

Work Digital / Think Archive

A guide to managing digital data generated
from archaeological investigations

Prepared by DigVentures for the Archaeological Archives Forum,
on behalf of Historic England

Work Digital / Think Archive

A guide to managing digital data generated from archaeological investigations

Supported by:

Archaeological Archives Forum

Historic England

Chartered Institute for Archaeologists

© Historic England, Chartered Institute for Archaeologists and DigVentures 2019

This document has been prepared by DigVentures, on behalf of Archaeological Archives Forum and in partnership with the Chartered Institute for Archaeologists. The project was funded by Historic England.

HE Project: 7796 Creating a sectoral standard and guidance for managing digital data generated from archaeological investigations

DigVentures is a Registered Organisation with the Chartered Institute for Archaeologists, dedicated to designing and delivering publicly focussed archaeology projects. We are constituted as a Social Enterprise, reflecting the wider social, economic and environmental benefits of the projects we deliver.

Document author:

Manda Forster MClfA PhD, DigVentures

Additional contributions from:

Jen Parker Wooding ACIfA, ClfA

Chris Casswell MClfA, DigVentures

Project Partner Logos

Archaeological Archives Forum



Historic England



Chartered Institute for Archaeologists



DigVentures



Purpose

This document has been prepared as a guidance document developed for the Archaeological Archives Forum, delivered as part of the Historic England Funded project: *7796 Creating a sectoral standard and guidance for managing digital data*. It is intended to be used in conjunction with tools and documentation that will be made available via the ClfA website.

The document was prepared by DigVentures, in partnership with the Chartered Institute for Archaeologists. DigVentures is a Registered Organisation of the Chartered Institute for Archaeologists. DigVentures accepts no responsibility or liability for any use that is made of this document other than by the project sponsors and executive, for the purposes for which it was originally commissioned and prepared.

Acknowledgements

Thanks to Historic England for commissioning and funding this project, and particularly to Duncan Brown, Dan Miles, Claire Tsang and Hugh Corley for their ongoing support and advice. This project would not have been possible without the commitment, encouragement and support of members of the Archaeological Archives Forum and the ClfA Archaeological Archives Group. Particular thanks are also due to the Project Advisory Board, Dig Digital Beta Group members and all those who have responded to surveys and consultations for providing comments and thoughts about digital archives. Jenni Butterworth provided welcome support and encouragement throughout the project delivery. Samantha Paul, Katie Green, Jen Parker Wooding and Kate Geary have been especially helpful in sharing their time, knowledge and experience as the guidance document and supporting work have been delivered.

Social Value Act

DigVentures is a Registered Organisation with the Chartered Institute for Archaeologists, dedicated to designing and delivering publicly focussed archaeology projects. We are constituted as a Social Enterprise, reflecting the wider social, economic and environmental benefits of the projects we deliver.

Carbon Footprint

A printed copy of the main text in this document will result in a carbon footprint of 99g if 100% post-consumer recycled paper is used and 126g if primary-source paper is used. These figures assume the report is printed in black and white on A4 paper and in duplex. DigVentures is aiming to reduce its per capita carbon emissions.

Work Digital / Think Archive - Key Points

Use FAIR principles when collecting, managing and planning to archive digital data - Findable, Accessible, Interoperable, Reusable

A Data Management Plan (DMP) is required as part of initial project planning and included in key documentation (WSI or PD)

The DMP should be updated at key stages as the project is delivered, such as an assessment stage or review point

Not all digital material needs to be deposited – an active Selection Policy should consider how and why digital data is selected for inclusion in the Archaeological Project Archive

CiFA Standards and guidance require that archaeological material is kept in a stable, ordered and accessible archive. For digital data this means a Trusted Digital Repository

Museums without Core Trust Seal accreditation are not Trusted Digital Repositories and not equipped to store digital data in perpetuity

Good habits for digital data include file naming conventions, consistent folder structures and timely metadata creation

Costs of digital archiving can be estimated at the start of a project using ADS cost calculator – actively managing archives reduces the cost of archiving

How you intend to collect digital data should be articulated in the project DMP, signposting relevant best practice guidelines or standards

Processes which support deposition of digital data can be embedded into project delivery and save time at the end of the project

Digital data management within archaeological projects will be reviewed as part of the CiFA Registered Organisation Scheme

Using best practice guidance and advice for digital archives can save money

Table of contents

SECTION 1	WORK DIGITAL / THINK ARCHIVE	6
	Digital data management in archaeological projects	6
	The Mendoza Review	6
	What is this document?	7
	Glossary	8
SECTION 2	DIGITAL ARCHIVES AND CIFA STANDARDS	8
	What is the standard for digital archives in archaeological projects?	8
	Cifa Standards for archaeological archives	9
	Other relevant Cifa standards	9
	Cifa standards and requirements for digital data	11
	Compliance with Cifa Standards and guidance	12
SECTION 3	DEFINING AND MANAGING THE DIGITAL ARCHIVE	13
	What is the digital archive?	13
	Managing digital data from generation to archive	14
	Selection and de-selection of digital materials	15
SECTION 4	DEPOSITING THE DIGITAL ARCHIVE	18
	Why digital archives need to be deposited with a Trusted Digital Data Repository	18
	Why does digital archiving cost money?	19
	Preservation and accessibility	20
SECTION 5	THE ARCHAEOLOGICAL PROCESS AND DIGITAL DATA MANAGEMENT	20
	The archaeological process	20
	Personnel and roles	21
	Project stages and activities	21
	Project tasks	22
SECTION 6	DATA MANAGEMENT PLANS	24
	Digital Data Management planning	24
	How ready are you? Self-assessment and implementation	25
	Dig Digital Data Management Plan: checklist and guidance	26
SECTION 7	BIBLIOGRAPHY	27
	Appendix 1 Glossary	28
	Appendix 2 Best practice data standards	30
	Appendix 3 Are you ready? Work Digital / Think Archive Self Assessment tool	32
	Appendix 4 Digital archive example - from collection to deposition	34
	Appendix 5 Data Management Plan and checklist	42

SECTION 1 WORK DIGITAL / THINK ARCHIVE

The process of excavation is destructive, and no archaeological interpretations are sustainable unless they can be backed up with the evidence of field record and post excavation analysis. Such records and analysis should be available for re-examination and re-interpretation (Hedley Swain, Foreword to Brown 2011)

Memory, like history, is rooted in archives. Without archives, memory falters, knowledge of accomplishments fades, pride in a shared past dissipates. Archives counter these losses. Archives contain the evidence of what went before (Schwartz and Cook 2002, 18).

Digital data management in archaeological projects

The archaeological archive is something which has been regularly discussed and debated, often from the perspective of being problematic, time-consuming, expensive and difficult to manage. The access and use of all aspects of the archaeological archive – their value and public interest – is also a vital part of solving some of those issues (Merriman and Swain 1999). Archaeologists instinctively see the value of retaining archives, as summarised succinctly in the quote above from Hedley Swain, that the practice of excavation is destructive and that records should be accessible to all. What is more difficult is how archaeologists can help underpin why these archives should be seen as valuable assets – and kept in perpetuity – to counter those losses and provide evidence of what went before. In 2017, *the Seeing The Light of Day Project* provided a series of recommendations to help develop sustainable solutions to the management, accessibility and long-term preservation of archaeological archives in the South West - <https://seeingthelightofday.wordpress.com/>. The first of those is that the archaeological sector must champion the value of archaeological archives.

The challenge to archaeologists and archive managers to promote value is intrinsically linked to how we value the archives we create and how we manage them during the life of a project and beyond. Our commitment to the long-term value of an archive is demonstrated through how that material is collected, stored and managed – and the standards which are met in each of those areas (eg Brown 2011). Discussion of the professional expectation of archaeological archives management are well rehearsed, with ClfA Standards and Guidance well established in the UK (ClfA 2014, Brown 2011) and a widely adopted framework for Europe (Perrin et al 2014). Those standards and how they relate to digital data are discussed below, following a breakdown of what is meant when we talk about digital archives. The practical steps that you and your organisation can take to map the digital data journey is explained and supporting tools and information are included in appendices.

The Mendoza Review

The Mendoza Review, published in 2017, involved a comprehensive review of museums in England. It was undertaken to gain a deeper understanding of the sector, the issues it faces and how it can be best supported by government (Mendoza 2017). One of the recommendations made was for Historic England to work with key stakeholders and produce a plan to support the long-term sustainability of the archaeological archives generated by developer-funded excavations (*ibid.* Recc. 27, p16). In response, Historic England set up an advisory panel involved key organisations / relevant project teams: Arts Council England, ALGAO, The British Museum, ClfA, FAME, HS2 project lead, Historic England, Receiver of

Wreck, Society of Museum Archaeology and Seeing the Light of Day project lead. A series of advisory recommendations were made as a result, all supporting a flexible and sustainable approach to the creation, compilation, transfer and curation of archaeological archives deriving from the planning process (HE 2018). Importantly, the action plan was endorsed by the then Minister for Arts, Heritage and Tourism, Michael Ellis - <https://bit.ly/2wn0FSN>. Of particular relevance to this project is Recommendation 6:

DCMS should welcome and endorse guidance from key archaeological organisations that, as soon as practicable, relieves museums of the expectation that they should attempt to curate digital archive material from archaeological projects, in favour of their deposition in a Trusted Digital Repository that will guarantee the preservation and accessibility of digital material, such as the Archaeological Data Service. (HE 2018)

What is this document?

This document – Work Digital / Think Archive – has been designed to help support the above recommendation and is therefore directly linked to the findings of Mendoza Review. Other projects are also key to supporting those findings; the sixth recommendation of the *Seeing the Light of Day* project was to enable preservation and access to digital archives. Historic England and ClfA's *21st-century challenges for archaeology* included archaeological archives as a key area for discussion. Data curation formed a central part of online discussions and digital archives were seen as problematic and a source of confusion, as well as a potential solution to making archives more accessible (see Wills 2018). More recently, the ALGAO project *Planning for Archives: opportunities and omissions* (HE project 7756) identified key concerns over the management of digital data and revealed very low numbers of digital archives being deposited with an appropriate body (ALGAO 2018). This project should also be seen as a follow on to the ClfA Archaeological Archives Group *Selection Toolkit for Archaeological Archives*, which requires a Data Management Plan to be included in any pre-project documentation: <http://cifa.heritech.net/selection-toolkit>

The *Work Digital/ Think Archive* guidance is one of the outputs of a HE funded project (7796) that has been developed and delivered by DigVentures and ClfA under the auspices of the Archaeological Archives Forum. The aim has been to provide guidance for those working with digital archives in archaeology every day, linked to ClfA Standards and guidance and in consultation with practitioners. It has been put together to help archaeologists manage digital data, including both born digital and digitised information, throughout the project and to create a complete, ordered and stable archaeological archive. It defines how ClfA Standards relate to digital materials throughout a project, including clarification of what should be expected at each project stage, where you can find details about best practice and technical standards, and practical advice in how to achieve those standards.

This guidance can be seen within the wider context of digital data management in research projects, ensuring that the standards of archaeological research undertaken across all sectors is in line with current practice and expectations. Academic research funding bodies, such as Arts and Humanities Research Council, require the projects they support to include articulated plans for data management. FAIR Guiding Principles for data management and stewardship (Wilkinson et al 2016) provide a useful definition of what good data management is: Findable, Accessible, Interoperable and Reusable (FAIR) – see www.go-fair.org/fair-principles/. The essence of these foundational principles are easily mapped on to our professional imperative as archaeologists: to create a stable, ordered and accessible archive.

Work Digital / Think Archive includes step-by-step guidance alongside explanation of how digital data management fits into archaeological project delivery. The guidance signposts where you can find relevant and detailed technical guidance and includes practical tips on digital data management. A central tool in the management of digital data archives throughout archaeological projects is the Data Management Plan (DMP). The DMP can be tailored to any project and organisation to explain how data management is planned and structured. It should be completed at the project's initiation phase and forms the central focus of the *Work Digital / Think Archive* guidance, which includes a DMP checklist with embedded guidance (Appendix 5), and advice about how good practice for digital data management can be embedded into every day practice.

Glossary

To help be as clear as possible, a glossary has been included which includes terms considered specific to archaeological projects, or which may carry a specific meaning in the context of an archaeological project (see Appendix 1 Glossary). For a comprehensive glossary of all things digital data related, the Digital Preservation Coalition has a glossary of acronyms, initials and words which you might come across and need to look up: <https://dpconline.org/handbook/glossary>

SECTION 2 DIGITAL ARCHIVES AND ClfA STANDARDS

What is the standard for digital archives in archaeological projects?

The following section describes the link between ClfA Standards and digital archives, explaining how they affect the way we collect, manage and archive digital data. The *Work Digital / Think Archive* guidance provides both some background to why those standards exist and what they mean for everyday practice. Whilst there is not one single ClfA Standard which focuses specifically on digital archives, the following principles highlight the overarching expectation:

- Digital data created as part of an archaeological project is an intrinsic part of the archaeological archive and must be managed to the same standard as all parts of the Working Project Archive.
- Project planning documentation, such as WSIs and Project Designs, must include a Data Management Plan (DMP).
- The content of the DMP should be consistent with *Work Digital / Think Archive* guidance and example provided, outlining how data will be collected, managed, selected and transferred for long-term preservation.
- The receiving repository for digital archives must be a Trusted Digital Repository, accredited by Core Trust Seal.
- The Trusted Digital Repository should be notified early in the project planning process and identified in the DMP.

- The DMP will be updated by the Project Team throughout the project, highlighting any changes in agreement with Project stakeholders.

