



Assessment Information

[CoreTrustSeal Requirements 2017–2019](#)

Repository:

Archaeology Data Service

Website:

<https://archaeologydataservice.ac.uk/>

Certification Date:

27 April 2020

This repository is owned by:

University of York

CoreTrustSeal Board

W www.coretrustseal.org

E info@coretrustseal.org



Archaeology Data Service

Notes Before Completing the Application

We have read and understood the notes concerning our application submission.

True

Reviewer Entry

Reviewer 1

Comments:

Reviewer 2

Comments:

CORE TRUSTWORTHY DATA REPOSITORIES REQUIREMENTS

Background & General Guidance

Glossary of Terms

BACKGROUND INFORMATION

Context

R0. Please provide context for your repository.

Repository Type. Select all relevant types from:

Domain or subject-based repository, Publication repository, Library/Museum/Archives, Research project repository

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

Brief Description of Repository

The Archaeology Data Service (ADS) is a digital repository that has been supporting research, learning and teaching with freely available, high quality and dependable digital resources for over 20 years. It does this by preserving digital data in the long term, and by promoting and disseminating a broad range of historic environment data including both terrestrial and marine resources. The ADS promotes good practice in the use of digital data in archaeology, provides technical advice to the research community, and supports the deployment of digital technologies.[n1]

[1] About our Work - <http://archaeologydataservice.ac.uk/about/ourWork.xhtml>

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

Brief Description of the Repository's Designated Community.

The ADS provides preservation services to UK-based practitioners and researchers, and also provides open access to digital data for those within the UK and International archaeological and heritage communities. Throughout our history we have broadened our scope to support those working within the research and university environments, the commercial archaeological sector, history and heritage organisations, museums, secondary and tertiary education, community archaeology and heritage groups.[n2] Research carried out by Beagrie and Houghton concluded that the ADS:

"... has a broad range of users including commercial archaeological contractors, as well as academic archaeologists in universities. Compared to many data services it also has a very high proportion of private individuals as users" [n3]

The ADS seeks to engage with those working within its community by taking an active role, alongside national and international stakeholders, to advocate on behalf of digital preservation and to actively promote the increased accessibility of digital data produced within the archaeological and historical environment sectors. As part of this commitment to

working with the wider heritage sector, the Archaeology Data Service (ADS) is a member of the Bedern Group [n4], an alliance of the key agencies concerned with the preservation of the intellectual record of the historic environment of the UK, convened under the auspices of the Digital Preservation Coalition (DPC). [n5]

Representatives from key stakeholders, funding bodies, and user communities, alongside the internal management team, form the ADS Management Committee which supervises, advises and monitors the work being carried out by the repository. [n6] Members of this Management Committee meet annually to assist in the development of strategic goals, monitor progress and represent the wider historic environment sector. [n7]

The ADS plays an active role within the wider Digital Preservation Community, and the group of organisations concerned with the archiving of digital materials from the archaeological and heritage sector. The ADS is an Associate member of the DPC, and regularly attends and contributes to wider DPC events and initiatives. Within the international archaeological sector the ADS takes a leading role in advocating Digital Preservation. Individuals sit on various boards and special interest groups, and often work with like-minded organizations to advocate best practice and understanding. The ADS hosts a range of materials for archaeologists working with digital archives, from advice on topics such as digitisation and selection and retention [n8] to specific technical guidance on best practice for creation and documentation of digital materials. [n9] Careful consideration is given to presenting advice to the community in terms that can be clearly understood by the designated sector, and with appropriate examples, while also retaining the standards and levels of best practice from the wider non-archaeological community.

[2] see ADS' Five Year Strategic Plan, October 2016 - October 2021.

[3] Beagrie & Houghton 2013:12.

[4] <https://www.dpconline.org/our-work/working-groups-and-task-forces/bedern-group>, accessed 09 March 2020.

[5] <https://www.dpconline.org/>, accessed 09 March 2020.

[6] <https://archaeologydataservice.ac.uk/about/governance.xhtml>

[7] <https://archaeologydataservice.ac.uk/about/managementCommittee.xhtml>

[8] <https://archaeologydataservice.ac.uk/advice.xhtml>

[9] Guides to Good Practice - <http://guides.archaeologydataservice.ac.uk/g2gpwiki/>.

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

Accept

Level of Curation Performed. Select all relevant types from:

C. Enhanced curation – e.g. conversion to new formats; enhancement of documentation

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

Accept

Comments

C. Enhanced curation – e.g., conversion to new formats, enhancement of documentation. The ADS follows a migration-based preservation strategy, which involves the normalisation of datasets into software independent formats at the point of ingest, and the migration of that data over time (refreshment). [n10] Documentation and metadata enhancement is carried out in collaboration with the depositor. All normalisation, migration and enhancement activities are documented in the ADS' Collection's Management System (CMS) and Object Metadata Store (OMS). [n11] Both the CMS and OMS are internal systems which for security reasons have protected and restricted access.

'Data-level curation' is carried out, but only in collaboration with the depositor, typically following a request by the depositor, a digital archivist or data user. Any updated data is re-submitted to the repository and forms part of a new version of the dataset. All data objects are managed through the OMS, where technical metadata (e.g. file name, file location, file size, etc.) and file characterization documentation is stored, (e.g. file type, file version, pronom id, mime type, etc.) for all files. At the same time fixity values are created for all files. All actions and processes carried out on data are documented within the CMS, while data integrity is maintained through regular fixity checks on both active and closed archives.

Details on the curation process are outlined in the ADS Preservation Policy. [n12]

[11] Available internally only.

[12] <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#PresPol>.

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

Accept

Outsource Partners. If applicable, please list them.

[n13] The ADS is a not-for-profit organisation hosted by the University of York (UoY). The UoY is the legal entity for all services, consultancy and research carried out by the ADS and provides office space and service provision to allow the

ADS to function. ADS finances are also managed by the UoY. The specifics of this relationship are expressed in the ADS MoU with the University of York Registrar and Finance 2012. [n14]

The UoY also provides computing and technical support for the ADS; hosting its collections, resources and website through a series of virtual machines. The UoY also provides short and medium-term storage for all datasets held within the repository. [n15] While a formal Service Level Agreement (SLA) for the Provision of Information Technology Services between the ADS and the UoY IT Services defines the needs and responsibilities of both parties. [n16] As part of the UoY the ADS is also subject to the policies and guidelines outlined by its host organisation. [n17]

Previously the ADS held a formal SLA with the UK Data Archive (UKDA) [n18], at the University of Essex, to provide remote, long-term storage facilities for datasets held by the repository. The UKDA has been awarded the Data Seal of Approval. [n19] As this has expired expiring the ADS has recently implemented a cloud-based alternative, to replace the UKDA off-site storage, with storage via Amazon Web Services (AWS) for long-term/deep storage of the off-site backup only. [n20] The SLA for Amazon S3 Glacier SLA is available. [n21] The specifics of this relationship are outlined in the Storage and Resilience section of the ADS Preservation Policy. [n22]

[13] <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Partners>.

[14] <https://archaeologydataservice.ac.uk/manPages/mou.xhtml>.

[15] See the Systems Overview - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Systems>.

[16] <https://archaeologydataservice.ac.uk/manPages/mou.xhtml>.

[17] <https://www.york.ac.uk/about/departments/support-and-admin/information-services/information-policy/index/>, accessed 09 March 2020. specifics of this relationship are outlined in the ADS Outsource Partners - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Partners> and expressed within the Preservation Policy - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#PresPol>, section on Storage and Resilience section.

[18] <http://www.data-archive.ac.uk/>, accessed 09 March 2020.

[19] <http://www.data-archive.ac.uk/curate/trusted-digital-repositories/standards-of-trust>, accessed 09 March 2020.

[20] <https://aws.amazon.com/>, accessed 09 March 2020.

[21] <https://aws.amazon.com/s3/sla/>, accessed 09 March 2020.

[22] <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#PresPol>.

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

Accept

Other Relevant Information.

The ADS works closely with a number of national heritage agencies (e.g. Historic England (HE), [n23] Historic Environment Scotland (HES) [n24] and the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) [n25] providing preservation services, guidance and expertise. We also advocate for the preservation and increased accessibility of digital datasets within the heritage sector through our involvement with the Chartered Institute for Archaeologists (CIfA) [n26], the Association of Local Government Archaeological Officers (ALGAO) [n27], the Collections Trust [n28], and the Council for British Archaeology (CBA) [n29]. Formal memorandum of understanding with these organisations have been created where appropriate [n30]. The ADS is also a founding member of the Bedern Group, an alliance of key national agencies within the UK concerned with the preservation of the intellectual record of the historic environment. [n31]

Outside of the heritage sector the ADS acts as an accredited data archive centre for historic environment datasets within the Marine Environmental Data and Information Network (MEDIN) [n32] and Natural Environment Research Council's (NERC). [n33] We also take an active role in the wider data preservation community with associate membership of the Digital Preservation Coalition (DPC). [n34] The partnership with the DPC has allowed the ADS to continue to play a significant role in championing digital preservation, and the organisation regularly contributes papers, case studies and reviews contributions to DPC initiatives and outputs. The role of the ADS within the UK digital preservation was recognised in 2012 when the ADS was awarded the DPC's Decennial Award for the most outstanding contribution to digital preservation of the preceding decade.

The ADS is also involved in a pan-European network of organisations within the heritage sector and data preservation communities through involvement in a variety of research projects. [n35] The ADS acts as Deputy Coordinator for ARIADNEplus [n36], the H2020 European e-infrastructure for Archaeology, and is a key UK partner in E-RIHS [n37] and UKRIHS. [n38] It is one of only two archaeological partners in Social Sciences and Humanities Open Cloud (SSHOC) [n39], where it is working with representatives of DARIAH, CESSDA and CLARIN towards the development of EOSC (the European Open Science Cloud).

Most recently the ADS is leading a European Cooperation in Science and Technology (COST) project, Saving European Archaeology from the Digital Dark Age (SEADDA) [n40], which aims to bring archaeologists and data management specialists together to share expertise, and create resources that allow them to address digital preservation problems within their own countries. The ADS also maintains close relationships with colleagues in North America, principally Digital Antiquity which maintains The Digital Archaeological Record (tDAR) [n41] repository, and for which the ADS Director sits on the board of directors.

The ADS is an advocate for FAIR (Findability, Accessibility, Interoperability and Re-usability) and the FAIR principles for data stewardship. [n42] As such we recognise that while preservation and dissemination of data remain of core importance, stewardship should also include demonstratable quantitative and qualitative evidence for data reuse. The ADS is actively investigating how the datasets it curates can be fully compliant with the FAIR principles and is working within ARIADNE, ARIADNEplus and E-RIHS to promote this.

The usage and impact of the repository data holdings are documented in the RIN/JISC report on the usage and impact of

a series of data centres and repositories in the UK. [n43] While a subsequent study on the value, impact and sustainability of the ADS provides a more focused appraisal. [n44]

The ADS curates and disseminates some 2977 collections covering a broad range of archaeological and heritage datasets and data types. [n45] The repository preserves some 42 international, national and regional journals and series and disseminates these through its ADS Library service. [n46] The repository, through the OASIS system, has accessioned and preserved over 57000+ grey literature reports (rising by 8208 in 2018-2019) and disseminates these through the ADS Library. [n47] As of 2018-2019, the repository has a broad social media following (2828 on Facebook [n48], 6348 on Twitter [n49], 518 on LinkedIn [n50] and 684 on Instagram [n51]). A fuller appraisal of statistics associated with the development of the repository can be found within the ADS' Annual Reports. [n52]

[23] <https://historicengland.org.uk/>, accessed 09 March 2020.

[24] <https://www.historicenvironment.scot/>, accessed 09 March 2020.

[25] <https://rcahmw.gov.uk/>, accessed 09 March 2020.

[26] <https://www.archaeologists.net/>, accessed 09 March 2020.

[27] <https://www.algao.org.uk/>, accessed 09 March 2020.

[28] <https://collectionstrust.org.uk/>, accessed 09 March 2020.

[29] <http://new.archaeologyuk.org/>, accessed 09 March 2020.

[30] <https://archaeologydataservice.ac.uk/about/memorandaOfUnderstanding.xhtml>

[31] <https://www.dpconline.org/our-work/working-groups-and-task-forces/bedern-group>, accessed 09 March 2020.

[32] <https://www.medin.org.uk/about/data-archive-centres>, accessed 09 March 2020.

[33] <https://nerc.ukri.org/research/sites/data/>, accessed 09 March 2020.

[34] <https://www.dpconline.org/>, accessed 09 March 2020.

[35] <https://archaeologydataservice.ac.uk/research/projects.xhtml>

[36] <https://ariadne-infrastructure.eu/>, accessed 09 March 2020.

[37] European Research Infrastructure for Heritage Science - <http://www.e-rihs.eu>, accessed 09 March 2020.

[38] <https://e-rihs.ac.uk>, accessed 09 March 2020.

[39] <https://sshopencloud.eu/>, accessed 09 March 2020.

[40] <https://www.seadda.eu/>, accessed 09 March 2020.

[41] <https://www.tdar.org/about/>, accessed 09 March 2020.

[42] Wilkinson, M. D., et al. (2016) 'The FAIR Guiding Principles for Scientific Data Management and Stewardship.' *Scientific Data* 3: Article Number: 160018. <https://doi.org/10.1038/sdata.2016.18>; Wright, H & J. D. Richards (2018) 'Reflections on Collaborative Archaeology and Large-Scale Online Research Infrastructures', *Journal of Field Archaeology*, 43:sup1, S60-S67. <https://doi.org/10.1080/00934690.2018.1511960>.

[43] Technopolis (2011) 'Research Information Network: Data centres: their use, value and impact'. The Research Information Network: London http://www.rin.ac.uk/system/files/attachments/Data_Centres_Report.pdf, accessed 09 March 2020.

[44] Beagrie, N & Houghton, J (2013) *The value and impact of the Archaeology Data Service. A study and methods for enhancing sustainability*. Charles Beagrie Ltd: Salisbury. http://repository.jisc.ac.uk/5509/1/ADSReport_final.pdf, accessed 09 March 2020.

- [45] <https://archaeologydataservice.ac.uk/archive/archives.xhtml>
- [46] <https://archaeologydataservice.ac.uk/library/>
- [47] <https://archaeologydataservice.ac.uk/archives/view/greylit/>
- [48] <https://www.facebook.com/archaeology.data.service/>
- [49] https://twitter.com/ADS_Update and https://twitter.com/ADS_chatter
- [50] <https://www.linkedin.com/company/archaeology-data-service>
- [51] <https://www.instagram.com/archaeologydataservice/>
- [52] <https://archaeologydataservice.ac.uk/about/annualReports.xhtml>

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

Accept

ORGANIZATIONAL INFRASTRUCTURE

I. Mission/Scope

R1. The repository has an explicit mission to provide access to and preserve data in its domain.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:

4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

Response:

The ADS is the leading accredited [n53] digital repository for heritage data [n54] generated by UK-based fieldwork and research. Founded in 1996 [n55], the core activity of the ADS is the long-term digital preservation of the data entrusted to our care. To do this we follow a policy of active data management [n56] and curation [n57] to ensure the integrity, reliability and accessibility in perpetuity of all our data. [n58] All resources archived with the ADS are Open Access [n59], and delivered through our website to facilitate re-use by the heritage sector and wider community. The ADS is a world leader in promoting good practice [n60] in the use of digital data in archaeology, providing technical advice to the research community and taking the lead in a wide range of research projects. [n61] The ADS works within International e-infrastructure collaborations such as ARIADNE [n62] to explore new ways of connecting archives around the world, creating a genuinely global network for communication that cuts across traditional research boundaries.

