, that it invests public money in ways that optimise value. Proposals should therefore make a convincing case that the project will make a real and positive impact on England's heritage. It should address the following questions:

- How will the project represent a good return on investment?

- Why do we need the project now? What are the consequences if it doesn't happen?

- How does the project address other strategies such as local research frameworks or local government plans?

Budget

Project proposals should include detailed costs as set out in the Guidance for Grants.

How to apply

Proposals should be based on the template attached to this document and must include a task list, timetable and costs. We will not be commissioning Project Designs.

Please submit proposals by emailing HPCPcalls@HistoricEngland.org.uk.

The Heritage Protection Commissions Programme Guidance for Grants can be downloaded from the HPC web pages. https://historicengland.org.uk/services-skills/grants/our-grant-schemes/hpc/.

Timetable

Proposals must be submitted by 16th February 2024. Applicants will be informed of the decision by no later than the first week in March 2024.

Further information

For questions about the project please contact Matthew Oakey at Matthew.Oakey@HistoricEngland.org.uk

For further queries about the application process, deadlines etc please contact Tim Cromack at [Tim.Cromack@HistoricEngland.org.uk.](mailto:Tim.Cromack@HistoricEngland.org.uk)
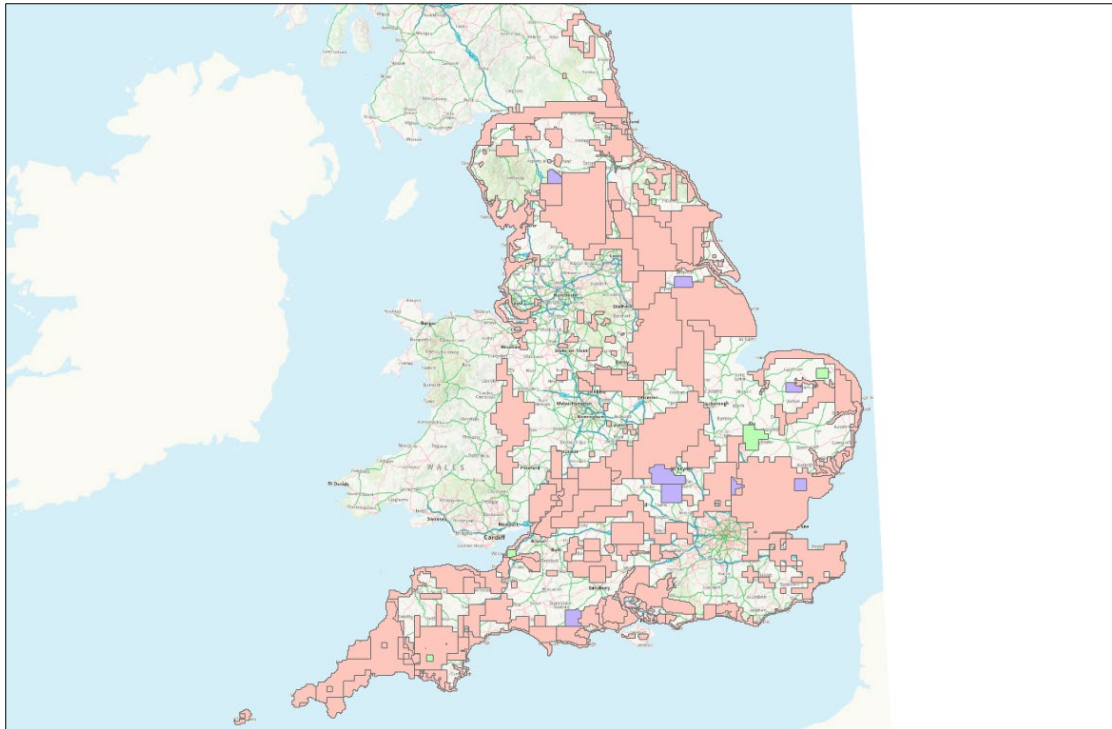
If you would like this document in a different format please contact our Customer Services department:

Telephone: 0370 333 0607

Email: customers@HistoricEngland.org.uk

Appendix 1 previous and current project areas

The results of previous Aerial Investigation and Mapping projects can be viewed here- []. or accessed via the Historic England Open Data Hub.

AI&M project areas as of December 2023. Completed (red), ongoing (purple) and planned (green). Base mapping © Crown Copyright and database right 2023. All rights reserved. Ordnance Survey Licence number 100024900

Appendix 2 Format for proposals

This template should be used in conjunction with the information in the Call document, general MoRPHE guidance and MoRPHE PPN7 (appendix 3).

Document control

Title:	*Include a document control grid in your proposal*
Author(s):	
Derivation:	
Origination Date:	
Reviser(s):	
Date of last revision:	
Version:	
Status:	
Summary of Changes:	
Circulation:	
Required Action:	
File Name/Location:	
Approval:	

1. Project Name and Area

Background

A brief summary of the context and motivation for the project. Provide an accurate location map – projects must be defined by full OS one kilometre squares irrespective of crossing county or other administrative boundaries. The only exception to this is along the Welsh or Scottish borders. Please provide a shape file of the project area with your proposal.

Aims and Objectives

Refer to potential protection outcomes in this area. Describe the opportunities for the project to deliver additional benefits beyond heritage protection, for example research potential, partnerships or community work. Refer to how the project will meet the key research questions relevant to this area.

Business Case

Include a brief business case explaining how the project will meet the aims of relevant areas of the Historic England Corporate Plan, Future Strategy, and Research Agenda as well as regional or local strategies and research agendas. Include a statement of the archaeological potential of your area and the impact of the project.

Methods

A brief outline of how you will achieve your project aims and objectives. Why and how using Historic England standards will be effective in achieving the aims of the project. Describe how the proposed methods conform to MoRPHE PPN7 – for example how you propose to access material at the Historic England Archive. You must specify how data will be entered into the local authority historic environment record and how results will be disseminated.

Stages, Products and Tasks

Provide a list of main stages and products. Provide a task list with allocation of days required for each of the main tasks. This should include time allocations for each member of the project team.

Interfaces

Mention who has been consulted in the relevant Local Authority and the Historic England Regional team, in particular the Inspector of Ancient Monuments and Listing advisor. Mention interfaces with other local initiatives where relevant.

Project team

Include a brief outline of the relevant project team members' experience (including delivery of aerial investigation and mapping projects) and their roles on the proposed project. Any changes to the project team must be discussed with the Historic England Aerial Survey team.

Project timescale and budget

Include the project timescale (including proposed timescale for each mapping block if necessary) and budget. Provide a brief explanation of how the budget or resources were calculated including a short timetable assessment based on available sources and archaeological knowledge of the area.

Appendix 3 MoRPHE PPN 7

Preface

MoRPHE Project Planning Notes (PPNs) form an integral part of the Management of Research in the Historic Environment (MoRPHE) Project Management Methodology issued by English Heritage in 2006 and updated to reflect changes to the organisation and the creation of Historic England. This PPN has also been updated to reflect the name change from National Mapping Programme to Aerial Investigation and Mapping.

They are intended to be presented together with, and read in conjunction with, the 'MoRPHE Project Managers Guide' which gives generic guidance on project management. The Project Managers Guide can be downloaded from the Historic England 'Free Publications' list website:

https://historicengland.org.uk/images-books/publications/morphe-project-managers-guide/

It must be emphasised that Project Planning Notes represent guidance on planning and running projects. They do not supplant or replace accepted standards and guidelines on the practice of particular skills or techniques.

Contents

Introduction

Scope of this Project Planning Note

This PPN provides guidance on the planning and management of projects that involve the interpretation and mapping of archaeological landscapes using aerial photographs and other remote sensed data such as lidar (airborne laser scanning) derived images.

This PPN provides an overview of the processes involved in production of a Project Proposal and Project Design for projects that use aerial photographs as a main source.

This PPN is particularly relevant to projects using Historic England's methods and other projects where aerial images are a primary source, such as desk-based assessments. Guidelines on Historic England aerial investigation and mapping methods and standards are available on request from Historic England. Matthew.oakey@HistoricEngland.org.uk

This PPN covers large area projects, such as those using Historic England aerial investigation and mapping (AI&M) methods but can be adapted for smaller areas or site-based work.

This guidance applies to internal Historic England projects and those undertaken by contractors funded by the Heritage Protection Commissions Programme (HPCP). Applicants for grants must also consult the specific HPCP guidance. https://historicengland.org.uk/services-skills/grants/our-grant-schemes/hpc/

This document does not cover flying and the taking of oblique aerial photographs. This is covered in MoRPHE PPN 5: Aerial Reconnaissance.

Planning

General considerations

The following sections identify aspects to be considered during the planning of a project. Some aspects should be considered for the Project Proposal and others may need more detailed documentation in the Project Design. Project Proposals and Designs for AI&M SURVEYS must follow the layout in the MoRPHE Project Managers' Guide (pages 44-46).

From the outset there should be consultation with potential stakeholders including the relevant local authority. For Historic England funded projects this consultation

must also include the appropriate Historic England Regional team and Aerial Survey team.

Early consultation with relevant aerial photograph archives is necessary to ensure that access or loan arrangements are agreed.

Where the assessment of aerial photographs forms part of a wider multi-disciplinary project, ensure that the timescale and aims complement the other strands of the project.

BOX A: CONSIDER THESE ASPECTS WHEN PLANNING

Clear project objectives and scope

Clear definition of the project area

Clear idea of products

Quantification of aerial photographs, lidar and other remote sensed data

Quantification of current archaeological knowledge

Costs of copyright and licensed use of source material

Timetable assessment

Project Stages and Tasks

Team structure and skills

Allowance for liaison with stakeholders

Risks and their management

Archive and dissemination

Project Closure

Setting Objectives

Objectives should be clearly articulated and include their expected contribution to the understanding and protection of the historic environment. Include the potential for integrating results with existing knowledge and heritage management infrastructures, in particular the relevant Historic Environment Records

Objectives should clearly identify the archaeological scope of the project. For Historic England supported projects this must meet AI&M standards.

Refer to relevant Regional Research Frameworks, World Heritage Site Research Agendas, and designated area Management Plans.

Projects should reference the Historic England corporate plan.

https://historicengland.org.uk/about/what-we-do/corporate-strategy/

Define the project area to include a small buffer zone. Provide accurate illustrations and describe the project area in the Project Proposal and Project Design.

For larger projects, such as those using Historic England AI&M methods, the project area may be divided into blocks for aerial photograph loan management and project review stages.

AI&M projects should usually cover a contiguous area and consider the location of previous projects. For Historic England supported AI&M projects, whole kilometre squares should be completed, even if they cross an administrative boundary.

List of products or outcomes:

- A geo-referenced digital map of the form and extent of all archaeological features visible on aerial photographs and other remote sensed data, linked to:

- Database records of the location, indexed classification, archaeological description and analysis, and main sources for all archaeological sites visible on aerial photographs and other remote sensed data.

- A summary report with an overview of the archaeology recorded by the project, analysing its character, diversity, distribution, and associations in the landscape

- Recommendations for heritage protection/development control

- End of Project Report

Other products should be described in the Project Design. This could include dissemination outcomes and statements on monument condition or landscape change. A list of typical products is in Annexe 1.

Standards for digital mapping and database records should be clearly stated in the project design and agreed with stakeholders. Projects funded by Historic England projects must adhere to national standards including the current Historic England standards for digital mapping and database recording.

Where heritage protection or development control outcomes are anticipated, there should be good liaison with the relevant Local Government Archaeologist and, when of national relevance, the Historic England Regional Team, to ensure that recommendations can be followed up.

Quantification of aerial photographs, lidar and other remote sensed data

The identification and quantification of available aerial photographs and other sources is an essential part of project planning. Archives of aerial photographs and lidar will usually provide and any other readily available data. The use of other remote sensed data, such as multi spectral surveys, must be clearly justified in terms of suitability and potential value.

Identify the numbers and types of aerial photographs, and any other readily available sources of images and remote sensed data. Sources include the Historic

England Archive, HERs, Environment Agency, and online sources of aerial photographs, such as Google Earth.