CifA Standards for archaeological archives

This guidance document is underpinned by *CifA Standards and Guidance*. The most relevant professional standard for archaeological data archives is the *Standard for the creation, compilation, transfer and deposition of archaeological archives* (2014). This provides a benchmark for the professional archaeological community for all aspects of the archaeological archive. The digital archive should be managed as part of the overall archaeological project archive, and not treated as an entirely separate entity. The CifA Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives (2014) is that:

All archaeological projects that include the recovery or generation of data and/archaeological materials (finds) will result in a stable, ordered, accessible archive. All archaeologists are responsible for ensuring that the archive is created and compiled to recognised standards, using consistent methods, and is not subject to unnecessary risk of damage or loss. It is the responsibility of all I [repository managers / museum curators] of archaeological archives to ensure that archives are stored to recognised standards for long-term preservation and made accessible for consultation.

The Archaeological Archives Forum produced a best practice guidance document for the creation, compilation, transfer and curation of archaeological archives (Brown 2011) which provides comprehensive guidelines relating to each identified stage of an archaeological project. The AAF guide is also linked to the framework of existing standards and techniques, which explain how archaeological archives can be properly prepared and delivered to meet those standards. In addition, a European standard supported by the European Commission, aims to make archaeological archives throughout Europe sustainable and accessible, outlining Standards and providing relevant guidance (ARCHES). This document should be used in conjunction with other available guidance on archaeological archives, expanding on how those standards are relevant to digital data to ensure the digital element of an archive is properly prepared and delivered.

Other relevant CifA standards

The archaeological archiving process begins at the start of any archaeological project, and in addition to the Archives Standard, relevant material can also be found in standards relating to archaeological advice, consultancy and project delivery. Some key examples are included here (but this is not a comprehensive list):

- Standard and guidance for archaeological advice by historic environment services (CifA 2014)

Advisors should seek to ensure that the archives of archaeological investigations are deposited in a suitable repository (Para 1.60).

Prior to the start of investigations, advisors should require that those responsible for carrying out the investigations establish contact with suitable repositories willing to

accept archaeological archives, or alternatively identify appropriate temporary storage (Para 1.61).

Advisors should ensure that the specification for the work makes provision for the deposition of archive material and for the transfer of title, except where title rests with the Crown, in accordance with ClfA and agreed national standards and guidance and using appropriate local and specialist advice (Para 1.62).

- Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment (ClfA 2014)

Those providing advice to the commissioners of archaeological services and/or procuring archaeological services must: ensure that those initiating, sponsoring or commissioning archaeological fieldwork understand their responsibility for resourcing the processing and analysis of the data and finds, appropriate scientific analysis, synthesis, and dissemination of the results, long-term conservation, security of and access to the archive (Para 4.1c, p8)

- Standard and guidance for archaeological excavation (ClfA 2014)

The WSI should make suitable provision for archive deposition and include an appropriate retention and disposal policy for digital, photographic and paper archival materials, as well as artefacts and ecofacts (Para 3.2.15).

Digital records created as part of the project should comply with specified data standards. Digital information, paper and photographic records must be stored in a secure and appropriate environment, and be regularly copied or backed up, and copies stored in a separate location (Para 3.3.7).

In updating the project design, archaeologists should be aware of future research and/or resource management needs, together with requirements for the effective short- and long-term curation of the project archive (including retention/disposal considerations) (Para 3.6.2).

The requirements for archive preparation and deposition must be addressed at the outset of the project (Para 3.10.1).

The proposed recipient museum or other repository must be contacted at the project planning stage, and arrangements for deposition of the project archive should be detailed in the WSI and/or project design (Para 3.10.2).

The archive, including all retained artefacts and ecofacts, must be treated and packaged in accordance with the requirements of the recipient museum/repository and national guidelines (Para 3.10.3, p16).

As with all ClfA standards and guidance, the requirements articulated do not tend to be prescriptive about the methods used in achieving benchmarks. The intention is to identify what the overarching expectation is, rather than create a standard method of undertaking archaeological research. This can have the unintended side effect of creating a confusing environment to work within, with benchmarks being open to interpretation or ambiguous. As

archaeology methods change and update, sometimes the original language of a requirement can be left behind. The table below maps examples of specific requirements taken from ClfA Standards and guidance which inform how digital data should be managed in the archaeological process.

ClfA standards and requirements for digital data

Table 1 Key requirements from ClfA Standards (2014) and how they relate to digital archives

Requirement	Standard and guidance for...	Action for digital data
<p><i>Project specifications, research designs or similar documents should state that one outcome of the project is to compile a stable, ordered, accessible archive (para 3.3.1)</i></p> <p><i>Project specifications, research designs or similar documents should identify the repository where the archive will be deposited for long-term curation (para 3.3.2)</i></p>	the creation, compilation, transfer and deposition of archaeological archives	<ul style="list-style-type: none"> ✓ The Project Team should ensure that data generated throughout the project life is managed effectively and results in a stable, ordered, accessible archive ✓ The Project Team should ensure that an appropriate repository for both the physical and digital archive has been identified during the pre-project planning stages ✓ Create a Data Management Plan during project initiation stages
<p><i>Digital material should be fully documented and created according to recognised standards and guidelines as made available by the Archaeology Data Service (para 3.4.5)</i></p> <p><i>The digital archive should conform to recognised standards and guidelines on how data should be structured, preserved and accessed (para 3.4.6)</i></p> <p><i>Security copies of all digital material should be created and managed as appropriate (para 3.4.7)</i></p> <p><i>Digital archive material should be deposited with a trusted digital repository, where data migration and backup procedures are in place, and the integrity of the digital archive is maintained (para 3.5.5)</i></p>	the creation, compilation, transfer and deposition of archaeological archives	<ul style="list-style-type: none"> ✓ The Project Team should use specified collection methods aligned to best practice guidance where relevant, such as ADS Guides to Good Practice, HE Best practice guides, and FAIR principles – see Appendix 2 for examples ✓ Ensure that data collected is stored appropriately and a secure back up copy is kept ✓ Update and maintain a Data Management Plan during project delivery stages ✓ Ensure that the intended repository for digital data is a trusted digital repository
<p><i>The proposed recipient museum or other repository must be contacted at the project planning stage, and arrangements for deposition of the project archive should be detailed in the WSI and/or project design (para 3.10.2)</i></p>	archaeological excavation	<ul style="list-style-type: none"> ✓ The Project Team should ensure that an appropriate repository for the physical and digital archive has been contacted during the pre-project planning stages ✓ For digital archives, ensure the repository is a trusted digital repository ✓ Details of archive repositories for both physical and digital archives should be identified in the pre-project planning documentation

Requirement	Standard and guidance for...	Action for digital data
<i>Advisors [Planning archaeologist / Project Executive] should seek to ensure that the archives of archaeological investigations are deposited in a suitable repository (para 1.60)</i>	archaeological advice by historic environment services	<ul style="list-style-type: none"> ✓ The Planning Archaeologist and/or Project Executive should ensure that pre-project planning documentation identifies the repository for the digital archive ✓ The archive repository for digital data should be a trusted digital repository and have the appropriate level of accreditation and be recognised by Core Trust Seal or equivalent.
<i>Advisors [Planning archaeologist / Project Executive] should seek to ensure that the specification for the work makes provision for the deposition of archive material (para 1.6.2)</i>	archaeological advice by historic environment services	<ul style="list-style-type: none"> ✓ The Planning Archaeologist or Project Executive should ensure that pre-project planning documentation articulates appropriate provision for physical and digital archives to be deposited
<i>Ensure that those initiating, sponsoring or commissioning archaeological fieldwork understand their responsibility for resourcing the processing and analysis of the data and finds, appropriate scientific analysis, synthesis, and dissemination of the results, long-term conservation, security of and access to the archive (para 4.1c)</i>	Commissioning work or providing consultancy advice on archaeology and the historic environment	<ul style="list-style-type: none"> ✓ Archaeological consultants should ensure that clients, stakeholders and / or commissioners understand the value of archaeological archives, and the need to secure the long-term preservation and access of both physical and digital archives ✓ It must be clear that long-term access to digital data can only be assured through deposition with a trusted digital repository which is recognised by Core Trust Seal or equivalent
<p><i>It is the responsibility of all curators [repository managers / museum curators] of archaeological archives to ensure that archives are stored to recognised standards for long-term preservation and made accessible for consultation (Standard, p3)</i></p> <p><i>Archive repositories are responsible for ensuring the continuing stability and accessibility of archives in their care (para 3.7.2)</i></p>	Archaeological archives	<ul style="list-style-type: none"> ✓ The archive repository for digital data should be able to demonstrate they are a trusted digital repository recognised by Core Trust Seal or equivalent ✓ Where repositories would like to retain a copy of digital archives for their own access, this should be seen as in addition to storage at a trusted digital repository. ✓ The Project Team should ensure that information as to the location of the digital data archive is signposted in the appropriate location (such as OASIS).

Compliance with ClfA Standards and guidance

The ClfA Standards and guidance documents are not fixed documents and will be updated from time to time. This document seeks to highlight how current Standards relate to digital data management, and what that means for the collection, storage, selection and archiving of the digital elements of archaeological archives. The guidance supports the implementation of best practice archives management and recognises that this is a step-by-step process. As such, individuals and organisations are not expected to demonstrate full adherence to the best practice outlined here straight away. Ideally, a process of change will be initiated which will enable the necessary workplace adjustments to take place. This process is expected to take place over a period of time and can be guided using a self-assessment tool (see Appendix 3)

to identify steps that need to be taken in order for individuals and organisations to be fully compliant. The self-assessment tool can also help demonstrate clear strategic recognition that digital preservation is vital and part of the organisation's remit, and that there is work and commitment towards implementing digital preservation.

The following chapters discuss what materials digital archives include (Chapter 3) and a breakdown of the archaeological process which identifies the roles and responsibilities of various people within a project (Chapter 4). Much of the detail around data management and the requirements of ClfA Standards can be addressed at the outset of an archaeological project. The final chapter in this document (Chapter 5) introduces the Data Management Plan (DMP); a very practical and usable document which should help everyone involved in a project meet the requirements outlined in the table below.

SECTION 3 DEFINING AND MANAGING THE DIGITAL ARCHIVE

What is the digital archive?

The archaeological archive constitutes the knowledge base essential to facilitate reanalysis and reinterpretation in the light of new data, research questions, techniques and technology in the future. Archaeological excavation destroys primary evidence during investigation; the retention of the archive maximises social benefit, with the information gained from the process preserved for future interrogation. Retained archives must be created, managed and cared for in such a way that facilitates this, ensuring they continue to be easily accessible, legible and comprehensible for future generations (Perrin et al. 2014, 6). How the digital archive is created, managed and selected from should form part of the decision-making processes which define other aspects of the complete archaeological archive. A recent project undertaken by the ClfA Archaeological Archives Group has provided a practical toolkit to support decision making around selection for long-term preservation to aid the creation of sustainable archives (ClfA 2019).

- The Working Project Archive is defined as:

The records and materials gathered during an archaeological project and retained for analysis prior to Selection for the Archaeological Archive (Selection Toolkit for Archaeological Archives 2019).

- The Preserved Archaeological Archive includes:

All records and materials recovered during an archaeological project and identified for long-term preservation, including artefacts, ecofacts and other environmental remains, waste products, scientific samples and also written and visual documentation in paper, film and digital form (ARCHES, Perrin et al. 2014, 20).

The use of digital technology is well established within archaeology, with digital data comprising both born digital and digitised records being central to most current projects. The degree to which digital techniques are embedded within any one project ranges from the types of apparatus used (such as cameras, survey equipment), the way we record

archaeological sites and objects (including born digital recording systems and photogrammetry), how we analyse and question data (GIS, databases), and how we disseminate and communicate (from PDFs to virtual reality).

- Digital archive products include:

The digital archive consists entirely of digital data; example file types are CAD files, databases, digital aerial photograph interpretations, excavation archives, geophysical and other survey data, GIS files, images, satellite imagery, spreadsheets, text files and 3D data. (Brown 2011, 14).

The digital archaeological archive constitutes a knowledge base which will be essential in any revisiting of the conclusions and interpretations in the light of new data collected by future archaeologists. (Perrin et al, 2014, p6)

Managing digital data from generation to archive

Whilst the standards which underpin archaeological archive management are the same for all aspects of an archive, each project will require a tailored approach to the practical implementation of those standards. Digital material is no exception. The way that we acquire, modify, manage and then select digital elements for inclusion in an archive will be affected by a range of factors that can change from project to project. Processes which determine how digital data is handled throughout the life of the project will be linked to these factors. For example:

- The type and significance of the archaeology recorded, and the nature of the project (*A well preserved archaeological site under full excavation and reporting may be dealt with differently to a watching brief with negative results*)
- The requirement and expectation of the client, funding organisation, intended repository and/or other stakeholders (*Elements of an archive might be managed differently due to a specific requirement put in place during project planning stages*)
- The intrinsic value of the digital data as part of the site archive (*Duplicate files or drafts of reports might be useful to keep as part of the working project archive, but need not be retained in perpetuity as part of the preserved archaeological archive*)

These project specific factors will determine how digital material is selected for long-term preservation but should not affect how the digital components of the archive are acquired, managed and documented as the project is delivered. In order to get to grips with your digital archive as the project progresses there are some key processes which can be embedded into organisational procedures. The most fundamental are listed below, highlighting how each contributes to the management of digital data throughout project delivery. Further guidance can also be found within the Data Management Plan and checklist (Appendix 5).

- **OASIS** – setting up a record at the beginning of the project ensures it is indexed. The redevelopment of OASIS through the HERALD project adds a further advantage in project tracking throughout delivery and into archive: <https://oasis.ac.uk/pages/wiki/HERALD>.
- **Understanding deposition requirements** – as with physical archives and museum requirements, you should contact the digital repository early on to discuss archive deposition requirements.