Over the next five years ADS aims to further enhance its position within the UK historic environment community, capitalize on its standing within the international archaeological and digital heritage communities, and leverage its reputation in different spheres to become the first port of call for Open Access data, and made available according to the FAIR principles.

The ADS will provide digital preservation services to UK-based archaeological and heritage practitioners and researchers: primarily commercial practitioners (i.e those operating within UK national planning frameworks or large-scale infrastructure projects), UK HE academics, and locally based researchers and independent groups. The ADS will preserve the full range of data that generated by its community, including but not limited to:

- Born digital and digitised documents
- Tabular data, including spreadsheets or databases
- Raster and Vector imagery
- Geospatial data
- Geophysical analysis and techniques
- Remote sensing, including LIDAR
- 3D models
- Video and Audio data
- Medical imagery, including X-ray and CT scans
- Laser and structured light scanning, including Polynomial Texture Mapping (PTM) and Reflectance Transformation Imaging (RTI)

The ADS will play a prominent leadership role within its UK community, advocating the role of digital preservation and working with partners to continue to embed preservation within the wider community standards and guidance for archaeological work being undertaken in the UK. The ADS will also continue to lead the pan-European response from heritage agencies in developing standards, guidance and methodologies for digital preservation and guidance for those wishing to establish digital repositories in their own countries. In 2019 the ADS Director became the Action Chair for a new COST Action: SEADDA [n63], which has been joined by 31 European partner countries, and four international partner countries: in Argentina, Canada, Japan and the United States.

ADS will also further enhance its standing within the international digital preservation community by assuring its work is aligned to appropriate international digital preservation accreditation and data management standards, by proactively engaging with the preservation community, and advocating its work on guidelines and standards to a wider community to ensure the ADS remains at the forefront of data management and digital preservation. [n64]

Specifics of this vision statement are framed by the Five-year Strategic Plan [n65] which is reviewed, and then ratified by the ADS Management Committee. [n66] The Management Committee, which includes representatives from key stakeholders, funders, digital preservation experts and user communities, provides accountability and ensures that the ADS continues to work towards this strategic vision. Details of progress are circulated to the management committee, discussed during the annual meeting, and also documented with the Annual Reports. [n67]

[53] <https://archaeologydataservice.ac.uk/about/accreditation.xhtml>

[54] <https://archaeologydataservice.ac.uk/advice/collectionsPolicy.xhtml>

[55] <https://archaeologydataservice.ac.uk/about/background.xhtml>

[56] <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Ingest>

[57] <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#RepOp>

[58] <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#PresPol>

[59] <https://archaeologydataservice.ac.uk/advice/termsOfUseAndAccess.xhtml>

[60] <https://guides.archaeologydataservice.ac.uk/g2gpwiki/>

[61] <https://archaeologydataservice.ac.uk/research/projects.xhtml>

[62] <https://ariadne-infrastructure.eu/>, accessed 09 March 2020.

[63] <https://www.seadda.eu/>, accessed 09 March 2020.

[64] See Strategic Plan - <https://archaeologydataservice.ac.uk/about/strategicPlan.xhtml>

[65] See Strategic Plan - <https://archaeologydataservice.ac.uk/about/strategicPlan.xhtml>

[66] See above and <https://archaeologydataservice.ac.uk/about/governance.xhtml>

[67] <http://archaeologydataservice.ac.uk/about/annualReports.xhtml>

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

Accept

II. Licenses

R2. The repository maintains all applicable licenses covering data access and use and monitors compliance.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:

4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

Response:

The University of York is the legal entity for all services, consultancy and other contracts carried out by the ADS, with an archive level deposit licence for use with both individual and institutional depositors that has been implemented to protect the rights of depositors, users and repository.

Between 1996 and 2018 the ADS held and disseminated data under a non-exclusive repository specific deposit licence. [n68]

Since late 2018 the deposit licence has been updated, moving towards one aligned with the Creative Commons Attribution 4.0 International License. [n69] This was enacted to align current practice with extant rights and access standards used throughout the wider archiving and preservation landscape. All licence and rights information is clearly shown within the collection interface and includes links to the appropriate terms of use and access.

Other access arrangements are enacted on the request of depositors, typically these follow established copyright and legal statements of use and reuse. [n70] The terms of access and dissemination of a dataset are defined in Annex B of the deposit licence.

In signing the licence the depositor acknowledges that they are “the owner of the copyright and associated intellectual property rights” or that they are authorised by the same to grant permission for the ADS to hold and disseminate data. [n71] If there are changes to the rights associated with the deposit it is the responsibility of the depositor to notify the ADS. [n72] All datasets are monitored during accession, as per the Ingest Manual, [n73] and in those instances where ownership, or rights issues, are identified and remain unresolved to the satisfaction of the repository, or other rights holder, then the ADS may refuse to accept that part of the deposition affected, or even the entire dataset.

All data is freely accessible under the terms of the deposit licence [n74] alongside Copyright and Liability Statements, the Common Access Agreement and the Website Terms and Conditions. [n75] As per the terms of the licence the ADS shall “not be under any obligation to take legal action on behalf of the Depositor or other rights holders in the event of breach of

intellectual property rights, the Access Licence, or any other right in the Data Collection". [n76]

In circumstances where rights infringement, or content objections, are made by rights holder, data consumers or website users, the ADS has a prescribed process for dealing with these complaints (see Website Terms and Conditions). [n77]

[68] Deposit Licence (pre-2018) - http://archaeologydataservice.ac.uk/resources/attach/ads_licence_form.pdf.

[69] <https://creativecommons.org/licenses/by/4.0/>, also see specifically Deposit Licence (2018) -

https://archaeologydataservice.ac.uk/resources/attach/ADS_Deposit_Licence_2018.pdf.

[70] For example, Creative Commons Attribution-NonCommercial 4.0 International -

<https://creativecommons.org/licenses/by-nc/4.0/>

[71] See Deposit Licence (2018), Section 4.3.1.

[72] See Deposit Licence (2018), Section 4.3.5-6.

[73] See Ingest Manual - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Ingest>, section on Documentation and Integrity Check.

[74] See Deposit Licence (2018) -

https://archaeologydataservice.ac.uk/resources/attach/ADS_Deposit_Licence_2018.pdf.

[75] Copyright and Liability Statements -

<https://archaeologydataservice.ac.uk/advice/termsOfUseAndAccess.xhtml#CopyrightSecuriAndLiabilityStatement>;
Common Access Agreement -

<http://archaeologydataservice.ac.uk/advice/termsOfUseAndAccess.xhtml#CommonAccessAgreement>; Website Terms and Conditions - <https://archaeologydataservice.ac.uk/advice/WebsiteTerms.xhtml>.

[76] See Deposit Licence (2018), Section 5.1.7.

[77] See Website Terms and Conditions: Objections -

<https://archaeologydataservice.ac.uk/advice/WebsiteTerms.xhtml#Objections>.

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

Accept

III. Continuity of access

R3. The repository has a continuity plan to ensure ongoing access to and preservation of its holdings.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:

4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

Response:

The University of York (UoY) is the legal entity for all services, consultancy and other contracts carried out by the ADS. As explicitly expressed in the deposit licence it is the UoY that takes overarching responsibility for the ongoing preservation and access to ADS' collections should it cease to function. Should this happen responsibility for the archive would pass to Information Services, at the UoY. Specifics of this agreement are outlined in two Memorandum of Understanding with the UoY covering financial responsibility [n78] and also succession and continuity planning. [n79]

Similarly, financial and budgetary responsibility for ADS lies with the Department of Archaeology and the UoY. As part of its annual budget the ADS maintains a 'reserve account' which is intended to fund the transfer of the archive, and its responsibilities, to another organisation (i.e. the UoY) should it cease to function. Specifics of this arrangement are given in a Memorandum of Understanding between the University of York, Archaeology Data Service and the Department of Archaeology (University of York). [n80]

The medium and long-term future is outlined in the Five-Year Strategic Plan and is reviewed annually by the ADS Management Committee. [n81] All agreed updates or changes to this plan are documented in the Annual Report. [n82]

[78] See ADS MoU with University of York Registrar and Finance 2012

<https://archaeologydataservice.ac.uk/manPages/mou.xhtml>

[79] See ADS MoU with University Information Services & Library 2016 -

<https://archaeologydataservice.ac.uk/manPages/mou.xhtml>

[80] <https://archaeologydataservice.ac.uk/manPages/mou.xhtml>

[81] <https://archaeologydataservice.ac.uk/about/governance.xhtml>

[82] <http://archaeologydataservice.ac.uk/about/annualReports.xhtml>

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:
Accept

IV. Confidentiality/Ethics

R4. The repository ensures, to the extent possible, that data are created, curated, accessed, and used in compliance with disciplinary and ethical norms.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository

Response:

The ADS maintains a Policy and Guidance on the Deposition of Sensitive Digital Data [n83] and will only accept personal, confidential and sensitive data for deposit and immediate dissemination either when it is anonymised and/or when it is accompanied with written consent from the contributor, in line with current ethical and legislative standards within the archaeological and heritage communities. This is a policy used in conjunction with the Guidance on the Selection of Material for Deposit and Archive, which provides wider advice on the selection and retention of data for archiving. [n84]

Ethical and legal concerns for a dataset are often identified and discussed by the Collections Development Manager during any negotiations for the deposition of data, and often in advance of data capture. In this way the ADS hopes to help depositors plan for deposition and mitigate against future difficulties which are often hard to redress after data collation has been completed. In these instances depositors are directed towards the ADS' Guidance on the Selection of Material for Deposit and Archive and Policy and Guidance on the Deposition of Sensitive Digital Data. [n85] Further checks of datasets are made by digital archivists during the accession of a collection [n86] and any data that shows evidence of a disclosure risk or breaches the Policy and Guidance on the Deposition of Sensitive Digital Data is highlighted to the depositor. The depositor is then given an opportunity to respond to these concerns. If the depositor is unable to supply suitably anonymised versions of the file or entire dataset, or to add appropriate documentation which authorises the ADS to hold and disseminate the data then, typically, the ADS would refuse to accept the affected part, or even the entire dataset. As an additional legal safeguard, all depositors signing the ADS deposit licence acknowledge that “the Data

Collection is not and shall be in no way a violation or infringement of any copyright, trademark, patent, or other rights whatsoever of any person”. [n87]

If data is believed to contain sensitive or confidential information then depositors can opt to ‘embargo’ data for a prescribed period, typically this is for 2-5 years where the disclosure risk is regarded as ‘low’, although in instances where the risk is ‘high’, or where the dataset contains personal or identifiable data, embargoes of up to 70 years can be arranged. These policies are outlined in the Collections Policy, and more specifically the Policy and Guidance on the Deposition of Sensitive Digital Data (see especially sections on ‘data embargos’ and ‘embargo periods’). [n88] Any data that exhibits a disclosure risk, and/or has been the subject of an embargo, is stored on data servers with restricted access until any risk has been mitigated, or the embargo period has passed.

All data collections deposited with the ADS are accompanied by metadata that includes information that acknowledges the rights holders of the dataset, and these are clearly displayed within the interface for discrete collections and datasets.

At the same time some its services (e.g. OASIS [n89] and ADS-easy [n90]) necessitate the collection of personal information to facilitate the effective management of collections and datasets. Details of these practices are outlined in the Privacy Policy [n91], which includes details on how this information is collected, stored and shared. At the same time the ADS is governed by the legal statements [n92] and Information Security Policies [n93] of its host institution, the University of York (UoY). All ADS staff have undertaken mandatory training in data protection in compliance with extant legislation (General Data Protection Regulation and Data Protection Act 2018) with annual updates.

Generally, use of the ADS website, [n94] and associated services, is governed by the ADS’ Website Terms and Conditions, although specific resources and data collections may have additional terms of use and access which are clearly identified within the resource interface.

A small number of cookies are used within the ADS website and its related systems; primarily these are used to improve functionality, but a small number also collect data on website usage. A full list of these cookies and their usage can be found in the Cookies Policy. [n95]

Data consumers and users are encouraged to contact the repository in circumstances where they believe a dataset breaches their intellectual property rights, or where they object to the publication of information. Details of this process are outlined in the Website Terms and Conditions. [n96]

[83] <http://archaeologydataservice.ac.uk/advice/sensitiveDataPolicy.xhtml>

[84] <http://archaeologydataservice.ac.uk/advice/selectionGuidance.xhtml>

[85] Guidance on the Selection of Material for Deposit and Archive

-<http://archaeologydataservice.ac.uk/advice/selectionGuidance.xhtml> and Policy and Guidance on the Deposition of Sensitive Digital Data - <http://archaeologydataservice.ac.uk/advice/sensitiveDataPolicy.xhtml>.

[86] See Ingest Manual - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Ingest>, section on Documentation and Integrity Check.

[87] See Deposit Licence (2018) -

https://archaeologydataservice.ac.uk/resources/attach/ADS_Deposit_Licence_2018.pdf, section 4.3.2, see also section 4.3.3.

[88] See Collections Policy - <https://archaeologydataservice.ac.uk/advice/collectionsPolicy.xhtml>, section 2.9, also Policy and Guidance on the Deposition of Sensitive Digital Data

<http://archaeologydataservice.ac.uk/advice/sensitiveDataPolicy.xhtml>.

[89] <https://oasis.ac.uk/pages/wiki/Main>, {requires registration}.

[90] <https://archaeologydataservice.ac.uk/easy/>, {requires registration}.

[91] <http://archaeologydataservice.ac.uk/advice/Privacy.xhtml>

[92] <https://www.york.ac.uk/about/legal-statements/>, accessed 09 March 2020.

[93] <https://www.york.ac.uk/about/departments/support-and-admin/information-services/information-policy/index/information-security-policy/#tab-1>, accessed 09 March 2020.

[94] <https://archaeologydataservice.ac.uk/>

[95] <http://archaeologydataservice.ac.uk/about/Cookies.xhtml>

[96] See Website Terms and Conditions - <https://archaeologydataservice.ac.uk/advice/WebsiteTerms.xhtml>, specifically the section on 'Content Objections'.

