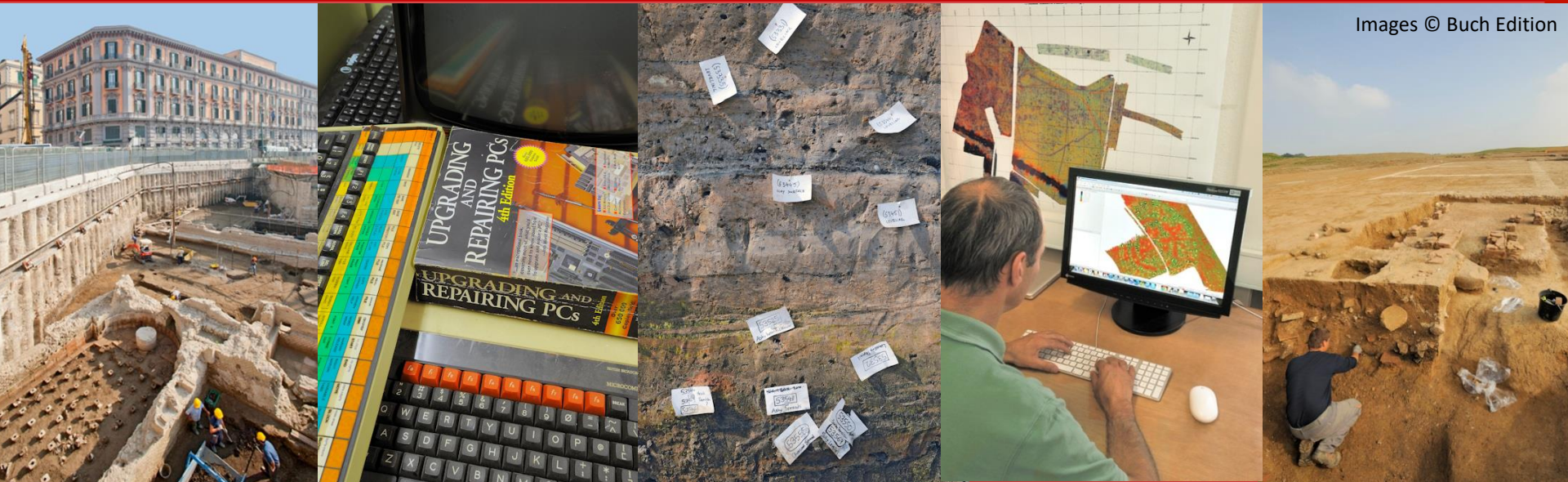


ads

ARCHAEOLOGY DATA SERVICE



Images © Buch Edition

<http://archaeologydataservice.ac.uk>

The Archaeology Data Service

- Set up in 1996
- Based at the University of York
- Only accredited UK **digital data** repository for archaeology

Remit:

“Support research, learning and teaching with free, high quality and dependable digital resources”



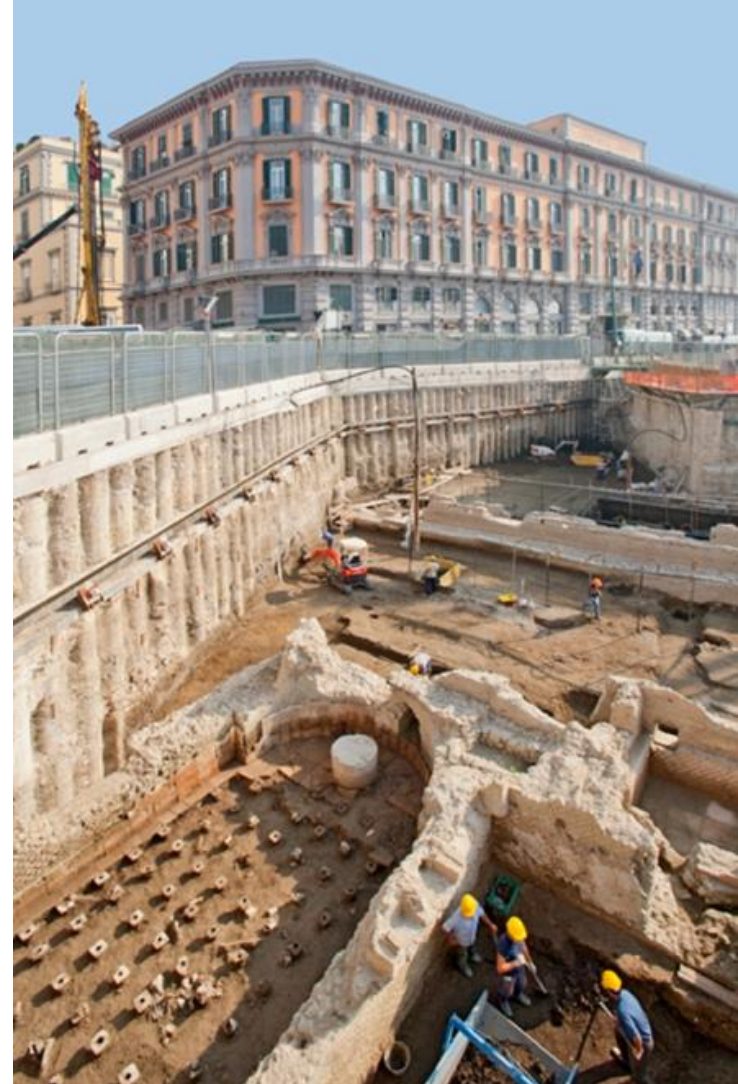
Outline

Part One

- Why is preserving data important
- Behind the scenes at ADS
- ADS Resources

Part Two

- Data Management Planning
- Data Practical



Why was ADS established?

- Archaeology is **destructive**
- Comprehensive **records** of field work are imperative
- The use of computers in archaeological fieldwork recording and research has become **routine**

Images © Buch Edition



Digital Data

Born Digital

Data created in digital format



Image © Oxford Archaeology (North)

Digitised Data

Hardcopy converted to digital format



Image © State Library of New South Wales 2015

BEWARE: Digital Data is Fragile

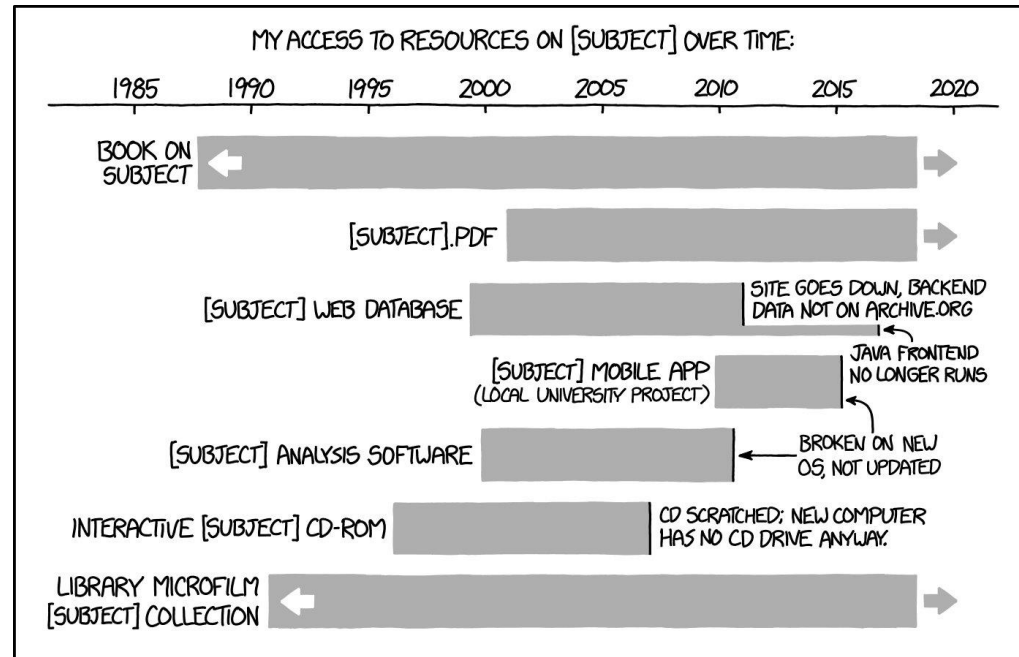
Digital data is encoded and requires software & technology to present content

Your data



Computer data

```
01110101011010101
10100101011010101
01010101011010101
01000101011010101
01101010101001100
00101011101100111
10101001010101010
```



IT'S UNSETTLING TO REALIZE HOW QUICKLY DIGITAL RESOURCES CAN DISAPPEAR WITHOUT ONGOING WORK TO MAINTAIN THEM.

Image Copyright: <https://xkcd.com/1909/>

Why is Digital Data Fragile?

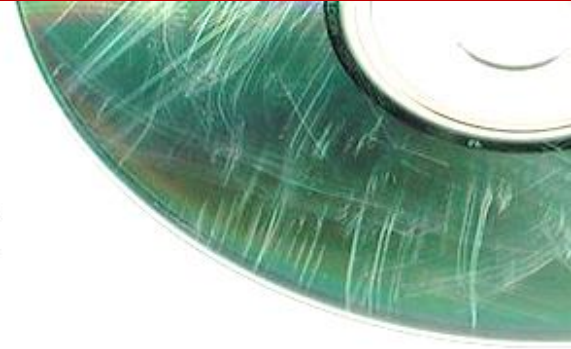
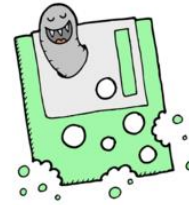


https://youtu.be/8dhp_20j0Ys

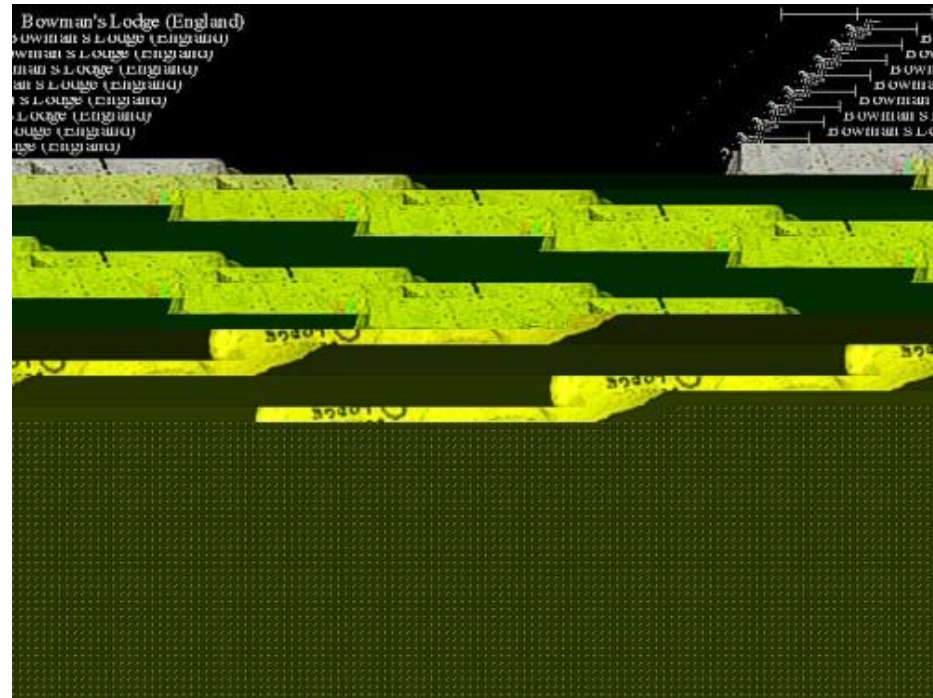
Why is Digital Data Fragile?

