Technical Appendix

Please complete this section if your application proposes to create an electronic resource.

1. Project Management of technical aspects

a. Management and reporting structure:

For reporting structure see Case for Support and Visual Evidence II.
Management of the project's technical aspects is as follows:

Steering Committee (see list Case for Support p.7)
Monitors progress via quarterly written reports from the Chief Researcher and biannual meetings
Assists in troubleshooting and managing risk
Specialist guidance from senior GU Humanities Advanced Technology & Information Institute representative

Principal Investigator
Monitors workflow and quality control of project team monthly, ongoing risk management
Intellectual stewardship and input

Chief Researcher(CR)
Acquires and enters data from research to meet project aims
Provides day-to-day management and intellectual stewardship
Monitors workflow; implements quality control for the creation of project systems, the acquisition and entry of data and images, and delivery of project outputs

Research Assistant
Acquires and enters data from research to meet project aims
Conducts initial checking and editing of data
Maintains image library

Systems Developer
Gathers requirements, undertakes all tasks relating to the development of the database, project website and web-based management systems for post-project updates
Trains project team in the use of the database, the development of XML resources and image capture
Provides technical support for the duration of the project including the launch of project website
Batch processing of TIFF images to JPEG and uploading of images to the webserver

Administrative Assistant
Transcribe data in XML format and development of image metadata
Maintain project archive

Data Editor
Supports CR in editing and checking research data to conform to project standards and uploading approved data onto the project website

Historic Scotland (HS) and Royal Commission on Ancient and Historical Monuments (RCAHMS)
Building analysis information and images will be inputted by RAs

Graphic Designer
Visual identity for the project

b. Project Timetable:

See Visual Evidence 1 for a graphic representation of the overall project timetable.
Technical Timetable:
Year 1
- assess system requirements and create a requirements document
- development of a relational database structure and user interface for project staff
- develop procedures for image capture/management
- assess required document structure for TEI texts and create a TEI P5 XML schema - instal XML editing software (oXygen) and develop XML-related resources: templates, CSS and XSLT stylesheets
- documentation on use of systems and provision of tuition/support for project staff
- development of systems based on user feedback
- creation of a visual style for project and integration with and launch of publicly accessible website

Year 2
- continued support in the use of all systems
- website user needs survey and analysis of results
- creation of a prototype password-protected website allowing searchable access to the database (based on user needs

survey)
- specialist subject contributors asked for feedback on prototype website
- present website prototype at the project seminar
- develop systems to deliver TEI XML content dynamically via the website

Year 3
- complete data and image entry, and web essay
- review all on-line texts
- complete website, document archive and project documentation
- develop management systems for images and XML content
- project launched online
- deposit archive

Year 4
- formal launch of website

c. Project deliverables:

A fully searchable website allowing access to the database, XML encoded texts and images including analytical essays; c.100 architectural projects; c.600 designs; data from c.2,000 job-book pp.; information on related clients, businesses and tradesmen; c.3,800 images. The top level pages of the project website will be developed at the beginning of the project and will deliver valid, accessible XHTML pages powered by the content management system T4. This will allow staff to update the site during and after project completion. A searchable, database-driven website will be developed on another server during the project and will integrate seamlessly with the main site. Web-based systems to upload XML content and images will be put in place towards the end of the project to ensure post-project sustainability.

An archive set of c.3,800 images stored in uncompressed TIFF format with accompanying metadata. Sets of smaller JPEG images derived from the TIFF archive will be used on the website. Where they exist, raw camera/scanner images will also be preserved in DNG format with embedded metadata.

Project documentation describing: database structure, editorial/encoding policy, technical design issues, and how user feedback influenced the design of the website.

Other project outputs include:
Analytical on-line essays
Catalogues raisonnés of projects and designs
Project Seminar
Exhibition
Conference
Publications (outside this project)

d. Monitoring process:

See page 1 of the Technical Appendix Addendum for the monitoring process.