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

Accept

V. Organizational infrastructure

R5. The repository has adequate funding and sufficient numbers of qualified staff managed through a clear system of governance to effectively carry out the mission.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:

4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

Response:

The ADS is hosted by the University of York (UoY). The UoY is also the legal entity for all services, consultancy and research carried out by the ADS (see Section II. Licenses above) and provides office space and service provision to allow the ADS to function. [n97] It is the UoY that would also assume responsibility for the ADS' datasets and collections should the archive cease to function as such. [n98] The specifics of the relationship between the ADS and the UoY are laid out in Memoranda of Understanding which cover financial responsibility [n99] and succession planning. [n100]

While 'day to day' planning and activity remains the responsibility of the Director and Deputy Director and the management team, [n101] an overarching management committee, made up of representatives of key stakeholders, funders, user communities, ensures that the ADS continues to work towards its strategic vision and assists in the decision-making process for those activities and commitments that may affect the long-term future of the repository. [n102]

The ADS has been in operation since 1996, when it was established with grant funding from the Joint Information Systems Committee (JISC) and subsequently Arts and Humanities Research Board (AHRB), now the Arts and Humanities Research Council (AHRC). [n103] In recognition of the fact that most archaeological research data are generated outside the academic sector from 1999 the ADS introduced a Charging Policy [n104], whereby a one-off data deposit charge is levied at the point of deposit, and this has provided a sustainable funding model. Staffing levels have increased from b2 staff in 1996 to an average of 12 full-time staff over the last 5 year period. Around 50% of these, or c.6 FTE are dependent upon external research and development projects but the level of R&D funding have been relatively stable for the last 10 years. If R&D income ceased the ADS is still sustainable from income earned from annual archiving revenue. ADS operates a 4-year rolling medium term budgetary planning cycle, and 4-year projections are reviewed by the University of York's Management Accountants. The budget includes provision for stable staffing levels, IT provision, and an annual operating budget.

The ADS actively engages with both national funding councils and UK Local Authorities to provide advice and digital preservation services to projects undertaken under a research or commercial remit. As part of this role, the ADS is currently a mandated archive for heritage data undertaken under the auspices of the following national organisations and funding councils:

- Natural Environment Research Council
- Marine Environmental Data and Information Network
- Nature (specifically for the journal Scientific Data)
- Historic England
- Arts and Humanities Research Council

- Birmingham City Council + Birmingham Museum Trust
- City of York Council
- Devon County Council + Devon Museums
- Durham County Council
- Hampshire County Council Arts and Museums Service
- Hertfordshire Museums
- Southampton City Council
- City of York Council
- Museums Worcestershire
- British Academy
- Heritage Lottery Fund
- Council for British Archaeology
- Society of Antiquaries of London

A comprehensive list of partners and specific arrangements is maintained for public reference. [n105]

The ADS also maintains a training budget that allows all staff to receive focused and formal training, but are also actively encourages staff to attend conferences, workshops and meetings that assist in both personal development, networking opportunities and the improvement of skills. All staff have access to training and staff development courses provided by the ADS' host organisation (UoY), [n106] but where focused technical and specific data management training is necessary staff are encouraged to discuss needs with their line manager. All staff are subject to formal annual 'performance review', with shorter (quarterly) meetings throughout the year, where staff can raise training needs and requirements. [n107]

A diagram of organisational staffing is available. [n108]

Staff have a thorough understanding and experience of working within the archaeological and heritage sectors, the designated community for the repository. Staff actively engage, through both formal and informal mechanisms, with colleagues and organisations within both the historic environment sector, and the digital preservation community generally, to ensure that activities and procedures are in line with disciplinary and community standards. Repository staff are educated to a high level (UK Master's level, or above) with detailed knowledge of its core subject area (archaeology/cultural heritage management) and a thorough knowledge of computing and the deployment of technology within this area. Staff also have specialist knowledge of the use, management and creation of digital resources and applications.

The ADS is an associate member of the Digital Preservation Coalition (DPC) and proactively engages with the preservation community to stay at the forefront of digital preservation. [n109] The ADS is also a founding member of the Bedern Group, an alliance of key UK agencies within the historic environment sector which focuses on the preservation of digital data. [n110] A full list of ADS partnerships has been published, [n111] alongside information on outreach and engagement with the archaeological, cultural heritage and data preservation communities. [n112]

The ADS is a founding member of the Coalition for Archaeological Synthesis (CfAS). [n113] The Coalition promotes and funds innovative, collaborative synthetic research that rapidly advances our understanding of the past in ways that contribute to solutions to contemporary problems, for the benefit of society in all its diversity. This is accomplished through the analysis and synthesis of existing archaeological and associated data from multiple cultures, at multiple spatial and temporal scales. ADS has taken a leadership/membership in promoting best practice for preservation, dissemination and reuse of archaeological data, and the need for improved knowledge exchange, under the auspices of the SEADDA project. [n114] While, similarly, membership of the CARARE network and the ARIADNE Association [n116] allows the ADS to advocate for the development of appropriate procedures and practices with regard to data preservation and dissemination.

ADS hold, or have held, membership of the following archives and digital preservation special interest groups:

- Forum for Information Standards in Heritage [n117]
- ClfA Archaeological Archives Group Committee - current [n118]
- ClfA Information Management Special Interest Group - current [n119]
- DPC Advocacy and Communications Sub-Committee - 2016-2018 [n120]
- H2020 Discovery, Identification and Understanding Working Group - current [n121]
- Archaeological Archives Forum - current [n122]

[97] See also Section R0.

[98] See section R3 above.

[99] See ADS MoU with University of York Registrar and Finance 2012

<https://archaeologydataservice.ac.uk/manPages/mou.xhtml>

[100] See ADS MoU with University Information Services & Library 2016

<https://archaeologydataservice.ac.uk/manPages/mou.xhtml>

[101] <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Roles>

[102] See sections on governance <https://archaeologydataservice.ac.uk/about/governance.xhtml> and the ADS Management Committee <https://archaeologydataservice.ac.uk/about/managementCommittee.xhtml>

[103] <https://ahrc.ukri.org/>, accessed 09 March 2020.

[104] <https://archaeologydataservice.ac.uk/advice/chargingPolicy.xhtml>

[105] <https://archaeologydataservice.ac.uk/research/partnerships.xhtml>

[106] Learning & Development - <https://www.york.ac.uk/admin/hr/browse/learning-and-development>, accessed 09 March 2020.

[107] <https://www.york.ac.uk/admin/hr/browse/forms/performance-review>, accessed 09 March 2020.

[108] See ADS' Roles and Responsibilities - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Roles>.

[109] <https://www.dpconline.org/>, accessed 09 March 2020.

[110] <https://www.dpconline.org/our-work/working-groups-and-task-forces/bedern-group>, accessed 09 March 2020.

[111] <https://archaeologydataservice.ac.uk/research/partnerships.xhtml>

- [112] <https://archaeologydataservice.ac.uk/research/presentations.xhtml>
- [113] <http://archsynth.org/index.html>, accessed 09 March 2020.
- [114] <https://www.seadda.eu/>, accessed 09 March 2020.
- [115] <https://www.carare.eu/>, accessed 09 March 2020.
- [116] <https://ariadne-infrastructure.eu/>, accessed 09 March 2020.
- [117] <http://www.heritage-standards.org.uk/>, accessed 09 March 2020.
- [118] <http://www.archaeologists.net/groups/archives>, accessed 09 March 2020.
- [119] <https://www.archaeologists.net/groups/imsig>, accessed 09 March 2020.
- [120] <https://www.dpconline.org/our-work/working-groups-and-task-forces>, accessed 09 March 2020.
- [121] <http://www.heritage2020.net/working-groups-discovery-identification-understanding/>, accessed 09 March 2020.
- [122] <http://archives.archaeologyuk.org/>, accessed 09 March 2020.

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

VI. Expert guidance

R6. The repository adopts mechanism(s) to secure ongoing expert guidance and feedback (either inhouse or external, including scientific guidance, if relevant).

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository

Response:

The ADS works closely with a network of individuals, organisations and agencies within both its subject area and the wider data management communities to remain relevant to the community it serves. Through its management committee, made up of key stakeholders, funders and user groups, the ADS remains engaged with the deployment of new and existing technologies with the profession, so that it can effectively react to these developments in a timely manner. [n123] Similarly, active engagement and involvement with individuals and organisations working within the commercial and research communities of the sector, through involvement with professional bodies representing its community (e.g. Chartered Institute for Archaeologists (CIfA) [n124], England's Heritage Information Access Strategy (HIAS) [n125], and consortia of stakeholders (e.g. Bedern Group, [n126] the Forum on Information Standards in Heritage (FISH) [n127], Historic Environment Information Resources Network (HEIRNET)), allow the ADS to engage directly with data managers and technologists working within its community.

As an example of the successful outcome of these activities, the ADS, in collaboration with the US-based Digital Antiquity [n128], has taken a leading role in the creation and development of a series of digital and print-based Guides to Good Practice which provide subject specific guidance to data producers on appropriate data management and preservation strategies within the archaeological and historic environment sectors. [n129] These guides have been researched and written by a mixture of experts and practitioners within the heritage community, data management specialists and ADS staff. These volumes are 'active' publications and kept under periodic review from the wider profession, and, where necessary, are updated to legislate for these comments. In instances where new technologies are deployed, or techniques developed, the ADS will actively engage with experts and data technologists to create new guidance so that good data standards can be assured across its designated community. All Guides to Good Practice are actively promoted to the profession, and form the basis of the ADS' own in-house Data Procedures. [n130]

The repository seeks to advocate 'best practice' within both its subject area, and the wider data preservation community, by encouraging students, researchers and colleagues to come and work alongside its staff to promote a better understanding of data management and preservation, to build networks and share experiences. The ADS achieves this by providing formal lectures, informal talks and workshops on data management to students and colleagues within its designated community. A large proportion of these have been made available via the ADS website [n131], with a comprehensive list of activities published in the annual ADS reports. [n132]

The ADS also actively encourages 'work experience' placements from amongst undergraduate and postgraduate communities at the University of York (UoY), and those studying at other academic institutions within the UK and beyond, in order to support those individuals seeking an understanding of the issues surrounding data management and preservation.

In addition the ADS also has an active involvement in projects that support cross fertilization of knowledge and experience with colleagues and organizations within its community in Europe, and beyond, allows the ADS to share knowledge with those outside of its geographical area [n133], or via delivering masterclasses in digital preservation. [n134] Similarly, membership of the ARIADNE Association [n135] has facilitated the exchange of best practice and process throughout the network through formal lectures, meetings and seminars, but also through the sending and receiving of short-term staff placements. The ADS has worked closely with developing data centres in Japan (NARA Research Institute for Cultural

Heritage [n136]), Sweden (Swedish National Data Service [n137]), Germany (IANUS - Forschungsdatenzentrum Archäologie & Altertumswissenschaften [n138]) and Turkey (British Institute at Ankara [n139]) sharing guidance and expertise.

ADS staff also keep their own active 'technology watch' for changes within its designated community, contextualising these with a wider understanding of developments in the broader data management landscape. This is achieved through literature review, attendance at conferences and workshops and, both formal and informal discussion with individuals and organisations within its subject centre, and the wider data management community. [n140] Repository staff contribute to formal academic publication [n141], attending and presenting at meetings, workshops and conferences. [n142]

Similarly, membership of professional organisations, such as the Digital Preservation Coalition (DPC) [n143], allows the ADS to engage with a wider network of colleagues and specialists working within the data management and preservation communities. This involvement allows the repository to contextualise the subject specific issues and problems within a broader data management and archiving landscape, whilst, at the same time, sharing the experiences of its designated community. The ADS actively seeks to engage and share its expertise with both these communities through presentation, conference attendance and publication. [n144] The ADS also seeks to engage with its communities informally through a newsletter [n145], blog [n146] and social media. [n147]

[123] <https://archaeologydataservice.ac.uk/about/managementCommittee.xhtml>

[124] <https://www.archaeologists.net/about>, accessed 09 March 2020.

[125] <https://historicengland.org.uk/research/support-and-collaboration/heritage-information-access-strategy/>, accessed 09 March 2020.

[126] <https://www.dpconline.org/our-work/working-groups-and-task-forces/bedern-group>, accessed 09 March 2020.

[127] <http://www.heritage-standards.org.uk/>, accessed 09 March 2020.

[128] <https://www.digitalantiquity.org/>, accessed 09 March 2020.

[129] See Guides to Good Practice - <http://guides.archaeologydataservice.ac.uk/g2gpwiki/>; Mitcham, J., Niven, K., and Richards, J.D. (2010) 'Archiving Archaeology: Introducing the Guides to Good Practice'. In Proceedings of the 7th International Conference on Preservation of Digital Objects, iPRES 2010, edited by Andreas Rauber, Kaiser, Max, Guenther, Rebecca, and Constantopoulos, Panos, pp. 183–187; Richards, J.D (2017) 'Twenty Years Preserving Data: A View from the United Kingdom'. *Advances in Archaeological Practice* 5:3, pp. 227-237.
<https://doi.org/10.1017/aap.2017.1>.

[130] <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#DataProcedures>.

[131] <https://archaeologydataservice.ac.uk/research/presentations.xhtml>.

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

[133] For example, SEADDA - Saving European Archaeology from a Digital Dark Age (<https://www.seadda.eu/>, accessed 09 March 2020) for which the ADS Director is Action Chair - <https://www.cost.eu/actions/CA18128>, accessed 09 March 2020.

[134] For example, <https://ffyh.unc.edu.ar/posgrado/2017/10/03/curso-de-doctorado-preservando-los-bits-formas-de-publicar-el-patrimonio-en-el-siglo-xxi/>, accessed 09 March 2020.

[135] <https://ariadne-infrastructure.eu/>, accessed 09 March 2020.

- [136] <https://www.nabunken.go.jp>, accessed 09 March 2020.
- [137] <https://snd.gu.se/>, accessed 09 March 2020.
- [138] <https://www.ianus-fdz.de/>, accessed 09 March 2020.
- [139] <https://biaa.ac.uk/>, accessed 09 March 2020.
- [140] Details of formal meetings, workshop and conference attendance are outlined in the ADS Annual Report.
- [141] See Publications - <https://archaeologydataservice.ac.uk/about/aBibliographyOfTheADS.xhtml>.
- [142] See Presentations - <https://archaeologydataservice.ac.uk/research/presentations.xhtml>.
- [143] <https://www.dpconline.org/>.
- [144] Details of formal meetings, workshops and conference attendance are provided in the Annual Report - <http://archaeologydataservice.ac.uk/about/annualReports.xhtml>, see also Publications - <https://archaeologydataservice.ac.uk/about/aBibliographyOfTheADS.xhtml>.
- [145] ADS Newsletter - <https://archaeologydataservice.ac.uk/about/newsletter.xhtml>.
- [146] Sound Bytes from the ADS - <http://archaeologydataservice.ac.uk/blog/>.
- [147] Facebook - <https://www.facebook.com/archaeology.data.service/> and Twitter - @ADS_Update and @ADS_Chatter.