- **Project folder structure** – having a consistent structure to project folders stored on the organisational server means that the project team are able to locate files easily.
- **File naming conventions** – including version control, means that everyone can be clear what file they need and which is the most recent version. An organisational file naming policy can be applied consistently and use a format which will meet repository requirements.
- **Metadata documentation** – following the same general principle as other aspects of the archaeological archive, such as finds registers and photograph lists (or indexes), metadata tables simply provide a register and field level definition of the data collected. This level of documentation should not be left to the end of the project and can be embedded as part of the project delivery work procedures.
- **Review of data acquisition standards** – you need to identify which data standards are being used to collect digital materials within the Data Management Plan. Undertaking an organisational review of data standards may sound excessive but might save time when developing project specific DMPs.
- **Review of GDPR and project files** – checking your digital data policy and ensuring that all levels of reporting are consistent will help identify any potential issues, such as specialist contact details included in archived reports with permission. The DMP includes sections where you can include any ethical information and sensitive data
- **Review of archive selection procedures** – use ClfA’s 2019 *Selection Toolkit for Archaeological Archives* to prompt a review of all archive selection procedures and provide updated procedures.
- **Review of roles and responsibilities** – make sure that individual team members understand their role within digital data processes. For example, if your policy is for the Project Supervisor to sort images, apply file naming conventions and create metadata, make sure they know how, what and when.
- **Awareness of FAIR Guiding Principles** – published in 2016, the FAIR guiding principles set out an ambition for all research project data, that it should be Findable, Accessible, Interoperable and Reusable (FAIR).
- **Data Management Plan template** – whilst each DMP should be project specific, the example provided as part of the *Work Digital / Think Archive* guidance can be tailored to your organisation, with any regular or common information included.
- **Digital Data Policy or Organisational Manual** – all of the above can be wrapped up to form a policy or manual which is specific to your organisation and tailored to both the structure and culture of your business.

Selection and de-selection of digital materials

As with other aspects of an archaeological archive, it is unlikely that every digital file generated during the life of a project should be retained in full as part of the preserved Archaeological Archive. A selection process should be undertaken which is agreed in advance of deposition by all stakeholders (eg project team, advisory team and intended repository). ClfA’s *Selection Toolkit for Archaeological Archives 2019* provides comprehensive advice regarding the development of a project-specific Selection Strategy. Completion and update of a Data Management Plan throughout project delivery will support the Selection Strategy, and both

documents will be included with the pre-project documentation (eg the Project Design and/or WSI). The Selection Toolkit is available on ClfA's website and can be found here:

<http://cifa.heritech.net/selection-toolkit>

Throughout project delivery, particular stages will provide review points where updates to the Selection Strategy and DMP can be made. These will ideally be linked to key stages that provide an opportunity for review, specialist input and evaluation, such as Project Design, Post Excavation Assessment, Updated Project Design, Project Reporting. The Selection Strategy and DMP can be updated as the project progresses. Reasons for selection of particular digital components will vary from project to project and should take into consideration the project aims and significance of the results, the research potential and contribution to research frameworks, and ability to provide greater access to heritage information. Some archaeological projects, such as a Watching Brief or small-scale Evaluation, are unlikely to produce a large digital data archive for deposition. In such cases, a technical archaeological report attached to the OASIS record with a selection of images may suffice, as long as this has been agreed with stakeholders as part of the Selection Strategy and DMP process.

A useful way to frame your selection strategy is to consider a couple of key ethical questions about future accessibility and re-use: what data needs to be included in order that future researchers can reexamine and reinterpret the site? How do these data need to be archived in order to facilitate that process? The responses to wider ethical questions concerned with preserving the archaeological site and providing access to research data will help inform your selection strategy, as well as contribute to practical decisions around file formats and documentation. Below are a few examples of how different elements of the digital Working Project Archive might be considered for inclusion in the Preserved Archive. Links to information about relevant data standards for acquisition and archive can be found in Appendix 2.

- **Supporting documentation:** Fully contextualise the data by embedding an explanation of the methodologies, recording standards, abbreviations, codes or notations used to create the archive, in order to ensure users are able to understand the archive. This might include recording manuals, methodologies, references to standard processes used in creating data, and will always require the inclusion of metadata tables.
- **Reports:** Whilst the PDF/a format is an excellent vehicle for dissemination and does have long term archival properties, the combined report – with text, illustrations, tables and data all wrapped up into a single document – is less accessible. This acts as a barrier to reusability, making re-use and re-interpretation difficult. Including the 'raw materials' of what makes up the final version of a technical report means project data remains accessible. This might include;
 - text in a preservation format,
 - the final version of illustrations, images or tables (in csv format – comma separated values),
 - the original and complete version of appropriate appendices,
 - the complete pdf version saved as PDF/a – preserving the structure of the report.
- **Specialist reports and data:** The digital archive should include the full specialist report, original specialist analysis and data. To avoid data sharing and copyright issues, discuss archive policy with the specialist team, especially any individuals working outside of your organisation. All team members, including external specialists or project partners should

be aware that this data will be deposited and made available as part of the Archaeological Archive. This might include;

- the final version of the text file relating to specialist reports (see above)
 - any spreadsheets or databases that contain specialist data from any stage of work, including assessment and analysis
 - some databases may be separated into constituent tables and presented as csv files, the metadata should include documentation of how the database was structured
 - images provided by a project specialist which would aid reinterpretation in the future should be included in the archive
 - additional documents or data, such as radiocarbon dating certificates or the results of scientific analysis
- **Images:** Photographs within the working project archive are commonly duplicated and should be subject to a comprehensive selection which supports a full visual record of high quality images, removing repeated, irrelevant or sub-standard files.
 - **Digitised records:** Where data was originally created in analog form (such as paper context sheets or permatrace plans) and will be deposited with the documentary / physical archive, you may not need to include digitised (scanned) versions of those records in the digital archive. The digital archive does not need to duplicate material which is included in the physical archive, but the DMP should clearly set out how these records will be included in the archive. Including primary analog records as master digital copies may be preferred, although the collecting museum may still wish to retain hardcopy archive material to accompany artefactual elements. It is important to include relevant stakeholders in the decision making process, and record the resulting strategy clearly on the DMP. *NB the need to maintain a security copy of analog and digital records should not be forgotten, and any change in procedure developed with the digital archive in mind should be careful not to disrupt established security practices.*
 - **Born digital site records:** Where records such as plans and context sheets are recorded digitally, the data will form the primary archaeological record and should be deposited. As such, data will need to be presented in a format which maximises sustainability and reuse, and thereby can enable interoperability, such as a csv file, and is in line with deposition guidance.
 - **Survey and geophysics:** Survey data and geophysics will be collected digitally and should be included in a format which maximizes interoperability. Any interpretative reports or analysis produced as separate documents to the collated project reporting, should also be included. Where survey data is collected as a paper record, this should either be digitised or included in the physical archive.
 - **Project GIS:** Will include all spatial data that relates to the project, specifying the coordinate system used. You must ensure that any data included in the GIS (such as images or maps) is not copyright protected and that you are able to share that material.
 - **Laser scans and 3D models:** Depending on the nature of the project, a number of different file types might be associated with laser scans and photogrammetry. At the outset of the project it should be decided which data will be required as part of the archive. For example, scans taken as part of the primary record should certainly be included. Orthoimages created in a supporting role, such as to enhance public engagement, might not be necessary as part of the project record. Where techniques such as photogrammetry

provide the only record, aid interpretation or will benefit re-interpretation, component images might also be considered as necessary elements of the digital archive.

Appendix 4 includes an example of what might be included in the working project archive. This will most likely include data which is both born digital (the data which is produced in digital form) and which has been digitised (including the records which have been converted from paper or other analogue forms). The table provides a fictional example of the different files a project may generate through key stages of its delivery. The project is called P2019001 and the table lists the digital files the project has generated under the project folder it is stored in. Files selected for long-term preservation are underlined and highlighted in blue font, and listed in a separate column.

SECTION 4 DEPOSITING THE DIGITAL ARCHIVE

Why digital archives need to be deposited with a Trusted Digital Data Repository

ClfA Standards and guidance require that archaeological archives 'are stored to recognised standards for long-term preservation and made accessible for consultation' (Archives standard 2014, for discussion of standards see Chapter 3). This is supported within sector guidance ARCHES, principle 4.3.1, which states that all archaeological projects must result in a stable, ordered accessible archive. In addition, the public and open access nature of the archaeological archive produced is also underpinned by National Planning Policy Framework (see Paragraph 199, Footnote 64). In order to support this requirement, all elements of the archive should be made publicly accessible:

A publicly accessible repository is one that is capable of providing physical and intellectual access to stored collections and their associated data to a wide and diverse range of audiences. Society for Museum Archaeologists definition for publicly accessible repositories: <http://socmusarch.org.uk/publically-accessible-repositories/>

When it comes to digital data, that requirement means a data repository able to guarantee long-term preservation and ensure that all data is useable and accessible into the future. The ability to meet that requirement goes beyond the capacity of museum-based repositories – hence Historic England's recommendation to DCMS following the Mendoza review to relieve museums of the expectation that they should attempt to curate digital archive material from archaeological projects, in favour of their deposition in a Trusted Digital Repository (HE 2018). In order to meet the ClfA standard, the digital elements of the project archive must be deposited with a Trusted Digital Repository which has a commitment to long-term preservation and access.

More than a label for some digital archive repositories, a Trusted Digital Repository is an accredited service. Long-term preservation of digital archives requires specialist resources, knowledge, capacity and technical solutions which facilitate the storage, curation and accessibility of data in perpetuity. In order to demonstrate to users that data archive standards are met, the Core Trustworthy Data Repository Requirements were developed by a community of global data organisations including the Data Seal of Approval and World Data System. This recognised and universal data archive standard has provided the basis for certification of repositories: The Core Trust Seal <https://www.coretrustseal.org/>. In order to meet the

standards necessary for certification, the repository has to demonstrate that certain requirements of the Core Trust Seal are implemented. Accreditation involves the comprehensive assessment of sixteen areas of operation, including mission and scope, licences and ethics, to infrastructure, preservation and reuse policy. Similar to ClfA Organisational Registration, the process of accreditation is ongoing and Core Trust Seal approved repositories will be reassessed every three years. You can find out which repositories have been accredited via the website: <https://www.coretrustseal.org>.

Currently, the only UK based repository which has gained this accreditation, and which regularly accepts archaeological archives is the Archaeology Data Service (ADS). This is about the change, with National repositories in both Scotland and Wales both working towards Core Trust Seal accreditation. It is imperative when working in the UK to check the national guidelines of the country you are working in – just as you would for other parts of the archaeological archive. In England, you should follow ClfA standards and guidance, which correspond with the Work Digital / Think Archive guidance, as well as the deposition guidelines of relevant repositories for both digital and physical archives.

In Wales, the national repository for digital archaeological archives is the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) and archives from any work undertaken in Wales should be deposited here. RCAHMW are working towards Core Trust Seal accreditation. Archaeological archives in Wales are governed by The National Standard and Guidance to Best Practice for Collecting and Depositing Archaeological Archives in Wales <http://bit.ly/RCAHMWBestPractice>. This includes an appendix specifically relating to digital archives, produced by RCAHMW <http://bit.ly/RCAHMWDigiArchives>. Any archaeological work undertaken in Wales should comply with these standards and guidance.

In Scotland, Historic Environment Scotland is the principal repository for archive material relating to archaeological projects. It is the repository for the documentary archive including both paper and digital materials from all archaeological projects funded by Historic Scotland, and is the primary repository for those funded by other sources. HES are currently working towards Core Trust Seal accreditation. Guidelines for depositors to HES can be found on Canmore <http://bit.ly/HESdeposition>. These guidelines are intended for all archaeologists, whether preparing an archive from an excavation or survey, a recent project or one from twenty years ago. HES provide some guidance to depositors for common data types and links to additional guidance.

Why does digital archiving cost money?

The cost of deposition of digital data archives is directly linked to the need for repositories to maintain complex processes which support long-term access to and preservation of data in its domain. However, whilst the deposition of a complete data archive can be expensive, if certain steps are introduced at an early stage in the archaeology project, those costs will be known and can be managed effectively as the project progresses. Much of the costs of archiving relate to the preparation of archive materials for deposition with the repository, which might include appraisal and selection, file organisation, file naming, saving files in accessible formats, creation of metadata tables and deposition. In some very practical ways, this resourcing issue that can accumulate at the end of a project may be reduced by embedding some of the processes suggested into everyday practice. By mapping out your Data Management Plan at the start of a project, these practical steps are outlined early on and the Project Team have a clear path in place to follow (see Sections 5 and 6).

Additional costs also relate to the deposition of the archive and are applied by the repository to cover the accession of the archive and contribute to the maintenance of processes and systems supporting Core Trust Seal accreditation. Some file types will cost more than others to deposit and the way archive materials are organised and deposited may impact accession costs. You can find a costing calculator on the ADS website which can be used to estimate of the costs for depositing your digital archive during project planning stages.

- <https://archaeologydataservice.ac.uk/easy/costingCalculator.xhtml>

Preservation and accessibility

In addition to Core Trust Seal level accreditation, it is important to check the preservation agreement and accessibility of archives which the repository supports. The ClfA Standard for archaeological archives requires that information will be: stored to recognised standards for long-term preservation and made accessible for consultation. The ADS are currently the only Core Trust Seal accredited body in the UK which receive archaeological archives. They are committed to the long-term preservation of archives in perpetuity, and to making archives accessible for research and consultation. Additional repositories may offer a similar level of accreditation but not able to support long term preservation and accessibility – it is important to check first with the repository to ensure ClfA expectations are met. You can find a copy of the ADS Data Seal of Approval certificate here:

https://assessment.datasealofapproval.org/assessment_96/seal/html/

SECTION 5 THE ARCHAEOLOGICAL PROCESS AND DIGITAL DATA MANAGEMENT

Good data management is not a goal in itself, but rather is the key conduit leading to knowledge discovery and innovation, and to subsequent data and knowledge integration and reuse by the community after the data publication process. (Wilkinson et al 2016,1).

The archaeological process

The processes relating to digital data management in the archaeological project will be determined by the individual organisation project and outlined within the Data Management Plan. In more general terms, the procedure involved across the delivery of an archaeological project is more predictable, with the same sequence of events and similar personnel being involved. This chapter outlines how archive creation is a fundamental part of every process within the project, highlighting the personnel, activities, and tasks which effect the successful creation of a well-ordered and secure archive. This builds on the archaeological process as outlined in *Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation* (Brown 2011) and provides updated examples relevant to the management of digital data.