- **Deterioration of the storage medium**

- Degrade – Bit rot!
- Can be easily damaged
- Can be easily overwritten



Case Study: ADS



What happened to an image as it was removed from a CD.



What the image was supposed to look like.

Case Study: NASA!

- Lost original Apollo 11 data tapes
 - “original” in directly transmitted from Moon.
- Erased and reused.
- High-quality broadcast versions were found.
- NASA restored the found footage.
- Rereleased in HD for 40th anniversary of Apollo 11.

<https://www.nasa.gov/feature/not-unsolved-mysteries-the-lost-apollo-11-tapes>



Why is Digital Data Fragile?

- Deterioration of the storage medium
- **Obsolescence of the storage medium**



5.25" Floppy

Media Types

- Experience rapid change



3.5" Floppy



xD Picture Card



5.25" Optical Disk



MultiMedia Card



cloud



DG90M Tape



12" Optical Disk



QIC DC600



Memory Stick



Rectangular Hole
Punch Card



8mmD-eight



Jaz Disk



DC4_120



Punch Tape



IBM 3480



SD Memory Card



9-Track Reel



Cassette tape



Floptical Disk



Zip Disk



DVD-ROM



8" Floppy



Click!



5.25" Floppy



G2000 Tape



CD-ROM



Sparq Disk Cartridge



DLT Tape



CompactFlash



4mm Tape



Smart Media



Travan



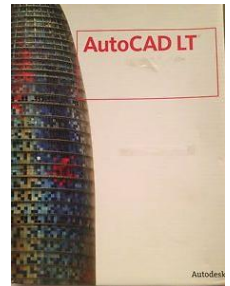
Ditto Max

Why is Digital Data Fragile?

- Deterioration of the storage medium
- Obsolescence of the storage medium
- **Obsolescence of the software**



5.25" Floppy



Case Study: NASA again!

- NASA sent two Viking Landers to Mars in 1975
- Data recorded on magnetic tape
- Climate controlled environment
- In the 1990s they could not decode the formats used
- Had to track down old printouts and retype everything



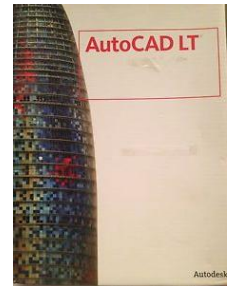
Photos: Courtesy NASA/JPL-Caltech

Why is Digital Data Fragile?

- Fragility of the storage medium
- Obsolescence of the storage medium
- Obsolescence of the software
- **Obsolescence of the hardware**



5.25" Floppy



Technology

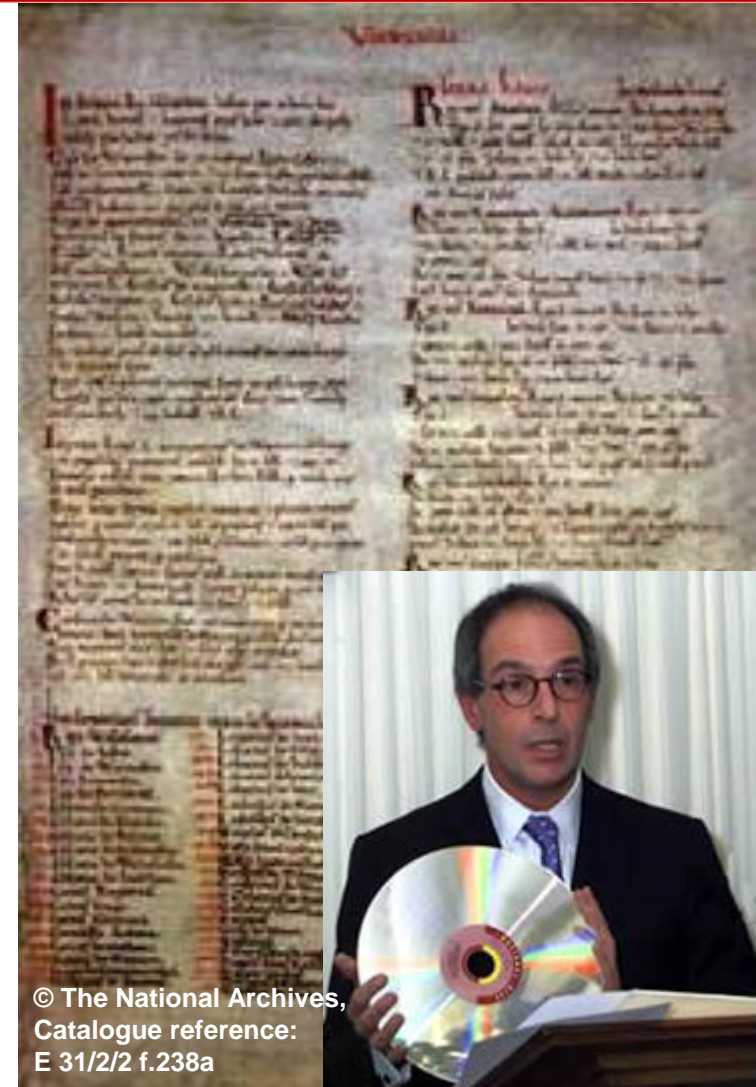
- Hardware experiences rapid change



Case Study: BBC Domesday Project

- 1986
- photographs, maps, etc
- 30cm laserdiscs
- BBC Microcomputers
- In 2006 the laserdiscs were **obsolete** as was the hardware
- Rescue projects launched by The National Archives and Leeds University

<http://www.bbc.co.uk/history/domesday/story>



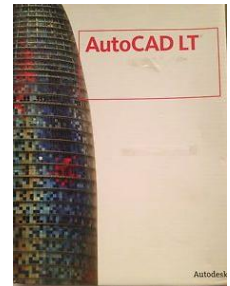
© The National Archives,
Catalogue reference:
E 31/2/2 f.238a

Why is Digital Data Fragile?

- Fragility of the storage medium
- Obsolescence of the storage medium
- Obsolescence of the software
- Obsolescence of the hardware
- **Failure to document the data adequately**



5.25" Floppy



Pr661_ArchiveInformation
Pr661_Metadata
Pr661_Photogrammetry_Topcon
Pr661_PostExcavationImages
Pr661_Sitelimages
Pr661_AutocadDrawings
Pr661_DigitisedSiteDrawings
Pr661_DigitisedTopconProjects
Pr661_FindsandEnvironmentalImages

Pr661_2007_Drawing-5001_Archive_v02.dwg
Pr661_2007_Drawing-5004-Sheet4-a_Archiv
Pr661_2007_Drawing-5004-Sheet4-b_Archiv
Pr661_2007_Drawing-5012-5017-5019-Shee
Pr661_2007_Drawing-5015-Sheet14_Archiv
Pr661_2007_Drawing-5016-Sheet15_Archiv
Pr661_2007_Drawing-5018-Sheet16_Archiv
Pr661_2007_Drawing-5020-Sheet17_Archiv
Pr661_2007_Drawing-5021-Sheet18_Archiv
Pr661_2007_Drawing-5022-Sheet19_Archiv
Pr661_2007_Drawing-5024-Sheet21_Archiv
Pr661_2007_Drawing-5025-Sheet22_Archiv

Case Study: Newham Museum Archaeological Service

Active in archaeological fieldwork across North East London for several decades closed abruptly in 1998 with only a few days notice.

Staff left, computers were sold, a desperate salvage operation began

The result? Two shoe boxes of floppy disks.

Case Study: Newham Museum Archaeological Service

Archive:

- approx. 150 excavations
- 6432 individual files
- 1500 excavation reports
- 700 database files
- 1200 geophysics files
- 200 separate projects



Image © www.digitalbevaring.dk

Case Study: Newham Museum Archaeological Service

Archive:

- approx. 150 excavations
- 6432 individual files
- 1500 excavation reports
- 700 database files
- 1200 geophysics files
- 200 separate projects

The Problem?

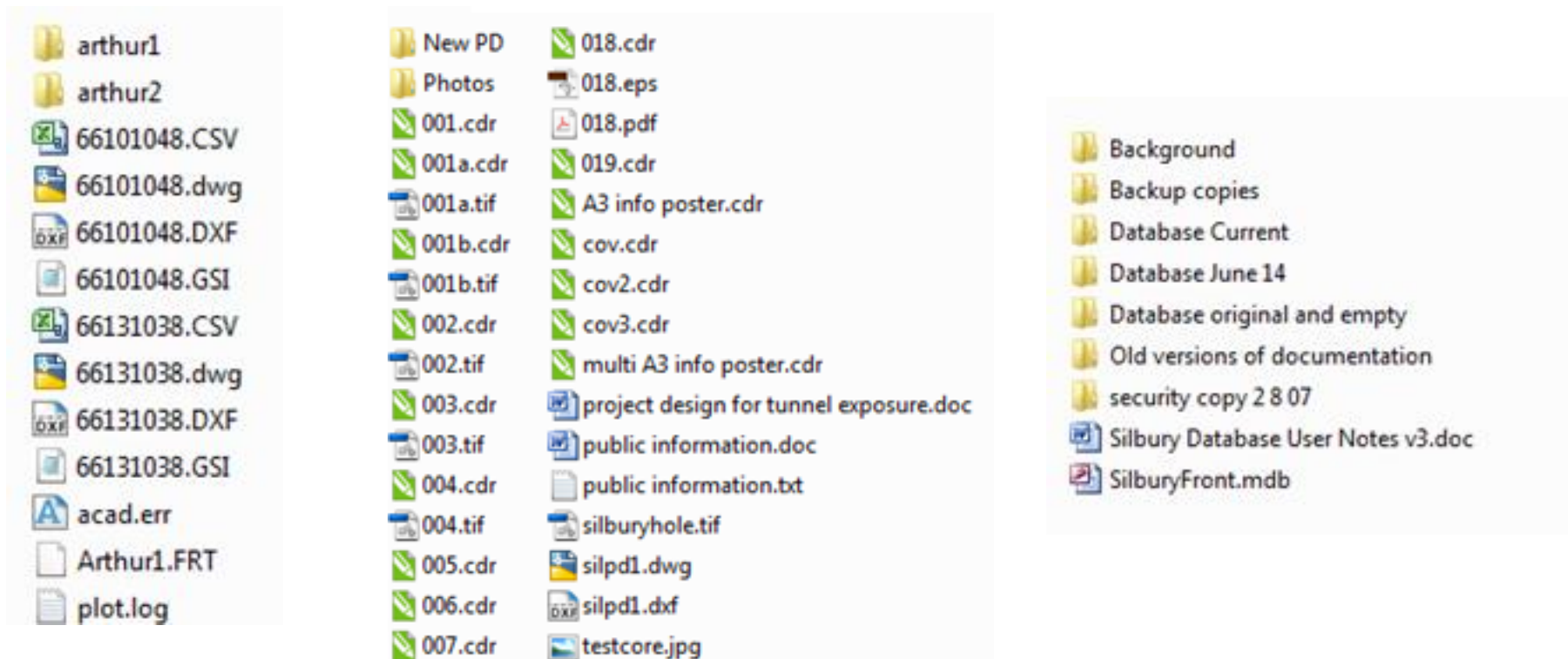
- No link between database/files and excavations
- Missing key to codes
- Little metadata
- Some files simply couldn't even be opened (i.e., CAD)