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

DIGITAL OBJECT MANAGEMENT

VII. Data integrity and authenticity

R7. The repository guarantees the integrity and authenticity of the data.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

Response:

The ADS maintains a Java-based Collections Management System (CMS) and Object Management System (OMS) [n148] which facilitates the documentation of all datasets and collections. This has been integrated within the workflows documented in the Ingest Manual [n149] and Preservation Policy. [n150]

The integrity of data held by the ADS is monitored through the use of fixity value or MD5 (Message-Digest algorithm 5) checksum. These are created at ingest, as outlined in the Ingest Manual and Preservation Policy, using the DROID file characterization software to create 'technical' metadata for data, which is stored within the OMS. [n151] In instances where submissions are made through one of the ADS' submission portals (e.g. ADS-easy [n152] and OASIS Images [n153]) fixity values are created during upload and stored in the associated ADS-easy database. At ingest these values are checked during the transfer of data from the ADS-easy server to the designated preservation server. Discrepancies arising during the movement of data are brought to the attention of the digital archivist.

During accession depositors are emailed a 'deposit receipt', extracted from the OMS, following the completion of the ingest process. This provides a mechanism whereby depositors can check that the complete dataset has been received by the repository. The 'deposit receipt' includes a checksum and file size information allowing the depositor to identify any issues arising from the transfer of data and ensure that the entire dataset has been successfully transferred to the repository.

All archiving activities and processes carried out on data objects (e.g. normalization, migrations, renaming, etc) are documented within the CMS as outlined in the Ingest Manual and Preservation Policy.

All datasets are the subject of an AIP check, by another digital archivist, on the completion of archiving activities, which also involves checks to file integrity and fixity. [n154] These checks ensure that discrepancies, or other changes made to the datasets during the archiving workflow, are sufficiently documented within the CMS. [n155]

Data integrity checks are carried out regularly throughout the data lifecycle. A semi-automated validation of all checksum values within the OMS, every three months, as outlined in the Preservation Policy [n156] ensures that data has not changed or degraded during storage. In rare instances where discrepancies are identified manual interventions are made to ascertain the reason for the inconsistency, and if necessary data can be retrieved from medium, or long-term/deep storage. [n157]

As part of the ingest process [n158] all datasets are checked to ensure that they are accompanied by appropriate documentation and metadata in line with the Guidelines for Depositors and Data Procedures. [n159] In instances where datasets are submitted using the ADS' submission portal (ADS-easy, or OASIS Images) checks are performed programmatically within the application, although qualitative checks are also carried out at the point of ingest.

As noted above, any changes, normalization and migrations carried out on data are documented within the CMS, as outlined in the Preservation Policy. This is a largely semi-automated process, although manual enhancement of records is also carried out. [n160] All actions carried out, whether on entire datasets, or individual digital objects, are documented in terms mapped to the PREMIS 3 ontology. [n161]

Where a dataset requires regular update, substantial revision, or the submission of replacement data, then the repository utilises version control to manage the associated changes. In these instances the 'original' dataset is maintained in its entirety, with all technical metadata and documentation preserved, and a new version of the entire dataset created (specifics are outlined in the Repository Operations manual. Each new version of the dataset is given a new resource identifier, i.e. Digital Object Identifier's (DOI). Our policy is to disseminate only the most up-to-date version of the dataset to avoid confusion; as part of the process all resource identifiers for previous versions are updated to direct users towards the latest version of the collection, although previous versions are retained, and made available upon request.

Likewise, the repository practices a combination of normalization, version migration, format migration and refreshment for the active management and ongoing preservation of all archived data types to ensure long-term preservation. These are managed much like an update or revision, but specifics are outlined in the Repository Operations. A discussion of the most recent version migration is also available. [n162]

AUTHENTICITY

The ADS seeks to maintain the authenticity of all datasets; if problems are identified, typically during accession, these are highlighted to the depositor and resolution is sought. [n163] Changes to file/directory names may be carried out in accordance with the 'File Naming Policy', although modification of original file and directory structure is actively discouraged. [n164] Where possible digital archivists will endeavour to preserve the original data structure created by the depositor, but in some circumstances it may be necessary to rearrange data into a more meaningful structure. Where possible the ADS tries to negate structural and filename changes by providing guidance via its Guidelines for Depositors. [n165] When changes are necessary they are documented within the CMS/OMS, and where necessary reported to the depositor at ingest, via the 'deposit receipt'.

Collection and file-level metadata is transferred to the repository through standardised templates, [n166] or in instances where data is submitted through ADS-easy [n167] and OASIS Images [n168] metadata is added through a series of web forms. All metadata is transferred to the CMS and OMS respectively where it can be more effectively stored and managed. Where ADS metadata templates are used these are preserved alongside the dataset, and also disseminated in a suitable format.

All relationships between data, metadata and documentation are recorded within the OMS in terms mapped to the PREMIS 3 ontology. [n169]

In much the same way relationships between datasets held by the ADS, and other repositories (both digital and physical), alongside any related published material are documented within the CMS. This information is supplied by the depositor at

the point of ingest, but is sometimes updated, typically following a formal request from the depositor, during the data lifecycle.

Changes to the original data are actively discouraged, but where issues are identified during ingest these will be highlighted to the depositor [n170] and an opportunity given to those responsible for the data to submit replacement files, or remove data from the deposit. In rare circumstances, typically when the depositor or data creation cannot be contacted, it may be necessary for the repository to carry out minor changes to the original data. Any changes will be documented in the CMS and OMS to maintain a complete audit trail for the dataset.

The ADS asks for detailed information and contact details for all data creators, copyright holders, publishers, funders, etc) for a dataset to provide provenance for data and allow the appropriate audit trail to be documented and maintained, at least from the point of accession into the repository. Such metadata is created by those most familiar with the dataset, typically the data creator or depositor. [n171] This includes information that can be used to identify individuals or organisations (email address, hosting institution, ORCID ID, etc.) and is proactively checked at the time of ingest. Metadata for both collections and digital objects is added to the CMS and OMS respectively, to allow a full audit trail for datasets to be preserved.

[148] <http://adsmanticore0.york.ac.uk:8080/cms3/login.jsp> {internal access only}.

[149] <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Ingest>.

[150] <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#PresPol>.

[151] DROID is created and maintained by the National Archives (UK)

<http://www.nationalarchives.gov.uk/information-management/manage-information/preserving-digital-records/droid/>, accessed 09 March 2020. The uses DROID to create checksums and document data type, MIME type and PRONOM identifier (see <http://www.nationalarchives.gov.uk/PRONOM/Default.aspx>, accessed 09 March 2020) for each digital object within the archive. The ADS monitors the periodic DROID file signature updates, and downloads new signatures where necessary. Archival staff also monitor the changes between signatures, and the impact such changes may have on existing file identifications. In the case of a potential re-classification, a careful study is made to ensure fidelity is retained.

[152] <https://archaeologydataservice.ac.uk/easy/> {requires registration}.

[153] <https://oasis.ac.uk/>, {requires registration}.

[154] Specifics are outlined in the AIP Checklist, a static version of the checklist is available and is used in conjunction with the AIP Checking Notes - <http://adsmanticore0.york.ac.uk:8080/wiki/Wiki.jsp?page=AIPChecking>, {internal access only}.

[155] See Preservation Policy - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#PresPol>, Section 6.2 Acquisition, Retention or Disposal and 6.3 Preservation and Management.

[156] See Preservation Policy, Section 6.3.2 Data Management.

[157] See Preservation Policy, Section 6.3.1 Storage and Resilience.

[158] See Ingest Manual - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Ingest>, section on Documentation and Integrity Check.

[159] Guidelines for Depositors - <https://archaeologydataservice.ac.uk/advice/guidelinesForDepositors.xhtml> and Data Procedures {internal access only}, static versions are available through the ADS website - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#DataProcedures>.

- [160] See Preservation Policy, Section 6.2 Acquisition, Retention or Disposal.
- [161] <http://id.loc.gov/ontologies/premis-3-0-0.html>, accessed 09 March 2020.
- [162] Green, K., Niven, K. and Field G. (2016) 'Migrating 2 and 3D Datasets: Preserving AutoCAD at the Archaeology Data Service'. ISPRS Int. J. Geo-Inf., 5(4), pp. 44.<https://doi.org/10.3390/ijgi5040044>.
- [163] As outlined in the Ingest Manual, see sections on Documentation and Integrity Check and Acknowledge Receipt of Data.
- [164] See Repository Operations - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#RepOp> , specifically section on SIP File name changes.
- [165] See Guidelines for Depositors, specifically File Management section - <http://archaeologydataservice.ac.uk/advice/PreparingDatasets.xhtml#File%20Management>.
- [166] See Guidelines for Depositors, File-level Metadata Requirements - <https://archaeologydataservice.ac.uk/advice/FilelevelMetadata.xhtml#File-level%20Metadata%20Requirements>.
- [167] <https://archaeologydataservice.ac.uk/easy/>, {requires registration}.
- [168] <https://oasis.ac.uk/>, {requires registration}.
- [169] <http://id.loc.gov/ontologies/premis-3-0-0.html>, accessed 09 March 2020.
- [170] See Ingest Manual - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Ingest>.
- [171] Specific details on collection and file-level information can be found in the Guidelines for Depositors - <https://archaeologydataservice.ac.uk/advice/guidelinesForDepositors.xhtml>.

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

VIII. Appraisal

R8. The repository accepts data and metadata based on defined criteria to ensure relevance and understandability for data users.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:

4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

Response:

The scope and nature of data and is suitable for deposit with the ADS is outlined in the Collections Policy. [n172] This policy is subject to periodic review to maintain relevance to the designated community that the repository serves.

All future depositors are encouraged to contact the ADS in advance of deposition, and are asked to provide detailed information on the thematic, chronological and geographical extent of their deposition. This allows the ADS to gauge the nature of the dataset and to advise depositors on the appropriateness of that collection for deposition with the ADS. All submitted collections are the subject of further and more detailed evaluation, in terms of completeness and quality, at the point of accession, as outlined in the Ingest Manual. [n173] If issues are identified then the dataset is, typically, returned to the depositor who is given an opportunity to comment on and rectify any problems.

All datasets are required to have appropriate metadata before they can be formally accepted by the repository and the ingest process completed. [n174] The ADS provides a series of downloadable templates made available through the Guidelines for Depositors to facilitate the collection of metadata. [n175] A collection-level metadata template ensures that the repository receives sufficient information to document the dataset. [n176] This ensures consistency across the repository and forms the resource discovery metadata. Alongside this documentation file-level metadata appropriate to the data type is requested. [n177] In instances where data is deposited through ADS-easy [n178] or OASIS Images [n179], some quantitative validation is made through the online forms to ensure that all required fields are completed. In cases where collection or file-level metadata is insufficient repository staff will contact depositors who will be advised of the discrepancy and asked to resolve the gaps within the documentation. In instances where the depositor is unable to supply metadata to the required standard, and where the lack of metadata is believed to undermine the preservation, and any potential use and reuse of a dataset, then the affected part, or even the entire dataset, may be refused by the repository. [n180]

Whether metadata data is submitted through the completion of repository templates, or the submission of the online forms, all documentation is subject to qualitative checks during accession to ensure that the dataset is sufficiently documented.

In rare instances the ADS may be asked to provide preservation services for collections where metadata is incomplete, or entirely missing. [n181] In these circumstances the dataset is evaluated and where possible appropriate metadata extracted, or created, by a member of repository staff. Such preservation is enacted on a 'best efforts' basis.

During accession all collection and file-level metadata from templates, or online forms, is transferred into the Collection Management System (CMS) and Object Management System (OMS).

Collection-level metadata is disseminated alongside data within the archive interface, and the dedicated 'Metadata' tab for each dataset. [n182] All file-level metadata is disseminated, alongside the data, within the 'Downloads' section of all collections, either within the archive interface, or to download.

In instances where depositors would like to deposit data types or formats unfamiliar to the repository, the ADS will conduct its own research from within its designated community and beyond to ensure that the correct formats and levels of documentation are supplied. As an example, in response to the growing prevalence of 3D data within workflows within archaeology and cultural heritage management, the ADS created guidance on the preservation and appropriate documentation for this type of data. [n183] More recently, due to the growing use of medical imaging data within the subject area the repository is actively engaged in researching and evaluating suitable preservation workflows for radiography and CT scan data. [n184]

Prospective depositors are advised of these requirements during any initial approach of the ADS' list of preferred formats, accessible within the Guidelines for Depositors [n185], specifically the page on Preferred and Accepted Formats. [n186] Checks are made during accession, as outlined in the Ingest Manual [n187], to ensure that the entire dataset adheres to the list of preferred and accepted formats. In instances where data is received through one of the ADS' digital submission systems (e.g. ADS-easy), users are unable to upload files those formats outside of the list of preferred and accepted formats. This approach ensures that clear preservation and dissemination pathways are available for all data types and formats. These are outlined in the ADS' data procedures. [n188] Additional checks are undertaken as part of the AIP check prior to completion of the archive.

In instances where data is submitted in formats outside of the list of Preferred and Accepted Formats the repository will contact the depositor and ask that data is re-submitted in one its accepted format. [n189] If the depositor is unwilling, or unable, to provide data in the appropriate format, then that part of the deposition may be refused.

[172] See Collections Policy - <https://archaeologydataservice.ac.uk/advice/collectionsPolicy.xhtml>.

[173] See Ingest Manual - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Ingest>, section on Documentation and Integrity Check.

[174] As outlined in the Ingest Manual.

[175] Guidelines for Depositors - <https://archaeologydataservice.ac.uk/advice/guidelinesForDepositors.xhtml>.

[176] See Guidelines for Depositors, specifically details on Collection-level Metadata Requirements - <https://archaeologydataservice.ac.uk/advice/DatasetlevelMetadata.xhtml#Collection-level%20Metadata%20Requirements>.

[177] See Guidelines for Depositors, specifically File-level Metadata Requirements - <https://archaeologydataservice.ac.uk/advice/FilelevelMetadata.xhtml#File-level%20Metadata%20Requirements>.

[178] <https://archaeologydataservice.ac.uk/easy/>, {registration required}.

[179] <https://oasis.ac.uk/pages/wiki/Main>, {registration required}.

[180] As outlined in the Ingest Manual - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Ingest>.

[181] See, for example, Medieval Pottery Research Group (2010) 'Alan Vince Archive' [data-set]. York: Archaeology Data Service [distributor]. <https://doi.org/10.5284/1000382> or Newham Museum Service (2000) 'Newham Museum Archaeology

Project Archives [data-set]. York: Archaeology Data Service [distributor]. <https://doi.org/10.5284/1000328>.

[182] See, for example, Oxford Archaeology (South) (2019) 'Lime Lane, Oakwood, Derby: Geophysical survey and evaluation (OASIS ID: oxfordar1-290324) [data-set]'. York: Archaeology Data Service [distributor]. <https://doi.org/10.5284/1056678>).