Request a 'cover search' of aerial photographs from the Historic England Archive by providing a clear definition of the proposed project area. The Historic England Aerial Photograph Explorer [Aerial Photo Explorer – Over 400,000 aerial photos in Historic England's digitised collections | Historic England](#) allows access to over 400,000 digitised photos taken from our aerial photo collections of over 6 million photographs preserved in the Historic England Archive. Use the Heritage Gateway to find out how to access information held in relevant HERs and whether the information is available in a suitable format for a quantification.

For Historic England AI&M projects, include distributions of aerial photographs against a suitable map background, and a table of figures in the Project Design.

Assess how you will view aerial photographs depending on whether they are prints, born digital images, digitised prints, or online images. Prints currently form the bulk of archives and need to be viewed in person and will often require a stereoscope for effective analysis. Different types of digital images, lidar or other remote sensed data may require specialist equipment or software.

Where possible, during the execution stage of the project, the aerial photographs, and other remote sensed data, should be viewed simultaneously for the same site, or area, so that the maximum amount of information can be extracted efficiently from the appropriate source.

Ascertain any costs, and conditions of use, associated with acquiring sources from the key archives. Historic England approved projects may be able to borrow prints from the Historic England Archive subject to certain conditions. Air Photography for Great Britain (APGB) orthophotography and height data may also be available

For large area projects, and other projects requiring large numbers of aerial photographs, the quantification assessment should include a strategy and agreement for accessing and viewing aerial photographs held in key archives such as, the Historic England Archive, and HERs.

If, after all existing sources have been assessed, it is felt there is still a need to commission new photography, lidar or other remote sensed data then this should be a separate project stage with a Review Point. It is important to remember that all forms of remote sensing are seasonally and weather dependent and a considerable lead in time is required to capture appropriate data.

Quantification of current archaeological knowledge

To help assess the necessary timescale for the project, carry out a quantification of current archaeological knowledge in the project area.

The quantification should include geographic location, distribution, period and type of archaeological sites in the Historic England National Record of the Historic Environment and the local HER, as well as any other relevant source. Further details

of factors impacting aerial investigation and mapping project timetables are explored here https://historicengland.org.uk/research/results/reports/46-2019.

Use the Heritage Gateway to find out how to access information held in relevant HERs. The Historic England Archive may hold hard copies of previous archaeological surveys.

For Historic England AI&M projects, present the quantification in the Project Design, as a table of figures, with distributions shown against a suitable map background.

Copyright and licensed use of source material

Ensure you have adequate base mapping and height data. Ensure correct licences are in place for the use of this data.

Copyright permission and referencing information must be sought for all material, such as images or historic maps, sourced from the Historic England Archive, CUCAP, HERs or other third parties such as companies who supply lidar. The Historic England Archive and HERs etc do not always hold the copyright for items in their collection.

It is the responsibility of the Project Team to ensure that conditions of use are adhered to for maps, photographs, and other data.

All products of Historic England AI&M projects are either Historic England copyright or licensed for their use subject to terms and conditions.

Timetable Assessment

Assess the time required for the project based on:

- experience of previous projects

- quantification of aerial photographs and other data

- access arrangements at archives (including loans)

- quantification of archaeological knowledge to anticipate the expected density of archaeological features

- additional tasks beyond interpretation, mapping, and recording

The Timetable Assessment should estimate the expected rate of mapping. This allocation includes analysis of aerial photographs and other relevant sources, photo rectification, digital mapping of archaeological features, and monument recording.

An average of 0.8-1.1-person day per square kilometre is usual for the interpretation, mapping and recording phase of Historic England AI&M projects. More, or less, time may be required depending on the density and complexity of the

archaeological remains, the number of aerial photographs and the scope of the project.

For Historic England AI&M projects the Project Design must demonstrate how the quantification of aerial photographs and other sources, and current archaeological knowledge have been used to estimate time allocations for mapping and recording.

Itemise time for tasks such as visiting AP archives, AP loan management, field trips, meetings, progress reports, dissemination, and report writing. Time allocated to these tasks, especially report writing, must reflect the size of the project area and the anticipated density and character of archaeological sites.

Include a GAANT chart in the Project Design to illustrate the timetable of tasks for the duration of the project.

Likely project stages

Project stages follow the MoRPHE Project Managers' Guide (page 13) and should include the following as a minimum, with appropriate Review Points:

- Start-up
- Initiation
- Execution
- Closure

Project tasks for aerial photograph interpretation and mapping projects are normally completed in one Execution Stage. The number of Review Points will depend on the duration of the project. See Annexe 2 for a list of typical tasks. The key elements are

- Project set-up and management
- Interpretation, mapping and recording
- Landscape analysis and reports
- Meetings and dissemination
- Archive including delivery and integration of data into the HER and Historic England Archive

Table 1. Typical stages and products

Stage	Research products	Archive products	Dissemination products
Start up	Project Proposal		
Review Point R1: Has the project area been agreed? Have the relevant sources been assessed?			
Initiation	Project Design		
Review Point R2: Does the PD sufficiently define project scope, methods and timetable? Has the timetable assessment been carried out properly? Is the project infrastructure in place? Are access arrangements in place for all sources, in particular for aerial photographs? Are data exchange agreements and mechanisms in place?			
Project set-up Mapping (Block 1 etc)	Digital Mapping Monument Records	Project management file Loan lists Rectified photographs	Web Page Highlight Report(s) HER records via Heritage Gateway
Review Point R3: Is the project keeping to the agreed timetable? Is the quality of the mapping and recording to the standards defined in the Project Design?			
Report	Summary Report Heritage Protection recommendations	Project proposal for publication	Archive and web (PDF) versions of Report Web Page update
Review Point R4 Does the project report meet the requirements defined in the project design? Will there be a further publication?			
Archive/data exchange	Digital mapping Monument records	Project management file	Summary Report End-of-Project-Report
Review Point R4 Has the project delivered its aims and objectives? Are the products completed? Has data exchange taken place?			
Closure			End-of-Project-Report

Team structure and skills

The team structure should follow the MoRPHE Project Managers' Guide (p16) and include the following roles

- Executive
- Manager
- Experts

The Project Executive has responsibility for the project and sets the overall direction while delegating day-to-day responsibility to the Project Manager, although these roles can be combined on small projects.

The Project Manager will prepare the Project Design and carry out project planning, identification of Risks, internal monitoring of quality, costs and timetable.

The Project Experts undertake aspects of the project in accordance with (and may contribute to) the Project Design. Project Experts should have a minimum of 4-6 months professional experience of interpretation and mapping of archaeological landscapes using aerial photographs. For Historic England AI&M projects this is a requirement. A person specification is outlined in Annexe 3.

When Project Experts are not available, training should be provided. This should usually form a separate project. The trainer must be an acknowledged specialist with at least 2 years' experience of interpretation and mapping of archaeological landscapes using aerial photographs. Calculate the effect of training on the project timetable and cost. Allow time for the trainer and for the initially slower work rate of the trainee. Training requirements vary but up to 45 person days for the trainee is usual.

Risks and their management

Document Project Risks, in the Project Design, in a tabulated Risk Log following MoRPHE guidelines (page 46).

Minimise delays by early agreement on how to access and view aerial photographs in archives such as CUCAP, Historic England Archive and the HERs (Historic Environment Records).

For larger projects, minimise the risk of delays by agreeing a timetable for access to the photographs with the Historic England Archive. For Historic England AI&M projects it may be possible to arrange for loans of material, but this must be agreed with the Historic England Archive in advance and documented in the Project Design.

Minimise the risk of potential loss of data due to IT systems failure with rigorous backup routines. Describe the strategy for this in the Project Design.

Carry out appropriate consultation at the project planning stage to ensure project products, especially digital data, and project scope are compatible with relevant heritage management infrastructures and stakeholder needs.

Project Execution

Project set-up

Ensure all relevant data sources are available from the outset. This will require careful planning and appropriate early discussions with the relevant heritage data managers and providers of aerial photographs and other images.
Ensure data recording standards and mechanisms are agreed and are in place from the outset.
Ensure Project Experts have some familiarity with the landscape, archaeology, geology, and soils of the project area.

Interpretation, mapping, and recording

The main process of interpretation, mapping, and recording should be a continuous cycle of work for each Project Expert. The project experts should carry out database recording immediately after completion of mapping of a given area, when memory of the evidence is fresh. The area covered in each cycle may vary depending on the size of the project, types of archaeological feature, and individual preference, but should not exceed 25 square kilometres.

Project Experts should undertake regular discussion to minimise errors and variations in recording between individuals and to enhance expert local knowledge.

Project experts should maintain an overview of results considering heritage protection outcomes, key sites, landscapes, potential illustrations and observed gaps in knowledge and data sources. If it is within the project remit, also discuss opportunities for dissemination.

Landscape analysis and summary report

The Project Experts should carry out the analysis and write the summary report. Consider the observations of the project team, even when an individual writes the

bulk of the report. Historic England Aerial Investigation and Mapping team must review Historic England AI&M reports.

The detailed structure of the report should be related to the results of the interpretation and mapping. It should include an archaeological overview and recommendations for heritage protection.

There are a wide variety of reports on the Historic England website, which provide examples of different formats and approaches from Historic England AI&M and other projects using aerial photographs as a main source.
https://historicengland.org.uk/research/research-results/research-reports/

Review

Approaches to assessment of quality

Specify formal review points following MoRPHE guidelines (p12)

For HPCP funded projects, Historic England will assign a Project Assurance Officer (PAO), who will act as the contact point between Historic England and the commissioned organisation. The PAO and the commissioned organisation will set milestones, review points and stage payments for the final contract.

Specify and timetable a quality assurance process in the Project Design. The quality assurance should include checks on project scope as well as checks of the quality of mapping and recording.

The time allocated for quality assurance should include preparation time and time for feedback and any amendments or actions required. Newly trained project experts require higher levels of quality assurance.

The Historic England Aerial Survey team will provide general advice and undertake quality assurance checks on sample areas of all Historic England AI&M projects.

Communication and documentation to support continuous review

Facilitate ongoing communication and collaboration between the project team and stakeholders by direct contact, meetings, or reports.

Document progress for each project review point. For Historic England AI&M projects, a short Highlight Report must be submitted to the Historic England PAO.

Historic England AI&M projects are required to provide a report for each quarter of the financial year. This short report, of no more than 150 words, will include project

statistics, as specified by Aerial Investigation and Mapping, and a brief statement of progress, archaeological highlights, and project milestones.

For long running projects, liaison meetings with stakeholders are recommended. Hold these at about six-monthly intervals throughout the project to present progress and discuss archaeological highlights.

Archive and Dissemination

Project data and archives

The products of projects that involve the interpretation and mapping of archaeological landscapes, using aerial photographs and other remote sensed data, usually comprise digital mapping, digital database records and a summary report.

The primary archive for aerial photograph interpretation and mapping projects should be a publicly accessible organisation, such as a Historic Environment Record, Sites and Monuments Record, or the Historic England Archive

Historic England AI&M data is archived at the Historic England Archive. Historic England AI&M projects should include costs for the transfer of data to Historic England and/or relevant HER/SMR, in accordance with the Association of Local Government Archaeological Officers (ALGAO), and with any known partners and stakeholders. All Historic England AI&M products are either copyright of Historic England or project partners but all parties, and some stakeholders, will be licensed to use the data.

Establish a mechanism for data exchange of digital mapping and monument records to and from project stakeholders at the Project Design stage.

Reports and other dissemination

Projects should be signposted at an early stage in the project, preferably with a web page. A brief project summary of all NHPCP commissioned projects must be provided for the Historic England website.

The summary report should provide a synthesis of the archaeology, analysing its character, diversity, distribution, and associations in the landscape. It should

include relevant details of methods, project statistics and recommendations for future heritage protection and research.

For all grant-funded projects, a digital copy of the report should be submitted to Archaeology Data Services (ADS) http://ads.ahds.ac.uk/

For Historic England AI&M projects, digital copies of the report must be provided at full resolution for archive and as a fully accessible copy for internet dissemination.