Case Study: Silbury Hill



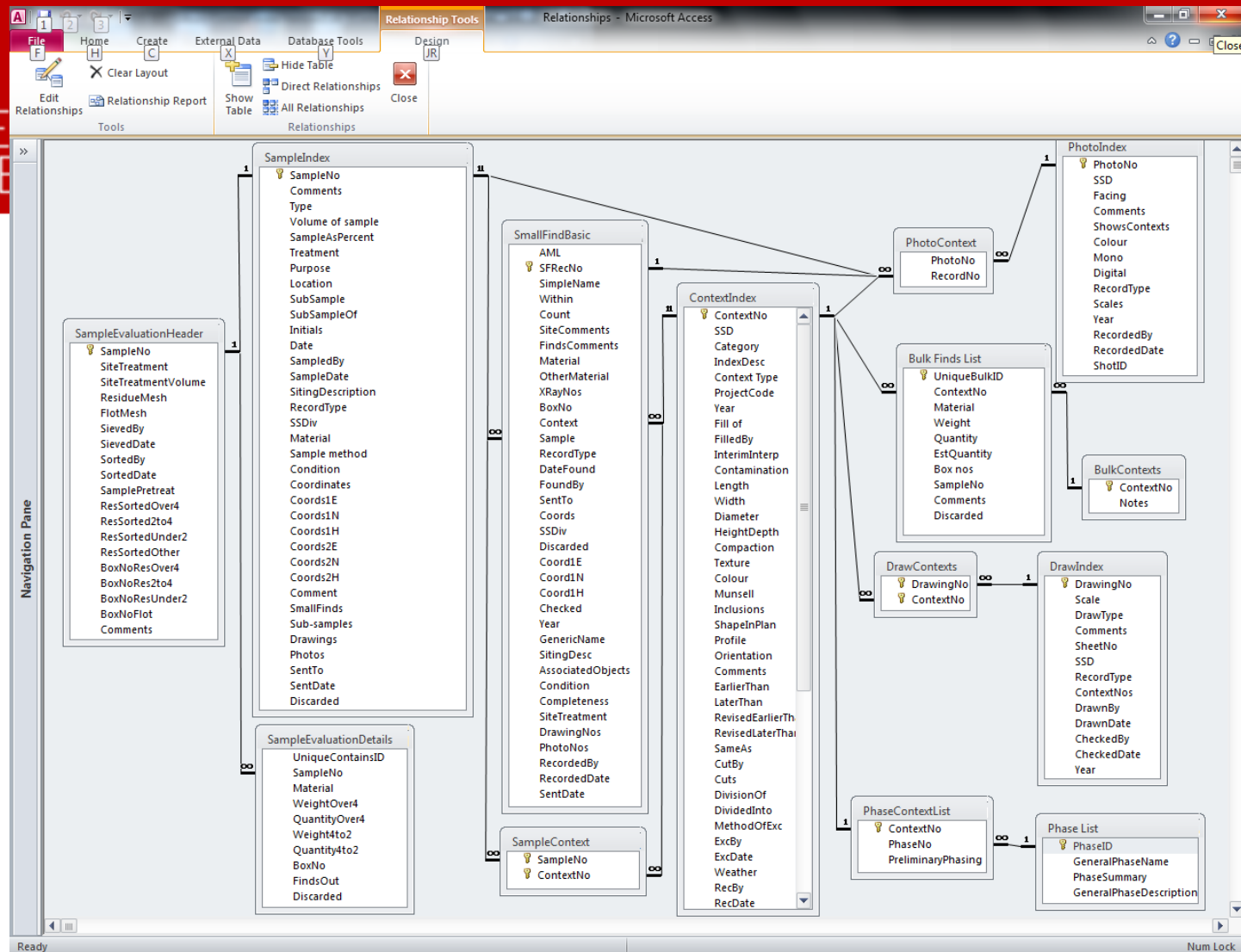
Silbury Hill from the eastern bank of the Winterbourne © English Heritage

Case Study: Silbury Hill



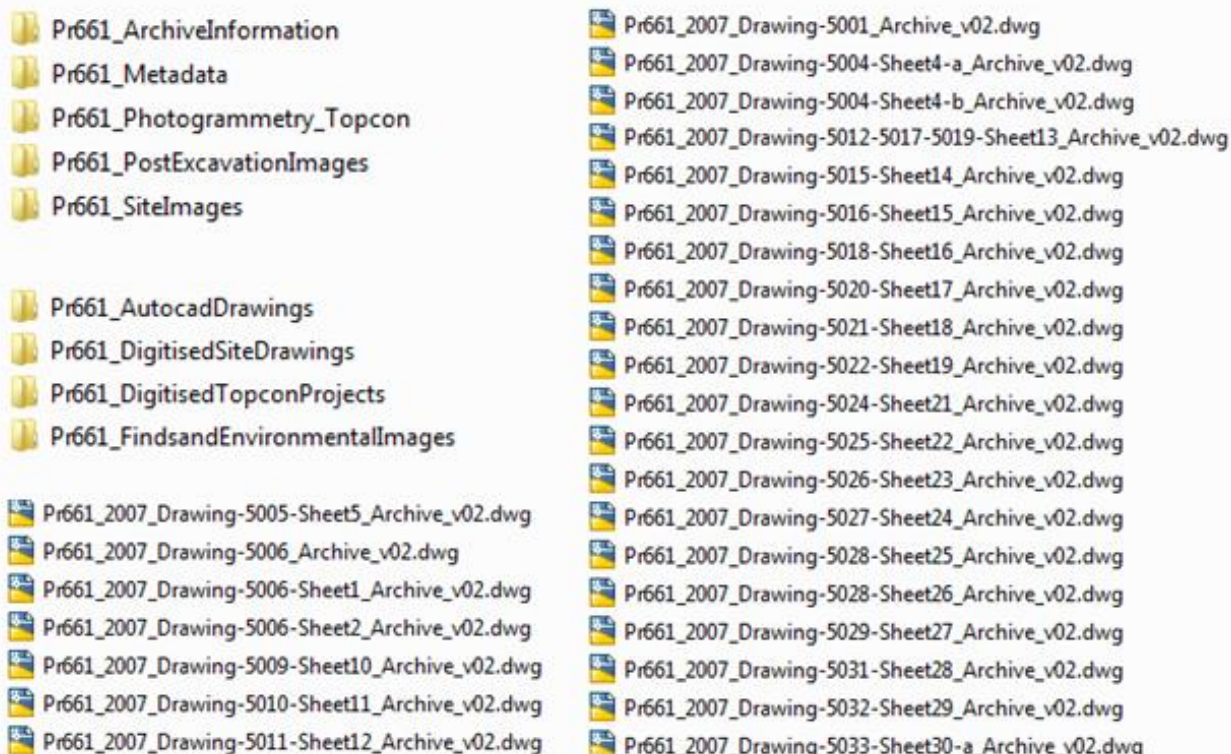
<http://archaeologydataservice.ac.uk/blog/2013/08/jenny-ryders-day-of-archaeology-at-the-ads-a-silbury-hill-update/>

Case Study: Silbury Hill



<http://archaeologydataservice.ac.uk/blog/2013/08/jenny-ryders-day-of-archaeology-at-the-ads-a-silbury-hill-update/>

Case Study: Silbury Hill



<http://archaeologydataservice.ac.uk/blog/2013/08/jenny-ryders-day-of-archaeology-at-the-ads-a-silbury-hill-update/>

Protecting Digital Data

- Recognise data is as **fragile** as the archaeological record we excavate
- **Stop** archiving data as **objects** rather than computerised information

2,000 years in the making

3 days to record

Backed up in 10 seconds

Lost forever?

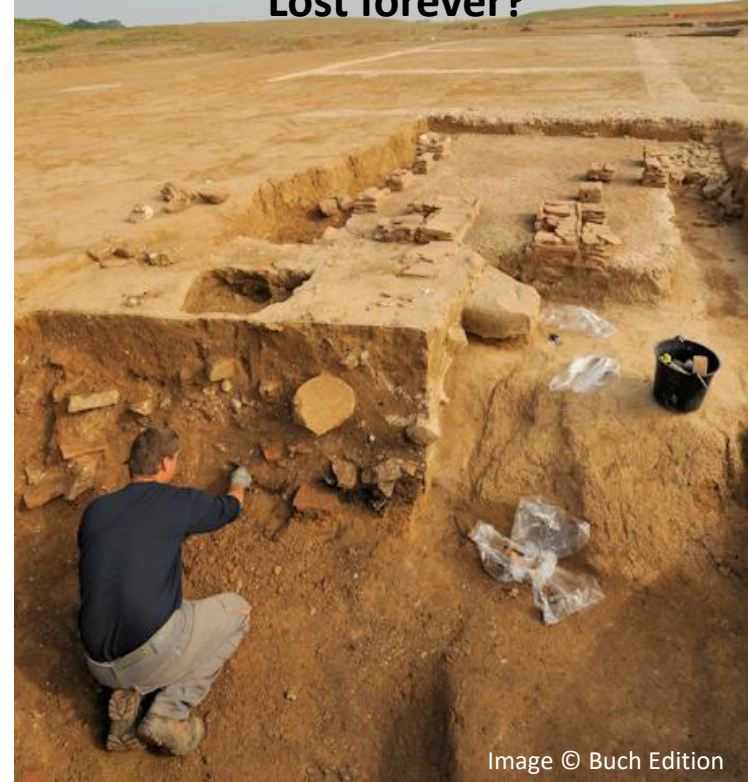


Image © Buch Edition

My lithics data is here, on a CD



Protecting Digital Data

- Recognise data is as **fragile** as the archaeological record we excavate
- **Stop** archiving data as **objects** rather than computerised information
- Create **Data Management Plans**
- Professionally **archive** digital material

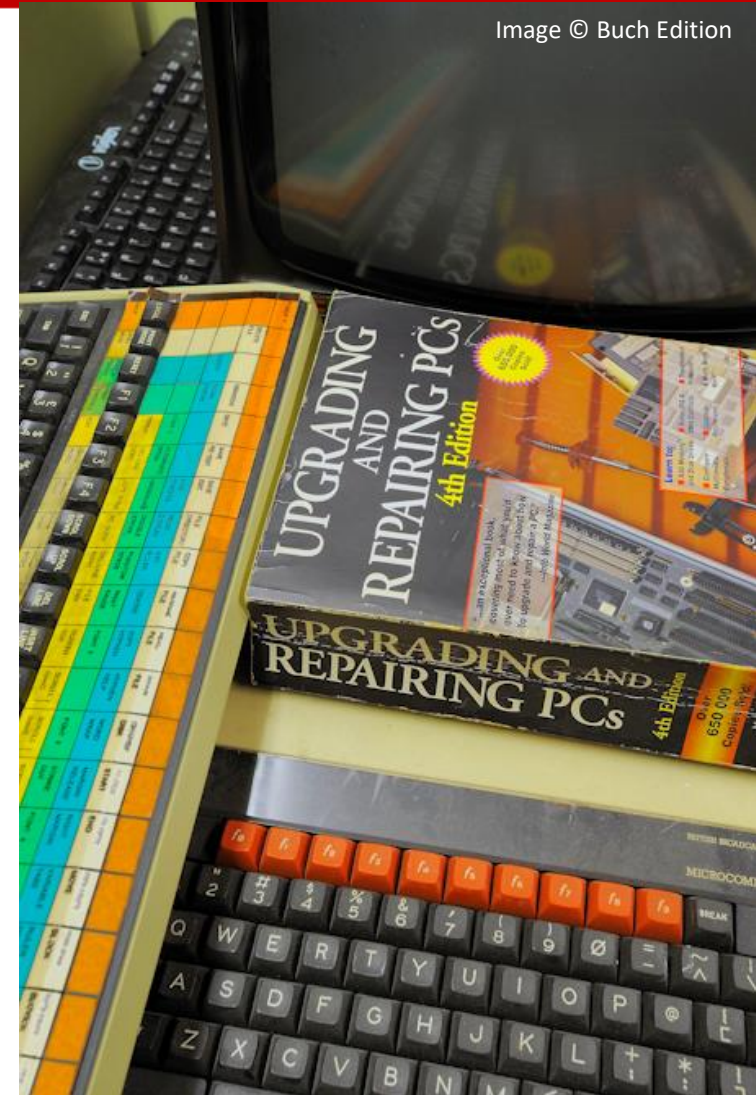


ADS Role: Digital Preservation

3 Methods

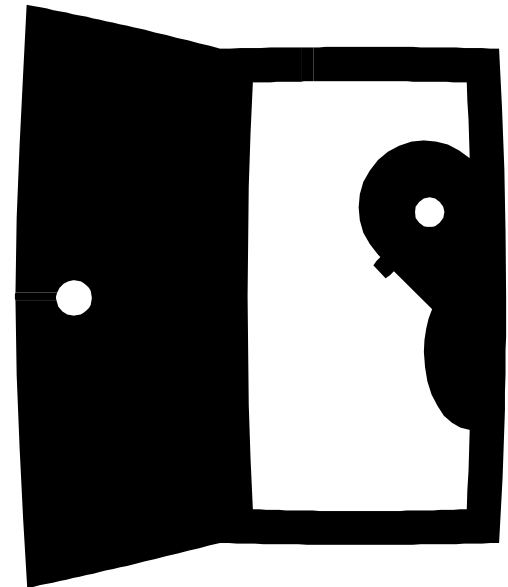
- The Hardware Museum
- The Software Emulator /Virtualisation
- Migration

**NB much more intervention is needed
than conventional archives**

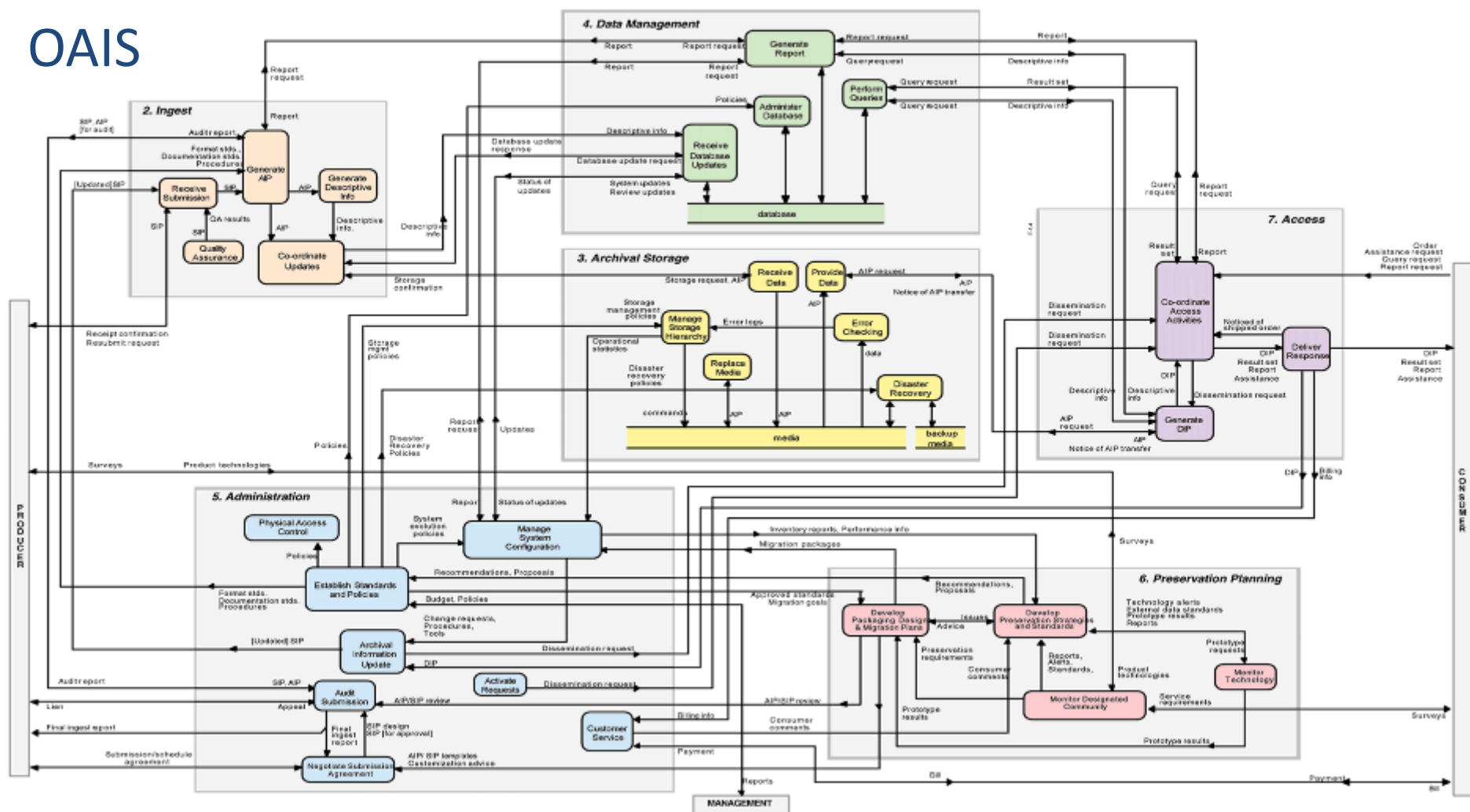


Behind the Scenes at the ADS

- Use data **migration** strategies
- Follow the **Open Archival Information System (OAIS)** reference model
 - International ISO standard 14721
- Ensure the multiple and regular **backups** and the **renewal** of storage media
 - 30+ Virtual Servers
 - Tape backup at University of York & Hull
 - Deep Store



OAIS



Open Archival Information System (OAIS) reference model

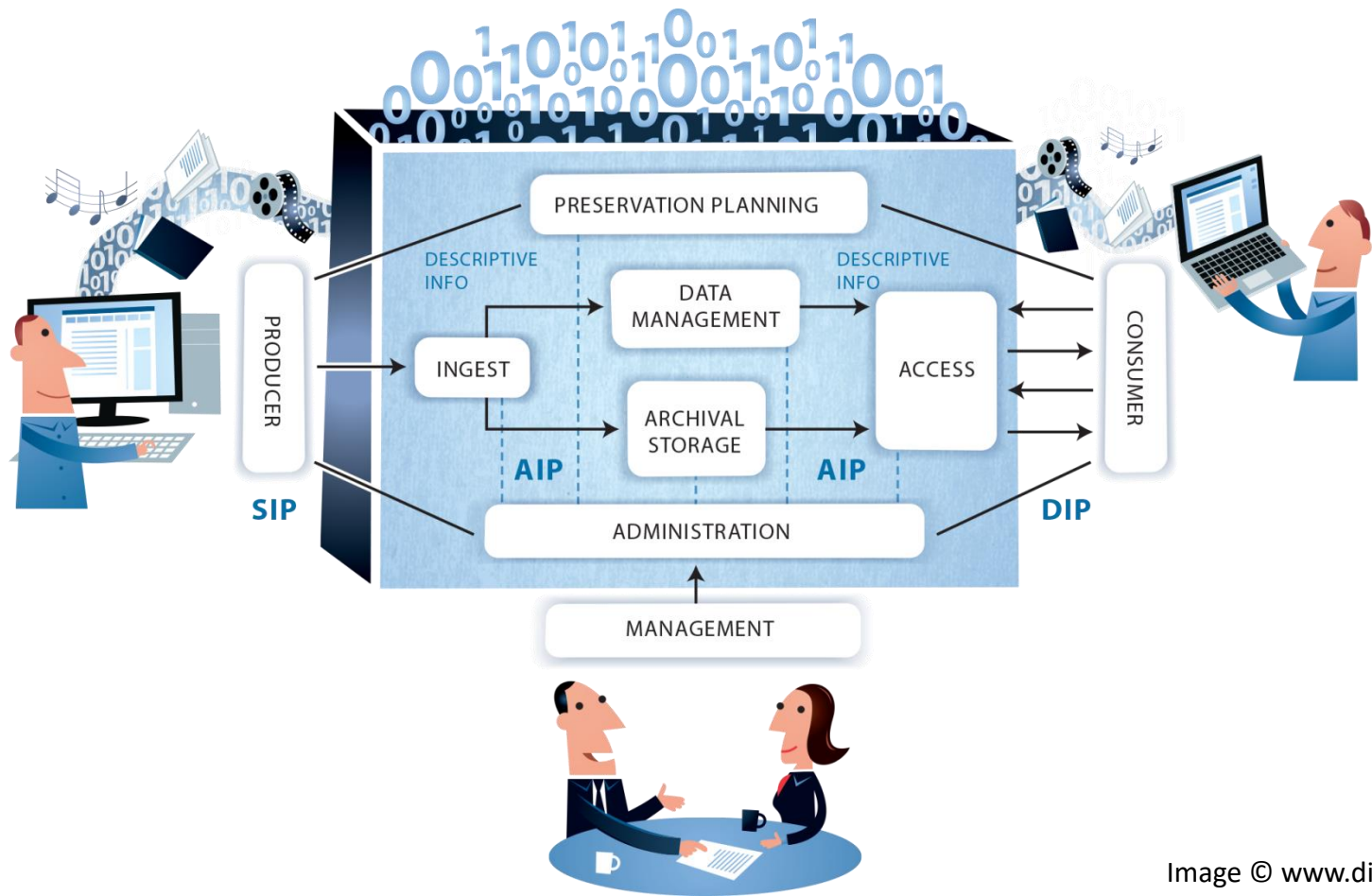


Image © www.digitalbevaring.dk

How do ADS disseminate data?

Everything we archive is **freely** available through the web interface.

1.3 million metadata records

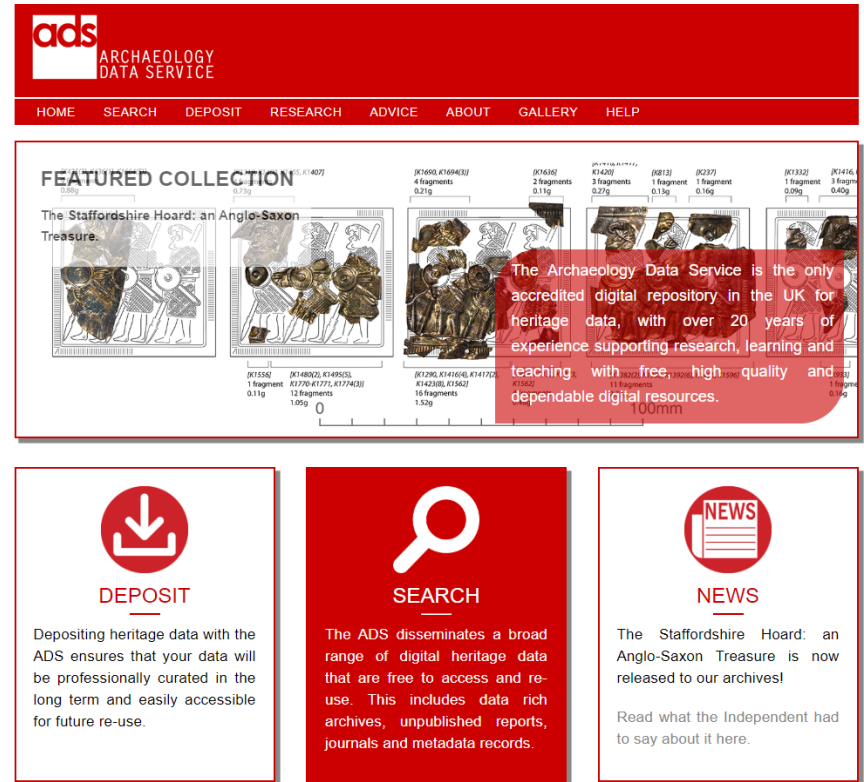
250,000+ bibliographic records

- 37 full text Journals
- 100+ full text monographs
- 56,000+ reports

3000+ data rich archives

- 22+TB data

<https://archaeologydataservice.ac.uk/about/annualReports.xhtml>



The screenshot shows the ADS website interface. At the top is the ADS logo and navigation links: HOME, SEARCH, DEPOSIT, RESEARCH, ADVICE, ABOUT, GALLERY, HELP. The main content area features a 'FEATURED COLLECTION' section titled 'The Staffordshire Hoard: an Anglo-Saxon Treasure'. It displays several images of gold and silver artifacts, each with a label indicating the number of fragments and weight. A red text box overlaid on the images states: 'The Archaeology Data Service is the only accredited digital repository in the UK for heritage data, with over 20 years of experience supporting research, learning and teaching, with free, high quality and dependable digital resources.' Below the featured collection are three red boxes with white icons and text: 'DEPOSIT' (downward arrow icon) with text 'Depositing heritage data with the ADS ensures that your data will be professionally curated in the long term and easily accessible for future re-use.', 'SEARCH' (magnifying glass icon) with text 'The ADS disseminates a broad range of digital heritage data that are free to access and re-use. This includes data rich archives, unpublished reports, journals and metadata records.', and 'NEWS' (newspaper icon) with text 'The Staffordshire Hoard: an Anglo-Saxon Treasure is now released to our archives! Read what the Independent had to say about it here.'

Outline

Part Two

- **Data Management Planning**
- Data Exploration Practical

Data Management Plan



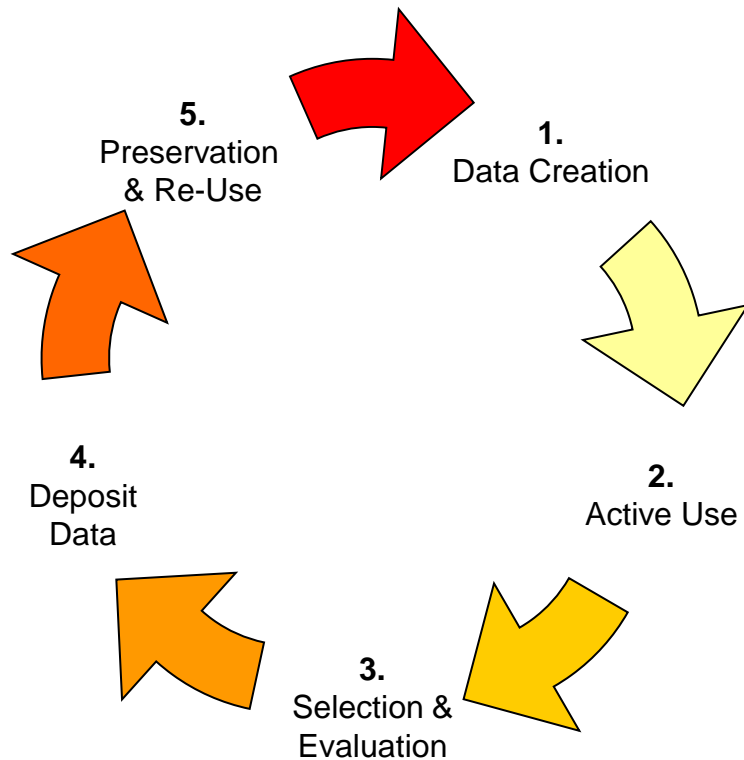
**Data
Management
Plan**



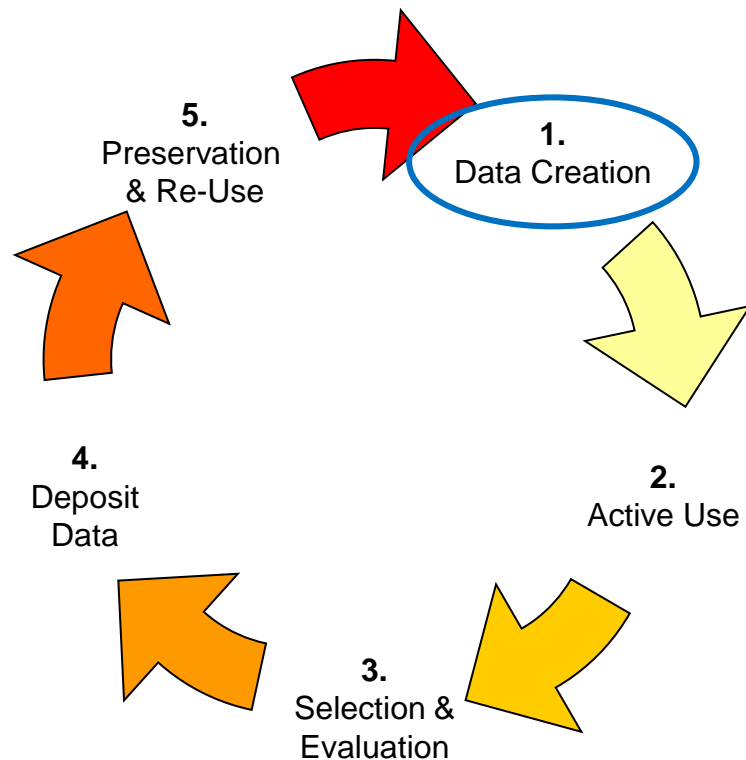
**Informs all
other stages**



Data Cycles & Management Plans



Data Cycles & Management Plans



- What data will I produce?