[183] Niven, K. (2018a) 'Preserving 3D data: Best Practices from a UK perspective'. CS3DP workshop, St. Louis, MO 02/02/2018. https://archaeologydataservice.ac.uk/resources/images/presentations/2018/PDFa/20180205-CS3DP_presentation-KJN.pdf , accessed 22 October 2019.; Niven, K. (2018b) '3D Data: A few questions and a bit of a rant...' Digital Past 08/02/2018.

<https://archaeologydataservice.ac.uk/resources/images/presentations/2018/PDFa/20180208-DigitalPast-KJNv3.pdf>, accessed 09 March 2020; Moore, J., Rountrey, A. and Scates Kettler, H. (2020). 3D Data Creation to Curation: Building Community Standards for 3D Data Preservation. Association of College and Research Libraries. In press; ADS Data Procedures: 3D data {internal access only}.

[184] See Data Procedures: X-ray and CT scanning {internal access only}.

[185] See Guidelines for Depositors.

[186] See list of Preferred and Accepted File Formats -

<https://archaeologydataservice.ac.uk/advice/FileFormatTable.xhtml>, see also section R12 below.

[187] See Ingest Manual, specifically section on Check File Formats are Suitable for Deposit.

[188] Data Procedures {internal access only}, static versions of these procedure documents are available from the ADS website <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#DataProcedures>.

[189] List of Preferred and Accepted File Formats.

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

IX. Documented storage procedures

R9. The repository applies documented processes and procedures in managing archival storage of the data.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:

4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

Response:

All data and metadata (AIP, DIP and SIPs) are stored and backed up by ADS staff on the University of York (UoY) network. On this network ADS data is stored on a pair of Dell Compellent enterprise storage arrays (current capacity ~1Pb), located in two different data centres, 2 km apart. Each data centre is dedicated and purpose built, and has full UPS, fire suppression, generators and is "lights out" and alarmed. Within each site, data is protected by being spread redundantly across multiple disks ("RAID"). Between data centres it is replicated asynchronously, with a maximum data loss of 2 hours. Data is protected against accidental deletion or ransomware via read-only snapshots, taken hourly and stored for 30 days), and additional backups to tape versions, which are stored for 90 days. External 'archival storage' is now provided by Amazon Web Services (September 2019), having previously been provided by the UK Data Archive (UKDA) at the University of Essex. Detailed Procedures for the archival storage of datasets are summarised in the Preservation Policy, [n154] with specific and detailed documentation available in the ADS internal wiki. [n155] Further information can be found below.

All ADS services and systems are protected with appropriate permissions granted to staff on a needs basis, with appropriate levels of access relevant to their working practices. Access to these resources is also restricted using IP address and encrypted passwords. All passwords are managed through a centralised password management system, and in line with ADS Security Policy passwords are updated regularly, and/or when staff changes necessitate, and in accordance with the Information Security Risk Assessment. As part of the University of York (UoY) the ADS also adheres to the security policies and guidance outlined by its parent organisation. [n156]

Archival storage is important and discussed within the ADS Preservation Policy. [n157]

The ADS retains multiple/backup copies of all datasets in order to build resilience. Short and medium-term storage for collections and datasets is provided by the ADS' host institution, the UoY. Data is preserved across a series of virtual machines, with the Submission Information Package (SIP) and Archival Information Package (AIP) stored separately from the Dissemination Information Package (DIP). While data submitted via one of the ADS submission portals, ADS-easy and OASIS Images, is 'stored', in the short term, on a separate dedicated virtual machine until formal accession has been initiated. Access to each of these is managed and restricted to authorized users, with authentication required to access them. Backups of all data on these virtual machines are via hourly snapshots (retained for 30 days), with further tape backups of data retained for 90 days. [n158] All data transfers are carried out using the Secure File Transfer Protocol (SFTP), with checks to verify the successful transfer of data.

As of September 2019, all AIPs and SIPs are synchronised, from the local copy in the UoY, to dedicated off-site store

maintained by Amazon Web Services (AWS) for long-term/deep storage. This process intends to mitigate against data loss caused by hardware degradation and failure of local storage and any associated physical threat to storage device, and build resilience into the preservation of the datasets the repository curates. Data synchronization between UoY and AWS is carried out on completion of the AIP, or following update, according to prescribed process, utilising file fixity and time stamps, to mitigate for data corruption. [n159] Further details on storage procedures are presented in the Preservation Policy [n160] and the Repository Operations. The ADS has intimated that all data stored using AWS should be stored within the European Union, specifically Ireland.

The use of AWS replaces a previous arrangement with the UK Data Archive (UKDA) at the University of Essex (until August 2019). Within this workflow data was synchronized on a monthly basis to the remote server (this server has RAID 5 disk configuration) maintained by the UKDA. Outside access to the server is via SSH tunnel using nominated IP addresses at the UoY. All data on the remote server was further backed up to tape. Data synchronization between UoY and the UKDA was carried out according to prescribed process, using similar file fixity and time stamps, to ensure successful data transfer, and mitigate for data corruption and/or accidental deletion. [n161] Access to the remote server is restricted by IP address and password protection to members of ADS staff with appropriate access requirements and staff at the UKDA.

Those databases supporting the Collections Management System (CMS), the Object Management System (OMS) and ADS-easy are also mounted on dedicated virtual machines. These databases are themselves backed up (weekly) to a separate designated server, but are also backed up via daily snapshots (retained for 30 days), with taped backup (retained for 90 days).

The codebase for core ADS systems, including the CMS/OMS, is backed-up in the University of York Bitbucket repository, with access restricted access to ADS Systems Manager, Application Developers and designated UoY ITS staff. [n162]

Where necessary all data can be retrieved from short (UoY snapshots), medium (UoY taped backup) or long-term storage (AWS). Guidance on data retrieval from short and medium-term storage is provided by UoY IT Services. [n163] Data retrieval from long-term/deep storage, at the AWS, is carried out via direct access by members of ADS staff with appropriate access requirements. Under the terms of the agreement with AWS there is a standard charge for the retrieval of data.

A Disaster Recovery Plan summarises the processes and procedures in place to protect, recover and mitigate problems and issues that may impact ADS resources and data storage. A redacted version of the plan is provided on the website. ADS staff have access to an unredacted version of the plan, shared digitally outside of the ADS network. Further offline/paper copies are available within the ADS offices. While additional copies are supplied to nominated staff within the Department of Archaeology (University of York) and with IT Services (University of York). This document should be used in conjunction with the Security Overview and the Information Security Risk Assessment. The documents have been developed with an eye to minimising and mitigating risk in the virtual and physical storage of the data and resources that the repository curates. The repository has carried out an Information Security Risk Assessment which informs this strategy.

The ADS uses MD5 (Message-Digest algorithm 5) checksums to ensure consistency across all archival versions. These values are checked during data transfers between 'local' and 'off-site' storage devices through a semi-automated process, and where inconsistencies are identified ADS staff can identify reasons for these discrepancies. It also maintains a 'changes log' where ADS staff can document updates or changes to a dataset at a collection level, with information on specific changes logged within the CMS.

ADS data is stored on a pair of Dell Compellent enterprise storage arrays (current capacity ~1Pb), located in two different data centres, 2 km apart. Each data centre is dedicated and purpose built, and has full UPS, fire suppression, generators and is "lights out" and alarmed. Within each site, data is protected by being spread redundantly across multiple disks ("RAID"). Between data centres it is replicated asynchronously, with a maximum data loss of 2 hours. The storage arrays are automatically monitored, with logs and alerts generated that report failed disks, storage capacity warnings and other hardware and software issues. These logs are emailed to several members of the UoY ITS team for immediate action.

The UoY ITS use Linear Tape-Open (LTO-6) for 90 day backups. UoY ITS plan to continue to migrate to newer LTO versions (with greater durability and storage capacity) as a matter of course; migrating to newer LTO versions will help to ensure against media deterioration. The LTO media is stored in II UPS, fire suppression, alarmed and secured rooms. If a tape error is reported (via a Storage Manager server), the relevant data is migrated to another tape and the tape with the error is removed from circulation. Daily logs are produced by the Storage Manager servers, which alert UoY ITS administrators of any errors or warnings.

References (a full list of links to ADS resources and bibliographic citations can be found in the Attachment document)

[n154] See Preservation Policy, Section 6.3.1 Storage and Resilience.

[n155] See <http://adslocalwiki0.york.ac.uk:8080/wiki/Wiki.jsp?page=SystemsAWS>, {internal access only}.

[n156] See <https://www.york.ac.uk/it-services/security/>.

[n157] See specifically Preservation Policy, Section 6.3.1 Storage and Resilience.

[n158] See UoY IT Services guidance on backups - <https://www.york.ac.uk/it-services/services/backups/>.

[n159] See <http://adslocalwiki0.york.ac.uk:8080/wiki/Wiki.jsp?page=SystemsAWS>, {internal access only}.

[n160] See Preservation Policy, section 6.3.1 Storage and Resilience.

[n161] See <http://adslocalwiki0.york.ac.uk:8080/wiki/Wiki.jsp?page=Ukdastorage>, {internal access only}

[n162] See Systems Backup - <http://adslocalwiki0.york.ac.uk:8080/wiki/Wiki.jsp?page=SystemsBackups>, {internal access only}.

[n163] <https://www.york.ac.uk/it-services/services/backups/#tab-2>.

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:
Accept

X. Preservation plan

R10. The repository assumes responsibility for long-term preservation and manages this function in a planned and documented way.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository

Response:

The ADS Preservation Policy provides an overview of the preservation and management strategies in place to ensure authenticity, reliability and integrity of all datasets. [n202] As such this policy is subject to regular review, at least on an annual basis.

The Guidelines for Depositors provide information on the preferred and accepted formats that the repository will accept, also providing guidance on the appropriate level of documentation required for deposition. [n203] Templates for collection and file-level metadata are provided by the repository. [n204] All documentation is disseminated alongside data to support usability by the designated community.

The ADS employs a migration-based preservation strategy involving the normalisation of data to open and non-proprietary formats and then the subsequent migration of data to successive formats and versions. [n205] Standardised preservation and dissemination pathways for all accepted formats are outlined in the data procedures and are arranged according to data type. [n206] These provide information on preservation and presentation formats, alongside appropriate metadata, any checks that might be necessary, and instructions on conversion. All preservation and dissemination actions are documented in Collections Management System (CMS) and Object Management System (OMS).

These procedures have been created in accordance with the data standards created by the repositories designated community and documented in the Guides to Good Practice. [n207] These procedures are subject to regular review by

digital archivists.

The deposit licence, signed by both the depositor and the ADS at the time of ingest, “provides the legal permissions and warranties needed to allow the ADS to preserve, and make accessible in a variety of formats and media, the deposited material (Section 1.2). [n208] This deposit agreement “grants a non-exclusive licence... to the ADS for the duration of this agreement for preservation, curation, dissemination and for such use as the ADS deems appropriate in accordance with the terms of this agreement” (Section 3.1). This agreement gives the repository the right to “distribute copies of the Data Collection in a variety of media formats” (Section 3.1.1), “catalogue, enhance, validate and document the Data Collection” (Section 3.1.3), “electronically store, translate, copy, or re-arrange the Data Collection to ensure its future preservation and accessibility” (Section 3.1.4) and carry out similar activities to discharge its principle responsibilities as a digital archive. While the ADS acknowledges its obligation “to protect and curate the Data Collection” (Section 5.1.1). The specifics arrangement for the licence under which the data is disseminated are defined in Annex B of the deposit agreement, but data is typically distributed under Attribution 4.0 International (CC BY 4.0) terms. [n209]

Details of the rights and responsibilities of the repository and depositor are clearly outlined in the deposit agreement. The ADS makes no claim of ownership or copyright of datasets that it curates, while any associated intellectual rights are maintained by the data creator/owner. The deposit agreement merely provides the repository with a non-exclusive right to hold and disseminate data, under the terms outlined in Annex B, on behalf of the depositor/data owner.

As per the terms outlined in deposit agreement the ADS has the right to copy, transform and store data (see discussion above). The agreement also acknowledges the rights of the repository to disseminate data, alongside any associated documentation and metadata, on behalf of the depositor/data owner.

All depositions must be accompanied by a ‘signed’ deposit agreement in order to formally acknowledge the rights and responsibilities of both the depositor and the repository. In instances where the depositor/data owner is unable, or unwilling, to accept the terms of the deposit agreement then all data and metadata associated with the collection will be removed from ADS systems and media returned to the depositor.

[202] Preservation Policy - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#PresPol>.

[203] Preferred and Accepted File Formats - <http://archaeologydataservice.ac.uk/advice/FileFormatTable.xhtml>.

[204] Guidelines for Depositors, specifically the section on File-level Metadata Requirements - <https://archaeologydataservice.ac.uk/advice/FilelevelMetadata.xhtml#File-level%20Metadata%20Requirements>.

[205] See Repository Operations - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#RepOp> , for an example see Green, K., Niven, K. and Field G. (2016) ‘Migrating 2 and 3D Datasets: Preserving AutoCAD at the Archaeology Data Service’. ISPRS Int. J. Geo-Inf., 5(4), pp. 44.<https://doi.org/10.3390/ijgi5040044>.

[206] Active versions of these procedures are stored internally, with static versions for depositors and data users provided through the website - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#DataProcedures>.

[207] Guides to Good Practice - <http://guides.archaeologydataservice.ac.uk/g2gpwiki/>.

[208] Deposit Licence 2018 - https://archaeologydataservice.ac.uk/resources/attach/ADS_Deposit_Licence_2018.pdf.

[209] <https://creativecommons.org/licenses/by/4.0/>, accessed 09 March 2020.

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

Accept

XI. Data quality

R11. The repository has appropriate expertise to address technical data and metadata quality and ensures that sufficient information is available for end users to make quality-related evaluations.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:

4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

Response:

The repository's Guidelines for Depositors provides guidance on the appropriate level of documentation necessary for deposition. [n210] Alongside this guidance the repository provides templates, for both collection and file-level metadata, which are downloaded and completed by depositors. These are disseminated in a variety of proprietary and open formats to accommodate workflows and access to software. In instances where data is deposited via the ADS deposition portal (ADS-easy) metadata is completed via a series of online forms. In either instance documentation and metadata is stored, in appropriate preservation formats, with the data that it relates to. [n211]

Both collection and file-level metadata are also transferred to the Collection Management System and Object Management System (OMS) where it can be more effectively managed. Any relationships between digital data and metadata is also documented within the OMS. All documentation and metadata is disseminated alongside the dataset; collection level and contextual metadata for each dataset is displayed in the archive interface [n212], while file-level metadata is presented alongside data where it can easily be downloaded. [n213] In instances where submissions have

occurred through the ADS deposition portal (ADS-easy) file-level metadata is transferred from that system into the OMS, and also extracted from the database, in a suitable dissemination formats, and disseminated alongside the data that it refers to.