Personnel and roles

- **Planning Archaeologist or Project Lead:** Identifies the scope of the project and monitors on behalf of the planning authority and/or project stakeholders. For non development-led projects, this role may be performed by the Project Lead, who oversees the whole enterprise from project design to dissemination.
- **Consultant:** Someone mediating on behalf of the client in a contracted project.
- **Project team:** This may be a commercial archaeological organisation, group of volunteers, specialist surveyors, divers, etc. It may include all or any of the following
 - project manager
 - on-site data-gatherers (eg surveyors, excavators)
 - specialist analysts (eg conservators, finds specialists)
 - illustrators
 - editors
 - organisational archive manager / officer
- **Collections Curators:** The individual that curates Archaeological Archives on behalf of the Collecting Institution. This will include both the local receiving museum (Museum Curator) and a separate Trusted Digital Repository (Digital Repository Curator).

Project stages and activities

An archaeological archive is created, established and managed throughout the life of a project and beyond. As outlined above, one clear aim is to create an archive resource that can be revisited, reinterpreted and republished. In general terms, a project can be separated into three stages and across each stage certain activities can affect the quality, usefulness and longevity of the archive. In terms of digital data, think in terms of FAIR principles – Findable, Accessible, Interoperable, Reusable. Beyond the project itself, we also need to consider curation and reuse of the archive.

Project stages include:

- **Start-up:** Project proposal, brief or specification.
- **Initiation:** Detailed project design or WSI, including Selection Strategy and Data Management Plan.
- **Execution:** Involving
 - data-gathering through the compilation of records (written, drawn, photographic, digital) and the collection of objects and samples.
 - data management, including updating the DMP and creating metadata.
 - assessment of results from data-gathering.
 - analysis and interpretation.
 - report-writing and publication.
 - selection of materials for archive.

- preparation of records, data, objects and samples for archive transfer.
- archive transfer.
- **Curation:** Managing the archive to ensure preservation and access.
- **Reuse:** Once deposited, the archive may be used within a different project.

Specific project activities will be outlined during project design, with project method statements referring to best practice guidance, organisational manuals and professional standards. With regards to digital data, these might include:

- **Project brief** – should stipulate the need to include a Selection Strategy and Data Management Plan in the project design or WSI, and might signpost particular data standards which the project team should follow.
- **Organisational digital data policy / manual** – at an organisational level, a clear policy or manual which articulates how digital data should be collected and managed as part of the archaeological project. This might include reference to data standards, file naming conventions, data security, sharing and storage, or data selection strategies.
- **Technical data standards** – particular techniques or data types benefit from having clear data standards and guidelines to help practitioners ensure high quality data acquisition and management.
- **Museum deposition standard** – museum guidelines for archive deposition will require that digital data is deposited with a Trusted Digital Repository.
- **Digital archive repository standard** – the Trusted Digital Repository will have specific requirements for digital data in archaeological archives which may determine how data is created and managed, and how it is deposited.
- **Professional standards** – a number of ClfA Standards and guidance include requirements which may affect how digital data is acquired and managed. Any project which requires ClfA Standards and guidance to be met, will require the completion of a Data Management Plan at the start of the project.

Project tasks

The list below defines the tasks which relate to the project stages outlined above, highlighting those which are specific to digital data management. Further guidance can be found throughout the Data Management Plan in Appendix 5.

Stage 1: Project start up

- The *Planning Archaeologist* or *Project Lead* produces a project proposal or project brief which will
 - highlight the standards to which the project must adhere, eg ClfA Standards and guidance.
 - requires the inclusion of a Data Management Plan which meets the requirement of ClfA Standards and guidance (outlined above and Appendix 5).

Stage 2: Project Initiation

- The *Project Team* produces a project design or WSI which
 - refers to technical data standards which will be followed, including best practice guidance, organisational manuals and professional standards.
 - includes a completed Data Management Plan, meeting the standard required by ClfA Standards and guidance (outlined in Section 2 and Appendix 5) and providing a clear framework for how data will be managed throughout the archaeological project, from acquisition to archive.
 - notifies the digital repository of the nature of the project, incorporating any deposition requirements and expected costs into the project programme.
 - demonstrates commitment to maintaining the integrity and security of archive material during the course of the project.
- The *Planning Archaeologist* monitors the project design/WSI against the brief and agrees the approach and methods outlined in the project design/brief, and in the Data Management Plan.
- The *Consultant* ensures their client comprehends the project proposal and associated costs, the project design and the requirement to produce a stable, ordered accessible archive which preserves both physical and digital archive components.
- The *Museum Curator* makes available standards for the submission of an archaeological archive. It is recommended that they refer to ClfA Standards and guidance, requiring that digital data which forms part of the archaeological archive is deposited with a Trusted Digital Repository.
- The *Digital Repository Curator* makes available standards for the submission of an archaeological archive to the Trusted Digital Repository. It is recommended that they refer to ClfA Standards and guidance, and require an updated Data Management Plan to be included with the archive.

Stage 3: Project Execution

- The *Planning Archaeologist* monitors the project to ensure that standards are being met and certifies completion.
- The *Project Team* ensures that standards are achieved by
 - maintenance and updates the Data Management Plan in consultation with stakeholders.
 - establishing systems for managing and storing digital files to protect from loss or damage, and to make them accessible throughout the project.
 - establishing systems for creation of digital data using appropriate data standards, and applying consistent file naming conventions as determined by the organisation throughout the project.
 - documenting acquisition, analytical and interpretative activities through appropriate metadata.
 - selecting digital data for long-term preservation by an appropriate archive repository, discussing selection strategies with stakeholders as necessary.

- consulting representatives of the archive repository as necessary.
- The *Project Team* compiles the project archive for transfer by
 - maintaining appropriate file naming conventions.
 - creation of preservation formats.
 - creation of metadata to the standard required by the digital archive repository.
 - creation of documentation which allows future users to understand the data archive.
 - ensuring any requirements relating to data accessibility or copyright are clearly stated in the Data Management Plan.
- The *Consultant* maintains a balance between the requirements of their client and the aims of the project, ensuring that the quality of the archive is not compromised.
- The *Planning Archaeologist* monitors the project as appropriate, ensuring that the condition and security of all archive material is maintained.
- The *Trusted Digital Repository Curator* advises on selection strategies as necessary.
- The *Trusted Digital Repository Curator* receives the archive.
- The archaeological project is completed.

Curation and reuse

- The *Digital Repository Curator* ensures correct standards of storage and care, and makes the archive available for use.
- Members of *Project Teams* accessing archive material for reuse, should ensure that that material is managed to the same standards as any archaeological material.

SECTION 6 DATA MANAGEMENT PLANS

...the cost of implementing late data management and sharing measures can be prohibitively high. Implementing data management measures during the planning and development stages of research will avoid later panic and frustration. Many aspects of data management can be embedded in everyday aspects of research co-ordination and management and in research procedures (UK Data Archive 2011, 6)

Digital Data Management planning

The ease of creating digital records, lack of appropriate documentation and the increased capacity for storage has combined to leave many of us with folders of duplicated images, unlimited versions of the same document and a virtually impenetrable archive of everything relating to every project. Just like its physical counterparts, the digital component of any archaeological project still requires attention prior to being deposited, and the easiest way to manage that is have a plan from the outset and stick with it. This is exactly the role that the Data Management Plan assumes, and in creating a plan at the start of a project, it provides a comprehensive framework for the project team and those working across the archaeological

process. The DMP provides a living document which can be used to aid project and resource planning throughout the project.

During the planning stages of any archaeological project, careful consideration of the complete archive and how it will be managed will save a lot of headaches further down the line. The simplest way to undertake this planning and to document it, is to produce a Data Management Plan at the outset. This document provides the framework for how data will be collected and managed throughout the archaeological project. It also articulates who is responsible for data management at different stages, where the archive will be deposited and what parameters for selection might be used.

If you are not familiar with using Data Management Plans when designing projects, some of the questions it asks may require further consideration with regards to how you / your organisation collects and manages digital data. To help you think about your own pathway to digital implementation, we have included a *Dig Digital Self Assessment Checklist* at the end of this document (see Appendix 3 Are you ready? Work Digital / Think Archive Self Assessment Tool). The checklist should help you identify how your business or organisation (of any shape and size) incorporates digital data into everyday project delivery and management – and identify the areas where some adaptation to process might be beneficial (also see Section 3).

If you do find yourself considering a wider update on processes across the organisation in order to help the management of digital data, it is useful to remember that;

- consistency is really important – introducing processes which are only used on one part of a project or organisation are unlikely to be sustainable.
- you don't have to do it all at once – it might be easier to introduce new processes in bite-sized chunks, testing and embedding new practice across the team to ensure it works.
- think about the project lifecycle (collection, use, selection and deposition) and plan to develop and apply specific, efficient processes at each stage.
- be clear about responsibilities – see if there are ways to embed new processes into existing roles and into each stage of the project.

How ready are you? Self-assessment and implementation

CIfA Standards and guidance are currently being updated to clarify the link between regulatory requirement and digital data and archaeological archives (see Chapter 2 above). The implementation of appropriate digital management strategies will be expected from accredited members and Registered Organisations, and project proposals and briefs are likely to expect Data Management Plans to be included in project designs. Writing a full Data Management Plan is simple enough when certain work processes are already in place, but it can be overwhelming if some aspects have not yet been considered. Individual organisations will be in very different positions when this guidance is introduced, some will already have processes for digital data management fully embedded in project delivery and others maybe just beginning to work out a process to get started. Digital preservation can require time, new skills and, occasionally, additional resources that may take time to assemble.

To help the process, a self-assessment tool has been developed which should help you identify where you are along the path towards full compliance (see Appendix 3). Rather than expecting to implement new strategies and processes overnight, it is important to plan the work required

to fully implement the changes that you have identified which need to be undertaken. The self-assessment tool supports that process by providing a nudge in the right direction – and you may find you have more things in place than you thought. Where there are gaps, these can become tasks – and by determining who will own each task and when they will be completed, your action plan will write itself. By engaging with the process of self-assessment and taking simple steps to change practice where they can be taken, you can take a positive step to manage the risks to digital material.

Dig Digital Data Management Plan: checklist and guidance

The Data Management Plan (DMP) provides an iterative framework for all digital data management. The DMP will perform a key part of project planning for the delivery and long-term preservation of archaeological archives. In order to be fully compliant with *ClfA Standards and guidance*, all archaeological projects should include a DMP to be completed as part of the archaeological project's Written Scheme of Investigation or Project Design, and then maintained throughout project delivery.

The minimum requirement for information to be included in the Data Management Plan (DMP) is as follows:

- the type of project, highlighting relevant information including key identifiers
- relevant people involved in data creation and management
- what data will be created within a project
- which data standards or methods will be used
- how data will be managed and documented through each project stage
- consideration of ethical and legal issues
- how the data will be stored, accessed and backed up during the research
- the process for data selection as part of the archive process
- the intended archive repository, costs of deposition and deposition process
- any restrictions that may need to be applied to data sharing
- define who is responsible for data management

The template and guidance provided in Appendix 5 are based on the Digital Curation Centre checklist (DCC 2014), which can be accessed online: <https://dmponline.dcc.ac.uk>. The template follows the same project planning stages included in the DCC checklist but guidance has been amended to be more specific to archaeological projects and standards. The guide template can be easily adapted to suit organisational processes but should retain the same basic information and functions in order to comply with ClfA Standards and guidance.

The Data Management Plan (DMP) should be completed at the start of each project and reviewed at key stages during project delivery. It should be included as an appendix to key project documentation, such as the WSI or Project Design, the Assessment Report and Updated Project Design, and as part of the final technical report. By treating the plan as a living document, it remains relevant and flexible to any changes which may occur through the project delivery stages.

SECTION 7 BIBLIOGRAPHY

ALGAO 2018 *Planning for Archives: opportunities and omissions*. Accessed March 2019: <https://historicengland.org.uk/images-books/publications/planning-for-archives/>

ARCHES *Archaeological Resources in Cultural Heritage: a European Standard*. Accessed March 2019: <https://archaeologydataservice.ac.uk/arches/Wiki.jsp?page=Main>

Brown, D 2011 *Archaeological Archives: A guide to best practice in creation, compilation, transfer and curation*, Archaeological Archives Forum. Accessed January 2019: http://www.archaeologyuk.org/archives/aaf_archaeological_archives_2011.pdf

CifA 2019 *Selection Toolkit for Archaeological Archives*. Accessed March 2019 <http://cifa.heritech.net/selection-toolkit>

Merriman, N and Swain, H *Archaeological archives: serving the public interest?*, *European Journal of Archaeology*, 2:2, 249-267, Accessed January 2019: <http://dx.doi.org/10.1179/eja.1999.2.2.249>

Perrin, K, Brown, D, Lange, G, Bibby, D, Carlsson, A, Degraeve, A, Kuna, M, Larsson, Y, Pálsdóttir, S U, Stoll-Tucker, B, Dunning, C, Rogalla Von Bieberstein, A, 2014 *A Standard And Guide To Best Practice For Archaeological Archiving In Europe*, EAC Guidelines 1, Accessed January 2019: https://archaeologydataservice.ac.uk/arches/attach/The%20Standard%20and%20Guide%20to%20Best%20Practice%20in%20Archaeological%20Archiving%20in%20Europe/ARCHES_V1_GB.pdf

Schwartz, J and Cook, T 2002 *Archives, Records, and Power: The Making of Modern Memory*, *Archive Scien* 2002, 2, 1 - 19

Wills, J 2018 *21st Century Challenges in Archaeology: project report* Accessed January 2019: <https://www.archaeologists.net/21st-century-challenges-archaeology>

Wilkinson, M D et al, 2016, *The FAIR Guiding Principles for scientific data management and stewardship*, in *Nature / Scientific Data*. Accessed March 2019: <https://www.nature.com/articles/s41597-019-0009-6>

Appendix 1 Glossary

Archaeological Archive (also see Preserved Archaeological Archive)	All records and materials recovered during an archaeological project and identified for long-term preservation , including artefacts, ecofacts and other environmental remains, waste products, scientific samples and also written and visual documentation in paper, film and digital form (Perrin et al. 2014, 20).
Archaeological Project	Any programme of work that involves the collection and/or production of information about an archaeological site, assemblage or object in any environment, including in the field, under water, at a desk or in a laboratory. Examples of an Archaeological Project include: intrusive projects such as excavation, field evaluation, watching brief, surface recovery and the destructive analysis of objects; non-intrusive projects such as landscape or building survey, aerial survey, remote sensing, off-site research such as desk-based assessment and the recording of objects or object assemblages. (Perrin et al. 2014, 20). One result of an Archaeological Project will be an Archaeological Archive.
Born Digital data	Born-digital materials are records that have been natively created in digital format (rather than digitised from paper records).
Collection Level Metadata Summary	A collection level metadata summary provides a useful tool to document the project details and summarise the data included in the archive. This might be required as part of the digital archive deposition process (see link below for ADS) and could also be relevant to documentation processes for the complete Archaeological Project Archive (eg including finds, documents and digital components). https://archaeologydataservice.ac.uk/advice/DatasetlevelMetadata.xhtml#Collection-level%20Metadata%20Requirements
Core Trust Seal	Core Trust Seal level accreditation is the quality stamp of repositories that manage digital archives. See Trusted Digital Repository.
Data Management Plan (DMP)	A Data Management Plan is a document which describes how you are planning to manage the data gathered through the delivery of a project, and what will happen to that data once the project is complete.
De-selected materials	The parts of the Working Project Archive not selected for inclusion in the Preserved Archaeological Archive.
Deposition requirements	Most collecting repositories for archaeological archives, such as Museums, will have a clear set of requirements which archive materials need to meet in order to be deposited. Digital archives are no exception and any Trusted Digital Repository will have a set of guidelines for depositors to follow. The ADS deposition guidelines can be found here: http://bit.ly/ADSguidelines
Dispersal	The process of dealing with De-selected Material, which is straightforward with regards to digital data and should be written into the Selection Strategy and DMP.
FAIR Guiding Principles	A useful definition of what good data management is: Findability, Accessibility, Interoperability and Reusability (FAIR) – see https://www.go-fair.org/fair-principles/ .

Metadata	<p>Metadata is data about a digital resource that is stored in a structured form suitable for machine processing. It serves many purposes in long-term preservation, providing a record of activities that have been performed upon the digital material and a basis on which future decisions on preservation activities can be made in the future, as well as supporting discovery and use. Source: http://bit.ly/DPCmetadata</p> <p>The form of metadata required for archive deposition may be specified by the receiving repository, for example, see ADS guidelines for depositors: http://bit.ly/ADSguidelines</p>
OASIS	<p>An online database and index of archaeological investigations undertaken in the UK, providing details about archaeological projects as they are set up and delivered. OASIS records for archaeological investigations are regularly required to be set up as part of work undertaken within the planning process. The redevelopment of OASIS through the HERALD project adds a further advantage in project tracking throughout delivery and into archive stages. See https://oasis.ac.uk/pages/wiki/HERALD.</p>
Preserved Archaeological Archive	See Archaeological Archive
Selection	<p>The process of applying a Selection Strategy to a Working Project Archive to determine which archive components, including documents, digital files and material objects, should be included in the Preserved Archaeological Archive. The aim of selection is to ensure that the Preserved Archaeological Archive contains everything required to establish the significance of the project and support future research, outreach, engagement, display and learning activities.</p>
Selection Policy	<p>A non-project-specific, generic methodology for Selection. As such, a Selection Policy may inform decisions about De-selected Materials but should not be used to determine a project specific Selection Strategy.</p>
Selection Strategy	<p>The methodology detailing the project-specific Selection process, agreed by all Stakeholders, which will be applied to the Working Project Archive in order to create the Preserved Archaeological Archive. The Data Management Plan is a separate document to the Selection Strategy but should be developed in conjunction with it. Both documents should be included in pre-project documentation (eg Project Design and/or WSI).</p>
Trusted Digital Repository	<p>A Trusted Digital Repository is an accredited service which supports the long-term preservation of digital archives through the provisions of specialist resources, knowledge, capacity and technical solutions which facilitate the storage, curation and accessibility of data in perpetuity. This recognised and universal system of data archive standard has provided the basis for certification of repositories using the Core Trust Seal https://www.coretrustseal.org/.</p>
Working Project Archive	<p>The records and materials gathered during an Archaeological Project and retained for analysis prior to Selection for the Archaeological Archive.</p>

Appendix 2 Best practice data standards

This guidance document provides guidance around the management of digital data, and does not provide a technical standard for the individual elements of a digital archive. For some elements of data management, it is important to provide a summary of the data standards that may be used in the acquisition of data. These might relate to organisational data standards defined within an operational process document and which might be referred to in the Project Design or WSI method statements. Specific data standards might also be required within Project Briefs or Repository deposition guidelines, and it is always advisable to check this during project planning stages.

The table below includes links to documents which define data standards relevant to archaeology, and including information about data collection, storage, documentation and archive. The list is not exhaustive, and some projects might need to work to a specific requirement. The most comprehensive source of information relevant to archaeology can be found in the ADS Guides to Good Practice, and many of the links below signpost specific pages within this document:

- <http://guides.archaeologydataservice.ac.uk/g2gp/Contents>

Data type	Guidance
Documents	ADS Guides to Good Practice: Creating Texts and Documents http://guides.archaeologydataservice.ac.uk/g2gp/TextDocs_2
Digitisation	The National Archives https://nationalarchives.gov.uk/documents/information-management/digitisation-at-the-national-archives.pdf Collections Trust https://collectionstrust.org.uk/digital-isnt-different/digitisation/
Digital images	<i>Digital Image Capture and File Storage: Guidelines for Best Practice 2015</i> https://historicengland.org.uk/images-books/publications/digital-image-capture-and-file-storage/ ADS Guides to Good Practice: Creating raster Images http://guides.archaeologydataservice.ac.uk/g2gp/RasterImg_2
Geophysical survey	ADS Guides to Good Practice: The Life of Geophysical Data http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_2#section-Geophysics_2-2.2DataAcquisition EAC Guidelines for the use of geophysics in archaeology http://old.european-archaeological-council.org/files/eac_guidelines_2_final.pdf
Photogrammetry (close range)	ADS Guides to Good Practice: Typical Steps for a CRP Project http://guides.archaeologydataservice.ac.uk/g2gp/Photogram_2-1 HES Applied Digital Documentation in the Historic Environment, Short Guide 13

Data type	Guidance
	<p data-bbox="395 237 1326 338">https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationid=9b35b799-4221-46fa-80d6-a8a8009d802d</p> <p data-bbox="395 383 1382 521">HE Photogrammetric Applications for Cultural Heritage https://historicengland.org.uk/images-books/publications/photogrammetric-applications-for-cultural-heritage/heag066-photogrammetric-applications-cultural-heritage/</p>
Terrestrial Laser Scanning	<p data-bbox="395 564 1273 629">ADS Guides to Good Practice: Acquiring and Processing Laser Scan Data http://guides.archaeologydataservice.ac.uk/g2gp/LaserScan_2-1</p> <p data-bbox="395 674 1361 813">HES Applied Digital Documentation in the Historic Environment, Short Guide 13 https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationid=9b35b799-4221-46fa-80d6-a8a8009d802d</p> <p data-bbox="395 857 1417 965">HE 3D Laser Scanning for Heritage https://content.historicengland.org.uk/images-books/publications/3d-laser-scanning-heritage/heag155-3d-laser-scanning.pdf/</p>
Airborne Lidar	<p data-bbox="395 1005 1374 1113">HE Using Airborne Lidar in Archaeological Survey https://historicengland.org.uk/images-books/publications/using-airborne-lidar-in-archaeological-survey/</p>
Landscape survey	<p data-bbox="395 1151 1437 1258">HE Understanding the Archaeology of Landscapes https://historicengland.org.uk/images-books/publications/understanding-archaeology-of-landscapes/heag142-understanding-archaeology-of-landscapes/</p>
GIS	<p data-bbox="395 1296 1114 1361">ADS Guides to Good Practice: Creating and Using GIS data http://guides.archaeologydataservice.ac.uk/g2gp/Gis_2-1</p>
CAD	<p data-bbox="395 1408 1161 1473">ADS Guides to Good Practice: Capturing Data for CAD Projects http://guides.archaeologydataservice.ac.uk/g2gp/Cad_2-1</p>

Appendix 3 Are you ready? Work Digital / Think Archive Self Assessment tool

This simple self-assessment checklist is intended to help identify areas of digital data management that need to be considered within an organisation to support implementation of best practice data management. By using the table below to identify areas which are either being achieved or that require a little work, you can develop a simple action plan to help Data Management Plans be fully integrated into the everyday project design and delivery process.

More specific guidance against each of the areas included is included in the Data Management Plan checklist and guidance document in Appendix 4. This checklist serves to provide a quick assessment in order to identify areas which will require some attention.

Work Digital / Think Archive: Self Assessment Checklist

Action plan

	Questions	Yes / No	What?	Who?	When?
1	Do you set up an OASIS record for each project?				
2	Have you recently reviewed relevant data standards and updated organisational methodology?				
3	Do you use a consistent folder structure for the storage of digital project files?				
4	Do you manage version control of files and documents with consistently applied naming conventions?				
5	Do you have quality assurance processes in place for data collection and management?				
6	Do you collect metadata for digital files which meet the standards required by the identified digital repository?				
7	Do you have a process in place for collecting metadata relating to digital files throughout the project?				
8	Do you have a GDPR compliant Privacy Policy which considers the management of digital personal data?				
9	Do you have appropriate data-sharing agreements in place with third parties, processes in place which record any data sharing restrictions for data?				
10	Do you maintain a security copy of your digital data?				
11	Do you normally contact the relevant data repository at the beginning of the project?				
12	Are you familiar with how digital data costs are calculated?				
13	Do you have a process for selection of data for long-term preservation?				
14	Do you have clear roles and responsibilities for project staff with regards to digital data (including areas of ethical / legal compliance) which include project staff (specialists) external to your organisation?				
15	Do you ensure that all data relating to your project is collected and stored in an accessible place as part of the working project archive (eg including external specialist data, or specialist teams within an organisation)?				
16	Are digital processes included in organisational documents, such as an operations manual or data management policy?				

Project stage and relevant functions	/ Project folder	Working project files	Selected and converted for archaeological project archive
	<p data-bbox="344 589 480 651">/Health and Safety</p> <p data-bbox="344 752 480 815">/Useful information</p>	<p data-bbox="572 266 708 293">/ WSI Finals</p> <p data-bbox="572 297 916 324">Final illustrations for document:</p> <p data-bbox="572 329 879 358">P2019001WSIfigure1V2-0.ai</p> <p data-bbox="572 362 879 392">P2019001WSIfigure2V2-0.ai</p> <p data-bbox="572 396 879 425">P2019001WSIfigure3V2-0.ai</p> <p data-bbox="572 459 900 488">P2019001WSIfigure1V2-0.pdf</p> <p data-bbox="572 492 900 521">P2019001WSIfigure2V2-0.pdf</p> <p data-bbox="572 526 900 555">P2019001WSIfigure3V2-0.pdf</p> <p data-bbox="572 589 863 618">P2019001RAMSV1-0.docx</p> <p data-bbox="572 622 863 651">P2019001RAMSV1-1.docx</p> <p data-bbox="572 656 863 685">P2019001RAMSV2-0.docx</p> <p data-bbox="572 689 847 719">P2019001RAMSV2-0.pdf</p> <p data-bbox="572 752 715 781">/ References</p> <p data-bbox="572 815 900 844">1982-Field-Survey-Report.pdf</p> <p data-bbox="572 848 810 878">1991-Geophysics.pdf</p> <p data-bbox="572 882 799 911">1993-Evaluation.pdf</p> <p data-bbox="572 916 842 945">1994-Journal-Article.pdf</p> <p data-bbox="572 949 1011 978">2008-Regional-Research-Framework.pdf</p>	<p data-bbox="1046 360 1514 425">Final illustrations (converted to svg files for greater interoperability):</p> <p data-bbox="1046 430 1374 459">P2019001WSIfigure1V2-0.svg</p> <p data-bbox="1046 463 1374 492">P2019001WSIfigure2V2-0.svg</p> <p data-bbox="1046 497 1374 526">P2019001WSIfigure3V2-0.svg</p>
<p data-bbox="114 1050 229 1077">Execution</p> <p data-bbox="114 1111 292 1272">Data gathering, data management, carried out by Project Team</p> <p data-bbox="114 1305 268 1435">Project Team updates and maintains the DMP</p> <p data-bbox="114 1469 320 1731">Team ensures digital files are named and stored in a manner consistent with DMP and organisational policy.</p>	<p data-bbox="344 1050 440 1077">/ Survey</p> <p data-bbox="344 1272 528 1299">/ Field Registers</p> <p data-bbox="344 1827 507 1854">/ Photographs</p>	<p data-bbox="572 1050 644 1077">/ Data</p> <p data-bbox="572 1081 890 1111">P2019001SVYDATAV1-0.xlsx</p> <p data-bbox="572 1115 890 1144">P2019001SVYDATAV1-2.xlsx</p> <p data-bbox="572 1149 890 1178">P2019001SVYDATAV1-3.xlsx</p> <p data-bbox="572 1182 890 1211">P2019001SVYDATAV1-4.xlsx</p> <p data-bbox="572 1216 890 1245">P2019001SVYDATAV2-0.xlsx</p> <p data-bbox="572 1279 652 1305">/ Finds</p> <p data-bbox="572 1310 868 1339">P2019001AllFindsV1-0.xlsx</p> <p data-bbox="572 1344 868 1373">P2019001AllFindsV1-2.xlsx</p> <p data-bbox="572 1377 868 1406">P2019001AllFindsV1-3.xlsx</p> <p data-bbox="572 1411 868 1440">P2019001AllFindsV2-0.xlsx</p> <p data-bbox="572 1473 692 1500">/ Contexts</p> <p data-bbox="572 1505 868 1534">P2019001ContextV1-0.xlsx</p> <p data-bbox="572 1538 868 1568">P2019001ContextV1-1.xlsx</p> <p data-bbox="572 1572 868 1601">P2019001ContextV1-2.xlsx</p> <p data-bbox="572 1606 868 1635">P2019001ContextV2-0.xlsx</p> <p data-bbox="572 1668 671 1695">/ Photos</p> <p data-bbox="572 1700 858 1729">P2019001PhotosV1-0.xlsx</p> <p data-bbox="572 1733 858 1762">P2019001PhotosV1-1.xlsx</p> <p data-bbox="572 1767 858 1796">P2019001PhotosV2-0.xlsx</p> <p data-bbox="572 1830 719 1856">/ Site photos</p> <p data-bbox="572 1861 887 1991">CR2 files: P2019001SITEIMG0001.CR2 to P2019001SITEIMG0300.CR2</p>	<p data-bbox="1046 1178 1410 1207">Survey data, preservation format:</p> <p data-bbox="1046 1211 1358 1240">P2019001SVYDATAV2-0.csv</p> <p data-bbox="1046 1274 1198 1303">Site registers:</p> <p data-bbox="1046 1308 1337 1337">P2019001AllFindsV2-0.csv</p> <p data-bbox="1046 1341 1337 1370">P2019001ContextV2-0.csv</p> <p data-bbox="1046 1375 1326 1404">P2019001PhotosV2-0.csv</p>