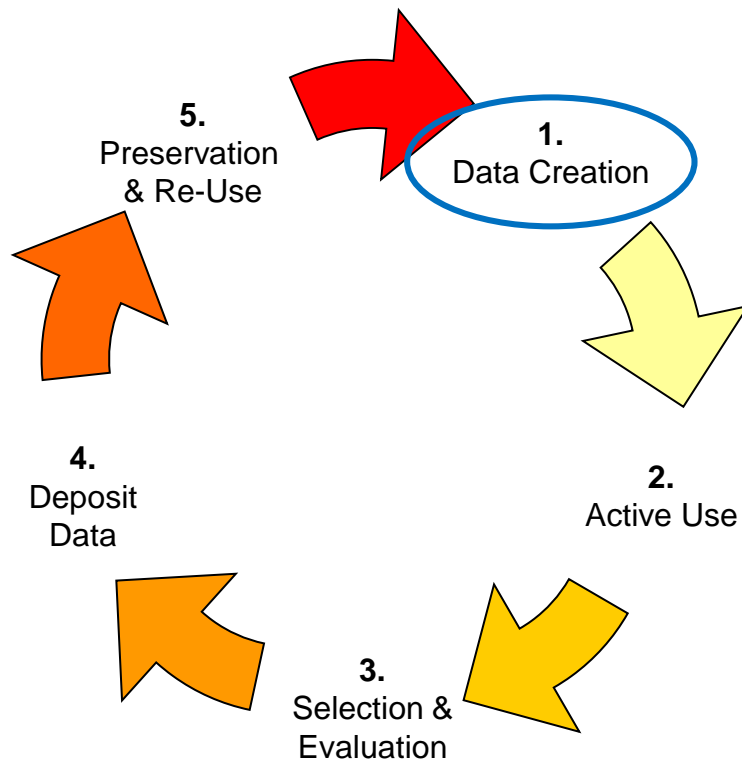
- Text documents
- Artefact analyses
- Sample analyses
- Survey data
- Drawings
- Photographs
- Recorded interviews
- Etc..

http://www.jiscdigitalmedia.ac.uk/infokit/file_formats/digital-file-formats

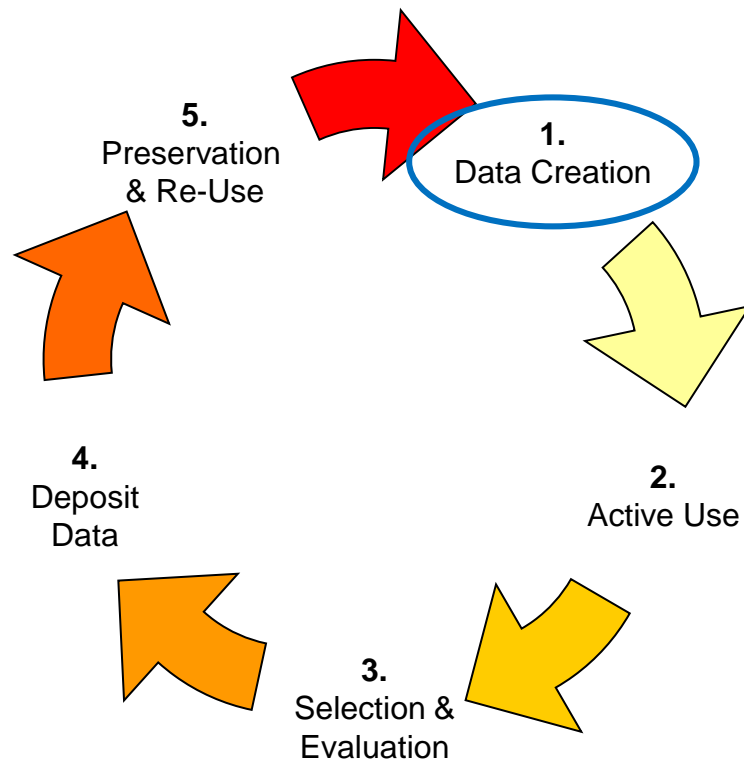
- Who will own data? Do I need permissions?

Data Cycles & Management Plans

- What data will I produce?
- How will I organise the data?



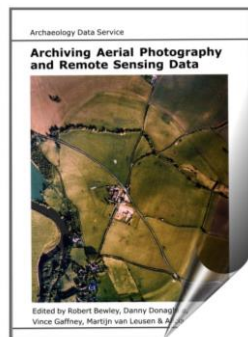
Data Cycles & Management Plans



- What data will I produce?
- How will I organise the data?
 - File structure
 - File naming and versioning
 - What file formats will I use?
 - Which software will I use?
 - Roughly how many files?
 - How will I describe and document my data? – **METADATA**

METADATA - Guides to Good Practice

- Digital Data (general)
- GIS
- CAD
- Geophysics
- AP & Remote Sensing
- Excavation & Fieldwork
- Virtual Reality
- UAV



Archaeology Data Service / Digital Antiquity Guides to Good Practice

Log in

- Home
- Full Table of Contents
- Digital Archiving
 - About these Guidelines
 - How to use these Guides
 - What is Digital Archiving?
 - Archival Strategies
- The Project Lifecycle
 - Planning for the Creation of Digital Data
 - Project Documentation
 - Project Metadata
 - Data Selection: Preservation Intervention Points
 - The Project Archive: Storage and Dissemination
 - Copyright and Intellectual Property Rights
- Basic Components
 - Documents and Texts

This new and revised series of Guides to Good Practice have been produced as the result of a two-year collaborative project between the UK Archaeology Data Service and Digital Antiquity in the US. The project has encompassed important revisions of the existing six ADS *Guides* as well as the development of entirely new documents covering areas such as marine survey, laser scanning, close-range photogrammetry, digital audio and digital video. The project has involved previous Guides authors revising existing content alongside new authors, from both Europe and the US, also contributing to the development of the guides into new themes and areas.

The project has been undertaken in collaboration with the Digital Antiquity initiative, a US-based project with the aim of enhancing the preservation of and access to digital records of archaeological investigations. A major aim of the Guides is to provide the basis for archaeological project workflows that will create digital datasets that can be archived and shared effectively by Digital Antiquity's tDAR archive and repository in the US and by the Archaeology Data Service in the UK. The development of the *Guides* involves close collaboration with teams in the US at both the University of Arkansas and Arizona State University.

Other ADS projects have also fed into the revision and development of the Guides. ADS involvement in the European VENUS project has formed the basis of a guide focussed on marine survey. In addition, the incorporation of findings from the ADS Big Data project, together with the revision of the existing guide on aerial photography and remote sensing data, has seen a significant contribution to the guides from English Heritage funded projects.

Previous versions of the ADS/AHDS Guides to Good Practice have been archived and are still available on the old Guides to Good Practice page.

View the full new Guides to Good Practice Table of Contents



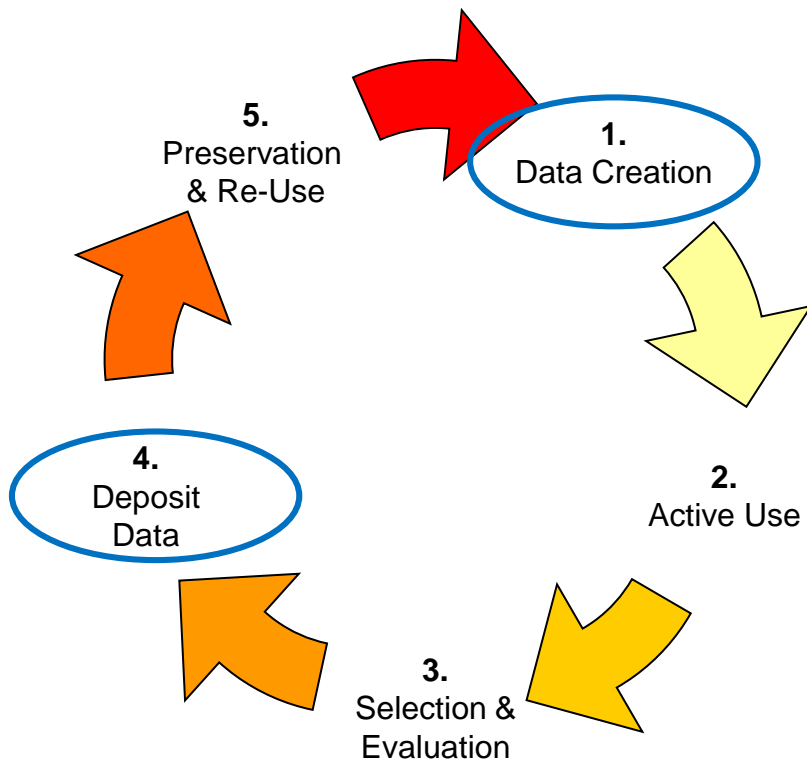
Silbury Hill, archive metadata

Location	World region	British Isles and Ireland
	British Isles country	England
	County	Wiltshire
	District	Kennet
	Parish	Avebury
	Place	Silbury Hill
	TGN	World, Europe, United Kingdom, England, Wiltshire, Silbury Hill (prehistoric site) [7032611]
Grid reference	OSGB	410011 168532
Grid reference	Latitude longitude bounding box	<div>51.4174300461</div> <div>-1.8605723152 -1.8541350603</div> <div>51.4138434794</div>
Subject	Archaeological Sciences (England)	SPECIALIST SAMPLING
	Archaeological Sciences (England)	ANTLER
	Event Type (England)	BOREHOLE SURVEY
	Event Type (England)	CORE SAMPLING
	Event Type (England)	ARCHAEOLOGICAL INTERVENTION

Silbury Hill, image metadata

Name of table	BulkFindsList	
Purpose of table	Records the bulk finds retrieved from site and from environmental samples.	
Number of rows	237	
Primary Key	UniqueBulkID	
Foreign Key	ContextNo (links back to the ContextIndex table); Material (links to GlossBulkFindMaterial look-up table); EstQuantity (links to Gloss_Finds_EstimatedQuantities look-up table)	
Name of field	Full description of field and codes or terminology used	Data type and field length
(PK) UniqueBulkID	A unique identifier for each instance of bulk finds entry.	AutoNumber-Long Integer
(FK) ContextNo	Unique identifier for the Context the finds are from. Field 01	Number-Long Integer
(FK) Material	Material. (What the artefact is made from:- controlled vocabulary, text to be retrieved from look-up table: GlossBulkFindMaterial) Field 75	Text-50
Weight	Weight in grams. No field number on form.	Number-Long Integer
Quantity	Number of artifacts/fragments associated with the record number. No field number on form.	Number-Long Integer
(FK) EstQuantity	None-numeric field for estimate quantities. No field number on form. (Controlled symbols used to display the estimated quantities, can be retrieved and defined from look-up table: Gloss_Finds_EstimatedQuantities).	Text-10
Box nos	Records which box the artefact was stored in. No field number on form.	Text-50

Data Cycles & Management Plans



- What data will I produce?
- How will I organise the data?
 - File structure
 - File naming and versioning
 - What file formats will I use?
 - Which software will I use?
 - Roughly how many files?
 - How will I describe and document my data? – **METADATA**
 - Do I have to follow any requirements?

Data Cycles & Management Plans



HOME ARCHSEARCH ARCHIVES LEARNING ADVICE OUR RESEARCH ABOUT US
ADVICE | PRESERVATION | GUIDES TO GOOD PRACTICE | NOTES AND PAPERS | TOOLS AND SERVICES

Guidelines for Depositors

Version 1.3, March 2008

1. Depositing with the ADS
 - 1.1. Why Deposit?
 - 1.2. How to Deposit
2. Creating and Documenting your data
 - 2.1. Part 1: Starting the Project
 - 2.1.1. Digital Archive Strategy
 - 2.1.2. The need for Metadata / Documentation
 - 2.1.3. File Naming Strategy
 - 2.2. Part 2: Creating and Documenting Your Files
 - 2.2.1. Overview of Preferred Data Formats
 - 2.2.2. Databases and Spreadsheets
 - 2.2.3. Geographical Information Systems
 - 2.2.4. Geophysics and Remote Sensing
 - 2.2.5. CAD and Vector Images
 - 2.2.6. Raster Images
 - 2.3. Part 3: Documenting the Project
 - 2.3.1. Creating Metadata Records for Datasets

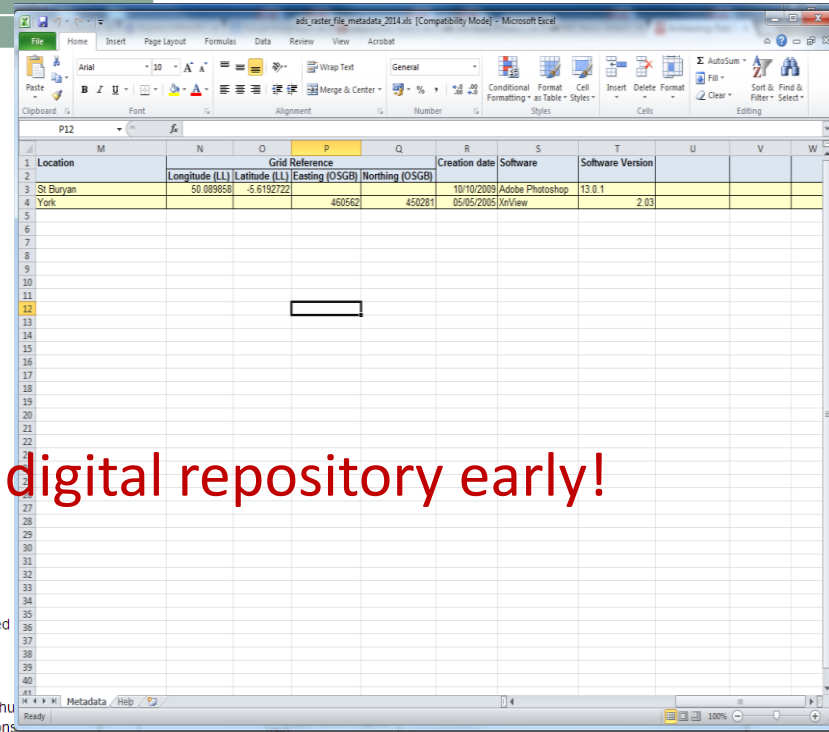
1. Depositing with the ADS

1.1. Why Deposit?

The Archaeology Data Service (ADS) collects, catalogues, manages, preserves, and encourages re-use of digital resources created. These pages describe the process of deposition and points to useful information about how to do it.

What is in the ADS collection?

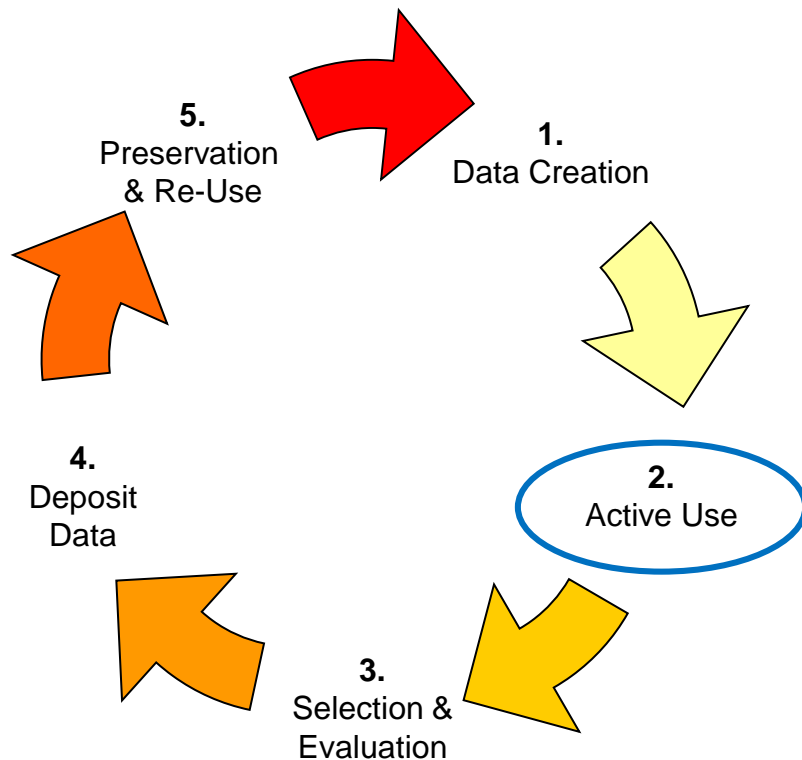
The ADS will provide an archival home for any archaeological data of interest to UK archaeologists. The ADS collections' scope is thus although priority will be given to the archaeology of the British Isles. Where existing archival bodies work to preserve digital collections collaborate with these bodies to facilitate more uniform access to on-line information. The ADS will prioritise its acquisitions policy according to perceived gaps in the provision of electronic information. Accessioned data will include CAD files, databases, digital aerial photograph interpretations, excavation



Location	Grid Reference				Creation date	Software	Software Version
	Longitude (LL)	Latitude (LL)	Eastings (OSGB)	Northings (OSGB)			
St Buryan	50.089856	-5.6192722	460562	450281	10/10/2009	Adobe Photoshop	13.0.1
York					05/05/2005	ArView	2.03

Talk to the digital repository early!

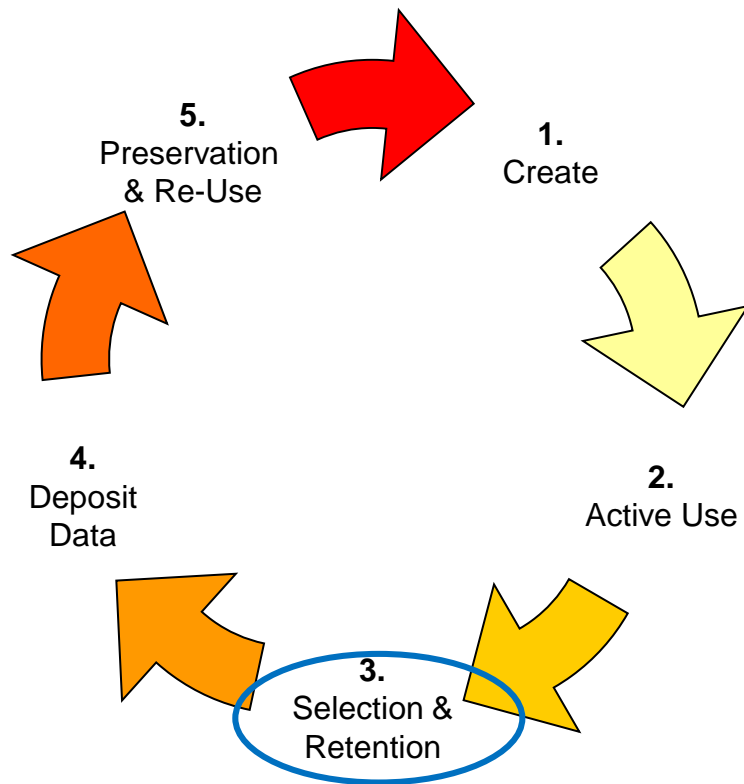
Data Cycles & Management Plans



- What standards and quality assurance might I use?
- How will I share data?
- How will I backup data?
- When will I evaluate if my data management is working?
 - Is the file structure / naming understandable to others?
 - Are further data required?
 - Are new data types required?