As a mandated repository for the Marine Environmental Data and Information Network (MEDIN) [n214] and Natural Environment Research Council's (NERC). [n215] NERC, the ADS also ensures that relevant archives that relate to those specific organisations are deposited with the correct levels of metadata to ensure they meet the standards required for metadata harvesting in the BGS [n216] and MEDIN data portals. [n217]

The ADS uses the National Archives file characterization software, DROID, to create technical metadata for all digital objects from the point of ingest and throughout the data lifecycle. [n218]

All depositions are reviewed by digital archivists at the time of ingest [n219] to check that metadata is quantitatively and qualitatively extensive enough to document both dataset as a whole and individual files. In instances where either is inadequate the repository will ask depositors to evaluate and re-submit metadata of the appropriate standards outlined in the Guidelines for Depositors. [n220] For those submissions submitted through ADS-easy checks on the presence of metadata are made programmatically within the web forms, while additional qualitative checks are made during accession to ensure that the level of documentation is adequate. In instances where a depositor is unable to supply metadata to the appropriate standard, preservation can be undertaken on a 'best efforts' basis. [n221] Gaps or other problems with metadata are recorded within the collection documentation, and highlighted to data users within the associated resource interface In cases where a lack of metadata is believed to undermine the preservation, and potential use and reuse of a dataset then the affected part, or indeed the entire collection, may be refused by the repository. [n222]

The metadata standards employed by the repository are derived from the Guides to Good Practice [n223]; these have been created by both data creators and users from within the designated community [n224] and are subject to periodic revision. The ADS also maintains its own 'technology watch' on developments within its subject area, and within the wider data management and archiving communities, and reacts to changes where appropriate. [n225]

The ADS encourages depositors to include citations and references to related works and datasets where appropriate. Where possible the repository encourages the use of persistent identifiers, e.g. Digital Object Identifiers (DOIs), which makes these relationships sustainable in the long-term. The ADS also uses DOI handles to provide persistent identifiers for all its collections and datasets [n226], and for grey literature produces DOI's for individual reports and monographs within the ADS Library. [n227] This is intended to support the sustainable referencing of datasets, resources and publications and adhere to the principles of FAIR. [n228]

The repository welcomes the publication of 'data papers', whereby datasets can be subject to more formal qualitative and quantitative assessment by members of its designated community. [n229] Such activities provide a mechanism to assess datasets, and provide feedback to data creators on the form and nature of the data being created. These actions can play an active role in improving the quality of data and metadata, thereby ensuring that datasets are correctly preserved and documented.

- [210] Guidelines for Depositors - <https://archaeologydataservice.ac.uk/advice/guidelinesForDepositors.xhtml>.
- [211] See Repository Operations - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#RepOp>.
- [212] See, for example, University of Leicester Archaeological Services, Research Laboratory for Archaeology & History of Art, Royal Holloway, University of London, British Geological Survey (2019) 'Brooksby Quarry: Investigations of the incised channel' [data-set]. York: Archaeology Data Service [distributor]. <https://doi.org/10.5284/1052202>, specifically the 'Metadata' page.
- [213] See University of Leicester Archaeological Services, Research Laboratory for Archaeology & History of Art, Royal Holloway, University of London, British Geological Survey (2019) 'Brooksby Quarry: Investigations of the incised channel' [data-set]. York: Archaeology Data Service [distributor]. <https://doi.org/10.5284/1052202>, 'Downloads'.
- [214] <https://www.medin.org.uk/about/data-archive-centres>, accessed 09 March 2020.
- [215] <https://nerc.ukri.org/research/sites/data/>, accessed 09 March 2020.
- [216] <http://www.bgs.ac.uk/discoverymetadata/>, accessed 09 March 2020.
- [217] http://portal.oceannet.org/portal/start.php?tpc=007_381a2c41-32e0-4a5a-82bb-e4c7d0e3cce0, accessed 09 March 2020.
- [218] See R7 above.
- [219] Outlined in the Ingest Manual - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Ingest>.
- [220] See Guidelines for Depositors.
- [221] See, for example, Medieval Pottery Research Group (2010) 'Alan Vince Archive' [data-set]. York: Archaeology Data Service [distributor]. <https://doi.org/10.5284/1000382>.
- [222] Guides to Good Practice - <http://guides.archaeologydataservice.ac.uk/g2gpwiki/>. See Ingest Manual - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Ingest>.
- [223] See Guides to Good Practice.
- [224] See R6 and R10 above.
- [225] See also R8 above.
- [226] See, for example, Crossrail Ltd (2019) 'Crossrail: Archaeological Investigations Conducted in Advance of Construction of the Elizabeth Line' [data-set]. York: Archaeology Data Service [distributor] <https://doi.org/10.5284/1055125>.
- [227] <https://archaeologydataservice.ac.uk/library/>
- [228] See R0 above.
- [229] Smith, N., Beale, G., Richards, J. and Scholma-Mason, N. (2018) 'Maeshowe: The Application of RTI to Norse Runes (Data Paper)', Internet Archaeology 47. <https://doi.org/10.11141/ia.47.8>.

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

XII. Workflows

R12. Archiving takes place according to defined workflows from ingest to dissemination.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:

4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

Response:

The repository maintains a dedicated Collections Policy which outlines the scope and collection priorities for the repository (see discussion above). [n230] All data resources offered for deposition with the ADS are evaluated according to three core criteria, as outlined in the Collections Policy:

- Assess their intellectual content and the level of potential interest in their re-use.
- Evaluate how (even whether) they may viably be managed, preserved, and distributed to potential secondary users.
- Determine the presence or absence of another suitable archival home.

These evaluations are generally carried out during negotiation for deposition by the Collection Development Manager (CDM) who, working in conjunction with other repository staff, provides feedback to depositors. If necessary, the CDM can defer a decision to the 'Collections Evaluation Working Group', drawn from its Management Committee, to establish the appropriateness of the dataset for inclusion in the archive. [n231] Where necessary staff will advise depositors of other repositories and archives who may be more appropriate for the deposition of their dataset.

The ADS maintains a list of accepted data types and formats to ensure that data is received in appropriate formats [n232], thereby ensuring the smooth transmission of data through the preservation workflow, and mitigating for any problematic, proprietary formats. Similarly, metadata templates are issued to ensure that all necessary metadata is submitted in accordance with Guidelines for Depositors. [n233]

The repository has endeavoured to improve and standardise workflows for depositors as well through the implementation

of its ADS-easy and OASIS Images submission systems. [n234] These impart some control onto the deposition process by managing the data types and file formats that can be uploaded, whilst providing oversight and quantitative assessment of metadata through a series of online forms. These systems also support the secure and consistent transfer of data to the repository. All necessary precautions are undertaken to ensure the secure transfer of data and metadata between the depositor and repository. [n235]

Further appraisal of datasets is carried out on deposition (as noted above) by Digital Archivists, and any concerns over the suitability of the data are raised with the CDM. Where necessary repository staff, working in conjunction with the depositor, will seek to resolve any issues or concerns. Once any issues have been addressed, the workflow will continue and the preservation pathway completed.

From accession through to release the ADS follows strict workflows and procedures, documented in policy documents and expanded within the ADS Wiki. [n236] The Ingest Manual and Preservation Policy document the process from the point of receipt of the Submission Information Package (SIP), through the archiving of data and creation of the Archival Information Package (AIP) alongside the production of Dissemination Information Package (DIP) in broad terms. [n237] These are used in conjunction with the Repository Operations which provides details of technical and structural background to the management of datasets. More detailed information on ingest and preservation practices are available to repository staff within the ADS wiki [n238] and are used in conjunction with a series of checklists which are completed for each deposition within the Collections Management System (CMS). [n239] Accession workflows differ slightly depending on the route of deposition and are documented in detail within the ADS wiki [n240], are similarly documented. Appropriate steps are undertaken to protect existing data and collections and mitigate against any potential security risks. [n241]

Once accession is complete data is subject to the same basic workflow and checklists. [n242] The repositories own 'Data Procedures' outline the workflows and decision process associated with the normalization of datasets and are utilised to facilitate the decision making process and standardise data transformations. [n243] These include information on appropriate formats, software, formats and conversion strategies and processes for the creation of the AIP and DIP. Once AIP and DIP have been produced qualitative and quantitative checks are also made as part of the checking process to ensure that all archives are consistently preserved and documented. [n244] All completed collections, particularly archive interfaces, are also circulated to the depositor and repository staff to allow additional checks prior to publication.

All workflows are subject to annual and, where necessary, more regular assessment, at which point processes and policies are evaluated and, where necessary, documentation updated. Ongoing change is monitored and tracked through the use of strict version controls, and is facilitated through the use of the CMS in which all changes to documentation are logged and tracked.

Qualitative checks are made of datasets throughout the negotiation phase for deposition, and particularly following the submission of collections. Depositors are encouraged to contact the repository as early as possible within the data lifecycle to ensure that appropriate advice can be given. The repository assists potential depositors, and its wider designated community, by providing specific guidance on the appropriate selection retention of data. [n245] Through

these the repository seeks to assist is community with the appraisal and selection of data for deposition and preservation. The repository also provides dedicated workshops to facilitate and assist data creators in the assessment of data for deposition. [n246] The ADS has also supported the development of guidance to facilitate the selection and retention workflow for would be depositors. [n247] All potential and active depositors are encouraged to contact the ADS where specific issues and concerns can be discussed with the Collections Development Manager, or other repository staff. [n248]

[230] Collections Policy - <https://archaeologydataservice.ac.uk/advice/collectionsPolicy.xhtml>.

[231] See Collections Policy, particularly section 2.3.

[232] See list of Preferred and Accepted File Formats - <https://archaeologydataservice.ac.uk/advice/FileFormatTable.xhtml>.

[233] Guidelines for Depositor - <https://archaeologydataservice.ac.uk/advice/guidelinesForDepositors.xhtml>.

[234] <https://archaeologydataservice.ac.uk/easy/> and <https://oasis.ac.uk/pages/wiki/Main> {require registration}.

[235] See Ingest Manual - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Ingest>, Security Overview - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Security> and Information Security Risk Assessment - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#ITRisk>.

[236] ADS Wiki - <http://adslocalwiki0.york.ac.uk:8080/wiki/> {internal access only}.

[237] Ingest Manual and Preservation Policy.

[238] ADS Wiki - <http://adslocalwiki0.york.ac.uk:8080/wiki/> {internal access only}.

[239] Collections Management System - <http://adsmanticore0.york.ac.uk:8080/cms3/> {internal access only}.

[240] For example, those involving the movement of physical media, or the digital exchange of data, are documented in the 'How to Accession' notes and checklist -

<http://adslocalwiki0.york.ac.uk:8080/wiki/Wiki.jsp?page=Accessioning%20procedures>, {internal access only}. Static versions of the 'Accession Checklist' are available through the ADS website

<https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Checklists>. Discreet workflows for depositions received through ADS-easy (<https://archaeologydataservice.ac.uk/easy/>) and OASIS Images (<https://oasis.ac.uk/form/>).

[241] For details see the Ingest Manual, Security Overview and Information Security Risk Assessment which illustrate the security checks undertaken by the repository.

[242] These are documented within the ADS wiki with a dedicated checklist of processes, see 'How to Archive'

<http://adslocalwiki0.york.ac.uk:8080/wiki/Wiki.jsp?page=Archiving%20procedures> {internal access only}. A static version of this 'Procedure Checklist' is published on the ADS website

<https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Checklists>.

[243] Live versions of these 'Data procedures' are documented within the ADS wiki -

<http://adslocalwiki0.york.ac.uk:8080/wiki/Wiki.jsp?page=DataProcedures>, {internal access only}, although static versions of these are distributed through the ADS website -

<https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#DataProcedures>.

[244] 'AIP Checking' notes and checklist - <http://adslocalwiki0.york.ac.uk:8080/wiki/Wiki.jsp?page=AIPChecking>, {internal access only}, with static versions published on the website -

<https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Checklists>.

[245] See, for example, Guidance on the Selection of Material for Deposit and Archive,

<https://archaeologydataservice.ac.uk/advice/selectionGuidance.xhtml> and/or Policy and Guidance on the Deposition of Personal, Confidential and Sensitive Data - <https://archaeologydataservice.ac.uk/advice/sensitiveDataPolicy.xhtml>.

[246] See, for example, the ADS ' Continuing Professional Development Workshops programme - <https://archaeologydataservice.ac.uk/learning/Workshops.xhtml>.

[247] See, for example, the Toolkit for Selecting Archaeological Archives, produced by the Chartered Institute for Archaeologists (CiFA) - <http://cifa.heritech.net/selection-toolkit>, accessed 09 March 2020.

[248] <https://archaeologydataservice.ac.uk/about/contact.xhtml>.

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

XIII. Data discovery and identification

R13. The repository enables users to discover the data and refer to them in a persistent way through proper citation.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:
4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:
4 – The guideline has been fully implemented in the repository

Response:

The repository provides a number of search facilities to provide access to ADS resources. ArchSearch is an integrated catalogue of 'thin' metadata records, including ADS collections and resources alongside metadata derived from archaeological and historic environment inventories from national and regional agencies within the UK. The Archsearch schema is built on qualified Dublin Core concepts. The repository also provides a simple 'keyword' search [n249], a faceted browse search [n250], a map search [n251] and a more complex query interface [n252] to provide access to these

datasets. These searches are constructed on an Apache SOLR index, and have been implemented to allow cross searching of the richer 'archived' datasets. A dedicated Archive search provides direct access to 'rich' datasets and collections held by the repository, with both a faceted browse and keyword search functionality. [n253] The ADS Library [n254] provides access to bibliographic references derived from the British and Irish Archaeological Bibliography and publishers of archaeological books and monographs, alongside direct access to textual content, particularly unpublished field reports and journal holdings, held by the repository.