2. Data Development Methods

a. Content selection:

See pages 2 - 4 of the Technical Appendix Addendum for the content selection method.

b. Data/file formats:

See pages 4 - 7 of the Technical Appendix Addendum for the data/file formats and justification for their use.

c. Documenting the resource:

The purpose and function of each field in the database schema will be described in detail and the structure represented graphically. The XML dataset and schema will be described in a detailed set of encoding guidelines. This will serve as both a manual for project staff engaged in marking up texts and as documentation on the use of TEI for this project. Metadata for each XML file will be contained in the TEI header.
Image metadata will be maintained and updated as embedded metadata within the archival versions of each image (TIFF and DNG). This metadata will encompass the IPTC and EXIF standards as well other fields particular to the image file format. A secondary copy of this data will be extracted periodically and stored as XMP (XML) files. These files will form an XML archive after completion of the project and may also be used directly as a data source for the website. Programming files including PHP, XSLT, ECMAScript and CSS will incorporate extensive commentary.

d. Advice sought on planning your proposed project:

Advice has been sought from the Humanities Advanced Technology and Information Institute (HATII) at the University of Glasgow. HATII has been involved with numerous successful online cultural heritage projects and has developed content management systems and databases for previous AHRC-funded projects.

The Technical Advisory Service for Images (TASI) has given advice related to imaging workflow, approaches to managing and extracting metadata, copyright and intellectual property.

Advice has been provided by the Digital Curation Centre (DCC) and AHDS (Literature, Languages and Linguistics, Visual Arts and Performing Arts) on this and past HATII research projects at the University of Glasgow.

See pp. 7-8 of the Technical Appendix Addendum for a list of other individual advisers.

e. Consultation with projects using similar methods:

Resource developers in HATII who have worked on a number of successful web-based cultural heritage research projects were consulted, including: three emblem book digitisation projects, Chinese Art: Research into Provenance; The Glasgow Story; The Other Europes Project; Andy Goldsworthy Digital Catalogue; Mapping Sculpture 1851/1951; The Whistler and Fox Talbot Correspondence Projects. Work on emblem digitisation has involved close collaboration with similar projects in Utrecht, Wolfenbuettel and Illinois.

Advice was also sought from a number of related projects including The Drawn Evidence (Univ of Dundee), Gillespie, Kidd and Coia Research Project (The Lighthouse and The Glasgow School of Art); Sir Basil Spence Archive Project (RCAHMS); Dictionary of Scottish Architects; and architectural design archives at a) UK: NMR, RCAHMS and RIBA ; b) Overseas: Avery Architectural Library, New York; Canadian Centre for Architecture, Montreal; Society of Architectural Associations, Chicago.

3. Infrastructural Support

a. Hardware, software and relevant technical expertise available:

The database, XML content and image archive located on a shared network server will be supported by University of Glasgow support staff. The website will be located on a University webserver running UNIX and Apache and making available to the project a range of open source server technologies including MySQL, PHP5, eXist, LIBXML2, SOAP. The project will be supported by the Systems Developer (SD) and will carry out all technical development and support for the project including database development, imaging and text mark-up as well as maintaining the image archive and XML dataset. The SD will also provide expertise in web design, XQuery and XSLT which will be required to make XML content available on both the website and network drive. Additional expertise will be available from HATII and IT Services as required. Support for workstations, network drives and the project web server will be provided by the IT support services at the University of Glasgow.

b. Additional hardware, software and relevant technical expertise, support and training that is likely to be required and how it will be acquired:

1 computer, 2 laptops
2 portable USB (bus-powered) hard disks - for backing up data on laptops when offsite
1 Buffalo 1TB DriveStation Duo USB/firewire dual drive (Raid 1) external hard disk - for additional backups of project dataset
Digital camera - Canon EOS 450D - for capturing reference images on site
Adobe Photoshop CS3 - for image processing
3 copies of the XML editor oXygen v.10 for XML encoding

The items listed above will be acquired from University approved suppliers.

The SD will provide support for project systems and for the project researchers. The University of Glasgow IT Services will support the workstations, network and email systems used by project staff. Project team training will be provided by the SD, HATII and the University Computing Service.

A graphic designer from the Hunterian will create a visual identity for the project which will be incorporated in publications, the website, and event-related material.

c. Describe the backup procedures that your project will use to safeguard your electronic resource during its development:

The database, XML dataset and image archive for the project will be located on a RAID 5 network drive maintained by IT Services at the University of Glasgow. The website, XML dataset and MySQL databases will be run on webservers managed by IT Services and running Apache. IT Services at the University of Glasgow will manage daily backups of both the network drive and webservers to an Ultrium LTO2 unit and provide network support. Daily backups of critical data will be be managed by the SD at another site. Periodic backups of the complete dataset will also be maintained at this site on a dual drive RAID 1 external storage unit. Where the laptops are used off site, backups of a working dataset will be made to portable USB bus-powered hard drives.

4. Data preservation and sustainability

a. Please detail advice sought on the preservation of the electronic resource(s)

Advice has been sought on preservation from AHDS, TASI and locally from HATII. Both AHDS and HATII staff have emphasised the importance of strong documentation and strict adherence to relevant standards. Their advice has allowed the project to be designed with a clear separation between a preservation dataset that is capable of being copied

periodically to a secure archive and the presentation of this data via a website. Appropriate standards and file formats for both the preservation dataset (XML, TEI, TIFF) and the website (XHTML, CSS2, W3C, WAI) have been adopted. The importance of designing a system where information in all formats can be updated efficiently after project completion has also been emphasised. The use of dynamic conversion of XML content and systems to update database, images and XML files will facilitate post-project sustainability. Advice from TASI has been important for the selection of appropriate image and metadata standards for digital preservation that also allow an efficient workflow for the management of images and metadata.

b. Please indicate what plans you have to preserve the data and make it available with the AHDS and/or through some alternative mechanism:

Preservation plans centre on making the resource available through the University of Glasgow using technology, expertise and resources available in various departments. A fully documented dataset resulting from the completed project will be archived by University of Glasgow Archive Services and will also be maintained in an accessible location on a network server. The preservation dataset will include:
  - an SQL 'dump' of the project database

c. Please indicate what plans you have to ensure that the electronic output will become a sustainable resource

The strict adherence to open standards in the creation of the dataset will guarantee the long term sustainability of the digital resource that will be created by the project. The dynamic transformation of XML content will result in a website that is extremely efficient to maintain.

In Year 3 the MySQL version of the database used for the website will become the primary project database. The Access front end will continue to be used with linked tables in the MySQL database via ODBC. This will allow the database to be updated after project completion without input from the SD. It will also be possible to access the database from off campus using the University VPN service.

During Year 3, web-based management systems will be developed that allow individual XML files and TIFF image files to be uploaded to the website. TIFF images will be automatically saved in JPEG format in a standard set of sizes.

General oversight of the website will become the responsibility of the Mackintosh Curator at the Hunterian who will work with HATII to provide updates/amends as required.

5. Access

Please indicate how you will make the resource accessible:

The website is an essential aspect of the project. It will be made available free of charge, with no registration procedures. The site will make extensive use of hyperlinks to navigate dynamic content allowing content to be indexed by search engines. The site will also be linked extensively from other websites including Mackintosh properties, HS, and RCAHMS helping to increase the site's ranking in Google.
The website will conform to the Web Accessibility Initiative (WAI) guidelines as well as UK government and Glasgow University requirements for web accessibility. Interoperability of web content will be ensured by using standard templates to deliver valid XHTML pages which maintain a clear separation between content, layout and CSS2 styling. The website will not rely on Javascript, Flash or other technologies that may not be available to all users.
Extensive testing of the website against expectations of intended audiences will result in a user interface that is as intuitive as possible. Extensive search options and use of hyperlinks will allow users to locate information easily.

6. Copyright and intellectual property issues

Please demonstrate that you have sought advice on and addressed all copyright and rights management issues that apply to the resource:

The project aims to provide free public access for non-commercial use while providing acknowledgement and protection of the rights of owners. Information has been sought from the UK Patents Office, JISC Legal, TASI, RCAHMS, the University's Research and Enterprise Department, and projects including the National Inventory of Research Project and SCRAN. Copyright issues will comply with the University of Glasgow's Copyright and IP statements. The content of the Mackintosh Architecture database meets the criteria for Database Right (originality in the selection of the contents and the result of substantial investment).

Database content wil held by Mackintosh Architecture at the University of Glasgow. Permission will be sought from all creators, authors and institutions for any text, quotations, and images within current copyright to be used on the project website. These will be credited alongside the relevant material. A dedicated Copyright and IP page will cite all owners, with contact details, access rights, and appropriate disclaimers. Individual licensing arrangements will be agreed. Where appropriate, Creative Commons licenses will be used. All authors and systems designers will be acknowledged and correct citations given on the website. Pixel dimensions of JPEG images on the site will prevent them being printed at a usable size.

Guidance will be given to project members and further advice sought prior to publication of outcomes.

Mackintosh Architecture - Project Schedule

Task	YEAR ONE	YEAR TWO	YEAR THREE	YEAR FOUR
DATABASE DEVELOPMENT				
Project definition and creation of requirements document [SD, PI, CR]				
Development of database structure and user interface [SD]				
Training and support in use of database + further refinement				
Switch to using MySQL as primary database with Access frontend				
Creation of web-based management system for post-project updates				
SD provides ongoing technical support				
WEBSITE				
Creation of visual identity for project [graphic designer]				
Development of T4 based website				
User needs survey (for database driven site)				
Creation of the database driven site				
Beta test phase				
Further testing and refinement based on user feedback				
Completion of database driven website				
XML CONTENT				
Instal copies of oXygen XML editor				
Creation of TEI schema and establish editing environment, templates				
Training/ support in the use of oXygen / TEI				
XML content creation and ongoing support				
IMAGING				
Set up procedures for image management / creation of procedures document				
Training / support in image management, workflow, metadata				
Maintenance of embedded metadata using Adobe Bridge				
RESEARCH, BUILDINGS STUDIES / SURVEYS, DATA ENTRY				
New staff take up posts CR; RAs and Admin Ass't				
CR admin metadata and contextual documentation started				
PI cataloguing designs and data entry				
CR and RAs Lit. review; property archives; job book transcr.; initial building list				
CR and RAs sift of archival material and secondary sources; site visits				
CR and RAs Contractors research				
Admin Ass't data transcription				
Admin Ass't photo orders and permissions				
HS and RCAHMS buildings analysis; RCAHMS photography				
Data editor edits data				
CR reviews weekly/fortnightly samples of data				
CR edits and checks data-quality control and upload to website on approval				
PI monitors research quality and targets fortnightly/monthly, as appropriate				
Steeting C'ttee monitors targets and budget via 1/4 reports and 1/2 meetings				
DATA ANALYSIS				
Preparation of web essays				
COMPLETION MILESTONES				
Final list of work				
Data entry, photography, web essays, images, suppporting info				
Maintenance plans				
Preservation dataset and documentation placed in digital archive				
OUTPUTS				
Seminar				
PI Exhibition planning				
Exhibition opens; website launched				
Conference				
Physical archive deposited at Hunterian				

Mackintosh Architecture: Tradition, Innovation, Making and Meaning

Technical Appendix – Addendum

1 Project Management of Technical Aspects

d. Monitoring Process

Project Management:
A range of project management techniques will be used to ensure progress in accordance with the project timetable:
- where tasks on the critical path show a risk of extending beyond the planned target date, resources will be reallocated to avoid any potential overrun
- the Chief Researcher (CR) will maintain a project plan setting a monthly schedule with clearly defined roles, responsibilities and targets for all team members
- the plan will be arrived at through discussion and reviewed at weekly team meetings. Integral to the planning process will be a rolling programme of risk assessment with established procedures for team members to raise areas of concern
- workflow will be monitored at weekly team meetings
- time will be allocated to discuss issues relating to data acquisition, content selection and technical issues
- minutes of all meetings will be kept to ensure full communication between all staff; clarify specific responsibilities; and provide a common record of all decisions.

Systems Development:
Progress towards the development of the database, creation of XML content, imaging workflow and website will be managed by the Systems Developer (SD) in consultation with the CR. Technical documentation will also be created by the SD and CR and reviewed by the Steering Committee area expert.

The SD, with input from the CR, will test and prove the database and user interface during months 2–3 by trial entries and upload of data, checking the field names and inbuilt quality assurance (QA). All necessary refinements will be implemented by the SD after approval by the CR. Feedback from other team members will be incorporated from month 4.

The database driven part of the website will be created in Year 2 based on analysis of a user needs survey. Beta testing of this website will be carried out during the remaining part of Year 2 and the site will be presented at a project seminar towards the end of Year 2. Prior to completion of the website, at the end of Year 3, the SD will evaluate and carry out refinements to the database and website in the light of feedback from a limited access release to relevant

specialists, and monitored use of the project website at the University of Glasgow by invited groups of students and the public.

Data Entry and Approval:
QA and monitoring progress on data entry and approval will be managed by a combination of staff supervision and in-built project systems. The CR will review weekly (fortnightly after first two months) samples of data acquisition and entry for review and approval. The PI will make fortnightly (monthly after first three months) checks of quality of research and targets, with quarterly reviews by the Steering Committee. QA will be implemented by use of controlled vocabularies and authorities within the database.

2. Data Development Methods

a. Content Selection

A project research manual prepared by the CR and agreed with the PI will define aims, outcomes and methods. Templates will control and structure data gathering and presentation of content. These will cover architectural projects; designs; individuals and businesses; periodical references; archival material; images. See sample fields below. The data will correlate to the working database developed in months 1 – 3 of the project.

Research Phase:

Archives:	In order to make the research efficient and productive, the guidelines will outline the scope of the research resources. In some cases, for example Glasgow School of Art Governors' minutes and annual reports, these contain information on activity outwith the scope of this project. Guidance will be given on what areas should be the focus of research activity. There will be provision in the database to enter citations of sources which have not been followed up but which may be of interest to database users. A research diary will be maintained to keep a log of sources not consulted with a brief explanation. This will be reviewed at the weekly team meetings.
Job-books:	project identification; client; location; dates; participants; cost; scope of work
Original designs:	authorship; dates; design development; specifications
Periodicals:	images; contemporary descriptions; names of participants; dates; bibliographic references
Site visits:	attributed projects will be visited and photographed by the Project Team for review and evaluation in conjunction with HS, RCAHMS, and the Steering Group

Building Analysis Phase:
User interfaces for data entry will be constructed from MS Access database forms and printed forms generated using MS Access reports. In both on screen and printed forms will be based on data standards used by

Docomomo, Historic Scotland and English Heritage. In addition, research data accumulated for each of the 10 key buildings will be interrogated at the end of the research phase and prior to on-site studies to determine specific questions relating to the project as built; materials and technology; and history of subsequent change.

Images:

Period views: the database will record the location of all images that show original state and location. The intention is to include all these images in the project dataset, or a representative selection where views are significantly comparable. Reference photographs will be taken, where permissible, by the project team during the research phase. Progress will be monitored at weekly team meetings and the final collection reviewed at the end of the Research Phase. Archival quality images will then be ordered as required.

Designs: the project dataset will include descriptions and images of all available designs.

Archival material: the database will record the location of archival material which relates directly to the design development and construction of the projects. A representative selection will be selected for inclusion as images or transcriptions.

Subsequent change: the database will record substantive change. Reference images will be taken by the project team during the research phase. Progress will be monitored at weekly team meetings and reviewed at the end of the Research Phase. The outcomes will form part of the RCAHMS photographic survey brief.

As existing: the database will include representative images of the building as it exists, provided either by the property owner or taken as part of the RCAHMS survey.

Team members will be explicitly discouraged from departing from the main project survey to pursue in-depth investigations of individual projects, businesses and trades.

SAMPLE DATA CATEGORIES
(where multiple entries are required in certain categories this will be accommodated by one-to-many and many-to-many relationships within the database schema)

BUILDINGS

Database Number	MB 001
Name	
Date(s)	Design stage – Completion; Phased if need be
Type	
Address	Number, Street, Town, Postcode
Designer(s)	Full name(s)
Client	Name (highlighted to cross refer)
Contractors	Name (highlighted to cross refer)
	Category of Work
Description	Free Text
Record of Change	Summary (multiple)
	Date

	By Whom
	References
Job Book Entry	Y/N (Highlighted to cross refer)
Archival Material	Summary list to cross-refer
Designs	Summary list by title and date with thumbnails to cross-refer
Photographs	Summary list by title and date with thumbnails to cross-refer
People associated	
Current status	Owner
	Use
	Date recorded
Listed status	
Literature	
Keywords	

DESIGNS

Database Number	MD 001
Maker	Personal Name
	Corporate Name
Role	Designer/ Draughtsman/ After

Title
Date
Purpose and Stage
Aspect
Client
Medium
Support
Inscriptions
Marks
Scale
Size
Collection
Ref No
Provenance
Literature
Exhibition history
Note
Keywords

b. Please outline and justify the data / file formats that you propose to use:

The Database:

The project database will be developed in MS Access 2003/7 on a shared network drive. Use of Access will allow the relational database structure and a form-based user interface to be developed relatively quickly. Access has good support for the relational database model and standard SQL queries. The

relational database structure will include a high level of normalisation in order to minimise duplication and avoid data anomalies. Access also allows features to be implemented efficiently that will facilitate quality control during data input. These features include maintenance of referential integrity, input masks and drop down authority lists derived from fields in other tables.

Access is more than adequate to cope with the projected size of the database and number of concurrent users required during the data entry phase. Access to the database from outside the University network is not a requirement, although this could be achieved using the University VPN service should the need arise. The use of web form-based user interface linked to a MySQL database has also been considered for data entry. The University has considerable experience in designing database front ends using both approaches. For this project it is felt that use of an interface built with Access forms will accelerate workflow for data entry and allow data entry to begin at an earlier point in the project schedule. Feedback from past projects also indicates a user preference for Access rather than web-based interfaces. Access is supplied as part of MS Office to all University of Glasgow staff as part of a campus-wide agreement. It is therefore well supported by University computing staff and there will be no additional cost in making it available to all project staff. The ability Access provides to build queries and reports quickly for a specific purpose will also be important for this project. Printed forms generated by Access as reports will be used for data entry off-site during the data-gathering phase in situations where use of a laptop is not feasible.

During the data-gathering stage of the project a range of strategies will be adopted to allow off-site working. Where it is possible to use a laptop, temporary versions of the project database will be used to develop subsets of data. These subsets will integrated with the main database by the SD when the laptop is returned to the project office. It is not anticipated that it will be possible to connect directly to the main database in most off-site situations, but should internet access be available connection to the University network via VPN will be an option. Data entry off-site will use the standard form-based user interface (or an adapted version of this interface). The development of XML data off-site will be less problematic. Template documents will be available to facilitate the creation of new TEI XML files. During this phase, management systems will ensure that while data is 'live' on a laptop it cannot be worked on within the main dataset.

MySQL will be used to deliver the database via the project website. MySQL has been used for many years to support dynamic websites at the University and has a proven record for reliability, performance and ability to handle multiple users. It is also open source software and will not involve additional costs. During the development and beta testing phase of the website, data will be exported periodically from Access to MySQL using an ODBC link. During Year 3 it will be possible to switch to the MySQL version of the database as the primary project database. The Access front end will continue to be used with linked tables in the MySQL database via ODBC. This will allow data seen on the website to be updated directly by project staff and will also be important for post-project sustainability.

Terminology and data structures within the database will be controlled using the Getty Architectural Thesaurus, RIBA and RCAHMS cataloguing guidelines; and Docomomo International, Historic Scotland and English Heritage building templates. Date fields will conform to the ISO 8601 date format.

The Website:
The website will be split between two server locations. A publicly accessible website will be developed during the first year of the project using the University's web content management system T4. This site will describe the project and include news, events listings and links to other sites. The use of T4 will allow all project staff to update the site through a web-based interface. It will also guarantee that all pages produced are valid XHTML, styled by external CSS2 style sheets, and conform to relevant guidelines on accessibility. The site will also have a structure that is consistent with other University sites, but will be customised to include a visual identity for the project.

The second website will be developed during the course of the project and will make the database, XML content and images generated by the project available in searchable / browsable form. This site will be delivered by PHP5, but will adopt the same structure and CSS styling as the T4 website to ensure a seamless transition between the two. The use of another server for this second website will allow the use of a range of open source technologies (MySQL5, PHP5, eXist, LIBXML2, SOAP) that would not be available on the server used by T4 and would also be difficult to implement in conjunction with the T4 CMS system. The search website will initially be password protected. The password protection will be dropped in year 3 to allow access and feedback from a wider user group. Prior to the launch of the website in year 4 the search site will be linked from the T4 project site and other Mackintosh related websites.

XML:
The XML dataset will be stored as XML files encoded in UTF-8 and validated against a Text Encoding Initiative (TEI) P5 RelaxNG schema created using the web-based tool Roma. Copies of the individual XML files will be stored on a shared network drive. These will be edited using the oXygen (version 9+) XML editing application. In addition to the standard text view, this programme now includes a WYSIWYG interface that project staff may find helpful. It will also be possible to preview the XML files in a standard web browser with the content dynamically converted to HTML by XSLT style sheets specifically created for the project. The search website will access the same XML texts stored either in the file system or in the 'eXist' open source native XML database. Content will be extracted from the XML texts and displayed dynamically using XSLT/XQuery. The choice of XML for the transcription and encoding of text-based material allows a clear separation to be maintained between the presentation of data on the website and a preservation dataset from which other outputs can be derived using the XSLT/FO transformation language (e.g. output for publications, CRF files etc.). XML is a W3C standard

and a preferred archival format for text-based material. TEI provides an established set of elements and attribute values suitable for encoding all types of textual features and will make available established mechanisms for handling links, annotations, bibliographical material and many other features. The creation of an XML dataset that can be validated against a TEI schema will also be of additional benefit in terms of digital preservation.

Images:
Archived images will be stored as uncompressed TIFF files. RAW image files captured by a flatbed scanner or digital camera will also be retained and stored in Adobe's Digital Negative format (DNG). The workflow for image capture and optimisation will make use of Adobe's Camera Raw plug-in and the Adobe Bridge file management application. Image metadata in IPTC and EXIF formats embedded in the archive set of TIFF files will be maintained using Adobe Bridge and extracted and stored as Extensible Metadata Platform (XMP) files, an XML format based on the W3C Resource Description Framework (RDF). JPEG images used in various sizes on the website will be batch processed from the TIFF archive images.

The ability to combine data describing physical objects (architectural drawings, photographs etc.) held in the project database with XMP image metadata will allow mapping to Dublin Core and VRA Core 4.0 metadata standards. Dublin Core data may be required if the project data needs to be made available for harvesting using the Open Archives Initiative (OAI) protocol or as an Resource Description Framework (RDF) file.

2d Advice sought on planning your proposed project

Additional guidance was sought from:

AHRC-funded projects
Ann Compton, Mapping Sculpture 1851–1951
Professor Margaret MacDonald, Whistler Etchings
Professor Nicholas Pearce, Chinese Art - Research into Provenance
Professor Alison Yarrington, Mapping Sculpture 1851–1951

Mackintosh Scholars
Roger Billcliffe, Mackintosh scholar
Dr James Macaulay, Architectural Historian
George Rawson, Architectural Historian

Related Collections and Archives
Simon Green, RCAHMS
Charles Hind, Curator, Royal Institute of British Architects: Drawings and Archives, British Architectural Library
Alexis Lenk, Canadian Centre for Architecture
Ranald MacInnes, HS
Dr Irene O'Brien, Archivist, Glasgow City Archives
Jane Thomas, RCAHMS

Peter Trowles, Mackintosh Curator, Glasgow School of Art

<u>Other Specialists</u>
Professor John Hume, former Chief Inspector, Historic Scotland; Chair, RCAHMS
Professor Charles McKean, Scottish Architecture, University of Dundee
Dr Colin Porteous, Mackintosh Environmental Architecture Research Unit, Glasgow School of Art
Professor David Porter, Head, Mackintosh School of Architecture
Pauline Saliga, Executive Director, Society of American Architectural Historians
Joseph Sharples, Architectural Historian
Professor David Walker, Dictionary of Scottish Architects