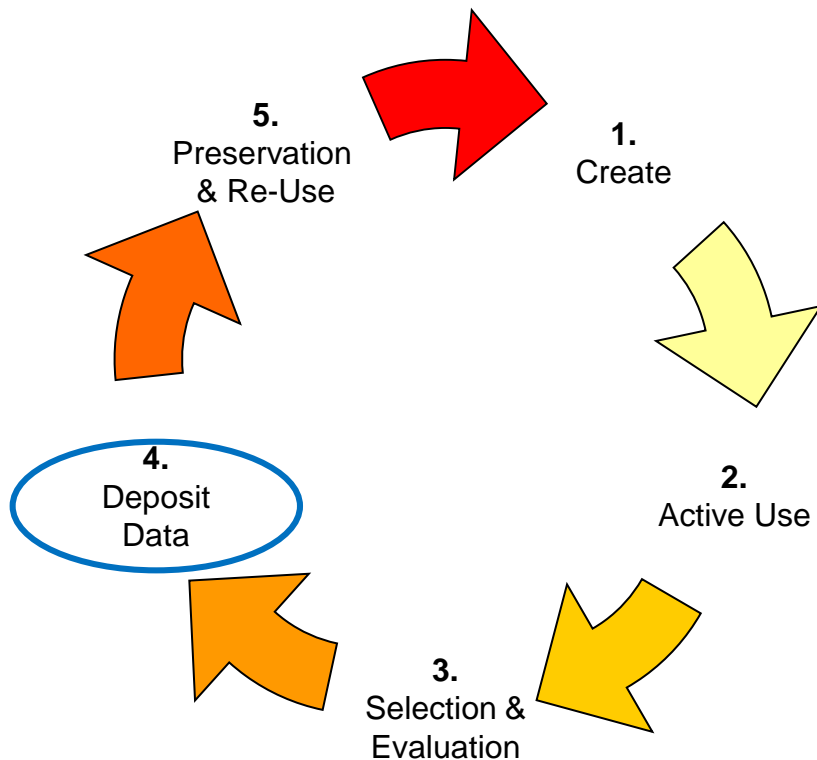
Data Cycles & Management Plans

- What data will I keep?
Selection and Retention strategy

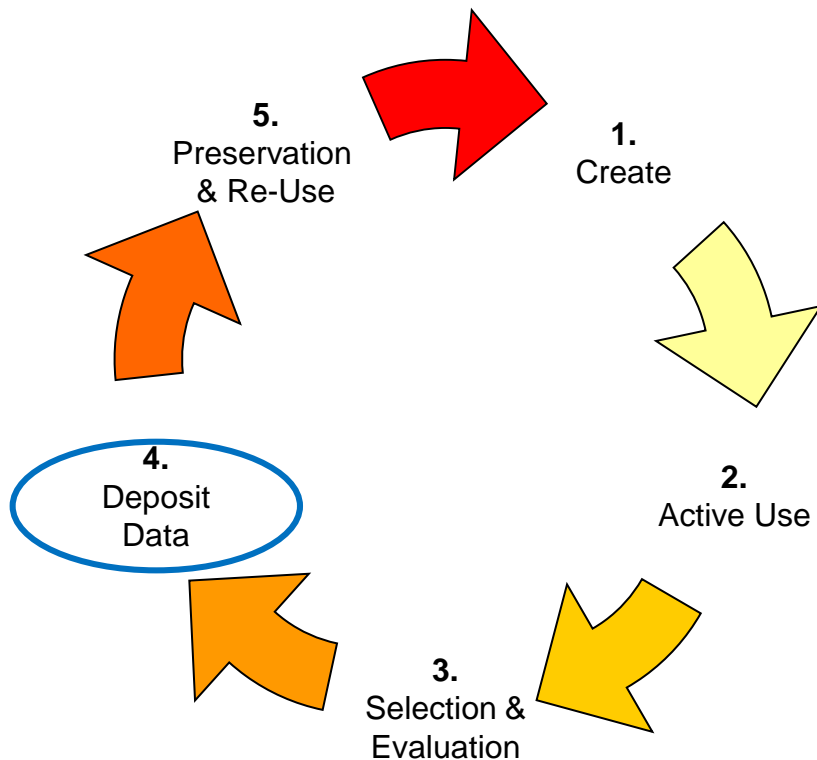


Data Cycles & Management Plans

- What data will be deposited and where?



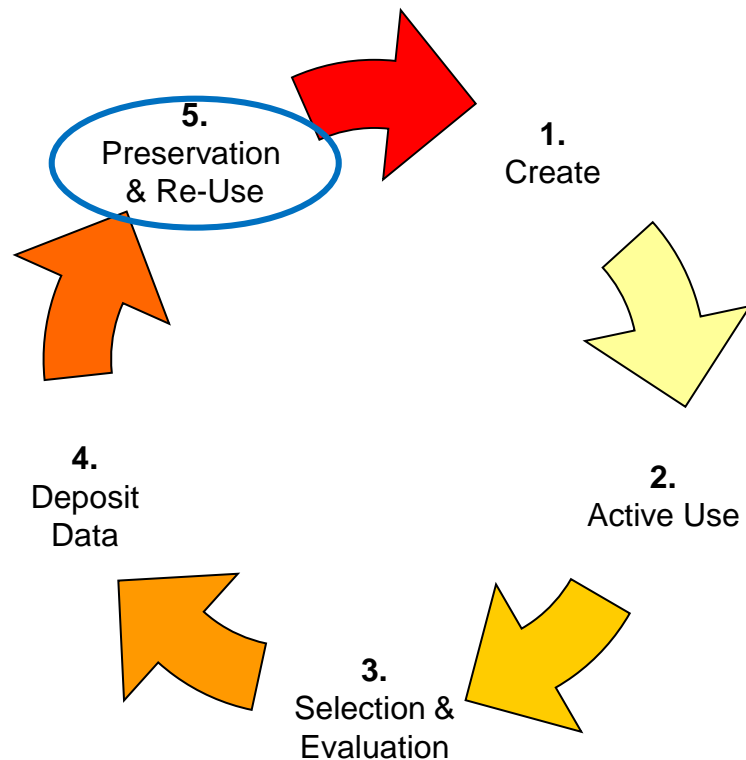
Data Cycles & Management Plans



- What data will be deposited and where?
 - Define the core data set of the project
 - Which data are supplementary?
 - Licences
 - Metadata
 - Where? Trusted Repository!

Talk to the digital repository early!

Data Cycles & Management Plans



- Who will be interested in re-using the data?
 - Who will be interested in re-using the data?
 - Is there sufficient information to allow easy re-use of the data?

Data Cycles & Management Plans

“The single most useful thing you can do to ensure the long-term preservation of your data is to plan for it to be re-used. Imagining it being reused by someone else who has never met you and who never will meet you, will cause you to approach the creation and design of your data in a new light.

Moreover, studies show that re-use of data is the single surest way of maintaining the integrity of data and tracking errors and problems with it. In short, always plan for re-use”

Prof. Julian Richards, Director ADS.

Creating a DMP: Some useful sources

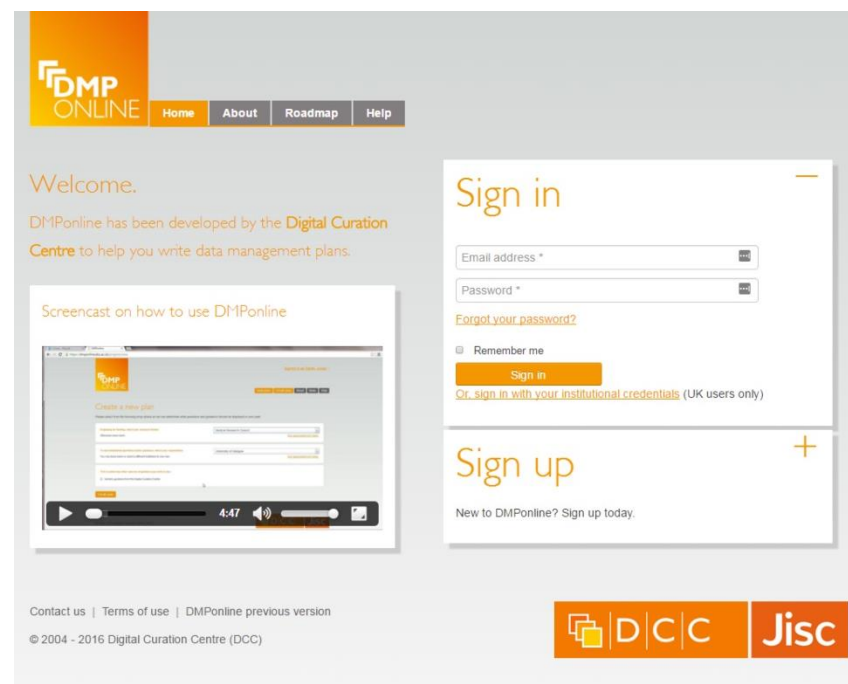


General guidance on data management and the creation of plans :-

<http://www.dcc.ac.uk/resources/data-management-plans>

DMP ONLINE

<https://dmponline.dcc.ac.uk/>



Why bother?

- Provides a **practical starting point** to help structure thoughts on your research/project
- Improves efficiency
- Help others understand the research process and how it developed
- Helps plan for data **reuse** by others, so the full potential of a research can be realised. Its lifecycle doesn't end here!
- Shows we take research integrity seriously and therefore increases trust in the archaeological community
- It is good practice
- Funding bodies require it!

What could go wrong?

- Cats-in-a-tent photos....and more
- Oral history project with no consent forms and therefore no audio files!

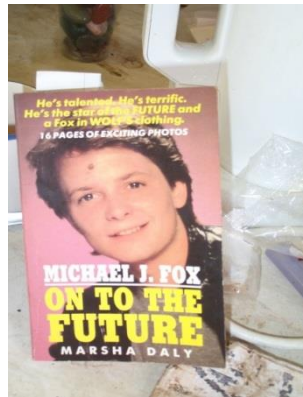
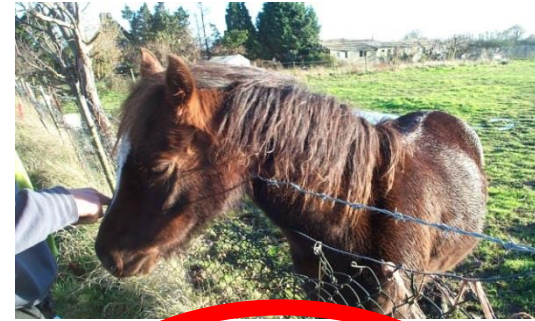
Downloads

We regret that we are unable to offer the archived audio files for this project at present due to copyright restrictions.

- Project in the red sea with videos of the rock of Gibraltar
- **Recently** an archive with the wrong archaeological site name in all the metadata



Odd one out – which image was included in a deposit but is not on the ADS web site?



For an example of poor data management:

<https://archaeologydataservice.ac.uk/learning/uniworkshop2020.xhtml>

For an example of good data management:

Denisova 11 Human Bone Fragment
ForSEAdiscovery

Teagan Zoldoske

teagan.zoldoske@york.ac.uk

Archaeology Data Service

Department of Archaeology

The King's Manor

University of York

York

YO1 7EP



Follow us on Instagram:
@archaeologydataservice



Follow us on Twitter:
@ADS_Update



Like us on Facebook:
<http://www.facebook.com/archaeology.data.service>

Questions

1. What is shown in photograph DCP _2707.jpg?
2. On what plan is Context 890 drawn?
3. What contexts appear on Section drawing 249?
4. In which phases /stratigraphic groups are post-holes 1231, 1235 and 1243?
5. List the finds recovered and recorded from Context 931.
6. In what type of feature was Small Find 6 found?
7. What is Small Find 6 and what is it made from?
8. How many fragments of worked flint came from contexts 89 and 1704?
9. Describe the cortex condition of the above fragments.
10. How many pottery jar sherds are there in Context 89?
11. What is the meaning of pottery form 'P'?
12. What is the meaning of Roman pottery type BS?
13. Explain Table J Overall Forms by Period B1 and B2.

Answers

1. What is shown in photograph DCP _2707.jpg? **No idea**
2. On what plan is Context 890 drawn? **80/520**
3. What contexts appear on Section drawing 249? **1173,1174,1175,1176**
4. In which phases /stratigraphic groups are post-holes 1231, 1235 and 1243? **Group 34 Phase 1.6 LBA**
5. List the finds recovered and recorded from Context 931.
Worked stone 1/0g, Worked stone 1/0, Stone tile 1/0, Roman pot 28/303, Daub 81109, Fe object 2/377
6. In what type of feature was Small Find 6 found? **Pit 1141 context 1105**
7. What is Small Find 6 and what is it made from? **Loomweight, Fired clay**
8. How many fragments of worked flint came from contexts 89 and 1704? **4 and 2.**
9. Describe the cortex condition of the above fragments. **No idea, 89 = f.**
10. How many pottery jar sherds are there in Context 89? **15**
11. What is the meaning of pottery form 'P'? **No idea**
12. What is the meaning of Roman pottery type BS? **No idea**
13. Explain Table J Overall Forms by Period B1 and B2. **Haven't a clue!**