As noted above the ADS uses qualified Dublin Core concepts within this data structure. At the same time, the repository uses terms from national, cultural heritage thesauri, whilst mapping historic data to these new ontologies. [n255] These vocabularies are published as structured Linked Open Data (LOD), using URIs, that facilitate the creation of semantic searches. [n256] The ADS also utilised the Library of Congress Subject Headings, which is published as Linked Data Service. [n257] In the case of maritime archives, terms are drawn from the MEDIN metadata keywords [n258] alongside the International Standards Organisation ISO19115 Topic Categories. [n259] Geographical terms are mapped to the Getty Thesaurus of Geographic Names [n260] and to Ordnance Survey Open Names. Where appropriate datasets use geographic coordinates (decimal latitude/longitude) as part of GEMINI compliance. The repository uses thesauri of temporal terms to qualify data and collections chronologically. [n261] In addition, chronological extent is also be stored as date ranges. The ADS also uses the UK Historic Environment Data Standard, MIDAS Heritage, to catalogue datasets. [n262] Those terminologies published as LOD are stored and published within the repositories own triplestore. The ADS has taken an active involvement in enhancing its metadata records via Natural Language Processing techniques. In these instances the ADS has worked with internal and external researchers to search text reports for recognisable archaeological terms, and map to relevant controlled vocabularies. [n263]

The ADS supports machine harvesting of its metadata via three Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) targets for its archives, journals and OASIS resources. [n264] It also provides access to its linked data repository through a SPARQL endpoint that allows the interrogation of its triplestore through both a query interface, or via a specialised client. [n265]

ADS surfaces repository, collection and file-level metadata through a number of external resources and portals, both within the UK and Europe. Through the Marine Environmental Data and Information Network (MEDIN) data portal, for example, the repository exposes metadata for those holdings associated with the historic environment within the marine environment. [n266] Resource discovery metadata for those collections containing science-based archaeological research is shared through the Natural Environment Research Council (NERC) data discovery portal. [n267] The ADS also surfaces metadata for its journal holdings through the Keepers Registry. [n268] The repository works closely with European partners to disseminate both collection and record-level discovery metadata through both the ARIADNE and Europeana portals. [n269]

Working with partners within the UK (Historic England, Historic Environment Scotland, and the Royal Commission on the Ancient and Historical Monuments of Wales) the ADS manages and provides access to the Online Access to the Index of archaeological investigationS (OASIS); an online index of archaeological fieldwork undertaken within the UK. [n270] This service allows archaeological and heritage practitioners to report their investigations and fieldwork to respective local

Historic Environment Records (HERs) and other national heritage agencies. [n271] While OASIS is used by archaeological and cultural heritage professionals the ADS also surfaces the records produced as part of OASIS through its own ArchSearch service [n272] and exposes resource discovery metadata to other external services, such as the Heritage Gateway. [n273] Contributors to OASIS are also encouraged to upload grey literature and reports produced as part of their fieldwork, these are preserved and added to the ADS Library. [n274]

As advocates of the FAIR principles [n275] the ADS provides persistent identifiers, Digital Object Identifiers (DOIs) for all its collections, supporting sustainable citation of its resources. [n276] The repository also provides a more granular use of the DOI, supporting citation at a digital objects at the record/file level. [n277] The ADS provides guidance and recommendations for data users on the correct citation of its datasets. [n278]

[249] <https://archaeologydataservice.ac.uk/archsearch/basic.xhtml>.

[250] <https://archaeologydataservice.ac.uk/archsearch/browser.xhtml>.

[251] <https://archaeologydataservice.ac.uk/archsearch/map.xhtml>.

[252] <https://archaeologydataservice.ac.uk/archsearch/advanced.xhtml>.

[253] <https://archaeologydataservice.ac.uk/archive/>.

[254] <https://archaeologydataservice.ac.uk/library/>.

[255] Thesauri are supplied by Historic England (HE), Historic Environment Scotland (HES) and the Royal Commission on Ancient & Historical Monuments of Wales (RCAHMW) via Heritage Data - <https://www.heritagedata.org/blog/>, accessed 09 March 2020. For example of implementation see

<https://archaeologydataservice.ac.uk/blog/2013/07/seneschal-value-to-the-ads/>. The ARAIDNE project has also mapped UK Heritage Data terminologies to the Getty Arts and Architecture Thesaurus (AAT -

<http://www.getty.edu/research/tools/vocabularies/aat/about.html>, accessed 09 March 2020), see

<http://legacy.ariadne-infrastructure.eu/resources-2/aat/>, accessed 09 March 2020.

[256] Wright, H. (2018) 'Semantic Web and Ontologies', in S.L. López Varela (ed.) *The Encyclopedia of Archaeological Sciences* (pp. 1-4). <https://doi.org/10.1002/9781119188230.saseas0527>.

[257] <http://id.loc.gov/authorities/subjects.html>, accessed 09 March 2020.

[258] https://www.medin.org.uk/medin/sites/medin/files/documents/medin_schema_doc_2_3_8_brief.pdf, accessed 09 March 2020.

[259] <http://vocab.nerc.ac.uk/collection/P05/current/>, accessed 09 March 2020.

[260] See TGN <https://www.getty.edu/research/tools/vocabularies/tgn/> alongside OS terms derived from Open Names <https://www.ordnancesurvey.co.uk/business-government/products/open-map-names>, accessed 09 March 2020.

[261] Thesauri are supplied by Historic England (HE), Historic Environment Scotland (HES) and the Royal Commission on Ancient & Historical Monuments of Wales (RCAHMW) via Heritage Data - <https://www.heritagedata.org/blog/>, accessed 09 March 2020.

[262] <https://historicengland.org.uk/images-books/publications/midas-heritage/>, accessed 09 March 2020.

[263] Richards, J.D., Tudhope, D. and Vlachidis, A. (2015) 'Text Mining in Archaeology: Extracting Information from Archaeological Reports'. In, J.A. Barceló and I. Bogdanovic (eds.) *Mathematics in Archaeology*. Science Publishers, Boca Raton, Florida, 240-54; Richards, J.D (2017) 'Twenty Years Preserving Data: A View from the United Kingdom'. *Advances in Archaeological Practice* 5:3, pp. 227-237. <https://doi.org/10.1017/aap.2017>.

[264] <https://archaeologydataservice.ac.uk/about/endpoints.xhtml>.

[265] <http://data.archaeologydataservice.ac.uk/page/>.

[266] <http://portal.oceannet.org/portal/start.php>, accessed 09 March 2020.

[267] <https://csw-nerc.ceda.ac.uk/geonetwork/srv/eng/catalog.search#/home>, accessed 09 March 2020.

[268] <https://thekeepers.org/>, accessed 09 March 2020.

[269] See <https://ariadne-infrastructure.eu/portal/>, accessed 09 March 2020. and <https://www.europeana.eu/portal/en>, accessed 09 March 2020.

[270] <https://oasis.ac.uk/>

[271] For example, Historic England, Historic Environment Scotland, and the Royal Commission on the Ancient and Historical Monuments of Wales.

[272] <https://archaeologydataservice.ac.uk/archsearch/>.

[273] <https://www.heritagegateway.org.uk/gateway/>, accessed 09 March 2020.

[274] <https://archaeologydataservice.ac.uk/library>.

[275] See R0 and R1 above.

[276] Details are outlined in the Repository Operations, with a more accessible discussion published on the ADS website - <https://archaeologydataservice.ac.uk/about/DOI.xhtml>. As an example of the implementation of DOIs see Oxford Archaeology (South) (2019) 'Lime Lane, Oakwood, Derby: Geophysical survey and evaluation (OASIS ID: oxfordar1-290324) [data-set]'. York: Archaeology Data Service [distributor]. <https://doi.org/10.5284/1056678>. DOIs for all datasets are shown in 'side bar'.

[277] For example, within the ADS Library where grey literature reports are given DOIs - Bowden , M., (2016). 'Stonehenge Southern WHS Project: Vespasian's Camp, Amesbury, Wiltshire: analytical earthwork survey'. Swindon: English Heritage Research Department. <https://doi.org/10.5284/1042244>.

[278] See 'How to cite using this DOI' on each archive page - <https://archaeologydataservice.ac.uk/archives/doi-helptext.html>.

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

Accept

XIV. Data reuse

R14. The repository enables reuse of the data over time, ensuring that appropriate metadata are available to support the understanding and use of the data.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:

4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

Response:

As supporters of the FAIR principles of data stewardship the ADS ensures that all its resources and datasets are findable, accessible, interoperable and reusable. [n279] The ADS exposes collection and file-level metadata through its own web-site, but also shares metadata with external services [n280] in order to maximise exposure of its catalogue and datasets and promote data reuse. The repository also supports a number of Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) targets [n281] and a SPARQL endpoint [n282] allowing human and machine interrogation of its metadata records.

To facilitate data reuse all data is preserved and disseminated in standard and, where possible, open and non-proprietary formats used by its designated community as a means to facilitate and support data reuse. [n283] The ADS has adopted a migration-based preservation strategy [n284] and this approach extends to the formats used for the dissemination of datasets. Specifics of this strategy are outlined in the ADS' Ingest Manual and Repository Operations documentation. [n285] Repository staff maintain a 'technology watch' [n286] to identify new technologies and the application of new techniques within its designated community so that it can ensure that data is disseminated in formats that facilitate data reuse. At the same time, the ADS monitors the data types and formats it curates in order to identify dissemination formats that have become unsupported or redundant. Where necessary file migrations are carried out to ensure the long term sustainability and viability of data types and formats it disseminates. [n287] The repository ensures that resource discovery and file-level metadata and documentation is published and disseminated alongside datasets to improve understanding of the resource and facilitate data reuse. Through its 'technology watch' the ADS ensures that appropriate metadata is requested from depositors to support the reuse of data. Like the data it curates, the repository ensures that all metadata and documentation is disseminated in standard, open and non-proprietary formats to improve its accessibility and support data reuse. Much like its preservation process the ADS ensures that all DIPs are subject to the same rigorous workflows utilised for the preservation of datasets and outlined in the Ingest Manual and the Repository Operations.

The ADS works to promote data reuse within its designated community. The repository actively engages with its community informally through its newsletter [n288], blog [n289] and, particularly using social media [n290] highlighting digital resources as a means to promote data reuse. The ADS maintains a 'helpdesk' where more specific questions on data handling and reused can be posed to repository staff and answered accordingly. [n291] Within presentations and

workshops staff actively highlight and encourage the reuse of datasets and resources. [n292] The ADS also seeks to engage with its community on the subject of data reuse through formal, academic publication. [n293] The ADS provides advice to its designated community on handling data, throughout the entire data life-cycle, through the Guides to Good Practice. [n294]

The repositories use of sustainable citation, through the use of Digital Object Identifiers (DOIs), supports data reuse, and allows tenable links between formal publication, resources and datasets. [n295] The ADS also ensures that the terms and conditions, by which the dataset is disseminated, are clearly displayed within the archive interface. At the same time we ensure that the creator and, where appropriate, copyright information is clearly displayed for each dataset. [n296] Working with publishers, most notably Internet Archaeology, [n297] promotes and supports the creation of peer-reviewed 'data papers' to raise awareness of datasets and highlight reuse potential. [n298] The ADS are currently working to develop a method, via DataCite Event Data, to use the DataCite API to return citations of ADS DOIs in external publications (via Crossref), and thereafter to feed these back into the ADS record to provide a clear reuse trail. [n299] The ADS hopes to implement this change before September 2020.

The ADS uses Matomo Web Analytics [n300] to monitor user experience and collect, non-personally-identifying, statistical information on visitors to the ADS website. [n301] For each resource and dataset a subset of this information is displayed alongside the archive [n302] allowing data creators to monitor resource use on a general level.

Where possible the ADS work with their user community to identify examples of data re-use from their collections. As noted above, providing (re)active display of citation via DOIs is still in development, so cross-referencing is often reliant on metadata supplied with archives, or the work of individual archivists to retrospectively fill in citations where re-use has been identified. An example of this basic re-use is the Where Rivers Meet archive, which was used to inform a later synthetic publication of an archaeological landscape. [n303] A more sophisticated reuse case study has been provided by the ArchAIDE project, who were able to repurpose digital data (images and database records) from the catalogue of Roman Amphorae archive to develop their own database and 3D models. [n304] In turn, this derived data has been deposited with the ADS as part of the ArchAIDE archive. [n305] The ADS are continuing to publicise re-use case studies to its user community to encourage best practice within the discipline.

[279] Wilkinson, M. D., et al. (2016) 'The FAIR Guiding Principles for Scientific Data Management and Stewardship.' Scientific Data 3: Article Number: 160018. <https://doi.org/10.1038/sdata.2016.1>. See R0, R1 and R13 above.

[280] See R13 above.

[281] <https://archaeologydataservice.ac.uk/about/endpoints.xhtml>.

[282] <http://data.archaeologydataservice.ac.uk/page/>.

[283] A list of preservation and dissemination formats is provided in the 'Data Procedures'

(<http://adslocalwiki0.york.ac.uk:8080/wiki/Wiki.jsp?page=DataProcedures> {internal access only}, although static versions of these procedures are provided on the ADS website -

<https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#DataProcedures>.

[284] See R0 above.

[285] See Ingest Manual - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Ingest> and Repository

Operations - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#RepOp>.

[286] See R12 above.

[287] See Green, K., Niven, K. and Field G. (2016) 'Migrating 2 and 3D Datasets: Preserving AutoCAD at the Archaeology Data Service'. *ISPRS Int. J. Geo-Inf.*, 5(4), pp. 44. <https://doi.org/10.3390/ijgi5040044>.

[288] ADS Newsletter - <https://archaeologydataservice.ac.uk/about/newsletter.xhtml>.

[289] Sound Bytes from the ADS - <http://archaeologydataservice.ac.uk/blog/>.

[290] Facebook - <https://www.facebook.com/archaeology.data.service/> and Twitter - @ADS_Update and @ADS_Chatter.

[291] See Contact Us - <https://archaeologydataservice.ac.uk/about/contact.xhtml>.

[292] See Presentations and Outreach - <https://archaeologydataservice.ac.uk/research/presentations.xhtml> and Workshops - <https://archaeologydataservice.ac.uk/learning/Workshops.xhtml>.

[293] Moore, R. and Richards, J.D (2015) 'Here Today, Gone Tomorrow: Open Access, Open Data and Digital Preservation', in A.T. Wilson and B. Edwards (eds.) *Open Source Archaeology: Ethics and Practice*. Dr Gruyter Open, pp. 30-43.; Richards, J.D. and Winters, J. (2015) 'Digging into data: Open Access and Open Data', *PostClassical Archaeologies* 5, pp. 285-98; Evans, T.N.L. and Moore, R.H. (2014) 'Beyond 'The Preserving machine': Promoting Use and Reuse of Grey Literature and Grey Data'. *The Archaeological Review from Cambridge*. 29.2, pp. 212-225; Green, K. (2014) 'Use of a Digital Archive: The Archaeology Data Service'. *The Archaeological Review from Cambridge*, 29.2, pp. 226-243.

[294] Guides to Good Practice - <http://guides.archaeologydataservice.ac.uk/g2gpwiki/>, see specifically the section on the Project Archive: Storage and Dissemination.

[295] See R13 above.

[296] For more detail see R2. See, for example, Oxford Archaeology (South) (2019) 'Lime Lane, Oakwood, Derby: Geophysical survey and evaluation (OASIS ID: oxfordar1-290324) [data-set]'. York: Archaeology Data Service [distributor]. <https://doi.org/10.5284/1056678>. The terms by which the dataset is disseminated are displayed in the left hand bar of the interface, alongside information on data creators and copyright - <https://archaeologydataservice.ac.uk/advice/termsOfUseAndAccess.xhtml#CopyrightSecuriAndLiabilityStatement>. More general information on the website terms and conditions are available from the bottom of each archive page.

[297] <https://intarch.ac.uk/index.html>.

[298] Smith, N., Beale, G., Richards, J. and Scholma-Mason, N. (2018) 'Maeshowe: The Application of RTI to Norse Runes (Data Paper)', *Internet Archaeology* 47. <https://doi.org/10.11141/ia>.

[299] See <https://api.test.datacite.org/events>, accessed 09 March 2020.

[300] <https://matomo.org/>, accessed 09 March 2020.