Project stage and relevant functions	/ Project folder	Working project files	Selected and converted for archaeological project archive
		<p>JPG files: P2019001SITETIMG001.JPG to P2019001SITEIMG0300.JPG</p> <p>/ Archive shots</p> <p>CR2 files: P2019001ARCHIMG0001.CR2 to P2019001ARCHIMG0065.CR2</p> <p>JPG files: P2019001ARCHTIMG0001.JPG to P2019001ARCHIMG0065.JPG</p> <p>/ Small finds</p> <p>CR2 files: P2019001FINDSIMGSF1-0.CR2 P2019001FINDSIMGSF1-1.CR2 P2019001FINDSIMGSF1-2.CR2 P2019001FINDSIMGSF1-3.CR2 P2019001FINDSIMGSF2-0.CR2 P2019001FINDSIMGSF2-1.CR2 P2019001FINDSIMGSF3-0.CR2 P2019001FINDSIMGSF3-1.CR2 P2019001FINDSIMGSF3-2.CR2 P2019001FINDSIMGSF3-3.CR2 P2019001FINDSIMGSF4-0.CR2 P2019001FINDSIMGSF4-1.CR2</p> <p>JPG files: P2019001FINDSIMGSF1-0.JPG P2019001FINDSIMGSF1-1.JPG P2019001FINDSIMGSF1-2.JPG P2019001FINDSIMGSF1-3.JPG P2019001FINDSIMGSF2-0.JPG P2019001FINDSIMGSF2-1.JPG P2019001FINDSIMGSF3-0.JPG P2019001FINDSIMGSF3-1.JPG P2019001FINDSIMGSF3-2.JPG P2019001FINDSIMGSF3-3.JPG P2019001FINDSIMGSF3-4.JPG P2019001FINDSIMGSF4-0.JPG P2019001FINDSIMGSF4-1.JPG</p>	<p>Selected site photographs x 65, preservation format: P2019001ARCHTIMG0001.tiff to P2019001ARCHIMG0065.tiff</p> <p>Selected finds images x 9: P2019001FINDSIMGSF1-1.tiff P2019001FINDSIMGSF1-2.tiff P2019001FINDSIMGSF2-0.tiff P2019001FINDSIMGSF2-1.tiff P2019001FINDSIMGSF3-0.tiff P2019001FINDSIMGSF3-1.tiff P2019001FINDSIMGSF3-2.tiff P2019001FINDSIMGSF4-0.tiff P2019001FINDSIMGSF4-1.tiff</p>

Project stage and relevant functions	/ Project folder	Working project files	Selected and converted for archaeological project archive
		<p>P2019001OSMap1906.pdf.aux.xml</p> <p>/ Shapefiles P2019001Fieldwalking.cgp P2019001Fieldwalking.dbf P2019001Fieldwalking.prj P2019001Fieldwalking.qpj P2019001Fieldwalking.shp P2019001Fieldwalking.shx P2019001SmallFinds.cgp P2019001SmallFinds.dbf P2019001SmallFinds.prj P2019001SmallFinds.qpj P2019001SmallFinds.shp P2019001SmallFinds.shx P2019001TrenchLocations.cgp P2019001TrenchLocations.dbf P2019001TrenchLocations.prj P2019001TrenchLocations.qpj P2019001TrenchLocations.shp P2019001TrenchLocations.shx</p> <p>/ CAD P2019001CAD-Trench1PreEx.dxf P2019001CAD-Trench1PostEx.dxf P2019001CAD-Trench2PreEx.dxf P2019001CAD-Trench2PostEx.dxf</p>	<p>P2019001Fieldwalking.cgp P2019001Fieldwalking.dbf P2019001Fieldwalking.prj P2019001Fieldwalking.qpj P2019001Fieldwalking.shp P2019001Fieldwalking.shx P2019001SmallFinds.cgp P2019001SmallFinds.dbf P2019001SmallFinds.prj P2019001SmallFinds.qpj P2019001SmallFinds.shp P2019001SmallFinds.shx P2019001TrenchLocations.cgp P2019001TrenchLocations.dbf P2019001TrenchLocations.prj P2019001TrenchLocations.qpj P2019001TrenchLocations.shp P2019001TrenchLocations.shx</p> <p>P2019001CAD-Trench1PreEx.dxf P2019001CAD-Trench1PostEx.dxf P2019001CAD-Trench2PreEx.dxf P2019001CAD-Trench2PostEx.dxf</p>
<p>Execution</p> <p>Analysis and Reporting carried out by Project Team</p> <p>Team continues to follow conventions re digital data, and ensures that external specialists provide digital files and metadata as required</p>	<p>/Reports</p>	<p>/ Assessment</p> <p>Text only: P2019001AssessmentReportV1-0.docx P2019001AssessmentReportV1-1.docx P2019001AssessmentReportV1-2.docx P2019001AssessmentReportV2-0.docx</p> <p>Combined PDF version, text and illustrations for circulation: P2019001AssessmentReportV2-0.pdf</p> <p>With comments P2019001AssessmentReportV2-0.pdf</p> <p>Amended document text: P2019001AssessReportV2-2FINAL.docx</p> <p>Updated final PDF: P2019001AssessReportV2-2.pdf</p> <p>/ Assessment appendices P2019001Appendix1TrenchTablesV1-0.docx P2019001Appendix2HERdataV1-0.docx P2019001Appendix3FindsEnviroV1-0.docx</p>	<p>Final document text: P2019001AssessReportV2-2FINAL.docx</p> <p>Combined final PDF: P2019001AssessReportV2-2.pdf/a</p>

Project stage and relevant functions	/ Project folder	Working project files	Selected and converted for archaeological project archive
	<p data-bbox="347 786 453 813">/Graphics</p> <p data-bbox="347 1211 416 1238">/Finds</p>	<p data-bbox="576 293 1007 454">P2019001Appendix1TrenchTablesV2-0.docx P2019001Appendix2HERdataV2-0.docx P2019001Appendix3FindsEnviroV2-0.docx</p> <p data-bbox="576 495 1023 618">P2019001Appendix1TrenchTablesV2-0.pdf P2019001Appendix2HERdataV2-0.pdf P2019001Appendix3FindsEnviroV2-0.pdf</p> <p data-bbox="576 658 703 685">/ PXA drafts</p> <p data-bbox="576 689 967 880">P2019001AssessmentFigure1V1-0.ai P2019001AssessmentFigure1V1-1.ai P2019001AssessmentFigure2V1-0.ai P2019001AssessmentFigure3V1-0.ai P2019001AssessmentFigure3V1-1.ai P2019001AssessmentFigure3V1-2.ai</p> <p data-bbox="576 920 703 947">/ PXA finals</p> <p data-bbox="576 952 887 1043">P2019001PXAFigure1V2-0.ai P2019001PXAFigure2V2-0.ai P2019001PXAFigure3V2-0.ai</p> <p data-bbox="576 1084 908 1176">P2019001PXAFigure1V2-0.pdf P2019001PXAFigure2V2-0.pdf P2019001PXAFigure3V2-0.pdf</p> <p data-bbox="576 1216 778 1243">/ Specialist reports</p> <p data-bbox="576 1247 1023 1637">P2019001AnimalBoneReportV1-0.docx P2019001AnimalBoneReportV1-1.docx P2019001AnimalBoneReportV1-3.docx P2019001AnimalBoneDataV1-0.xls P2019001AnimalBoneMetadata.xls P2019001EnvironmentalReportV1-0.docx P2019001EnvironmentalMetadata.docx P2019001EnvironmentalReportV1-1.docx P2019001PotteryV1-1.docx P2019001PotteryV1-2.docx P2019001PotteryDataV1-0.xls P2019001PotteryMetadataV1-0.xls</p>	<p data-bbox="1050 333 1187 360">Appendices:</p> <p data-bbox="1050 365 1513 488">P2019001Appendix1TrenchTablesV2-0.docx P2019001Appendix2HERdataV2-0.docx P2019001Appendix3FindsEnviroV2-0.docx</p> <p data-bbox="1050 954 1139 981">Figures:</p> <p data-bbox="1050 985 1361 1077">P2019001PXAFigure1V2-0.ai P2019001PXAFigure2V2-0.ai P2019001PXAFigure3V2-0.ai</p> <p data-bbox="1050 1247 1449 1274">External reports, data and metadata:</p> <p data-bbox="1050 1279 1513 1536">P2019001AnimalBoneReportV1-3.docx P2019001AnimalBoneDataV1-0.csv P2019001AnimalBoneMetadataV1-0.csv P2019001EnvironmentalReportV1-1.docx P2019001EnvironmentalMetadataV1-1.csv P2019001PotteryV1-2.docx P2019001PotteryDataV1-0.xls P2019001PotteryMetadataV1-0.csv</p>
Project administration and archive	/ Admin	<p data-bbox="576 1704 671 1731">/ Tender</p> <p data-bbox="576 1736 927 1798">T2019001TenderDocsV1-0.docx T2019001TenderDocsV1-0.pdf</p> <p data-bbox="576 1839 687 1865">/ Contract</p> <p data-bbox="576 1870 1023 1962">P2019001ClientContractV1-0.docx P2019001ClientContractV1-1signed.docx P2019001ClientContractV2-0.pdf</p> <p data-bbox="576 2002 791 2029">/ Delivery and costs</p>	<p data-bbox="1050 1704 1289 1731">Relevant material only</p> <p data-bbox="1050 1736 1513 1926">P2019001TownMuseumContractV2-0.pdf/a P2019001TransferTitleSignedV2-0.pdf/a P2019001SelectionStrategy.docx P2019001DMPV2-2.docx P2019001Project-level-metadataV2-0.docx</p>

Project stage and relevant functions	/ Project folder	Working project files	Selected and converted for archaeological project archive
	/ Archive	<p>P2019001BudgetV1-0.xls P2019001BudgetV1-1.xls P2019001BudgetV1-2.xls</p> <p>P2019001PaymentScheduleV1-0.xls P2019001PaymentScheduleV1-1.xls</p> <p>P2019001GanntV1-0.xls P2019001GanntV1-1.xls P2019001GanntV1-2.xls P2019001GanntV1-3.xls</p> <p>/ Invoices issued INV2019-P2019001-001.pdf INV2019-P2019001-002.pdf INV2019-P2019001-003.pdf INV2019-P2019001-004.pdf</p> <p>/ Subcontractors P2019001Bones-contract-letter.docx P2019001Pottery-contract-letter.docx P2019001Enviro-contract-letter.docx</p> <p>P2019001Bones-contract-letterSIGNED.docx P2019001Pottery-contract-letterSIGNED.docx P2019001Enviro-contract-letterSIGNED.docx</p> <p>/ Museum agreements P2019001TownMuseumContractV1-0.docx P2019001TownMuseumContractV1-1.docx P2019001TownMuseumContractV1-2.docx P2019001TownMuseumContractV2-0.pdf</p> <p>/ Title of Transfer P2019001TransferTitleV1-0.pdf P2019001TransferTitleSignedV2-0.pdf</p> <p>/Selection Toolkit P2019001SelectionStrategy.docx</p> <p>/ Data Management Plan P2019001DMPV1-0.docx P2019001DMPV1-1.docx P2019001DMPV1-2.docx P2019001DMPV2-0.docx P2019001DMPV2-1.docx P2019001DMPV2-2.docx</p>	

Project stage and relevant functions	/ Project folder	Working project files	Selected and converted for archaeological project archive
		/ Project metadata P2019Project-metadataV1-0.xls P2019Project-metadataV1-2.xls P2019Project-metadataV1-3.xls P2019001Project-metadataV2-0.xls	

Appendix 5 Data Management Plan and checklist

The following template and guidance are based on the Digital Curation Centre checklist (DCC 2013), which can be accessed online: <https://dmponline.dcc.ac.uk>.

The template follows the same project planning stages included in the DCC checklist but guidance has been amended to be more specific to archaeological projects and standards. The guide template can be easily adapted to suit organisational processes but should retain the same basic information and functions in order to comply with ClfA Standards and guidance.

The Data Management Plan (DMP) should be completed at the start of each project and reviewed at key stages during project delivery. It should be included as an appendix to key project documentation. The example here includes guidance notes; you will find a blank version as part of the Work Digital / Think Archive online resource.

Data Management Plan Overview

The sections below are the basic components of the Data Management Plan. Each section comprises a series of sections which need to be completed. In the pages below the DMP format is fully explained, and includes the Questions to Consider, Guidance and Examples where appropriate.

Section 1: Project Administration
<ul style="list-style-type: none">• Key project details, unique identifiers and contacts
Section 2: Data Collection
<ul style="list-style-type: none">• What data will you collect or create?• How will the data be collected or created?
Section 3: Documentation and Metadata
<ul style="list-style-type: none">• What documentation and metadata will accompany the data?
Section 4: Ethics and Legal Compliance
<ul style="list-style-type: none">• How will you manage any ethical, copyright and Intellectual Property Rights (IPR) issues?
Section 5: Storage and Backup
<ul style="list-style-type: none">• How will the data be stored, accessed and backed up during the research?
Section 6: Selection and Preservation
<ul style="list-style-type: none">• Which should be retained, shared, and/or preserved?• What is the long-term preservation plan for the dataset?• Have you contacted the data repository?• Have the costs of archiving been fully considered?
Section 7: Data Sharing and Accessibility
<ul style="list-style-type: none">• How will you share the data and make it accessible?• Are any restrictions on data sharing required?
Section 8: Responsibilities
<ul style="list-style-type: none">• Who will be responsible for data management?

Section 1: Project Administration

Project ID / OASIS ID
<p>Questions to consider:</p> <ul style="list-style-type: none"> • A unique project identifier (the organisational project code, site code) • An OASIS ID should be set up for all field investigation projects • Any other unique identifier • If more than one identifier is relevant, they should be highlighted here.
Project Name
<p>Questions to consider:</p> <ul style="list-style-type: none"> • The project name and a working title where used on any products, promotion, social media or reports
Project Description
<p>Questions to consider:</p> <ul style="list-style-type: none"> • What is the nature of the project? • What are the key investigation techniques? • What is the purpose of the investigation?
Project Funder / Grant reference
<p>Questions to consider:</p> <ul style="list-style-type: none"> • How has the project been funded? • Who is the funder or client? • Are there any relevant grant reference codes?
Project Manager
<p>Questions to consider:</p> <ul style="list-style-type: none"> • Name, job title and organisation of the project manager responsible for the project
Principal Investigator / Researcher
<p>Questions to consider:</p> <ul style="list-style-type: none"> • Name, job title and organisation of the principal investigator or researcher if different to the above
Data Contact Person
<p>Questions to consider:</p> <ul style="list-style-type: none"> • Name, job title and organisation of the person who should be contacted regarding the data associated with this project
Date DMP created
<p>Questions to consider:</p> <ul style="list-style-type: none"> • The date the document originated; this should not be changed on later versions
Date DMP last updated
<p>Questions to consider:</p> <ul style="list-style-type: none"> • The date of last revision, noting any key changes which may be relevant to the data management or archive
Version
<p>Questions to consider:</p> <ul style="list-style-type: none"> • Version number for this document
Related data management policies
<p>Questions to consider:</p> <ul style="list-style-type: none"> • Is this DMP guided by any particular requirements, guidelines or data management policies? <p>Guidance:</p> <ul style="list-style-type: none"> • For example, this might include requirements stipulated in the Project Brief, ClfA Standards and guidance, the receiving museum's Archive Deposition Policy, the Trusted Digital Repository guidelines (such as ADS guidelines) or other best practice guidance • If there is an internal Data Management Policy or Operational Process Document which has guided the DMP, it can be referred to here.

What data will you collect or create?

Questions to consider:

- What type, format and volume of data will the project generate?
- Do the chosen formats and software used enable sharing and long-term access to data?
- Will existing data be used, and how will this be dealt with in the archive?

Guidance:

- Innovations in technology mean that data formats are changeable, but there are some key principles to work by when organising your digital data archive:
 - Using data formats which are standardised, openly documented and, where possible, non-proprietary is preferable. This ensures data is sharable, supports data curation and facilitates interoperability between projects and datasets – as well as avoiding technological obsolescence.
 - If conversion of file formats are required prior to deposition, details should be included in Section 6 below.
 - ADS Guides for Good Practice include guidance on data collection and formats for most relevant material: <http://guides.archaeologydataservice.ac.uk/g2gp/Contents>
 - ADS have a preferred and accepted file formats look-up table for depositors, which acts as a useful guide to formats which support long-term access <https://archaeologydataservice.ac.uk/advice/FileFormatTable.xhtml>
 - If you need some detailed technical information relating to file formats, you can look up file types, software and migration paths using the National Archives technical registry PRONOM: <http://www.nationalarchives.gov.uk/PRONOM/Default.aspx>
- Projects often use existing data within research, and a brief description of that data and any third party sources should be noted.

Example response:

Geophysical survey has previously been undertaken at the site and will be used to inform the excavation strategy. The data images including interpretation are likely to be included within the project report with permission, but the original data copyright resides with the original researchers (Geophysics Limited) and will not be deposited with this project archive.

The table below provides a summary of the data types, formats and estimated archive volume for data collected / created as part of this project. As the project progresses, more detail regarding files will be added to this DMP.

Type	Format	Estimated volume (Data Archive)
Spreadsheets	Excel (.xlsx) To be deposited in preservation format (.csv)	15 objects (size <2MB total) (Context Register / Finds & Samples Register / Photo Register / Drawing Register / Specialist data tables x 6 / metadata tables)
Text / documents	Word (.docx) PDF (.pdf/a)	15 objects (size <100MB) (Project Brief / Project Design / Updated Project Design / Final Report / Individual Specialist Reports x 6)
Vector graphics	Affinity Designer (.svg)	Site plans x 10, av size 5MB Report images x 5, av size 2MB
Images	Lossy graphics file (.jpg) Intended deposition format - uncompressed (.tiff)	Archive shots x 100, av size 4MB Photogrammetry files x 250, av size 4MB
GIS	ESRI Shapefile (.shp & .shx & .dbf, plus associated files)	Overall GIS files x 10, including 6 shp layers <10MB

How will the data be collected or created?

Questions to consider:

- What data standards or methodologies will you use?
- How will you structure and name your folders and files?
- How do you manage version control?
- What Quality Assurance processes will you adopt?

Guidance:

- Provide an outline of how the data will be collected, and which data standards might be used – where appropriate data standards exist. Any requirements set out in the Project Brief may determine the nature of data collection, and this can be highlighted here. Your own organisational data processes and workflow might also be relevant, which might be referred to in the Project Design or WSI method statements.
- To ensure that all project data conforms to the data standards cited in your DMP, you may need to discuss data collection methods with individual project specialists or contractors working outside of your organisational procedures.
- Relevant guidance for best practice relevant to data collection is included in the AAF Work Digital / Think Archive document.
- Having a well organised file structure for your Working Project Archive will make it easier to find and keep track of data files. Conventions for data file structures can be introduced at an organisational level to ensure the project team of any project will know either to find relevant files.
- Using a consistent, logical and predictable naming convention within an organisation will also help to distinguish similar records from one another instantly, facilitating the storage and retrieval of records. A clear guide to naming conventions can be found here: <https://www.ed.ac.uk/records-management/guidance/records/practical-guidance/naming-conventions> and ADS have guidance here: <https://archaeologydataservice.ac.uk/advice/PreparingDatasets.xhtml#File%20Management>
- Creating a clear hierarchy for version control is part of the file naming conventions, and it is useful to consider the two areas at the same time. Version control provides a clear indication of which file is the most recent. All versions of a document can be retained as part of a Working Project Archive, but only the final version will generally need to be retained as part of the Archaeological Project Archive.
- Having a quality assurance process for data collection and data management provides assurance that data standards across the organisation (including conventions) are being used and applied as expected.
- For data collection, this might include calibration of instruments used, taking multiple measurements and using standardised methods. For data management, this might include data validation, using project databases to manage the data structures and conforming to data conventions. Data should then be continually checked, edited and cleaned as part of project delivery.

Example response:

Data Standards / Methods

- Standard methods of data collection will be applied throughout the project, working to best practice guidance where applicable / available. In general, data acquisition standards are defined against *ADS Guides to Good Practice*. Specific or additional guidance relevant to this project are listed below, and will be updated as the project progresses.
- Methods of collection are specified within the Project Design (see PATAP19ProjectDesignV2-0.pdf) and will meet the requirement set out in the Project Brief, the organisation recording manual and relevant ClfA Standards and guidance.
- Where appropriate, project contributors external to the organisation will be required to include data standards, collection methodology and metadata with individual reports and data.
- Specific guidance:
 - HE *Digital Image Capture and File Storage: Guidelines for Best Practice* 2015
 - HES *Applied Digital Documentation in the Historic Environment* 2018
 - EAC *Guidelines for the use of geophysics in archaeology* 2016

Data storage / file naming

- The working project archive will be stored in a project specific folder or data specific folder on the internal organisational server. The internal organisation server is backed up twice daily to maintain an up to date security copy of the organisation wide data.
- Project folders are named following established organisational procedures.
- Data collected will be downloaded and raw data will be stored in the appropriate folder.
- File naming conventions following established organisational procedures, based on ADS file naming guidance, and include version control management.
- All files included as part of this project archive will include an organisational identifier (PA), the Site ID (TAP19), the file descriptor (eg ProjectDesign) and Version number (eg V2-0).
- Final versions of files will include 'FINAL' within the filename.

Quality Assurance

- Instruments used in the collection of data are calibrated prior to use and checked to ensure they are in full working order.
- All site records and data collected will be reviewed during project delivery to ensure data is accurate and secure.
- Data collection and management are reviewed regularly as part of the organisational Quality Policy (PA2017QualityPolicyV3-0.pdf). This includes a quarterly review of internal project folders to ensure our organisational data management standards are being met.

Section 3: Documentation and metadata

What documentation and metadata will accompany the data?

Questions to consider:

- What information is needed for the data to be read and interpreted in the future?
- How will you capture and create this documentation and metadata?
- What metadata standards will you use and why?

Guidance:

- As a minimum, describe the types of documentation that you will provide alongside the data to help secondary users to understand and reuse it. This should include basic details including who created or contributed to the data, date of creation and under what conditions it can be accessed.
- Documentation should also include details on the methodology used, analytical and procedural information, definitions of variables, vocabularies, units of measurement, any assumptions made, and the format and file type of the data.
- Consider how you will capture this information and where it will be recorded. Wherever possible you should identify and use existing community standards.
- The archive repository identified as part of the long-term preservation of the archive (Section 6, below) is likely to define or refer to standards for the submission of data, including accompanying documentation and metadata. These can be highlighted here and will most likely require the submission of spreadsheet tables including metadata.
- A Collection Level Metadata Summary provides a useful tool to document the project details and summarise the data included in the archive. This might be required as part of the digital archive deposition process (see link below for ADS), and could also be relevant to documentation processes for the complete Archaeological Project Archive (eg including finds, documents and digital components).
 - <https://archaeologydataservice.ac.uk/advice/DatasetlevelMetadata.xhtml#Collection-level%20Metadata%20Requirements>
- The collection of metadata can be a simple process, especially where processes are embedded into the project delivery team workflow. Metadata compilation follows the same general principle as other aspects of the archaeological archive – we are used to compiling registers for finds, photos, plans etc, and metadata tables simply provide a register of data.

- Guidelines for what to include in data specific metadata tables can be found in the ADS Guides to Good Practice as part of the guide for each data section, and a summary of how to prepare data for deposition can be found within the ADS Guidelines for Depositors.
 - <http://guides.archaeologydataservice.ac.uk/g2gpwiki/>
 - <https://archaeologydataservice.ac.uk/advice/PreparingDatasets.xhtml#Metadata>

Example response:

- Data collected will include standard formats which maximise opportunities for use and reuse in the future (see Section 2, above).
- A Collection Level Metadata Summary is included in all standard archaeological projects and will be completed as the project is delivered. A working copy will be kept on the organisational server in the Project Folder. The Collection Level Metadata Summary brings together the overarching project details and includes a register of data types and number of objects included in the archive, along with all other archive components.
- Metadata tables for each data type will be populated as the project progresses and will use the standard format for each data type as recommended by ADS, who are the intended repository for the digital data archive.
- Data documentation will meet the requirement of the Project Brief, Museum Deposition Guidelines, Digital Repository Guidelines and the methodology described in the Project Design methodology.
- An archive catalogue documenting both physical and digital archive products will be maintained and submitted with both the Museum and Trusted Digital Repository.

Section 4: Ethics and legal compliance

How will you manage any ethical, copyright and Intellectual Property Rights (IPR) issues?

Questions to consider:

- Does your project archive include data which requires formal consent to be used or included, and have you gained the required consent?
- How will you protect the identity of individuals if required? For example, ensuring that there is a legal basis for inclusion of individual's names in the archive including transfer to the repository
- Is your digital data archive compliant with GDPR 2018 legislation?
- How will sensitive data be handled, stored and transferred securely?
- Who owns the data?

Guidance:

- Managing ethical concerns of digital data might include anonymisation of data (such as personal addresses), gaining permission for the inclusion of images, and making plans to ensure that formal consents are in place when the data is collected or at the appropriate stage in the project.
- GDPR legislation 2018 protects the collection and use of sharing of personal data. Most organisations should have a Privacy Policy in place which articulates how that organisation manages personal data. It is recommended that any project data is checked against this policy prior to archive depositions, ensuring that personal data is not included within the archive.
- Consideration of how sensitive data will be handled is also a key part of the project planning. The DMP should identify if sensitive data is likely to be included in the working project archive, provide a summary of how that data might be managed and how it will be dealt with in the archive with regard to data sharing.
- One of the key principles of archaeological projects is to make the results of the investigation widely available, accessible and re-usable. Ensuring that ownership, data sharing (including reporting and publication) and preservation (long-term) has been discussed as the project progresses with clients and stakeholders, and that copyright agreements are in place where necessary, will help reduce any issues.
- With regards to copyright, although the creator of the work or the employer will generally hold the copyright for data, contracts and funding agreements may require that another party also holds copyright to works they have supported.

- Consider use of a data sharing agreement – this is an example from the Society for Museum Archaeologists: <http://socmusarch.org.uk/data-sharing-agreement-archives-template-sma/>
- Some museum deposition guidelines may require rights to be waived / licenced for use in perpetuity
- Any ethical issues relating to specific data should be documented in the metadata tables which accompany the project archive.

Example response:

- The project archive will include the names and contact details of individuals who intend to volunteer or participate in the excavation and post excavation stages. We have a GDPR compliant Privacy Policy which underpins the management of personal data; any personal data is managed through a secure cloud-based database and not retained on the project specific folders.
- Personal data will be removed from the archaeological project archive and permission to include individual's names in any reporting is gained prior to use.
- Copyright for all data collected by the project team belongs to the organisation, and formal permission to include data from external specialists and contractors is secured on the engagement of the specialist or contractor.
- Where formal permissions and/or license agreements are linked to data sharing, they will be included in the project documentation folders and will accompany the archaeological project archive.

Section 5: Data Security: Storage and Backup

How will the data be stored, accessed and backed up during the research?

Questions to consider:

- Do you have sufficient storage?
- Do you need to resource further storage?
- How do you maintain a security copy of your data, and who will be responsible for backup and recovery?
- How will the data be recovered in the event of an incident?
- If creating or collecting data in the field how will you ensure its safe transfer into your main secured systems?
- How will you control access to keep the data secure?
- How will you ensure that collaborators can access your data securely?

Guidance:

- This section refers to the Working Project Archive and not to long-term preservation, see Section 6.
- The number and size of data accumulated throughout a project should be considered at the project planning stage to ensure there are adequate resources to manage a secure working project archive.
- Digital data is vulnerable and needs active management to ensure that risk of data loss is kept to a minimum. Within the DMP, you will need to provide an indication of how you will keep data secure through the working life of the project and provide sufficient measures to prevent data corruption or loss.
- Storing working project archive data on laptops, computer hard drives or external storage devices alone is very risky and does not meet ClfA Standards for archives which state that:
 - 3.1.1 *Ensuring the security and stability of the archive is a continuous process and a universal responsibility*
 - 3.4.7 *Security copies of all digital material should be created and managed as appropriate.*
- The DMP must provide an outline of the system of back up and security copy which your project team will have in place to protect the working project archive. This might include defining how often the data will be backed up and to which locations, how security copies are being made and what media is being used to host data. Ideally, the DMP will also include details of which team members are responsible for any actions and a process identified for data recovery.
- During fieldwork, data is often collected in the field and you should ensure that data security measures are also taken which protect data as it is acquired. This might include providing off site access to organisations servers, or ensuring a back-up copy of raw data is maintained during fieldwork.

- For guidance on data storage at an organisational level, the Digital Preservation Coalition has a detailed section in their *Digital Preservation Handbook*:
 - <https://www.dpconline.org/handbook/organisational-activities/storage>
- This also includes a separate section on cloud computing, which can provide a useful solution for the working project archive
 - <https://www.dpconline.org/handbook/technical-solutions-and-tools/cloud-services>
- The UK Data Archive handbook on managing and sharing data (2011) provides a useful section on data storage and keeping data safe (from p17)
 - <https://data-archive.ac.uk/media/2894/managingsharing.pdf>

Example response:

- Organisational IT is managed by an external data management provider, who is also responsible for the management and verification of our daily back-ups and who supports access to security copies as needed.
- Sufficient data storage space is available via the organisational server, which includes two-factor authentication and permissions-based access. The server is accessible by staff on and offsite through a secure log-in.
- Off-site access to the project files on the organisation's server is provided to support back-up of raw data while fieldwork is ongoing. Where internet access for data back up is not possible, the raw data will be backed up to a separate media device (such as laptop and portable external hard drive).
- Project files will be shared with external specialists and contractors directly using the same system, with the wider project team gaining access to only the files needed using permissions-based access.

Section 6: Selection and Preservation

Which data should be retained, shared, and/or preserved?

Questions to consider:

- How will you decide which data should be selected for inclusion in the Archaeological Archive?
- What will be the key selection review points during the project?
- How will the data relate to any planned publication and dissemination materials?
- What are the foreseeable research uses for the data?
- Describe what will happen with the de-selected data?

Guidance:

- A complete set of the digital data included in the Working Project Archive does not need to be retained in full as part of the deposited Archaeological Archive. As with the other records and materials which make up the Working Project Archive, a selection process should be undertaken which is agreed in advance of deposition by all stakeholders (project team, advisory team and intended repository).
- ClfA's *Selection Toolkit for Archaeological Archives* 2018 provides comprehensive advice regarding the development of a project-specific Selection Strategy. The DMP will support the Selection Strategy, and both documents will be included with the pre-project documentation (eg the Project Design and/or WSI).
- An updated copy of the Selection Strategy and DMP should be included in the project report as an appendix and should accompany the Archaeological Archive to the Collecting Institution.
- Review points along the project delivery which will inform the Selection Strategy should be noted. These will ideally be linked to key stages that provide an opportunity for review, specialist input and evaluation, such as Project Design, Post Excavation Assessment, Updated Project Design, Project Reporting. The Selection Strategy and DMP can be updated as the project progresses.
- Reasons for selection will vary from project to project and should take into consideration the project aims and significance of the results, the research potential and contribution to regional research frameworks, and ability to provide greater access to heritage.
- Negative archaeological results, such as from a Watching Brief, are unlikely to produce a large digital data archive for deposition. In this circumstance, a technical archaeological report attached to the OASIS record with a limited selection of images would suffice, as long as this was agreed as part of the Selection Strategy and DMP process.

- Where data is selected for inclusion in the project Archaeological Archive, it should be deposited in the data format identified in Section 2. Inclusion of images, context records, finds registers, specialist data and reports within a PDF document does not constitute digital data archiving.
- The planned dispersal (eg deletion or organisation-level archive) of de-selected material should be summarised.

Example response:

- The Selection Strategy and DMP will be reviewed and updated as part of the Post Excavation Assessment and Updated Project Design, and following full analysis. Updated documentation will be included in all reporting stages.
- Prior to deposition, the Selection Strategy and DMP will be updated and finalised in agreement with all project stakeholders (including the Local Planning Archaeologist, Client, Museum, ADS).
- Selection will be informed by the Project Design, defined against the research aims, regional and national research frameworks, specialist advice and the significance of the project results.
- The project will be published as an online technical report (accessible via OASIS and as part of this the archive), with full access to research data, and a short hard copy leaflet / booklet produced which raises awareness to the findings of the archaeological excavation and link to the digital archive.
- The project results are likely to provide new research data which can be included in the Historic Environment Record and will contribute to the knowledge of the early medieval period at The Site, and aiding the future management of the archaeological site.
- The data archive will be ordered, with files named and structured in a logical manner, and accompanied by relevant documentation and metadata, as outlined in Sections 2 and 3 of this DMP.

What is the long-term preservation plan for the dataset?

Questions to consider:

- Where will the digital data elements of the preserved Archaeological Archive be deposited and preserved in perpetuity?
- What costs if any will your selected data repository or archive charge?
- Have you costed in time and effort to prepare the data for sharing / preservation?

Guidance:

- The digital archive should be deposited with a repository recognised with the Core Trust Seal certification. This certification is based on a universal catalogue of requirements which defines trustworthy data repositories and underpins the secure and long-term preservation of data in perpetuity.
- Core Trust Seal certification meets the requirements of ClfA Standards for archives that:
 - 3.1.1 All archaeological archives must be stored in repositories that maintain proper standards of care and accessibility
 - 3.5.5 Digital archive material should be deposited with a trusted digital repository, where data migration and backup procedures are in place, and the integrity of the digital archive is maintained.
- The intended repository for the digital archive should be identified in the Data Management Plan, as required by the ClfA Standards for archives
 - 3.3.2 Project specifications, research designs or similar documents should identify the repository where the archive will be deposited for long-term curation.
- Due to the specialist nature of digital archives management, the digital archive and the physical archive may not always be deposited together. Whilst museums may request a copy of some or all of the project data for their own purposes, the digital archive must be deposited with a Core Trust Seal certified repository.
- The DMP should indicate that adequate consideration of the costs of deposition, including resources for the preparation of the archive, have been included in the project budget.

Example response:

- The digital archive will be deposited with the Archaeology Data Service, which is a certified repository with Core Trust Seal.

- The archive will be prepared for deposition by the project team and the costs for the time needed for preparation, and the cost of deposition have been included in the project budget.

Have you contacted the data repository?

Questions to consider:

- Have you contacted the trusted digital repository?
- If you have not, explain why this has not happened.

Guidance:

- You will need to communicate with the digital data repository and the intended museum for physical archive deposition at the start of the project to discuss your project archive.
- Both repositories will provide all the information you need to prepare and document the full archive (both physical and digital). This will facilitate proper consideration of the any deposition requirements well in advance.
- It would also be appropriate to discuss any changes to the original strategy with the repository, following different stages of assessment and analysis – which can be done via the DMP.

Example response:

- The relevant Museum has been contacted during project initiation and confirmed that the digital archive component should be deposited with a trusted digital repository.
- ADS have also been contacted as the intended repository for digital data.

Have the costs of archiving been fully considered?

Questions to consider:

- Are costs for the digital archive included in the project budget?

Guidance:

Making sure that sufficient allowance for digital archiving, including data preparation as well as deposition, will help minimise surprise costs at the end of the project. Cost projections can be estimated using tools like the ADS Costing Calculator, and should also consider inflationary increases for bigger projects.

Example response:

- A costing estimate has been produced using the ADS Costing Calculator and sufficient resources to cover these costs, and to allow for the preparation of the archive, have been included in the project budget.

Section 7: Data Sharing

How will you share the data and make it accessible?

Questions to consider:

- Has the project been added to the OASIS Index of Archaeological Investigations?
- How will you report the results of the project?
- Where will those results be shared and how will people find them?
- When will you make the data available?
- How will project data be shared with the Historic Environment Record?

Guidance:

- Providing a summary of the archaeological work undertaken is a requirement of ClfA Standards and guidance for archaeological excavation
 - 3.3.9 and 3.4.7 *Where it is possible to submit a record to an appropriate Standard and guidance: for archaeological excavation online index (OASIS or equivalent), a record should be completed and supplied within an agreed timeframe to ensure that other practitioners are aware of work in progress.*

- It is recommended that all projects undertaken in the UK are added to the OASIS Index of Archaeological Investigations at the earliest stage of the project, so this section should simply indicate if the record has been initiated, and if that is not the case, explain why
 - <https://oasis.ac.uk/pages/wiki/Main>
- Provide a summary of how the site will be reported on – a technical grey literature report, a journal paper, full publication – and how those documents will be found.
- Estimate when the project data is expected to be available – which might refer to project timetables as agreed in the Project Design or WSI, and will be subject to change.
- Outline of any specific arrangements with the HER with regards to data sharing in the DMP.
- The submission of the final report to the HER is a necessary step in all archaeological projects, as it ensures the information is accessible at a local and regional level. As the final report will include an updated copy of the DMP which will signpost the intended location of relevant data, in most cases this action will also provide the HER with the details they need.
- Information on access licence details, eg creative commons licences, highlighting the nature of any restrictions.

Example response:

- A summary of the project has been included on the OASIS Index of Archaeological Investigation and the museum and digital archive repository, and will be updated as the project progresses.
- The investigations are likely to result in a number of documents: Project Design, Post Excavation Assessment and Updated Project Design, Final Report, Journal submission.
- The final report is expected to be completed within 12 months of the completion of fieldwork.
- As the project progresses reports will be attached to the project OASIS record.
- A final version of the project report will be supplied to the Historic Environment Record via OASIS, and any data which they request can also be provided directly.
- The location (s) of the final Archaeological Archive will be added to OASIS when appropriate.
- The ADS will disseminate the digital elements of the Archaeological Archive online under a creative commons licence and the dataset will receive a unique identifier (DOI).

Are any restrictions on data sharing required?

Questions to consider:

- What action will you take to overcome or minimise restrictions?
- For how long do you need exclusive use of the data and why?
- Will a data sharing agreement (or equivalent) be required?

Guidance:

- Specific projects may be subject to a temporary embargo on data sharing and some agencies may have restrictions on what data can be shared. It is important to have discussed these issues at the beginning of a project and that any formal permissions required are gained in advance of archive deposition.
- Embargos on data sharing should not prevent the deposition of the digital data archive, but the accompanying documentation will need to clearly state the requirement.

Example response:

- A temporary embargo may be required on the sharing of the project results. If this is the case, specific details once agreed will be included in the updated version of this DMP and will be documented in the overarching Project Collection Metadata.
- Data specific requirements, ethical issues or embargos which are linked to particular data formats will be documented within the relevant metadata tables accompanying the project archive.

Who will be responsible for implementing the data management plan?

Questions to consider:

- Who is responsible for implementing the DMP, and ensuring it is reviewed and revised?
- Who will be responsible for each data management activity?
- How will responsibilities be split across partners in collaborative projects?
- Will data ownership and responsibility for data management be part of any consortium agreement or contract agreed between partners?

Guidance:

- Outline the roles and responsibilities for all activities e.g. data capture, metadata production, data quality, storage and backup, data archiving & data sharing.
- Consider who will be responsible for ensuring relevant policies will be respected.
- Individuals can be named where appropriate.
- Where projects are delivered by a consortium of different organisations, explain how the responsibility for data management will be agreed.

Example response:

- The Project Manager will be responsible for implementing the DMP, and ensuring it is reviewed and revised at each stage of the project.
- Data capture, metadata production and data quality is the responsibility of the Project Team, assured by the Project Manager.
- Storage and backup of data in the field is the responsibility of the field team.
- Once data is incorporated into the organisations project server, storage and backup is managed by an external company.
- Data archiving is undertaken by the project team under the guidance of the Archives Officer, who is responsible for the transfer of the Archaeological Project Archive to the agreed repository.
- Details of the core project team can be found in the Project Design.