If further publication is considered appropriate, a proposal should be drawn up for the necessary work to be undertaken as a separate project or project stage.

Project results can be disseminated at conferences and outreach events. The Project Design should include the costs of preparation time and attendance.

Project Closure

An End-of-Project Report should be lodged in the project archive and presented to the sponsor. This report will include an assessment of lessons learned reviewed via a post-project evaluation plan as defined in the MoRPHE Project Managers' Guide (page 49).

Further information

Information technology systems, hardware, and software

IT provision and associated costs require some consideration and planning. The minimum IT infrastructure required for a project that involves the interpretation and mapping of archaeological landscapes, using aerial photographs and other remote sensed data, is listed below.

Hardware:

- Computer suitable for moderate data processing with a large high-quality monitor.
- Scanner.

Software:

- Image viewing/scanning/manipulation software such as Adobe Photoshop or equivalent.
- Specialist photo transformation software such as the University of Bradford AERIAL system or AirPhoto. Historic England Aerial Survey Team can provide a copy.
- GIS software.
- Monument recording database conforming to Heritage Data Standards.

- Lidar visualisation software, such as Relief Visualization Toolbox [Relief Visualization Toolbox (RVT) | ZRC SAZU (zrc-sazu.si)](#)
- Word processing package, such as Microsoft Word or equivalent, for report writing
- Microsoft PowerPoint or equivalent for presentations.

Specialist photo transformation software used for Historic England AI&M projects must be approved by Historic England.

Working environment and equipment

An appropriate workspace is required for viewing aerial photographs. Good natural light, controlled with a window blind, and a desk lamp are necessary to view prints. Position the computer to avoid glare when viewing digital images on screen.

Enough desk space is required to lay out aerial photographs, and view stereo pairs, next to the desk lamp and to the computer, scanner etc used for mapping and recording.

Archaeological interpretation is aided by the stereoscopic viewing of pairs of aerial photographs. This is most easily achieved using a pocket stereoscope with a magnification of 2x. Pocket stereoscopes and mirror stereoscopes with a higher magnification may also be useful, particularly when dealing with historic aerial photographs and detailed interpretation. Use of a stereoscope is mandatory for Historic England AI&M projects.

Low-cost technology for on-screen 3D viewing of digital images is developing and use of this technique should be considered when suitable born digital images are available. A handheld stereoscope is still the most effective method for viewing the large volumes of prints typically involved in mapping from aerial photographs.

Access to and storage of aerial photographs

Make suitable arrangements to access and view aerial photographs. Wear suitable gloves when handling prints held in archives.

Commissioned projects using Historic England AI&M methods may be able to borrow prints from the Historic England Archive subject to certain conditions. These conditions require suitable storage of aerial photographs as defined by and agreed with the Historic England Archive.

Background reading

The basic methods and parameters for archaeological aerial photograph interpretation have remained unchanged for many years. Useful introductions are:

Riley, D N 1982 Aerial Archaeology in Britain. Shire, Princes Risborough.

Wilson, D R 2000 Air Photo Interpretation for Archaeologists. (2nd edition) Tempus, Stroud.

Lidar is a developing technology; recently published guidelines provide a starting point.

 Historic England 2018 Using Airborne Lidar in Archaeological Survey: The Light Fantastic. Swindon. Historic England Lidar: A Laser-scanning Technique Revealing New Archaeological Evidence | Historic England

Sources of aerial photographs and other remote sensing data

The Historic England Archive collection of aerial photographs is an essential source.

Historic England Archive Services
The Engine House
Fire Fly Avenue
Swindon
SN2 2EH

Tel: 01793 414600 Email: archive@historicengland.org.uk

Cambridge University holds another important national collection of aerial photographs and should be consulted. *In 2023, it is currently closed but some material is available online.*

http://www.geog.cam.ac.uk/cucap/

Local Historic Environment Records (or Sites and Monuments Records) will normally be able to advise on the availability of local collections. See the website of the Association of Local Government Archaeological Officers (ALGAO) website for contact details. www.algao.org.uk

Many websites now offer seamless aerial photographic cover. These provide up to date colour photographs. The drawback is that they cannot be viewed stereoscopically and the resolution, while mostly good, can be variable. The easiest to use examples include

www.bing.com/maps/ Free internet service. Vertical photographs supplemented by oblique images in some areas.

http://earth.google.com Free internet service with global coverage of varying quality/resolution. Note the Historic Imagery option allows access to multiple sets of images for many areas.

There is no central repository in the UK for lidar data; the most extensive 'off-the-shelf' collection is that of the Geomatics Group, a specialist business unit within the Environment Agency.

https://historicengland.org.uk/research/methods/airborne-remote-sensing/lidar/ provides information on downloading EA lidar.

Acknowledgements

Contact details

This Project Planning Note was written by Helen Winton, Yvonne Boutwood and Pete Horne with most recent updates by Matthew Oakey and Sally Evans. Comments and suggestions for further improvement are welcome.
matthew.oakey@HistoricEngland.org.uk

Information on aerial survey projects can be found at
https://historicengland.org.uk/research/methods/airborne-remote-sensing/

For advice on the Historic England aerial investigation and mapping standards contact Matthew Oakey Aerial Survey Principal.

For advice on regional issues, contact the local Historic England Office. Further information is available at https://historicengland.org.uk/about/contact-us/local-offices/

Annexe 1Typical products

Product number	P1
Product title	Event Record
Purpose of the product	To signpost the project to potential users.
Composition	Textual record identifying project area, location, specification, methodology, sources and project contact.
Derived from	Project Design
Format & presentation	Digital textual record
Allocated to	Project Experts
Quality criteria and method	Relevant data standards applied.
Person/ group responsible for quality assurance	Project Manager
Person/ group responsible for approval	Project Executive
Planned completion date	Created once PD agreed, updated at completion of project.

Product number	P2
Product title	Digital Map
Purpose of the product	Graphical depiction of archaeological features interpreted and mapped from aerial photographs.
Composition	A geo-referenced digital map of the form and extent of all archaeological features visible on aerial photographs, with attached data tables. Linked to Product P3 by unique identifier number.
Derived from	Aerial photographs and other airborne remote sensed data.
Format & presentation	Geo-referenced vector data (e.g. .shp or AutoCAD .dwg)
Allocated to	Project Experts
Quality criteria and method	Standards defined in the Project Design and checked by sample quality assurance.
Person/ group responsible for quality assurance	Project Manager, Project Experts
Person/ group responsible for approval	Project Executive
Planned completion date	Draft created during project, finalised on completion of each mapping block.

Product number	P3
Product title	Monument Database Record
Purpose of the product	Textual record of archaeological features, including aerial photograph interpretation.
Composition	New and enhanced database records identifying the location, indexed classification, archaeological description and main sources, including aerial photographs. Linked to Product P2 by unique identifier number.
Derived from	Aerial photographs and lidar imagery
Format & presentation	Digital textual record in format defined in Project Design to meet National Record of the Historic Environment (NRHE) or Association of Local Government Archaeological Officers (ALGAO) standards.
Quality criteria and method	Standards defined in the Project Design and checked by sample quality assurance.
Allocated to	Project Experts
Person/ group responsible for quality assurance	Project Manager, Project Experts
Person/ group responsible for approval	Project Executive
Planned completion date	Ongoing through project finalised on completion of each block. If data transfer involved, dates for this should also be listed.

Product number	P4
Product title	Summary Report
Purpose of the product	Dissemination of the project results.
Composition	A summary report recording the methods, scope and results of archaeological aerial photograph interpretation and mapping. To include a synthesis of the archaeology, analysing its character, diversity, distribution and associations in the landscape. Opportunities and recommendations for heritage protection.
Derived from	Project mapping and database analysis and research
Format & presentation	Digital text with illustrations in formats such as Word and .PDF format.
Allocated to	Project Experts
Quality criteria and method	Editing text and comment by Project Manager and stakeholders where appropriate.

Person/ group responsible for quality assurance	Project Manager, Project Experts
Person/ group responsible for approval	Project Executive
Planned completion date	As agreed in PD

Product number	**P5**
Product title	End of Project Report
Purpose of the product	Dissemination of project management and lessons learnt.
Composition	An overview summarising the Closure stage of the project and recording any useful lessons learnt to aid future project management.
Derived from	Project meetings, liaison and documentation.
Format & presentation	Digital textual record in Word or .PDF format.
Allocated to	Project Manager and Executive
Quality criteria and method	Editing text and comment by Project Experts
Person/ group responsible for quality assurance	Project Manager
Person/ group responsible for approval	Project Executive
Planned completion date	As agreed in PD

Product number	**P6**
Product title	Web page
Purpose of the product	To signpost the project and help disseminate the results of the project.
Composition	Text and illustrations
Derived from	Project mapping, analysis and research
Format & presentation	Digital text with illustrations
Allocated to	Project Experts
Quality criteria and method	Editing text and comment by Project Manager
Person/ group responsible for quality assurance	Project Manager
Person/ group responsible for approval	Project Executive
Planned completion date	Initially created after agreement of the PD, the web page should be updated with results and provide a link to the summary report at the end of the project.

Annexe 2 Typical Task List

Task Number	Task	Product	Performed by	Days
	Project set-up and management			
1.1	Set up project files and manage			
1.2	Acquire and manage aerial photograph sources and loans e.g. Historic England, HERs, lidar (if available), online and any other sources			
1.3	Create event record	P1		
1.4	Acquire data sources e.g. monument data, mapping, other relevant supplementary sources			
1.5	Set up and manage project files			
	Interpretation, mapping and recording			
2.1	Analyse and interpret aerial photographs and other sources			
2.2	Create digital mapping	P2		
2.3	Create monument records in Historic England monument	P3		

		database (as part of a transfer process to HERs), HER or project database			
2.4		Perform quality assurance checks and data cleaning	P2,P3		
		Documentation and landscape analysis			
3.1		Collate data and write quarterly and Highlight reports			
3.2		Analyse aerial survey results and plan summary report	P4		
3.3		Write summary report	P4		
3.4		Peer review of summary report	P4		
		Meetings and dissemination			
4.1		Attend review and team meetings			
4.2		Attend field visit(s) as necessary with project stakeholders and partners			
4.3		Prepare web material for project	P6		
4.4		Deliver project lectures, presentations and attend other events			

4.5	Distribute summary report				
4.6	Evaluate project, write and disseminate End-of-Project report	P5			
	Archive				
5.1	Collate archive and metadata	P1,P2, P3			
5.2	For Historic England AI&M projects - archive project data in standard format with Historic England Archive	P1,P2, P3			
5.3	Deliver data to local authority HERs and project stakeholders and partners	P1,P2, P3			

Annexe 3 Person Specification for Project Expert

See also comments above in 2.10

TRAINING, EXPERIENCE AND QUALIFICATIONS	
Essential	*Desirable*
Good honours degree in archaeology or related subject	
Experience of digital mapping techniques and databases	
Experience of aerial photograph interpretation	

KNOWLEDGE AND SKILLS	
Essential	*Desirable*
Good knowledge of British landscape archaeology	Knowledge and/or experience of aerial reconnaissance techniques
Familiarity with types of primary and secondary material related to the archaeology of England	Knowledge of a related discipline (e.g. geology, geophysics or other investigative techniques)
Good verbal and written communication skills	
Knowledge of the principal uses made of aerial photographs in a range of environments	
Good understanding of maps including the implications of the range of map products and scales and ability to read grid references	

INTERPERSONAL SKILLS	
Essential	*Desirable*
Ability to work for long periods without supervision	Ability to communicate to a wide range of professionals and stakeholders
Ability to manage time effectively and balance conflicting demands	
An enthusiastic and positive manner	
Ability to work effectively in a team	
Excellent interpersonal skills	

PARTICULAR CIRCUMSTANCES
The work is largely desk-based and requires a significant degree of concentration and critical visual analysis.

Document control

Title:	Standards for aerial investigation and mapping projects
Author(s):	Helen Winton, Aerial Investigation and Mapping, Swindon email: helen.winton@historicengland.org.uk Tel: 01793 414879
Derivation:	Developed from NMP standards and guidelines documents for the NMP manual
Origination Date:	1 September 2010
Reviser(s):	MO 18/12/2023 SE 21/10/2021
Date of last revision:	18/12/2023
Version:	0.1, 0.2
Status:	
Summary of Changes:	Update following revision of NMP name. Updates to guidance to match the technical specification Updates 2023 to technical changes, team name changes and other updates
Circulation:	
Required Action:	
File Name/Location:	
Approval:	

Preface
This technical guide provides information required for Aerial investigation and mapping projects.

This technical guide complements the Management of Research in the Historic Environment (MoRPHE) Project Management Planning Note 7 Interpretation and mapping from aerial photographs and other aerial remote sensed data.

When project planning, they are intended to be presented together with, and read in conjunction with, the 'MoRPHE Project Managers Guide', which gives generic guidance on project management. The Project Managers Guide can be downloaded from the Historic England website:
https://historicengland.org.uk/images-books/publications/morphe-project-managers-guide/

Appendix 4 Historic England Standards and Guidance for Aerial investigation and mapping projects

1 Introduction

1.1 Scope of this Technical Guide

1.1.1 This Technical Guide provides information on standards for Historic England aerial investigation and mapping projects. It provides details of the processes involved in production of mapping and recording from aerial photographs and other airborne remote sensed data such as lidar.

1.1.2 This Technical Guide applies to large area projects but can be adapted for smaller areas or site-based work.

1.1.3 This guidance should be used in conjunction with Management of Research in the Historic Environment (MoRPHE) Project Management Planning Note 7 Interpretation and mapping from aerial photographs and other aerial remote sensed data.

1.1.4 This guidance applies to Historic England projects and those undertaken by contractors funded by the Heritage Protection Commissions Programme (HPC). Applicants for grants must also consult the relevant guidance:

https://historicengland.org.uk/services-skills/grants/our-grant-schemes/hpc/

1.1.5 This document does not cover flying and the taking of oblique aerial photographs. This is covered in MoRPHE PPN (Project Planning Notes) 5: Aerial Reconnaissance.

2 Overview

2.1 Background

2.1.1 The Aerial investigation and mapping standard aims to promote

best use of aerial photographs and lidar data to create archaeological maps and descriptions suitable for historic environment records. This systematic synthesis of archaeological information is intended to assist research, planning, and protection of the historic environment.

2.1.2 The standard products are a digital archaeological map with linked archaeological descriptions, and a synthesis of the archaeological results, usually a report. Analysis of the project results should describe the character, significance, diversity, association and distribution of archaeological sites and landscapes, visible on aerial photographs, within a project area.

2.1.3 This document outlines the minimum standards required for Historic England funded projects and the information should be adapted to suit stakeholder requirements and the archaeological resource in each project area. The document is regularly updated in response to queries from those working on such projects. Please contact Matthew Oakey or Sally Evans if you have any suggestions for improvements.

2.2 Overview of methods

The following describes the main elements of aerial investigation and mapping.

Mapping and recording

- The following sources must be consulted: all aerial photographs from the Historic England Archive, Aerial Photography for Great Britain (APGB) agreement, Historic Environment Record/Sites and Monuments Record (HER/SMR), online sources (Google, BING, Channel Coastal Observatory) and Environment Agency, or other, lidar data. Other readily available sources of photographs can be consulted if it does not add significantly to the project timescale. The CUCAP library is currently closed but the potential of the collection must be assessed at proposal stage to ensure that they are not a key source.
- The Historic England Archive Services team will manage air photograph loans. In certain circumstances, large aerial photograph loans may be delivered to non-Historic England offices but must be used and stored according to Historic England Archive guidelines (see below).
- All archaeological features visible on aerial photographs are transcribed and recorded to an agreed level of detail. The scope of Historic England aerial investigation covers all buried (cropmarks and soilmarks) and surface archaeological remains (earthworks and

structures), potentially dating from the Neolithic period to the mid-20th century, including industrial and military features. See section 8 for details of scope.

- All mapping must be carried out using a Historic England approved aerial photograph rectification programme and digital drawing package. All monument recording must be carried out to Historic England/MIDAS standards. This would preferably be directly into the relevant HER/SMR but alternatively into the Historic England Research Record (WARDEN). Project proposals must assess and explain any costs for transfer or incorporation of monument records and mapped data to the relevant HER/SMR. See sections 9-11 for details. Consult with the HER on their preferred recording strategy.

Dissemination

- The report will refer to the character, diversity, association and distribution of archaeological sites and landscapes, visible on aerial photographs and lidar, within the project area. The report will highlight any major new discoveries and will provide a synthesis of the results of the interpretation, transcription and background research. The report should place the results in the context of current archaeological research and make recommendations for further work. The report will identify and discuss sites or areas of local, regional or national archaeological significance. The report will also include metrics that assess the impact of the project.

Data transfer, archive and copyright

- Copyright for the mapping remains with the grant recipient but Historic England are licenced to use the data as set out in the funding agreement. This will include release of the data under the Open Government Licence v3 via Historic England's Open Date Hub.
- mapping and monument records must not be passed to third parties without the prior agreement of Historic England unless already agreed under Terms and Conditions issued to a partner organisation.
- The main repositories are the relevant HER and the Historic England Archive.
- mapping will be loaded to the Aerial Archaeology Mapping Explorer by Historic England staff on the completion of any project and made available under the Open Government Licence v3 via Historic England's Open Date Hub.

2.3 General considerations

2.3.1 The following sections identify technical aspects to be considered during the planning and execution of a project. Some technical aspects should be considered for the Project Proposal but will need more detailed documentation in the Project Design. Project Proposals and Designs must follow the layout in the MoRPHE Project Managers' Guide (pages 44-46) and the guidelines in the *MoRPHE Project Management Planning Note 7: Interpretation and mapping from aerial photographs and other aerial remote sensed data.*

2.3.2 Early consultation with relevant aerial photograph archives is necessary to ensure that access or loan arrangements are agreed. Early consultation is also necessary to ensure that providers of other essential sources such as base mapping, height data, historic maps and monument records can provide the data in time for project start-up.

2.3.3 During the project planning stage, consult with potential stakeholders including the relevant local authority, to discuss general technical requirements for the project. This consultation must include the Historic England Aerial Survey team.

2.3.4 Where the assessment of aerial photographs forms part of a wider multi-disciplinary project, ensure that the technical requirements complement the other strands of the project.

2.3.5 Consider the following aspects to determine the technical requirements for the project

- Definition of the project area;
- Project sources;
- Project scope;
- Location and suitable working environment for the team
- Technical requirements for products;
- Hardware and software;
- Technical requirements for data transfer;

2.3.6 Copyright for the mapping remains with the grant recipient but Historic England are licenced to use the data as set out in the funding agreement. This will include release of the data under the Open Government Licence v3 via Historic England's Open Date Hub.

2.4 Defining the project area

2.4.1 Define the project area to include the focus of the project with a small buffer zone. Provide accurate illustrations and describe the project area in the Project Proposal and Project Design.

2.4.2 It is useful to supply the project area as a shape file, or

equivalent, so that stakeholders and suppliers of aerial photos and other data know the exact extents of the area.

2.4.3 Whole kilometre squares must always be completed, even if they cross an administrative boundary. There may therefore need to be a data transfer to different Heritage Environment Records. The exception to this is along the Scottish and Welsh borders.

2.5 Project sources

2.5.1 Sources must include the Historic England Archive, relevant local collections, such as those held by local authorities in Historic Environment Records (HER), and online sources of aerial photographs, such as Google Earth, BING, and Britain from Above (the latter can be supplied by the Historic England Archive). Environment Agency lidar must be consulted. If available, and where suitable, satellite images may be used. The Cambridge University Collection of Aerial Photography (CUCAP) is currently closed. See section 2.13 for more details on sources.

2.5.2 Background material must be obtained from published sources and the data held in WARDEN (Historic England's research recording database) and local HERs.

2.5.3 Suitable background maps and height data are required for photo rectification, georeferencing and mapping. Geological maps and soils information should also be consulted.

2.5.4 Where possible, during the execution stage of the project, the aerial photographs, and other remote sensed data, should be viewed simultaneously for the same site, or area, so that the maximum amount of information can be extracted efficiently from the appropriate source. All, or most, sources must therefore be available from the project start.

2.5.5 Assess how you will view aerial photographs depending on whether they are prints, born digital images, digitised prints, or online images. Different types of digital images, lidar or other remote sensed data may require specialist equipment or software.

2.6 Project Scope

2.6.1 The Sphere of Interest is defined as all archaeological features visible on aerial photographs, or other airborne remote sensed data, as cropmarks, soilmarks, parchmarks or earthworks and, in certain cases, as structures.

2.6.2 The earliest sites recognised on aerial photographs usually date from the Neolithic onwards. Projects therefore record all archaeological

features visible on aerial photographs with a date range from the Neolithic to the twentieth century.

2.6.3 Aerial Investigation and mapping methods require some selectivity in mapping and recording, particularly for the more recent periods. Guidelines for the most encountered examples of such variations to the Sphere of Interest are detailed in Section 5.

2.7 Location and suitable working environment for the project team

2.7.1 The location of the project team will influence the technical systems used. The preferred option for monument recording is to directly input to the relevant local authority HER systems to comply with Heritage Information Access Simplified Principal 1 (Local Authority HERs should be the first point of call for and primary trusted source of investigative research data and knowledge). Where this is not possible, monument recording can take place in WARDEN (Historic England's research recording database) but data transfer with the HER must be agreed. Data standards for recording and mapping must be discussed with the relevant HER and HE at the project proposal stage and details must be agreed and included in the project design.

2.7.2 Data transfer arrangements between the Historic England systems, local HERs and stakeholders must be discussed prior to project start-up.

2.7.3 Historic England funded projects for large areas and conforming to our standards may be able to borrow prints from the Historic England Archive subject to agreement with the Archive Services team. Conditions include suitable storage of aerial photographs as defined by and agreed with the Historic England Archive. See Section 4 for guidance on mandatory storage requirements for aerial photographs.

2.7.4 Project teams should carry out work in places with controlled access to natural light and with enough desk space to lay out and view aerial photographs using a stereoscope. The equipment required for archaeological mapping, such as large monitors, scanner etc, should be taken into consideration when arranging desk space.

2.8 Technical requirements for products

2.8.1 Digital georeferenced aerial photographs are created from scans of prints or born digital photographs. See Section 6 for requirements for photo rectification.

2.8.2 All mapping is carried out in a digital environment using

geographical information systems. A geo-referenced digital map is created of the form and extent of all archaeological features visible on aerial photographs and other remote sensed data. Textual data (attribute or object data) is compliant with FISH heritage data standards See Section 7 for mapping specification.

2.8.3 All monument recording is carried out to Historic England and MIDAS standards. See Section 8 for the database recording specification. An Archaeological Event record must be completed in OASIS V.

2.8.4 A report recording the methods, scope, and results of the project with an overview of the archaeology, analysing its character, diversity, distribution, and associations in the landscape. See Section 9 for technical specification for reports.

2.9 Hardware and software

2.9.1 The minimum IT infrastructure required for a project that involves the interpretation and mapping of archaeological landscapes, using aerial photographs and other remote sensed data, is listed below.

2.9.2 Hardware:

- Computer suitable for moderate data processing with a large high quality monitor, or two monitors.
- Scanner.

2.9.3 Software:

- Image viewing/scanning/manipulation software such as Adobe Photoshop or equivalent.
- Specialist photo transformation software such as the University of Bradford AERIAL system
- Software to create lidar visualisations e.g. Relief Visualisation Toolbox.
- Geographic Information System (GIS) software
- Monument recording database conforming to ALGAO standards/Historic England standards.
- Word processing package, such as Microsoft Word or equivalent, for report writing
- Microsoft PowerPoint or equivalent for presentations.

2.9.4 Specialist photo transformation software used for Historic England funded projects must be approved. Contact Historic England Aerial Survey team for advice on lidar visualisations.

2.10 Stereoscopes

2.10.1   Archaeological interpretation is aided by the stereoscopic

viewing of pairs of aerial photographs. This is most easily achieved using a pocket stereoscope with a magnification of 2x. Pocket stereoscopes and mirror stereoscopes with a higher magnification may also be useful, particularly when dealing with historic aerial photographs and detailed interpretation. Use of a stereoscope, for viewing stereo pairs of vertical photographs, is mandatory.

2.11 Technical requirements for data transfer

2.11.1   Projects must ensure that monument records and mapping can be provided in suitable formats for transfer to the HER and Historic England Mapping data should be available as shape files (or similar) to Historic England and the relevant HER with textual data, as specified below.

2.12 Project Monitoring and Assurance

2.12.1   The Historic England Project Assurance Officer (PAO) will monitor overall progress of the project and act as the contact point for advice between Historic England and the contracted organisation.

2.12.2   The project team should undertake a quality assurance (QA) process, to ensure standard interpretation and mapping and to check for errors and missed sites. This must be specified and timetabled in the project design. This will include preparation time prior to QA and time for feedback and any updates.

2.12.3   Additional QA on mapping and recording will be carried out by Historic England Aerial Survey team staff. The extent and timing of this should be agreed with the Aerial Survey Team. Project timetables should allow time to prepare the data needed for QA and to implement any changes as part of the feedback.

2.12.4   Each quarter (every 3 months), projects must provide a short report indicating the number of kilometre squares completed (mapped and recorded), numbers of new and amended monument records, along with a brief statement of progress (no more than 150 words) including archaeological/project highlights.

2.13 Aerial photographs and other aerial sources

The following sources must be used. These are subject to different copyright arrangements and must be used solely for the project. Permission to scan and reproduce must be discussed at project start-up.

Historic England
Archive Services, The Engine House, Fire Fly Avenue

Swindon, SN2 2EH
Tel: 01793 414600
Email: archive@HistoricEngland.org.uk
https://www.historicengland.org.uk/images-books/aerial-photos

Air Photography for Great Britain (APGB) sources of aerial photographs will be supplied by the Historic England Aerial Survey team.

Local HER/SMRs will advise on the availability of local collections and these should be used if they do not duplicate Historic England Archive material. These will usually comprise a limited range of vertical photographs and some specialist oblique photographs. See the website of the Association of Local Government Archaeological Officers (ALGAO) website for contact details. www.algao.org.uk.

Projects must use at least BING and Google Earth and any other online sources available. These provide up-to-date colour photographs. The drawback is that they cannot be viewed stereoscopically and the resolution, while mostly good, can be variable in more remote areas. www.bing.com/maps http://earth.google.com

There is no central repository in the UK for lidar data; the most extensive 'off-the-shelf' collection is that of the Environment Agency – free to download from the EA website. There is coverage for the whole of England at 1m resolution. Advice on formats and processing is available from simon.crutchley@HistoricEngland.org.uk

The CUCAP aerial photograph library is currently closed. The online catalogue should still be consulted to assess the potential of the collection and included in the report. https://www.cambridgeairphotos.com

2.14 Maps and height data

It is the project manager's responsibility to source Ordnance Survey maps, and permission for their use. The commissioned organisation, a local authority or private contractor, will normally use their own licence agreements. When this is not possible Historic England may be able to provide Ordnance Survey mapping

2.14.1 Use the most accurate maps available for photo rectification and as a background to mapping. The minimum standard is OS 1:2,500 scale MasterMap or equivalent. APGB orthorectified photos may be more accurate in some areas – consult with Historic England Aerial Survey team if required.

2.14.2 Use OS historic County Series mapping (1st to 4th editions) and any other readily available historic maps.

2.14.3 Height Data with a maximum of 5m intervals between contours must be used. This must be used during photo rectification so should be in a suitable format. This can be supplied by the Historic England Aerial Investigation and Mapping Team via the APGB agreement.

2.15 Other sources

2.15.1 Projects must refer to Monument records from Historic England and relevant HERs, and Event records via OASIS for archaeological background. All details of a monument record need to be consulted, in particular the sources. Full monument records must be sourced from WARDEN. The level of data available from HERs varies but as much information as possible should be obtained, preferably as a single data set (digital data, printouts etc) rather than accessed online. The most efficient method for accessing the data should be used, for example accessing monument data via the Heritage Gateway is acceptable but only if it provides all information required and is quicker than accessing the data through your mapping package.

2.15.2 Previous surveys, where relevant should be identified at the project planning stage and consulted from the Historic England Archive or HER. Previous aerial investigation and mapping surveys adjoining the current project area, will be supplied by Historic England.

2.15.3 Consult relevant published material, including reliable online sources.

3   Historic England Aerial Photography loans for Historic England funded aerial investigation and mapping projects: policy and guidance

3.1   Projects eligible for loans

Loans from the Historic England Archive aerial photography collections into the custody of non-Historic England staff will be made only to the following types of projects:

3.1.1   Historic England commissioned projects approved by Historic England using our aerial investigation and mapping standards.

3.1.2   Historic England funded Coastal Zone Assessment projects where these include an aerial investigation and mapping component and where the results are submitted to the overall Historic England dataset.

In the case of dispute over whether a project falls within these categories the final decision as to whether to loan material will be taken by the Director of the Historic England Archive.

3.2   Provision of loans

Costs for couriers for loans to and from the Historic England Archive must be included in the project design.

3.3   Loanable material

Historic England will only loan material from the Historic England Archive aerial photography collections for which a separate archival master exists either in the Historic England Archive holdings or in the holdings of another public institution.

The following will not be loaned:

- Films

- Transparencies which have not been copied

- Prints where original films or good quality copy films are not held

The Historic England Archive reserves the right not to loan material in poor condition.

Where feasible the Historic England Archive will supply digital copies of items which cannot be loaned, subject to format and condition of originals.

Cover searches for projects will supply an initial indication of which material can be loaned, but this will be subject to assessment of condition when material is withdrawn from the archive.

3.4   Management of loans

Loans will be issued in "blocks" of prints, with a block consisting of up to 2,000 vertical prints and up to 2,000 oblique prints (including photocopies of material /digital scans where appropriate).

No project will be allowed to hold more than two blocks of material at any one time.

The preparation and issuing of loan blocks will be to a timetable agreed with the Historic England Archive at the outset of the project. Projects are therefore urged to discuss their requirements with the Historic England Archive at the earliest opportunity to ensure that their requirements can be incorporated into the Historic England Archives timetable.

All loans will be to a named project representative, who will take responsibility for the management and safe return of the material.

If requested specific prints will be returned to the Historic England Archive within 48 hours of receipt of a request in order to support enquiries from external users.

3.5   Care of loans

Loans of material will be transferred to and from projects either by project staff or by a courier firm agreed with the Historic England Archive. All transfers will be at the expense of the project.

Costs may be required to cover visits to the Historic England Archive to view non-loanable material in person. This should be assessed and agreed at project planning stage.

Loaned material should not be removed from the agreed premises without the agreement in writing of the Historic England Archive except to return to the Historic England Archive

Projects will need to make appropriate arrangements for the secure storage of the loaned material when not in use and overnight. If a project does not have access to archive storage then material should be kept in a lockable fireproof cupboard. This should be able to maintain the contents at under 170 deg C for over 120 minutes. The cabinet should not be sited in an area where it might be subject to flooding, such as a basement.

The premises on which the material is to be stored should have an effective 24 hour fire alarm and security system. There should also be an appropriate disaster plan in place. Details of the systems in place should be supplied to the Historic England Archive.

All staff working with loaned material will be supplied with guidelines on the correct way to handle and protect the photographs, which they must conform to.

All projects receiving loans will need to show that they have insurance cover of at least £80,000 to cover the cost of replacing the loaned prints should these be lost or damaged.

3.6 Storage of loans

Vertical photograph loans are supplied by sortie and organised by library number. During surveys, it is essential to compare photographs of the same area taken at different times. Therefore, teams reorganise loans by geographical area to ensure the efficient use of the photographs. It is usual for each sortie to be divided into bundles, usually split by an individual's mapping area. A label indicates which area of the project is covered by the particular sortie. Bundles of photographs are then stored in boxes, usually by the mapping block.

The Historic England Archive recommends glassine photo bags to store bundles of photographs. A label on the front of the bag indicates the location of the photographs within the study area. Paperclips, or similar, **must not** be used on bundles of aerial photographs.

Project teams must calculate and include the cost of suitable photo bags in the project design. Information on cost and suppliers is available from Historic England Archive Services.

3.7 Use of loans

Loans are supplied solely for reference use in the agreed project. The loan of a print does not imply permission to make a copy of that print or to publish it - contact the Historic England Archive for advice. Where copying for research is permitted, copies of loaned material should not be supplied to third parties, and copies, whether in digital or hard copy formats should not be retained by the organisation beyond the lifetime of the project except in the context of the

agreed project archiving strategy. Specific permission must be sought from the rights holder before publication of any image in any media.

3.8 Recall of loan

Irrespective of the terms of the loan Historic England / Historic England Archive reserves the right to recall at any time any borrowed item, though as far as possible reasonable notice of recall will be given.

4   Sphere Of Interest

The Sphere of Interest is defined as all archaeological features visible on aerial photographs as cropmarks, soilmarks, parchmarks or earthworks, and some structures. The earliest sites recognised on aerial photographs usually date from the Neolithic onwards. Projects therefore record all archaeological features visible on aerial photographs with a date range from the Neolithic to the twentieth century.

The archaeological mapping is meant to be viewed against an OS map, and therefore will not usually record non-archaeological features visible on aerial photographs and depicted on the modern base map and still in use, such as buildings, field walls, hedges, canals and railways. The project design should describe the strategy for dealing with features visible on aerial photographs and marked on historic maps – the archaeological context or importance should determine whether features such as field boundaries, shooting butts, sheepfolds, relict quarries, canals, railways, tracks etc should be mapped. This should be discussed with project partners at project start-up.

Some selectivity may be required in mapping and recording, particularly for the 20th century. Guidelines for the most commonly encountered examples of such variations to the Sphere of Interest are detailed below and any variance from this should be defined in the project design.

The monument record and GIS attributes must record which elements of any particular archaeological site survive or have been levelled and/or destroyed.

4.1 Previous surveys

Where a previous survey (of cropmarks or earthworks) has resulted in the production of a plan it is necessary to assess the sources used and the quality of the resultant plan. Such surveys should, where possible, be incorporated into the mapping (subject to copyright) and updated where necessary. Where an existing survey has been done to a higher specification and larger scale, this can be used (subject to copyright) as the basis for a simplified plan appropriate to the project specification. Plans resulting from excavation and geophysical survey of sites visible on aerial photographs should be treated in the same manner as those from field and aerial survey and used to aid mapping and interpretation.

If an existing survey does not reach current standards, the area should be re-mapped from aerial photographs. However, if it has relied on sources unavailable to the surveyor then these should be described in the relevant monument records. Where it is not possible to verify a pre-existing survey, for example, when trees mask the site, it should not normally be mapped, but it should be described in the relevant monument record if the information is not already in the HER/WARDEN.

4.2 Cropmarks, parchmarks, soilmarks

All sub-surface archaeological remains are mapped and recorded when visible as cropmarks, parchmarks or soilmarks.

4.3 Earthworks

Map and record all archaeological earthworks visible on aerial photographs. This includes features visible as earthworks on early photographs, which have been levelled, and archaeological features marked on the OS maps that are within the project sphere of interest.

4.4 Buildings and Structures

Map and record all foundations of buildings visible as cropmarks, soilmarks, parchmarks, earthworks or ruined stonework. Standing roofed or unroofed buildings are usually more appropriately recorded by other methods, so will not normally be mapped. The exceptions are in specific archaeological contexts (e.g. industrial and military complexes and country houses), or when associated with other cropmark and earthwork features. If buildings have been demolished since the photography, then it may be appropriate to map them, in order to make an association explicit. Alternatively, they may be recorded solely in the monument record.

Map and record other structures (designed originally without a roof) not depicted on the OS base, particularly 20th century military structures. Structures depicted by the Ordnance Survey (e.g. sheepfolds and shooting butts) can be mapped if considered to be of archaeological significance to the project. (See below for more detail, section 9.10 20th century military features).

Other stone, concrete, metal and timber structures that are of archaeological relevance (eg fish traps, timber circles) should be mapped.

4.5 20th Century Military Features

The standard includes First and Second World War remains and Cold War features visible on aerial photographs or lidar. Mapping of military sites should aim to be a "snapshot" of the main features of the site at a relevant date such as the latest development of the site eg 1945. Military structures to be mapped include outlines of extensive features such as airfield perimeter and runways, camp perimeters as well as buildings and earthwork structures, and all ephemeral features such as barbed wire, lines of tank cubes, etc.

4.6 Industrial Features and Extraction

The aim should be to provide a survey of the extent and character of industrial remains in so far as this can be seen on aerial photographs. The scope for industrial recording is immense and data already exists within national databases, local specialist recording groups and literature. **Assess this at the**

project design stage to formulate a strategy for the level of detail to be mapped and recorded. Features usually mapped include buildings (roofed or unroofed), structures, spoil heaps and transport features associated with industrial processes. The strategy for mapping and recording of widespread and common small-scale extraction of resources for immediately local use (eg chalk pits, marl pits, and minor or modern stone quarries, gravel extraction, peat working) should be discussed with project partners and described in the project design.

4.7 Parkland, Landscape Parks, Gardens and Country Houses

If appropriate map and/or record former country houses if demolished within the date range of the available aerial photographs. Make or amend a monument record if the house is adequately depicted by the OS. Map all relict garden features. In some cases it may be appropriate to depict and record features normally outside the scope such as tree avenues. Map and record all vestigial earlier features preserved within parkland and gardens (eg prehistoric features or medieval deer parks). Treat significant parks and gardens in an urban context (originally or since engulfed) in the same manner.

4.8 Transport

Major transport features (i.e. disused canals and main railways) were included in the Ordnance Survey Archaeology Division sphere of interest, appear on various editions of OS maps, and were subsequently recorded; they should not be mapped unless considered to be archaeologically significant in the context of the project. Smaller features (e.g. local tramways), which were outside the Ordnance Survey sphere of interest, should normally be mapped and recorded, especially in the context of associated features.

4.9 Coastal Archaeology

In coastal areas, recording will identify features within the intertidal zone and depict them using appropriate conventions. Where features, such as wrecks, move about, map the latest position and explain the movement in the monument record, with key sources and record whether covered over with mud or sand on the latest source. For Rapid Coastal Zone Assessment Survey projects recording may be limited to the seaward side of a line 100m above mean high water rather than the usual full OS 1 km square.

4.10 Urban areas

In areas built up in the twentieth century, historic aerial photographs (most are from the 1940s onwards) will record archaeological features and aspects of the landscape not recorded on historic maps. Map all archaeological features visible on aerial photographs and lidar irrespective of whether they are built over. Project stakeholders should be consulted to agree a strategy for recording features or changes to urban areas that are not already recorded on historic maps. This may not involve mapping but could include sourcing illustrations that record landscape change relevant to the historic environment in a project area, for use in the report.

4.11 Natural features

Exclude all geological or geomorphological features. If there is risk of confusion archaeological remains, then the natural features should be explained in the monument record. In exceptional circumstances natural features may need to be mapped to fully understand the archaeology but this must be agreed at project design stage to ensure it is appropriate use of project resources. A discussion of common 'confusing' features should be included in the project report.

5 Photo Rectification and lidar visualisation

The distortions inherent in aerial photographs mean that to produce accurate plans of the archaeology, it is necessary to transform proportionally (rectify) and geo-reference each aerial photograph to a suitable map base before tracing off the archaeological features. Computer rectification should be used. Note that some computer packages only offer "rubber sheeting" which stretches rather than rectifies the image and this must not be used.

> • Specialist rectification software approved by Historic England (AERIAL 5.36) must be used.
>
> • Control must be derived from either OS 1:2,500 scale MasterMap (or equivalent) or orthophotos supplied through the APGB agreement.
>
> • Use a digital terrain model (DTM) to employ a 3D geometric transformation which takes account of the variations in surface height and is therefore more accurate.

The most commonly used software in the UK is AERIAL developed by John Haigh and the University of Bradford. This is now freely available - for further information please contact Aerial Survey team, Historic England. remotesensing@historicengland.org.uk

Staff should be experienced in the use of specialist programmes and best practice must be followed. Further advice can be obtained from Historic England if required.

5.1 Use of Rectified Images

Choose the best aerial photographs that include control information and the most archaeological information. Several sources may be required.

5.2 Use of Google Earth Images and other georeferenced data

 If suitable, lidar and APGB orhthophotographs should be used for mapping ahead of Google Earth and rectified aerial photographs as they do not require rectification and the spatial accuracy is better. This only applies if they are the best source for viewing the archaeological feature.

5.3 Control points

Control points are distinct locations that you can see on both the map and the aerial photograph (e.g. junctions of field boundaries). They are necessary for both manual and digital transcription techniques.

Control points need to be:

- Well placed: Evenly spread to surround all of the archaeology as only the area within the control points is accurately rectified. Also avoid placing control points in alignments as this reduces the variables available. Ideally use at least 6 or 7 control points. Be aware that use of numerous control points can increase the average error and therefore affect overall accuracy.

- Actually visible: only use control points you can actually see on both the photograph and the map. E.g., for buildings make sure you can see the foot of the wall, not just the roof (using roofs will add a height displacement).

- Preferably using "hard" detail. Try to avoid "soft" control points; be aware that hedges and other boundaries can be over a metre wide in the field, but are mapped down their centre as a single line. If you have to use streams and hedges use an intersection at their centre to reduce the overall error. Some maps have standardised road widths; again, use the intersection (e.g. of a field boundary) with the centre line of the road.

Understand the quality and limitations of the base-map you are using. The accuracy of your mapping will be within the range of accuracy of the base map that you used for control, no matter how accurate a fit you get to the map. You should aim for an accuracy of 2m or less at each control point.

5.4 Lidar visualisations

Lidar data should be acquired in a format suitable for visualisation – this will usually be environment agency .asc format from the Data.gov.uk. Suitable software (Relief Visualization Toolbox) should be used to create visualisations. Multiple visualisations should be used.

Contact the Historic England Aerial Survey team for advice.

The Relief Visualization Toolbox is free software developed by Institute of Anthropological and Spatial Studies at the Research Centre of the Slovenian Academy of Sciences and Arts funded by Slovenian Research Agency ArchaeoLandscapes Europe project funded by European Commission's Culture programme. http://iaps.zrc-sazu.si/en/rvt#v. RVT plugins are available for QGIS, Python and ArcGIS Pro.

6   Mapping Guidelines

6.1 Outputs

There are three spatial data outputs required from AI&M projects, they are:
AI&M_Lines (as shapefile)
AI&M_Polygons (as shapefile)
Monument_Polygons (as shapefile)

6.2 Polygonisation and Layers

Almost all archaeological remains must be mapped as polygons (or closed polygons for those working in AutoCAD). Single line depiction should only be used for features which are depicted as a symbol; this is limited to ridge and furrow alignment and slopes for those using the t-hachure symbol.

Each component of an archaeological feature is mapped according to its form eg bank or ditch (known as 'layers'). Non-standard layers should not be supplied to Historic England. The layer names need to be exactly as outlined below (eg using capital letters and underscores) to ensure consistent symbolisation across AI&M projects.

There are five Layers for Polygons:
BANK
DITCH
EXTENT_OF_FEATURE
RIDGE_AND_FURROW_AREA
STRUCTURE

There are two Layers for polylines:
RIDGE_AND_FURROW_ALIGNMENT
SCARP_SLOPE_EDGE

In GIS users Monument polygons are created as a separate shapefile/feature class.

The table below provides clarity on when to use each layer:

LAYER NAME	TYPE	DESCRIPTION
BANK	POLYGON	Use to outline banks, platforms, mounds and spoil heaps.
DITCH	POLYGON	Use to outline cut features such as ditches, ponds, pits or hollow ways.

EXTENT_OF_FEATURE	POLYGON	Use to depict the extent of large area features such as airfields, military camps, or major extraction/deposition.
RIDGE_AND_FURROW_AREA	POLYGON	Use to outline a block of ridge and furrow.
STRUCTURE	POLYGON	Use to outline structures including stone, concrete, metal and timber constructions e.g. buildings, Nissen huts, tents, radio masts, camouflaged airfields, wrecks, fish traps, etc.
SCARP_SLOPE_EDGE	LINE	This layer is for the T-hachure symbol only. The top of the "T" indicates the top of slope and the body indicates the length and direction of the slope. Use to depict scarps, edges of platforms and other large earthworks. The T-hachure can only be created in AutoCAD. We are exploring other options.
RIDGE_AND_FURROW_ALIGNMENT	LINE	Line depicting the direction of the rigs in a block of ridge and furrow. **The line should not have arrowheads depicted**; these can be automatically created for illustration purposes in GIS/Adobe Illustrator if required.

6.3 *Attribute Data*

GIS Attribute data is required for each feature mapped. This allows interrogation of the spatial data at the reporting stage, but more importantly allows the mapping data to function independently of textual monument records increasing flexibility of the outputs for AI&M data users within the Aerial Archaeology Mapping Explorer app.

The field names need to be copied exactly as laid out below.

Attribute data is required to feature level, not monument level.

Every attribute field needs to be populated except where that data does not exist eg there may not be both a HE_UID and a HER_UID in this case leave a NULL value.

The FISH heritage standards must be maintained for attribute data. The vocabularies can be downloaded here http://www.heritage-standards.org.uk/fish-vocabularies/. Use only preferred terms. Picklists can be created in ArcMap to

avoid errors, Historic England Aerial Investigation and Mapping team can advise.

Pick the most likely interpretation and any uncertainty can be explained in the monument record. Avoid using UNCERTAIN and multiple indexed monument periods and types as this makes it difficult to query the data for AI&M users. For AI&M_lines and AI&M_polygons the minimum attribute data or object data requirements are as follows:

Field Name	Type	Description	Sample data
LAYER*	Text (50)	The form of the archaeological feature (AI&M Layer Name)	BANK
PERIOD	Text (254)	Date of feature (Periods List). Single or dual indexed terms.	MEDIEVAL or MEDIEVAL/POST MEDIEVAL
NARROWTYPE (please note lack of underscore, otherwise the field name is too long in GIS)	Text (254)	Monument Type (from Monument Types Thesaurus). Specific monument type for individual features. Avoid dual indexing.	TOFT
BROAD_TYPE	Text (254)	Monument Type (from Monument Types Thesaurus). Broader monument type to enable grouping of individual features. This field may not be useful in all cases, if not simply repeat the narrow type field. Avoid dual indexing.	SETTLEMENT
EVIDENCE_1	Text (254)	Form of remains (Evidence Thesaurus) as seen on SOURCE_1	EARTHWORK
SOURCE_1	Text (254)	Source feature was mapped from aerial photograph or lidar (HEA Photo References, some examples are provided below)	HISTORIC ENGLAND ARCHIVE OS/67307 V 0065 20-AUG-1967
EVIDENCE_2	Text (254)	Latest form of remains (Evidence Thesaurus) as seen on SOURCE_2. If EVIDENCE_1 is CROPMARK, simply repeat	LEVELLED EARTHWORK

		CROPMARK (unless now quarried away then this would be DESTROYED MONUMENT).	
SOURCE_2	Text (254)	Latest available source aerial photograph or lidar (HEA Photo References) to give indication of current state of preservation. Not applicable for cropmark sites. Some professional discretion may be required if an earthwork shows well on lidar, but is not visible on slightly later orthophotography.	LIDAR English Heritage Trust DSM 03 & 14-MAR-2016
HE_UID**	Long Integer	National Record of the Historic Environment (NRHE) Unique Identifier (UID) for those monuments recorded in the NRHE or concorded with existing NRHE records.	23092
HER_NO**	Text (254)	HER number for those monuments recorded in the HER or concorded with existing HER records.	10928 or HER5683

*Layer is an attribute for GIS users. For AutoCAD users this remains as a layer, but must be exported as an attribute to the final shapefiles.
**Multiple HER number fields or HE_UID fields may be required for concordance purposes eg HER_NO_1, HER_NO_2 or HE_UID_1, HE_UID_2. These will be agreed before project commences. A prefref field may also be needed to allow links to Heritage Gateway to be created (check Heritage Gateway to confirm which ID the HER uses). Please discuss with Aerial Survey team.
For MONUMENT_POLYGONS the attribute or object data is as follows:

HE_UID**	Long Integer	NRHE Unique Identifier (UID) for those monuments recorded in the NRHE or concorded with existing NRHE records.	23092
HER_NO**	Text (254)	HER number for those monuments recorded in the HER or concorded with existing HER records.	10928 or HER5683

**Multiple HER number fields or HE_UID fields may be required for concordance purposes eg HER_NO_1, HER_NO_2 or HE_UID_1, HE_UID_2. These will be agreed before project

commences. A prefref field may also be needed to allow links to Heritage Gateway to be created (check Heritage Gateway to confirm which ID the HER uses). Please discuss with Aerial Survey team.

7 Monument Recording Standards

The guidelines refer to specific requirements for monument recording. Therefore, these guidelines should be used with the Historic England Research Record (WARDEN) Monument Recording Guidelines, or relevant HER/SMR monument recording guidelines.

Standards for HER/SMR can be found at
https://www.algao.org.uk/

7.1 Unit of record

The archaeological nature of the site determines the unit of record. Use different monument records to describe distinct sites of clearly different periods. Use a single record to describe an archaeological site, such as a cropmark complex, where overlapping phases cannot be clearly dated. Use a single monument record to describe a site comprising dispersed, but clearly grouped, elements, such as a medieval settlement. Do not use single monument records for very dispersed (more than 200m apart) features– these should be recorded individually unless they form part of a coherent archaeological complex. A monument record should describe the full extent of the monument; do not use separate monuments for administrative convenience according to OS grid square or modern field boundary.

7.2 Core fields

7.2.1 Location data

A single grid reference for the centre of the site is the minimum required for monument recording. In cases where the elements of the sites are dispersed try to give a grid reference which corresponds with part of the site i.e. try to avoid giving grid references which fall in a blank area, even though this may be the centre of the site. This may be unavoidable but should be explained in the text. A polygon depicting the extent of the site/monument (or multiple polygons for a dispersed monument) must be created in GIS.

7.2.2 Indexing (period, monument type, evidence)

A record of the date/phase, monument type and evidence is mandatory. It must reflect the chronology and interpretation expressed in the summary text. It is intended to aid retrieval and should not be considered as a statement of fact. Multiple phases should be used where appropriate.

Use indexing that aids retrieval; in the case of most sites, this will often just be the "broad term". Narrower terms should be used appropriately and according to the time constraints of a project. For example a medieval settlement, or other sites comprising several elements, should be indexed according to its

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broad term and narrower terms for the main components described in the summary text. However, the indexing should not include an exhaustive list of all components unless project time, and searching requirements, permits.

Use the latest evidence term for the monument, as seen on the latest available aerial photographs or lidar. Therefore this will usually be "CROPMARK", "EARTHWORK", or, "LEVELLED EARTHWORK". "DESTROYED MONUMENT" is only used when all sub surface features are known to have been removed e.g. quarried away. The monument description should include a summary of changes, such as whether a feature was seen as an earthwork and then ploughed level.

Try to avoid general period types, such as "Prehistoric and Roman" and "Early Medieval or Later". Monuments should be multiple-indexed with the appropriate periods.

Military sites should be indexed using the appropriate terms for the main elements of the site. Use the appropriate Evidence Term according to guidelines e.g. "EXTANT STRUCTURE", "DEMOLISHED STRUCTURE", or "RUINED STRUCTURE", "EXTANT BUILDING", "DEMOLISHED BUILDING", "RUINED BUILDING", and "LEVELLED EARTHWORK".

7.2.3 Text/description

Text should be clear and concise, using full sentences in grammatically correct non-technical English. Abbreviations, acronyms or "?" should not be used. The text should be suitable for heritage professionals, other professional groups and the general public. Use terms such as "listed" or "scheduled" carefully, to avoid confusion with the designated descriptions which have legal status.

In the Historic England monument database, there are two text fields, Summary and Long text. Projects using HER or stand-alone project databases must use a similar system.

The Summary text comprises a brief description of the site as currently and previously interpreted. Ensure that the summary covers all aspects of the monument, not just those relevant to the air photo evidence. This must contain in the first sentence: Period, type, evidence, source e.g. A Bronze Age round barrow was recorded as cropmarks on Historic England 2018 oblique aerial photographs. To ensure our projects are sign-posted include a reference e.g 'The site was mapped from aerial sources during the Historic England xyz project'. Where possible and relevant include dimensions.

The Long Text comprises an incremental record of each addition to the record. The long text can provide more detailed location information where necessary. You should repeat the summary description and add additional detail. For example, grid references may clarify the relationships and locations of the main elements in the site. Use the long text to explain any discrepancies or developments in the interpretation/location of the site

compared to previous text. Allocate a number, or numbers, to each relevant piece of text, corresponding to the list in the Sources/References section of the database.

7.2.4 **Sources/references**

Sources must list the key aerial photographs that best illustrate the site, always list both frames of a stereo pair including the archive e.g. 12345_001-005 21-JUL-2018 Historic England Archive. Sources will usually (but not always) include the rectified photographs used for mapping. Any other sources mentioned in the text, must be listed e.g. any map sources, including date and scale (if known), bibliographic sources, other unpublished surveys, excavations etc. Sources numbers must correspond to those referred to in the long text. Air photo sources must be in standard format, see below for details.

7.2.5 **Cross References to other Datasets**

Enter the relevant HER number (or the WARDEN number for those using HER systems). Add other numbering schemes/identifiers e.g. Scheduled number (SAM/RSM etc), Roman Road number. Add OASIS number.

7.2.6 **Related Warden Monuments**

References to other monument records that are mentioned in the long text in the WARDEN database.

7.2.7 **Associated Organisation and People**

This is mandatory data in the WARDEN database. It comprises the name, role (Air Photo Interpreter (API)), the date of the creation of the record, and the location.

7.2.8 **Event Recording**

The Archaeology Data Service (ADS) OASIS V system of event recording should be used. Each monument should cross-reference the relevant event record, the Event number is added under cross references to other datasets. The project report should be added to the OASIS record on the completion of the project.

7.3 AP Source Formats

For information on references in reports, posters etc see copyright guidelines below. Record sources as consistently as possible in anticipation of any future links between datasets (e.g. Airphotonet), and where these sources are available to the public on Heritage Gateway.

All projects must use the formats listed below when recording AP sources in the Historic England Archive, HER or project database. Each source must have a number which links to the relevant piece of text in the long text/description.

7.3.1 WARDEN Monument source types commonly used for aerial investigation

406 Vertical aerial photographs
409 Oblique aerial photographs
410 Light detection and ranging (lidar) airborne survey
427 Ordnance Survey map (enter scale/date in comments field)
416 Personal communication (name/date in comments)
431 API comment (enter name/date/project in comments field)
435 website
422 External reference (usually for bibliographic sources)

7.3.2 Examples of references for aerial photographs

The source organisation should be included in any aerial photograph reference
Examples include
Historic England Archive (followed by photograph reference)
Staffordshire County Council (followed by photograph reference)

The following shows how the reference is compiled from a number of columns within the Historic England Archive loan list, as set out by the Historic England Archive. Guidance on how to compile the references from the loan list (using excel formulas) can be sought from the Historic England Aerial Survey team. Once compiled these can be included as a picklist within ArcMap.

Vertical examples
The reference includes sortie number, camera position, frame number and date flown.
Historic England Archive ADA/099 V 108 22-JUL-1982
Historic England Archive MAL/71170 V 106 13-NOV-1971
Historic England Archive OS/74041 V 41 22-APR-1974
Historic England Archive RAF/541/23 RS 4176 16-MAY-1948

Oblique reference examples
For those taken by Historic England (or precursors) the reference includes source code, film number, frame number and date flown.
Historic England Archive NMR 12033/46 19-NOV-1990 (non-digital example)

Historic England Archive NMR 28985_003 22-FEB-2018 (born-digital example – the frame number must always be expressed as three digits, and underscores used to enable searching of the digital archive)

Military Oblique examples
The reference includes source code, original number, frame number and date flown.
Historic England Archive RAF 30162/PSFO-0013 01-MAR-1963

For those oblique photographs not taken by Historic England (or precursors) but held in Historic England Archive
The reference includes source code, film number, frame number, date flown (and original number where applicable).
Historic England Archive TMG 4559/55 15-JUL-1988
Historic England Archive CAP 7938/42 07-APR-1949 (XYZ123)
Historic England Archive AFL 60009/EPW000041 JAN-1920
Historic England Archive CCC 5208/06729 1930s (no exact date known in this example)

There are also photo reference formats for aerial photographs supplied by CUCAP
CUCAP BW13 23-JUL-1982
CUCAP RC8HP 076 30-MAY-1985

There are no standard formats for aerial photographs supplied by HERs or SMRs so an appropriate format is agreed by the project team. The reference typically includes information to identify the source organisation and allow them to identify the image for supply to an enquirer.

Lidar reference examples
LIDAR Cambridge Unit for Landscape Modelling DTM 06-APR-2006
LIDAR Cambridge Unit for Landscape Modelling LAST RETURN 01-APR-2006
LIDAR Environment Agency LAST RETURN 01-JUN-2007

Orthophotography reference examples
Next Perspectives APGB Imagery 01-JUN-2006
EARTH.GOOGLE.COM 31-DEC-2001 ACCESSED 20-APR-2009

8 Quality Assurance

8.1 QA background

Historic England Aerial Survey team provide general advice and perform MoRPHE compliant Quality Assurance on mapping and recording. **The QA process must be specified and timetabled in the project design.** The following sets out the requirements.

The precise areas to be looked at will be decided during the project and depend on how much each team member completes and the nature of the archaeological remains visible on aerial photographs.

For MoRPHE QA, the areas must be completed i.e. all mapping and recording finalised *and* checked. Any ongoing issues can be discussed informally with the Historic England Aerial Investigation and Mapping team.

8.2 QA, set up

8.2.1 Set out procedures for the format and timetable for QA in the Project Design depending on the experience of each team member.

8.2.2 For experienced teams, up to 5% of the total project area will usually be quality assured, distributed across the project area. This can be selected by the team member and it could include an area with particular questions about interpretation or process. A greater proportion should be considered for new or less experienced team members.

8.2.3 During the project delivery phase, decide on a precise area for QA in conversation with the project team. This will include a good range of archaeology/landscape completed by each team member. It may also include an area where there is an issue, for example with interpretation or depiction.

8.3 Quality Assurance Check List

8.3.1 **Checklist**

Project team to supply (for QA area only):

All aerial photographs, lidar etc *
- Rectified photographs
- DTM data used in rectifications
- All WARDEN/HER monument records as spatial data
- All new or amended monument records (as pdf)
- AI&M spatial data
- AI&M_Lines (as shapefile)
- AI&M_Polygons (as shapefile)
- Monument_Polygons (as shapefile)

NB Ensure that the QA area is delivered as three shapefiles. For the final mapping product the whole project area should be in the three shapefiles described above, not split by quarter sheet or block.
*If remote working data can be zipped and transferred by WeTransfer or equivalent.

Historic England's Aerial Survey team will use this data to:

8.3.2 Assessment of survey technique:

- Assess if sources have been used appropriately and efficiently eg all sources are being used and all archaeology has been identified.
- Check interpretation of mapped features is correct.
- Check that dpi and image manipulation (such as levels and contrast) are appropriate.
- Check that the number of rectifications is appropriate, ie not rectifying excessive numbers of photographs or not rectifying enough.

8.3.3 Assessment of rectification:

- Check a sample of rectified aerial photographs:
- Errors should be 2m or less.
- Check number of control points. At least five, but not too many.
- Check source of control is appropriate: OS MasterMap or equivalent 1:2,500 scale or better or APGB.
- Check that placing of control is accurate.
- Check use of DTM.
- Check accuracy of rectified aerial photographs against source used for control (OS map or APGB).
- Check that outputs are at an appropriate resolution.

8.3.4 Assessment of AI&M spatial data
General

- View all spatial data in DeskGIS using the Recce_rec template* or equivalent historic environment GIS. This should include OS background and other secondary sources, including historic OS maps and heritage data sets.
- Check accuracy of depiction (i.e. accurate transcription) and appropriate level of detail e.g. too much/too little polygonisation, number of nodes used (too many, too few).
- Check strategy for edge checking – have the mappers avoided duplicating or missing of features?

8.3.5 Drawing standards

- Check that the extent of each archaeological feature is mapped as seen. This means that almost all archaeological remains will be mapped as polygons. Single line depiction should only be used for features which are depicted as a symbol; this is limited to ridge and furrow alignment and slopes for those using the t-hachure symbol.
- Ensure that every archaeological monument is fully enclosed by a monument polygon, using multiple polygons for dispersed features (see also AI&M guidance on defining a monument).
- Check that the extent of each archaeological feature is mapped according to its form eg bank or ditch (known as 'layers'). Non-standard layers should be converted to standard AI&M conventions before submission to Historic England. The layer names need to be exactly as

outlined below (eg using capital letters and underscores) to ensure consistent symbolisation across AI&M projects.
- Ensure that lines or polygons are on the correct shapefile eg a ridge and furrow outline on the line shapefile.
- Ensure that each monument has a monument polygon. Monument polygons are created as a separate shapefile/feature class.

8.3.6 Attribute Data

Check that GIS Attribute is completed for each feature mapped. Ensure that:
- The field names are correct
- Attribute data is to feature level, not monument level.
- Every attribute field needs to be populated except where that data does not exist eg there may not be both a HE_UID and a HER_UID in this case leave a NULL value.
- The FISH heritage standards must be maintained for attribute data. The vocabularies can be downloaded here http://www.heritage-standards.org.uk/fish-vocabularies/. No use of non-standard terms, question marks, abbreviations etc.
- The most likely interpretation is given for monument type and period. Any uncertainty can be explained/discussed in the monument record. Avoid wherever possible use of UNCERTAIN and multiple indexed monument periods and types as this makes it difficult to query the data for AI&M users.
- For multiple indexed features only a '/' should be used between thesaurus terms for example MEDIEVAL/POST MEDIEVAL or ROUND BARROW/WINDMILL MOUND.
- Attributes are capitalised.
- Attributes are correct for each feature or monument

8.3.7 Assessment of monument recording against database recording guidelines:

General
- Check all monument records for the area and ensure that all monuments are complete.
- Check that interpretations match the attributes in the mapping.

Unit of record

Check that monument have been recorded appropriately:
- A monument record should describe the full extent of the monument, not separated by quarter sheet or modern field boundary.
- Where possible monuments dating to separate periods should be recorded separately eg a post medieval quarry on the same site as a medieval settlement would require two records.
- A single record can be created for complex cropmark sites where overlapping phases cannot be clearly dated.
- A single record can be used for dispersed, but grouped elements, for example those features comprising a medieval settlement.

Location Data
Monument polygons must be used if this is an option. Manual entry of grid references is discouraged.

Indexing
Period, monument type and evidence are mandatory and must match the types mentioned in the summary text and attribute data.

Ensure use of standard vocabulary http://www.heritage-standards.org.uk/fish-vocabularies/.

Latest evidence should be recorded.

Summary Text
This should be a short summary of all the evidence for the site.

Use full sentences, avoid abbreviations and acronyms.

The first sentence should read as follows:
A [date] [monument type] is visible as an [evidence term as seen on aerial source, evidence 1 in attributes] on [source}. The feature is/has been [latest evidence, evidence 2 in attributes] on the latest [year] [source, source 2 in attributes]. Where the main source of the monument record is not an aerial source this sentence should be adapted to reflect that.

Sources
Sources must list the key aerial photographs that best illustrate the site, always list both frames of a stereo pair.
Use standard photo references

8.3.8 **Feedback:**
The quality assurance officer will:
- Arrange a meeting to provide feedback (face-to-face or virtual).
- Provide written feedback with mandatory changes and general suggestions.
- Provide notation on shapefiles if useful/appropriate.
- Consider opportunities for coaching if necessary.

9 Guidelines on copyright and acknowledgements

9.1 Acknowledgements generally

Photographs, base maps (including contour data) and air photo mapping must be referenced correctly in PowerPoint presentations, reports, publications and web material. Copyright permission and referencing information must be sought for anything sourced from the Historic England Archive, CUCAP, SMR/HERs or other third parties. Remember that the Historic England Archive, and HERs etc, do not always hold the copyright for an image in their collection so *you must double check permissions with the Historic England Archive, HER or relevant organisation.*

For publications, the Historic England Archive, and other relevant organisations, must be approached to agree likely numbers of images and resultant costs etc. The Historic England Archive need a good notice period to pull any verticals or military obliques – it would be preferable if any requests for cover searches are as specific as possible when ordering verticals e.g. specific prints, or when you want to look at areas, keep them small and, where possible, detail specific year(s) of photography required.

When images are identified for publication, scans must be ordered from the Historic England Archive, – these are done from the negative (when available) and are much better quality. This takes about 3 weeks subject to demand and the number of images ordered.

9.2 Ordnance Survey mapping

NB: please see further below for information on APGB Contour data

Ensure you have permission to reproduce OS mapping at the scale you need, either as an Historic England contractor carrying out core Historic England business or from your employer.

The standard acknowledgement for users of Historic England supplied OS data, which must be used on any map images:
© Crown Copyright and database right 20XX. All rights reserved. Ordnance Survey Licence number 100019088. (Where 20XX is the year the document is published)

9.3 Historic OS mapping

Acknowledgement should include the date and original scale of mapping. Historic England supplied historic OS data must include the following copyright statement:

© and database right Crown Copyright and Landmark Information Group Ltd (All rights reserved 20XX) Licence numbers 000394 and TP0024. (Where 20XX is the year the document is published)

9.4 Mapping

To maintain the national dataset, all mapping is Historic England copyright but may be licensed for use subject to terms and conditions.

Copyright on projects funded through the NHPCP normally rests with the commissioned organisation or Historic England. These may be licensed for use subject to terms and conditions.

Mapping must be credited with copyright information and acknowledge Historic England. Where the illustration includes a base map include words to the effect **"The base map is…"** to distinguish the base mapping from the archaeological mapping which are subject to different copyright.

9.5 CUCAP

You must *always* ask permission for use of *any* CUCAP images irrespective of where they are held. Refer to the Cambridge Collection as *Cambridge University Collection of Aerial Photography (CUCAP).* Acknowledge CUCAP in the project report for the use air photographs during the project.

9.6 English Heritage/Historic England Archive Aerial Photographs

You *must* check copyright of *all* photographs supplied by the English Heritage/Historic England Archive. Do not assume the archive holds the copyright because you received the photo in the loan. Photographs must be referenced in a standard way (see below) with the relevant copyright credit unless a different format is specified by a third party copyright holder or the Historic England Archive. Where rights are not managed by Historic England, written permission must always be sought from the copyright holder before an image is used or reproduced in any way. The copyright holder will specify how they would like the image to be credited.

9.6.1 Examples of credit lines for oblique photographs:

If taken by RCHME before 1st April 1999 ©Crown copyright. Historic England Archive
Crown Copyright has a 50 year duration

If taken by English Heritage or Historic England from 1st April 1999 or later ©Historic England Archive

9.6.2 Examples of oblique photograph references:

56789/10 12th August 1998 © Crown copyright. Historic England Archive

12345/6 23-AUG-2001 ©Historic England Archive

9.6.3 Examples of common vertical photograph references:

This includes sortie, camera position, frame(s) and date + copyright.

RAF/106G/UK/1944 V 0086 14-MAY-1946 + credit line

RAF/58/3021 F21 0174 22-JUN-1952 + credit line

MAL/67083 V 222 10-SEP-1967 + credit line

OS/71080 V 012 14-APR-1971 + credit line

For other types of verticals, see the Historic England Archive loan lists for the correct format.

9.6.4 Examples of credit lines for vertical photographs:

USAAF   Historic England Archive (USAAF Photography)

RAF (>50yrs old)   Historic England Archive (RAF Photography)

*MoD   © Crown copyright. MoD

**MAL © Reserved *or © copyright holder or* © Crown copyright

OS (>50yrs old)   Historic England (OS Photography)

*OS (<50yrs old)   © Crown copyright. Ordnance Survey

*Reproduction rights may be required each time, i.e. per publication
** Always check with Archive Services, as there are many copyright holders and possible restrictions on this collection.

For other types of verticals see the Historic England Archive loan lists for the correct format.

9.7 References for lidar tiles:

9.7.1 Environment Agency jpeg tiles:

For single original tiles use:

LIDAR SU0854 Environment Agency D0048684 01-JUN-2007.

For composites use:

LIDAR SU0854 Environment Agency DSM 01-JUN-2007 where the date is the date for the latest main tile used in the composite.

The copyright statement must be included in reports, publications or © Environment Agency copyright 200X. All rights reserved

For tiles where the interactive data has been used:

LIDAR SU2666 Cambridge Unit for Landscape Modelling DTM 06-APR-2006

LIDAR ST5252 Cambridge Unit for Landscape Modelling LAST RETURN 01-APR-2006

LIDAR SD3872 Environment Agency DSM 01-JUN-2007

For a new image created from interactive lidar data owned by a third party:

It is important to record both the copyright and the source. In most cases the copyright will belong to Historic England because the processing of the data counts as "added value", but in others the image itself may have been processed by a third party. If required, contact Simon Crutchley for advice.

E.g.   © Historic England; source Cambridge Unit for Landscape Modelling or © Peter Crow – Forest Research; source Cambridge Unit for Landscape Modelling

N.B. This relates to the creation of images from interactive lidar data **not** the manipulation of lidar jpeg tiles.

If you use the Relief Visualization Toolbox please acknowledge this in the report with the following:
Kokalj, Ž., Zakšek, K., Oštir, K. 2011. Application of Sky-View Factor for the Visualization of Historic Landscape Features in Lidar-Derived Relief Models. Antiquity 85, 327: 263-273.

Zakšek, K., Oštir, K., Kokalj, Ž. 2011. Sky-View Factor as a Relief Visualization Technique. Remote Sensing 3: 398-415.

9.8 APGB air photos, contour data etc

Digital aerial photographs and height data are supplied to Historic England through an agreement called Aerial Photography for Great Britain. This is managed by a consortium called Next Perspectives made up of three companies – Airbus Defence and Space (formerly Astrium / Infoterra), Bluesky International and Getmapping. The data sometimes comes from different sources but our contact is directly with Next Perspectives and it isn't obvious which of the three is supplying what. Getmapping are the lead partner in the consortium and they manage the agreement on behalf of the others.

Contractors working on partnership projects can use the data subject to contract.

The Historic England contracts with data suppliers are subject to change so if you need more information ask Matthew Oakey.

9.8.1 General acknowledgement:

"Images supplied to Historic England through the APGB agreement by Next Perspectives".

9.8.2 Example of reference for APGB aerial photograph

SU1455 01-JUN-2006 + copyright

NB: A slightly different reference is used for monument records – see monument recording guidelines on sources for monument records.

9.8.3 Copyright acknowledgements:

"RGB Aerial Photography – ©Bluesky International/Getmapping PLC."

"Height Data – ©Bluesky International/Getmapping PLC."

"Height and RGB Aerial Photography – ©Bluesky International/Getmapping PLC."

10 Contact details

Suggestions for amendments or corrections are welcomed. For this, and information on any aspect of this document, please contact:

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