[301] See the Cookie Policy for more information on the use of cookies and collation of this statistical information - <https://archaeologydataservice.ac.uk/about/Cookies.xhtml>.

[302] This information is published within the 'Usage Statistics' for each dataset/resource, see, for example, Chapman, J. C. et. al. (2018) Trypillia mega-sites of the Ukraine [data-set]. York: Archaeology Data Service [distributor] <https://doi.org/10.5284/1047599>, https://archaeologydataservice.ac.uk/archives/view/trypillia_ahrc_2018/stats.cfm.

[303] See <https://doi.org/10.5284/1000311>.

[304] <https://doi.org/10.5284/1028192>.

[305] <https://doi.org/10.5284/1050896>.

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

Accept

TECHNOLOGY

XV. Technical infrastructure

R15. The repository functions on well-supported operating systems and other core infrastructural software and is using hardware and software technologies appropriate to the services it provides to its Designated Community.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:

4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

Response:

As outlined in previous responses the ADS works closely with its parent organisation, University of York, to ensure that the repository infrastructure is both reliable and stable. [n306] The nature of this relationship, from a financial perspective, is outlined in a Memorandum of Understanding between the ADS and the University of York Registrar and Finance (2012). [n307] While the ongoing support of the technical infrastructure and succession planning are expressed in a Memorandum of Understanding between the ADS and University Information Services and Library 2016. [n308]

The repository maintains a regular 'technology watch' [n309] to ensure that due diligence is paid toward technological changes within its designated community, and, where necessary, hardware and software is maintained to meet the

procedures and guidelines expressed. Through its relationship with the University of York, and particularly the Department of Archaeology, the ADS has access to a broad spectrum of software and hardware used within its designated community. [n310] Where necessary software/hardware is acquired by the repository. A full inventory of hardware and software is maintained by the ADS' System's Manager, and other repository staff, to ensure clear documentation of the technical infrastructure of the repository. [n311] Where necessary changes, issues or development of this infrastructure are highlighted at the monthly planning meetings and, where necessary, added to the Information Security Risk Assessment. [n312] Where necessary issues are also brought to the attention of the ADS' Management Committee, where advice can be requested, discussed and solutions enacted. [n313]

Recognising that OpenSource software and hardware are a feature within the workflows of its designated community, the ADS' endeavours to use, and disseminate datasets in formats that can be interrogated, using these softwares. At the same time, repository staff regularly use open, specialist software such as Apache OpenOffice, [n314] Quantum GIS, [n315] etc to perform normalization tasks and data interrogation. At a systems level, the ADS uses a range of open source software, principally Apache TomEE for its application software.

The structure and operations of the ADS incorporates a number of international and community standards, and at various levels of the organisation. Principally, the ADS is based on an implementation of the OAIS reference model. This includes the technical terminologies used to describe operations within the repository operations, but also tying the model to designated staff roles and responsibilities. More recently, the ADS have incorporated PREMIS entities and data dictionaries into its procedures for how it structures and describes preservation metadata.

The ADS also use Open Geospatial Consortium (OGC) standards for spatial datasets, principally WMS [n316] for data exchange, and GML [n317] for data preservation. In addition, the ADS use the INSPIRE standards for spatial metadata (19115/19139), ensuring spatial metadata is interoperable with mandated portals (MEDIN and NERC). The ADS also base their subject metadata on a UK cultural heritage standard known as MIDAS Heritage [n318], which outlines the minimum level of information needed for recording heritage assets and covers the procedures involved in understanding, protecting and managing these assets. Use of MIDAS Heritage enables a base level of interoperability with other UK cultural heritage organisations. The ADS also follow W3C standards for web design (mainly including HTML, CSS, SVG, Ajax), and XML used for any data interchange.

Any standard used by the ADS is reviewed on an annual basis. The responsibility to do so is split between members of staff, but principally the Deputy Director, Archives Manager and Systems Manager. A review of standards often comprises a brief evaluation of the standard, and a cost-benefit approach to its implementation within the organisation between the management team. An additional week of time is ring-fenced every year for a review of operations, including standards, by the technical team. A move towards a desired standard is researched and evaluated in this time, and an overview of cost/benefit (especially in terms of implementation) is provided to the management team where appropriate. Specific technical standards, for example WMS or GML may be implemented relatively quickly. Longer term strategic moves, such as the move to incorporate PREMIS often take the form of specific internal projects, with their own timescale, project design, and management.

Standards are implemented as close to the existing documentation as possible. Where possible validators (e.g. for INSPIRE or HTML) are used to ensure that standards have been implemented correctly.

The ADS use a wide range of community supported software for its day-to-day operations. For front-end and back-end applications ADS use Java Enterprise Edition (Java EE) specifications, principally Apache TommEE. The ADS also use PostGreSQL (with PostGIS) for certain database driven applications, and GeoServer for production of WMS and WFS. The organization also uses a wide range of community supported software and toolkits within its archival workflows, mainly for file conversion data extraction, or production of technical metadata. These include QGIS, OpenOffice, DROID, Sublime, Textpad, XnView and FWTools. The use of such software, is usually outlined in the relevant procedural documentation for data types.

The ADS work to ensure that all data preserved is also freely accessible via the ADS website. Each archive is usually split into its original discrete data packages, for example documents, images, or CAD files. Every attempt is made to ensure that file sizes are not prohibitive to users on lower bandwidths. This includes providing 'preview' images of file content (for raster images, CAD, videos, GIS files including georectified images), to allow a user to assess the object before committing to a download. In addition, where large file sizes are unavoidable, particularly for reports, lower resolution copies are supplied as an alternative download. Much larger files are often broken down into multi-zips, providing users on lower speeds with their data broken down into smaller packages. Guidance on how to use multi-zips is provided with the download. [n319]

The ADS provides a Risk Register which outlines risks associated within the management of the organisation, this provides an analysis of risk severity and evaluations of the probability, impact and current risk level. [n320]

The ADS maintains a Disaster Recovery Plan which summarises the processes and procedures in place to protect and recover the ADS infrastructure from short and medium-term technical failure or physical incident that may impact services. [n321] All ADS staff have access to an unredacted version of the Disaster Recovery Plan which is made available digitally, outside of the ADS network. Offline/paper copies of the plan are available within the ADS offices. Additional copies are supplied to nominated members of staff within the Department of Archaeology (University of York) and with IT Services (University of York). The repository has undertaken an Information Security Risk Assessment and maintains and Security Overview to ensure persistent access to the datasets the ADS curates. [n322]

[306] See ADS Attachments, section Outsource Partners, and responses R0, R9 and R11.

[307] See ADS MoU with University of York Registrar and Finance 2012

(<https://archaeologydataservice.ac.uk/manPages/mou.xhtml>).

[308] See ADS MoU with University Information Services & Library 2016

(<https://archaeologydataservice.ac.uk/manPages/mou.xhtml>).

[309] See R9, R11 and R14 above.

[310] See, for example, <https://www.york.ac.uk/it-services/software/>,

<https://www.york.ac.uk/archaeology/centres-facilities/bioarch/facilities/>.

[311] <http://adslocalwiki0.york.ac.uk:8080/wiki/Wiki.jsp?page=Systems> {internal access only}.

[312] Information Security Risk Assessment -

<https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#ITRisk>.

[313] Management Committee - <https://archaeologydataservice.ac.uk/about/managementCommittee.xhtml>.

[314] <http://www.openoffice.org/>, accessed 09 March 2020.

[315] <https://qgis.org/en/site/>, accessed 09 March 2020.

[316] <https://www.opengeospatial.org/standards/wms>, accessed 09 March 2020.

[317] <https://www.opengeospatial.org/standards/gml>, accessed 09 March 2020.

[318] <https://historicengland.org.uk/images-books/publications/midas-heritage/>, accessed 09 March 2020.

[319] For example see <https://doi.org/10.5284/1045778>.

[320] Risk Register - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Risk>.

[321] A redacted version of the Disaster Recovery Plan is available from the ADS website -

<https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Disaster>.

[322] Information Security Risk Assessment - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#ITRisk>
and Security Overview - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Security>.

Reviewer Entry

Reviewer 1

Comments:

Accept

Reviewer 2

Comments:

Accept

XVI. Security

R16. The technical infrastructure of the repository provides for protection of the facility and its data, products, services, and users.

Compliance Level:

4 – The guideline has been fully implemented in the repository

Reviewer Entry

Reviewer 1

Comments:

4 – The guideline has been fully implemented in the repository

Reviewer 2

Comments:

4 – The guideline has been fully implemented in the repository

Response:

The technical infrastructure of the ADS has been developed in a manner to facilitate the rapid recovery of the repository and its systems in the event of system or technical failure; a suite of procedures are in place to both backup and also recover this infrastructure should problems or issues arise.

As part of the University of York all ADS virtual machines (VMs) and systems are managed centrally. Access to these systems, and any associated file shares, is restricted and tightly controlled through password, multi-factor authentication and IP address. External access to these systems is managed through the use of secure Virtual Private Network (VPN). [n323] Through the University of York IT Services, the ADS have direct access to an implementation of 'Men and Mice' for constant scanning of all its VMs for emerging security vulnerabilities. Identification of such vulnerabilities are an organisational-wide priority, with designated monitoring of Mice and Men application a core responsibility of the ADS Systems Manager. When a weakness is identified, the issue is raised to ADS senior management (Deputy Director and Director). Additional monitoring of ADS VMs is also maintained by UoY IT Services, as part of the existing SLA. Any critical vulnerabilities are reported directly to the ADS Systems Manager, and thereafter the management team.

All applications and resources are backed up at regular intervals throughout each day, via hourly snapshots, on the network file system (NFS). These daily snapshots are made available for up to 30 days after creation as part of the University of York's wider Disaster Recovery Plan. [n324] These snapshots are intended for use in the event of catastrophic failure and are made available on a self-service basis for immediate download. The University of York also maintains taped backups, which provide access for up to 90 days. [n325] These are recovered and restored following formal request to IT Services, with recovery times being within three working days of the initial request. [n326] Specific details on the storage and recovery of archived datasets and files are discussed above, [n327] but can be recovered from local short/medium term storage, or where necessary, from deep storage (AWS).

The repository uses a series of Oracle databases to power resources and systems, [n328] which are managed via a central Oracle service provided by the University of York. Backups of all supported databases are undertaken each day, as part of the University of York's Disaster Recovery Plan, [n329] which enables the restoration of databases should they become corrupted, or succumb to a catastrophic event. [n330] Further weekly backups of all databases are carried out locally by repository staff, part of a wider workflow, in order to facilitate local, more immediate access to these databases. [n331]

The codebase for core ADS systems, including the CMS/OMS, is backed-up in the University of York Bitbucket repository, with access restricted access to ADS Systems Manager, Application Developers and designated UoY ITS staff. [n332]

The ADS has a dedicated Disaster Recovery Plan [n333] which outlines those processes and procedures in place to protect and recover the ADS infrastructure from short and medium-term technical failure, or physical incident that may impact services. All ADS staff have access to an unredacted version of the Disaster Recovery Plan which is made available digitally, outside of the ADS network. Offline/paper copies of the plan are available within the ADS offices.

Additional copies are supplied to nominated members of staff within the Department of Archaeology (University of York) and with IT Services (University of York). [n334]

The repository has undertaken a high-level Information Security Risk Assessment and maintains a low-level Security Overview to ensure persistent access to systems, resources and datasets. [n335] These should be used in conjunction with the policies and guidelines published by the repositories host institution, the University of York. The repository carries out a self-assessed risk analysis using DRAMBORA, and regularly evaluates the effectiveness of this assessment and associated risk management implications.

The ADS provides a Risk Register which outlines risks associated within the management of the organisation, this provides an analysis of risk severity and evaluations of the probability, impact and current risk level. [n336]

The ADS maintains a Disaster Recovery Plan [n337] which summarises the processes and procedures in place to protect and recover the ADS infrastructure from short and medium-term technical failure or physical incident that may impact services. All ADS staff have access to an unredacted version of the Disaster Recovery Plan which is made available digitally, outside of the ADS network. Offline/paper copies of the plan are available within the ADS offices. Additional copies are supplied to nominated members of staff within the Department of Archaeology (University of York) and with IT Services (University of York). The repository has undertaken an Information Security Risk Assessment and maintains and Security Overview to ensure persistent access to the datasets the ADS curates. [n338]

The ADS operates from offices within the King's Manor, York, and, as part of the University of York, adheres to its security policies and procedures. [n339] As an important historic building, the King's Manor is open to the public during working hours and at weekend. The use of CCTV and an on-site security team ensure access and use of the property are monitored, while key, key card and keypad security systems are deployed to protect those areas of the property, including the ADS Offices, which have restricted access. The ADS' Security Overview outlines these arrangements in detail. [n340]

[323] Virtual Private Network (VPN) - <https://www.york.ac.uk/it-services/services/vpn/>, accessed 09 March 2020.

[324] See <https://www.york.ac.uk/it-services/services/backups/#tab-1>, accessed 09 March 2020.

[325] See <https://www.york.ac.uk/it-services/services/backups/#tab-2>, accessed 09 March 2020.

[326] See ADS MoU with University Information Services & Library 2016 - <https://archaeologydataservice.ac.uk/manPages/mou.xhtml>.

[327] See R0 and R9.

[328] For example, the Collection Management System (CMS), Object Metadata System (OMS), archive interfaces etc.

[329] See above, and also <https://www.york.ac.uk/it-services/services/backups/#tab-1>, accessed 09 March 2020.

[330] See <https://www.york.ac.uk/it-services/services/oracle/#tab-4>, accessed 09 March 2020.

[331] See Systems Backup - <http://adslocalwiki0.york.ac.uk:8080/wiki/Wiki.jsp?page=SystemsBackups>, {internal access only}, see also R9 above.

[332] See Systems Backup - <http://adslocalwiki0.york.ac.uk:8080/wiki/Wiki.jsp?page=SystemsBackups>, {internal access only}, see also R9 above.

[333] A redacted version of the Disaster Recovery Plan is available from the ADS website -

<https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Disaster>.

[334] See also R9 above.

[335] Information Security Risk Assessment - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#ITRisk> and Security Overview - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Security>.

[336] Risk Register - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Risk>.

[337] A redacted version of the Disaster Recovery Plan is available from the ADS website -

<https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Disaster>.

[338] Information Security Risk Assessment - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#ITRisk> and Security Overview - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Security>.

[339] <https://www.york.ac.uk/about/campus/landmarks/kings-manor/>, accessed 09 March 2020.

[340] Security Overview - <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#Security>.

Reviewer Entry

Reviewer 1

Comments:
Accept

Reviewer 2

Comments:
Accept

APPLICANT FEEDBACK

Comments/feedback

These requirements are not seen as final, and we value your input to improve the core certification procedure. To this end, please leave any comments you wish to make on both the quality of the Catalogue and its relevance to your organization, as well as any other related thoughts.

Response:

Reviewer Entry

Reviewer 1

Comments:

Reviewer 2

Comments: