Tennessee Archives Management Advisory

1999

ARCHIVAL FACILITIES CLASSIFICATION AND SPECIFICATIONS OF STRUCTURES AND COMPONENT SPACES

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FOREWORD

I prepared this handbook first in 1990, for use by the Smithsonian Institution as a reference for long-range planning of a (then) proposed master archives and library facility. I relied heavily on professional literature from the National Archives and Records Administration, the Library of Congress, the Northeast Document Conservation Center, and the Society of American Archivists, and from my own experience as part of the planning staff for the John F. Kennedy Library, overlooking Boston harbor in Massachusetts. Early drafts were reviewed by several different archivists and museum professionals, and also by conservation professionals from the Smithsonian's internationally-renowned Conservation Analytical Laboratory (CAL). I have a good deal of confidence in the basic soundness of its advice. However, it has been about a decade since the handbook was prepared, and I have done little to update it for this revision.

I am always particularly concerned that commercial architects and contractors, who are used to certain modes of design and construction, will not take kindly to advice from a mere archivist. Nevertheless, I have been "burned" by architects and engineers who assured me that they could deliver me a product just as good as that which I proposed, but of different materials, design, or construction techniques and standards. They were wrong and I was right. The principal issue is one of structural stability and flexibility. An archives must be structurally sounder and less flexible than most functional buildings constructed today. In fairness, architects and engineers have also been "burned" by clients who ask for one thing and then are disappointed to get just what they asked for, instead of being advised in the direction of something better by those who know better.

With this in mind, I emphasize that these standards and criteria need to be taken seriously if the archival product is to serve its functions reliably. After all, I am (and you are) the expert with respect to archives. We *know* what archives need; and, if we don't ask for it, we won't get it.

Finally, I know it is unlikely that any local archives will want, need, or be able to afford the full range of facilities that are described here. They can,

however, select from among them in designing and constructing their archival facilities.

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6 April 1999

ARCHIVAL FACILITIES
CLASSIFICATION AND SPECIFICATIONS
OF STRUCTURES AND COMPONENT SPACES

Introduction

Archives require specialized spaces and building systems. Although existing buildings can be renovated to suit archives, most modern office construction—usually designed for maximum flexibility of rearrangement and use—is unsuitable. Archives require a variety of tightly controlled environments for the long-term preservation of archival materials, each having its own specifications. The ambient air and environmental variation tolerable in a standard building are inadequate for proper archives preservation. The more appropriate analogy is a scientific laboratory or computer “clean room”. It is often difficult to convince architects and other non-archivists that this is necessary, but past experience demonstrates that when the archival specifications are not followed, damage to the archives nearly always ensues.

One of the most successful general designs for an archival facility—from the archival point of view—is what might be called “a box within a box within a box.” That is, the archival storage spaces are within an “envelope” of thick walls, ceiling, and floor (preferably of stone or reinforced concrete, that is at least one meter thick). It is, in effect, a dry cave. Environmental insulation is further provided by a surrounding corridor that also serves as a passageway. Entrances/exits are all of the air-lock variety. The remainder of the building (public spaces, working spaces, etc.) surrounds that perimeter corridor. The storage area is well insulated from any ambient environmental conditions, so it is easy and cheap to keep both temperature and humidity constantly at proper levels. Studies in Germany have demonstrated that despite the initial high cost, such structures are cost-effective over a long life span. Nevertheless, it is most difficult to convince ordinary commercial architects and constructors to undertake such a design and construction. It is not what they usually do and make money at.

ARCHIVAL FACILITIES CLASSIFICATION AND SPECIFICATIONS OF STRUCTURES AND COMPONENT SPACES

Notes and General Requirements

Natural and Unnatural Disasters. To the greatest extent possible, consistent with unimpeded use and access to materials for archives processing and research, the facility should be located and constructed so as to minimize the likelihood that its contents will suffer from storm, flood, dampness, earthquake, fire, explosion, infestations of pests, mold, and airborne pollutants.

Building Systems Reliability and Redundancy. Because of the critical requirement to maintain constant environments within the facility, and because fulfilling that requirement depends entirely on powered equipment, it is necessary that delivery of power to the building service systems be constant and that the equipment be kept in optimal running order. Such a condition requires sufficient redundancy in power, electronic controls, and mechanical equipment that in case of failure of any one element, a back-up can be brought into operation promptly before environmental conditions deteriorate.

Fire Protection, Suppression, and Prevention. Experts cannot seem to agree on an optimal fire protection and suppression system, and since each kind of system seems to have significant disadvantages. Gaseous suppression systems such as halon may be effective, but they are dangerous to humans and expensive to maintain. Water sprinkler systems are effective, but water may be as damaging to archives as fire. Nevertheless, there are some guidelines that can be followed to create the best possible chance for archives survival in case of fire.

- Insofar as possible, structure, furnishings, and equipment should be made of fire-resistant or fire-retardant materials.

- Delivery of electricity to storage areas is necessary to effective operations, even more so in the computer age, so it is impossible to exclude electricity from storage areas. However, great care must be taken to minimize the electrical lines, junctions, transformers, and switches and other installations that might cause fire; and great care must be taken to use the best, fire-preventive materials and installation techniques to minimize if not eliminate likelihood of electrical fires.

- Conflagrations in open-faced stacks may be retarded if each shelf is enclosed on five of its six sides with heavy-gauge steel and if its contents do not overlap the edges but are recessed at least a half inch.

- Fire alarms and suppressant activation devices should be of both the heat sensing and smoke sensing (ionization) kinds. Alarm sensors should be set at a slightly greater sensitivity than the suppressant activation sensors so that they precede actual activation of suppressant systems. Both should be set at the minimum levels of sensitivity consistent with active use of the space they protect.

- Alarm response time and effectiveness are critical. Effective fire fighting should be factored into design and construction. The location and access to fire mains, for instance, is critical, as is the ability to deliver water via hoses into the further reaches of stack areas.[1]

- Water remains the fire suppressant of choice, despite the manifest potential for severe water damage to archives. Independent head-activated localized delivery through wet-pipe sprinkler systems also seems to be the method of choice.

- It is important to design and construct archives for the prompt and effective removal of water accumulated in fire suppression. Take-out plugs in floor drains should be provided and located strategically for this purpose.

Floors. Except in reading rooms, where carpeting serves to absorb sound and contributes to a quiet study atmosphere, floor covering should be of an inert, hard tile material that is easy to wipe clean of dust, impervious to liquid, and over which wheeled carts can roll with ease.

General Configuration and Adjacencies. Although archives of two or more stories are not unknown and are not impossible to work with, archives seem to work best in a more horizontal configuration. This is in part because of the routine traffic of boxed materials on wheeled carts to and from various portions of the facility.

- The direct and unimpeded flow of incoming materials from a receiving dock through gross sorting (perhaps cleaning and fumigation) and reboxing into the stacks or storage area is of great importance. The more that the flow is impeded by turns in corridors or changes in levels, the more awkward and inefficient is the process.

- Of nearly equal importance is a direct flow of materials between the stacks and the reading room, through an intermediate staging and control area.

- Flow of materials between the stacks and staff work areas is also important, but not quite so critical as the first two adjacencies.

- Public areas must be physically separate from and separated from staff and storage areas by physical barriers and controlled access. However, public entrances, lavatories, reception areas, and the reading room itself must be convenient and accessible.

Lighting. External sunlight must be minimized and limited to the more public areas such as the reception lobby, and even there it should be ultraviolet filtered. Internal lighting should minimize ultraviolet emissions, and all fluorescent lighting should be filtered to block ultraviolet rays.

Millwork and Furniture. The design of millwork and furniture should be carefully coordinated with the archives staff to assure that materials and functionality are suitable to the tasks that will be performed. In particular, surfaces should generally be smooth, impervious to liquids, and sealed to prevent "off-gassing". Wood tones and textures are desirable if they can be achieved without off-gassing.

ARCHIVAL FACILITIES CLASSIFICATION AND SPECIFICATIONS OF STRUCTURES AND COMPONENT SPACES[2]

Details and Explanations

000 STACKS (Storage Areas)

.000 General Records
.100 Cartographic and Oversize Materials
.200 Magnetic (Audio, Video, and Computer) Tapes and Disks
.300 Microfilm and Microfiche
.400 Motion Picture Film
.500 Still Photographs
.600 Staff Reference Library and Reference Files ("Vertical Files")
.700 Objects, Memorabilia, and Miscellaneous
.800 Sub-freezing Vault and Staging/Transition Room
.900 Valuable Materials Vault

Introduction

- **Other Names**: archives stacks; archives storage; range; stack range; working stacks; research collections storage.

- **General Characteristics**: This is an active part of the archives complex, not "dead storage". It is where archives in all media are kept so that they are well-preserved, readily available, and easily retrievable for proces-sing,

conservation, or research. Records boxes are moved in and out of the stacks every day by staff members serving researchers, processing records, or doing their own research. Staff, interns, and volunteers work in the stacks, so open space, electrically-supplied work stations, task lighting, and access via spacious aisles are integral to the stacks. "Stacks" includes not only shelving of various kinds but also cabinets with doors and drawers for the storage and retrieval of different kinds of materials. Space is at a premium, so use of compact (moveable or mobile) shelving and cabinets is desirable, provided that easy access to all shelf fronts and cabinet fronts is maintained.

- **Access and Security**: Only authorized archives staff will enter the space in normal working conditions. Custodial and maintenance access should be minimized and under archives staff supervision. Locate access to mechanical and electrical systems and equipment outside the stacks envelope. The perimeter should be secured and alarmed during non-working hours. Key-card access may be used during working hours.

- **Atmosphere and Environment**: A "clean-room" atmosphere and environment, comparable to that of a laboratory or hospital ought to prevail. The general storage area overall is a large, single, integral environmental envelope, but it contains specialized storage spaces with their own environments as shown below. The stacks should be separated from the rest of the facility by air-lock doors to protect the internal environment from ambient external air. Internal air should be largely re-circulating and all replacement air must be carefully and thoroughly filtered to eliminate particulates and gaseous pollutants to the greatest extent possible. Internal air handling should involve heating, cooling, humidification, and dehumidification to maintain temperature and humidity within narrow archival standards.

- **Base-line Temperature and Humidity**. Baseline temperature and humidity should prevail throughout the entire archives facility, except in special spaces as noted below. Unless the entire facility is designed to achieve and maintain these standards, it is unlikely that the sub-environments for specialized spaces can maintain their own particular standards. Note that since all main archival spaces, including most storage areas have a great deal of human activity during working hours, multiple entrances and exits and the heat from lights and bodies must be factored into the HVAC analysis.

    - **Temperature**. The base-line temperature should be controlled to seventy degrees Fahrenheit (**70º F**) with tolerable seasonal variation of plus or minus two degrees Fahrenheit (+/- 2 F) [equivalent to twenty degrees Celsius (20º C) plus or minus one degree (+/- 1 C)].

- **Humidity**. The base-line humidity should be forty-five percent relative humidity (**45% RH**) with tolerable seasonal variation of plus or minus five percent (+/- 5% RH).

- **Construction**. Construction should be on solid grade and of concrete or stone, reinforced as necessary to support weight of shelving. Interior surfaces must be sealed to prevent flaking of concrete dust and seepage of moisture. Roof construction must assure that all rain water and snow or ice buildup do not penetrate to the interior. Floor coverings should be of inert hard tile to facilitate movement of wheeled carts (manual, not powered) laden with boxed records (up to about 400 pounds per cart). Floor, walls, and ceiling should be sealed against moisture and vermin.

- **Lighting and Electrical**. There should be no windows, except in exterior administrative offices and entrance lobby, and even there the windows should have ultraviolet shielding. All interior lighting should be incandescent or ultraviolet-shielded fluorescent lamps. Standard electrical power is required throughout the facility, with special power for copiers and other equipment as needed. All electrical systems should be controlled by a circuit-breaker panel located somewhere near the main entrance so as to be easily accessible to emergency crews. Standard electrical power is required for all work stations, and every work station should have its own dedicated circuit.

- **Telecommunications**. All offices and work stations should be wired for both voice and computer network communications.

- **Fire Protection**. [See page 2, above.]

- **Shelving and Cabinets**. Archival records are stored in acid-neutral cardboard boxes on shelves or in cabinet drawers. Shelving and cabinets must be of heavy-gauge steel [18-gauge preferred for strength] with baked enamel surfaces and must be free of the “off-gassing” effect of residual vapors from the enamel. Mobile (moveable) compact shelves (and cabinets where possible) are highly desirable for optimum space use and storage efficiency. They should be manually-powered (whether pushed or hand-cranked with a gear arrangement. [*They should* **not** *be electric-motor-driven.*] Note that for mobile shelving, the floor surfaces must be absolutely flat to keep units from gravity-rolling, and tracks must be laid on the floor to keep heavily-laden units in line. All units should be on bases raised at least three inches above floor surfaces for protection against floor dust and flooding.

COMPONENT SUB-SPACES

.000 General Records (mostly paper records)

Temperature: sixty degrees Fahrenheit (**70º F**) [20º C] with tolerable seasonal variation of plus or minus two degrees (+/- 2º F) [+/- 1º C]

Humidity: forty-five percent relative humidity (**45% RH**) with tolerable seasonal variation of plus or minus five percent (+/- 5 %).

Shelving:

- Shelving units should be on bases that are at least three inches (3") [8 cm] high above the floor, or if open shelves, the lowest shelf should be at least three inches above the floor.

- Shelving units should be no more than seven and a half feet (7' 6") [2.25 m] tall overall, including covered metal top and base.

- Shelves within units should be adjustable (as to spacing between shelves) rather than fixed; however, devices fastening shelves to sides and backs of units and the shelves themselves be exceptionally sturdy, to accommodate sudden dropping of weights up to about 100 pounds [40 kg] without bending or breaking.

- The minimum shelf depth should be no less than sixteen inches (16") [40.5 cm] so that boxed records in legal-size (15.5") [38 cm] boxes do not overlap the edge.

- Shelving width may vary, but widths should be designed to accom-modate the optimum number of standard archives boxes that are five and a half inches wide (5.5") [14 cm]. The following guide may be used as a rule of thumb:

Shelf Width	Can Accommodate
38 inches [96.5 cm]	7 boxes
44 inches [112 cm]	8 boxes
49 inches [124.5 cm]	9 boxes
55 inches [140.7 cm]	10 boxes
60 inches [152.5 cm]	11 boxes

- A minimum of twenty-four inches (24") [61 cm] must be allowed for access to shelf faces by wheeled carts and people. The maximum allowable space between the faces of shelving units should be no more than twenty-eight inches (28") [71 cm].

- Main aisles between major blocks of shelving units should be at least sixty inches wide (60”) [152.5 cm] to accommodate the passage of two wheeled carts, but they need not be more than sixty-six inches (66”) [167.6 cm].

- Shelving installation plan and choice of size of units should maximize total storage capacity while still meeting the above requirements.

.100 Cartographic and Oversize Materials

Temperature: sixty degrees Fahrenheit (**70º F**) [20º C] with tolerable seasonal variation of plus or minus two degrees (+/- 2º F) [+/- 1º C]

Humidity: forty-five percent relative humidity (**45% RH**) with tolerable seasonal variation of plus or minus five percent (+/- 5 %).

Shelving: Shelves should be like those for general records, except they must hold large maps, charts, posters, architectural drawings, and engineering plans. Shelf depths from thirty-six inches (36”) [71.5 cm] to forty-eight inches (48”) [122 cm] are desirable, but if all must be the same, then the larger dimension should be used throughout. Some units should have open shelves and others of drawers. Drawer width should be no more than sixty inches (60”) [152.5 cm]; the inside depth of drawers (for flat records) should be no more than two inches (2”) [6 cm]

.200 Magnetic (Audio, Video, and Computer) Tapes and Disks

Temperature: sixty degrees Fahrenheit (**60º F**) [15.5º C] with tolerable seasonal variation of plus or minus two degrees (+/- 2º F) [+/- 1º C]

Humidity: forty percent relative humidity (**40% RH**) with tolerable seasonal variation of plus or minus five percent (+/- 5 %).

Shelving: Current advice is that electro-magnetic media should NOT be placed on metal shelves because of magnetic influence danger. They should be of wood sealed with an inert polyethylene sealant or made of inert polyethylene plastic. A combination of shelving and cabinetry may be used.

.300 Microfilm and Microfiche

Temperature: sixty degrees Fahrenheit (**60º F**) [15.5º C] with tolerable seasonal variation of plus or minus two degrees (+/- 2º F) [+/- 1º C]

Humidity: thirty-five percent relative humidity (**35% RH**) with tolerable seasonal variation of plus or minus five percent (+/- 5 %).

Shelving: See general records, above. A combination of shelving and cabinetry may be used.

.400 Motion Picture Film

Temperature: sixty degrees Fahrenheit (**60º F**) [15.5º C] with tolerable seasonal variation of plus or minus two degrees (+/- 2º F) [+/- 1º C]

Humidity: thirty-five percent relative humidity (**35% RH**) with tolerable seasonal variation of plus or minus five percent (+/- 5 %).

Shelving: See general records, above. Motion picture film is heavy and the "cans" of film must be stored flat on shelves that are spaced vertically no more than one foot (1') [30.5 cm] apart.

.500 Still Photographs

Temperature: sixty degrees Fahrenheit (**60º F**) [15.5º C] with tolerable seasonal variation of plus or minus two degrees (+/- 2º F) [+/- 1º C]

Humidity: thirty-five percent relative humidity (**35% RH**) with tolerable seasonal variation of plus or minus five percent (+/- 5 %).

Shelving: See general records, above. A combination of shelving and cabinetry may be used.

.600 Staff Reference Library and Files ("Vertical Files")

Temperature: sixty degrees Fahrenheit (**60º F**) [15.5º C] with tolerable seasonal variation of plus or minus two degrees (+/- 2º F) [+/- 1º C]

Humidity: forty percent relative humidity (**40% RH**) with tolerable seasonal variation of plus or minus five percent (+/- 5 %).

Shelving: See general records, above. A combination of shelving and cabinetry may be used.

.700 Objects, Memorabilia, and Miscellaneous

Temperature: sixty degrees Fahrenheit (**60º F**) [15.5º C] with tolerable seasonal variation of plus or minus two degrees (+/- 2º F) [+/- 1º C]

Humidity: forty percent relative humidity (**40% RH**) with tolerable seasonal variation of plus or minus five percent (+/- 5 %).

Shelving: See general records, above. A combination of shelving and cabinetry may be used.

.800 Sub-freezing Vault and Staging/Transition Room

A sub-freezing vault, kept at zero degrees Fahrenheit (0º F) [- 18º C] is recommended for storage of some materials, notably color film originals and masters (still and motion). Due to special and extreme requirements, the unit must be self-contained in its own environmental envelope that is inside the general archival environment. The unit is a complex of two parts, the freezer proper and a transition room or staging room.

Condensers and other HVAC equipment that serve the unit should be self-contained within the unit so that there are no more conduits entering the unit skin than absolutely necessary. The unit should be similar to what is known in the museum trade as a "Bally box"— a modular unit with an insulated metal skin, floor and ceiling. Due to the extreme cold, it is better that the shelving and cabinet units inside the vault be fixed, not mobile.

Doors between the freezer proper and the transition room and between that transition room and the general archives storage area should be tight-fitting, well sealed, and of the freezer-lock variety.

.801 Freezer Proper

Temperature: zero degrees Fahrenheit (**0º F**) [- 18º C] with tolerable seasonal variation of plus or minus two degrees (+/- 2º F) [+/- 1º C]

Humidity: twenty percent relative humidity (**20% RH**) with tolerable seasonal variation of plus or minus five percent (+/- 5 %).

Shelving: See motion picture film, .400, above. A combination of shelving and cabinetry may be used.

.802 Transition Room

Temperature: fifty degrees Fahrenheit (**50º F**) [10º C] with tolerable seasonal variation of plus or minus two degrees (+/- 2º F) [+/- 1º C]

Humidity: thirty-five percent relative humidity (**35% RH**) with tolerable seasonal variation of plus or minus five percent (+/- 5 %).

Shelving: The staging area should have some fixed shelves like those for motion picture film (.400, above), but also a counter on which preparation work can be done on film moving in and out of the freezer.

.900 Valuable Materials Vault

A separate reinforced concrete room with a bank type vault door is needed for storage of valuable items. It should open from the main stacks.

Temperature: sixty degrees Fahrenheit (**60º F**) [15.5º C] with tolerable seasonal variation of plus or minus two degrees (+/- 2º F) [+/- 1º C]

Humidity: thirty-five percent relative humidity (**35% RH**) with tolerable seasonal variation of plus or minus five percent (+/- 5 %).

Shelving: See general records, above. A combination of shelving and cabinetry may be used, but they must be fixed rather than mobile.

100 ARCHIVES WORK AND ADMINISTRATION

.000 Gross Sorting and Initial Control
.100 General Processing (Paper)
.200 Microfilming
.300 Still Photograph—Archival Processing
.400 Videotape/Audiotape Processing
.500 Motion Picture Film Processing'
.600 Conservation
.700 Electrostatic Duplication
.800 Automated Information Management
.900 Management, Administration, and Staff Offices

Introduction

Archives staff work intensively with materials. The space should be reserved for staff only; visitors should be allowed only under staff escort. Custodial, maintenance, and protective services access should be minimized and under archives staff observation. A "clean room" laboratory-like atmosphere is required. Temperature and humidity standards apply throughout.

Temperature: seventy degrees Fahrenheit (**70º F**) [15.5º C] with tolerable seasonal variation of plus or minus two degrees (+/- 2º F) [+/- 1º C]

Humidity: forty-five percent relative humidity (**45% RH**) with tolerable seasonal variation of plus or minus five percent (+/- 5 %).

COMPONENT SUB-SPACES

.000 Gross Sorting and Initial Control[3]

Activities: This work is usually done in the loading dock area or immediately adjacent to it. Hundreds of boxes of archival materials, are examined, identified, sorted, and labeled. Staff inventory the material, make container content lists, write accession reports, establish accession folders, and check materials as needed for cleaning or other remedial work before they can go into the archives proper.

Requirements: Large, open floor space, long and deep counters (easy working-table height) with supply shelving below, and shelving for temporary holding of records awaiting work or awaiting transfer into the archives proper. Shelving can be fixed rather than mobile, but must be comparable in dimensions and gauge to that in the archives proper. At least ten percent (10%) of the available shelving should be suitable for oversize (large and flat) items.

.100 General Processing (Paper)

Activities:

- Examination, Inventory and Arrangement. Each collection or group of records is examined, box-by-box, folder-by-folder, and document-by-document, to determine and to perfect the established rational order of documents, files, and boxes according to the functional original order imposed by the agency that created and used the files.

- Holdings Maintenance. Archivists flatten and clean records as needed, refolder the records into new, acid-neutral folders, and place the folders in new, acid-neutral boxes. They label both folders and boxes appropriately as to contents. If more serious conservation work is required, archivists may remove items temporarily for work in the conservation laboratory before returning and reintegrating them into the record group.

- Research and Finding Aid Composition. Archivists conduct research into the provenance of the records, the administrative history of the creating agencies, the functional relationships of the records to the work of the agencies. They prepare content inventories (folder/box lists), compose provenance notes, compose administrative histories, compose summaries of contents of series and sometimes of folders, prepare indices to folder-title lists and to the texts they have composed

- Cataloguing. Archivists compose and enter summary descriptions into on-line catalogues according to established rules and procedures.

- Editing. Archivists proofread and edit both finding aids and electronic catalogue descriptions before they are approved for release to public use.

Requirements: The work requires independent work stations, each with its own integrity and support, including shelving to hold materials in process, and work surfaces, electric power, word processing and data processing, supplies, space for wheeled carts holding materials awaiting processing or transport. Personal computers and printers at each work station may be linked to others in a network and to central database management and communications. Each work station requires about 150-200 square feet of space. Each work station is usually staffed by one archivist, but should be capable of accommodating an archivist and one or two assistants (interns or volunteers) working simultaneously in cooperation or in a tutorial.

.200 Microfilming[4]

Activities: Archivists and film technicians prepare records for filming, film the records, process the film, examine film for quality control, and "reshoot" frames as needed.

- Large quantities of documents (tens of thousands of pages) must be examined to assure they are in the right order and to restore strays to their proper places.
- "Targets"—full-page poster-style labels of the beginnings and ends of collections (record groups) and records series, resolution test images, and other non-document items must be prepared and placed in proper sequence in the material to be filmed.
- Cameras are loaded with film, lighting is adjusted for each document's peculiar and particular reflective characteristics, and each document is carefully placed, positioned, aligned, and "shot" with the camera.
- Film is processed (developed and dried), using self-contained chemical-mechanical processing machinery.
- Finished film is examined to assure that all documents were filmed, that the resolution and density meet archival standards, and that there are no residual chemicals on the film from processing.

Requirements: At least four separate spaces are required, as shown below. Microfilming requires protected, sole-source, dedicated electrical circuitry for steady and continuous camera task-lighting and a dark filming environment to avoid variations in light intensity. Shelving and counters for film awaiting filming, processing, and awaiting return to the stacks after filming are needed. A separate room for the processing equipment and chemicals storage is needed.

.201 Filming/Camera Room (about 200-250 ft^2)

The standard filming room should have space enough for two planetary cameras to operate concurrently, each requiring a separate, screened cubicle about ten feet square. Black walls, floor and ceiling an a black cloth curtain over the entrance so no ambient light intrudes on controlled task-lighting. Shelves and containers must be to each side of the camera stand for supplies, for material awaiting filming, and for material that has been filmed and is awaiting removal.

.201B Over-size Filming (optional)

Some archives may need a large camera to produce 5" x 7" negative plates of large maps and architectural drawings. The camera is too large to shoot from overhead, so the camera must be mounted with its focal line parallel to the floor, and the document to be filmed must be hung of mounted temporarily on the opposite wall. Configuration and requirements are otherwise similar to those for .201, above.

.202 Preparation (about 100-150 ft^2)

Adjacent to the camera room must be a room where the entire collection to be filmed (often as many as a hundred or so boxes) may be stored in the order it is to be filmed. This is also where the targets and test patterns are prepared. Shelving for temporary storage, counters for examining and preparing materials, and cupboards for supplies are needed. A refrigerator, located beneath the work counter, should be provided to hold film stock to be used in filming.

.203 Film Developing (about 75-100 ft^2)[5]

A laboratory-like room of ceramic tile, with water and drains, should be used to house the film-developing equipment (film processor). There must be cabinets and shelves for supplies of chemicals and other materials and parts for the equipment.

.204 Testing and Quality Control (100-150 ft^2)

There should be a separate room for the careful examination and testing of processed film before it is placed in storage or used for reference. Here, film is placed in archival containers and labeled for storage or reference use. Shelves for stocks of archival supplies and a long work counter over supply cabinets are needed. A store of chemicals used to test processed film should be stored carefully so as not to damage materials.

.300 Still Photographs—Archival Processing (150-200 ft^2)

Activities: Photographs must be examined item-by-item, properly identified, rehoused, and the new housing properly labeled. Security copies and reference prints are made as needed.[6]

Requirements: One or more work stations comparable to those in .100 General Archives (Paper), above, are needed. In addition, light tables (opaque glass-tops through which light shines for the examination of transparencies and negatives) may be needed. A dry-mount machine (electrical) is needed for mounting reference prints onto museum board.

.400 Videotape/Audiotape Processing (250-300 ft^2)

Activities: Most of the work has to do with copying from one medium to another (tape-to-tape or analog tape to digital disc), labeling and boxing tapes and discs, rewinding and smooth-winding tapes, splicing leaders onto tapes, examining tapes for deterioration.

Requirements: Several counter-top work stations equipped with audio/video viewing and examining equipment and duplicating equipment are needed. Large table work spaces for labeling and boxing and other work are needed. Adjacent spaces are needed for carts of materials awaiting work or return to storage. Millwork and shelving should be of wood sealed with a polyethylene sealant. Requires numerous dedicated electrical circuits for equipment such as tape recorders, audio/video playback.

.500 Motion Picture Film Processing (250-300 ft^2)

Activities: Film is examined, rehoused in new containers and labeled. Film in 8mm, 16mm, and 35mm sizes is closely examined with the use of film editors, and using other equipment it is copied onto videotape or videodisc for reference use and further duplication.

Requirements: Work spaces are comparable to those for video/audio processing, above, except that shelving should be metal rather than wood..

.600 Conservation (chiefly paper archives)

Activities: Conservators examine, clean deacidify, repair, and rehouse paper archives. Materials worked on include anything from postage stamps to items that may be six feet square or more.[7]

Requirements: The work requires large, flat work surfaces, shelves, sinks, water and drains, and specialized equipment for different kinds of conservation work. Fumes must be vented safely. Saturation tanks, freeze-dry chambers, drying racks, and the like are needed. There should be space for carts of materials awaiting work or awaiting return to storage. Floor and walls should be of acid-resistant tile. Floor drains are important for carrying off spillage. A safety shower, in case of chemical contamination, is required. Separate secure storage

for ordinary conservation supplies and for chemical liquid supplies are needed. The following sub-component spaces are needed:

.601 General Work Area (250 ft^2)

Requirements:

- Along one wall should be a formica-topped counter with supply cabinets below and a wet-sink for washing and a dip-tank for "Wei-T'o"[8] treatment.
- There should be a table-top chamber for small-scale deacidification, with a fume hood and closed venting to the building exterior. The counter will hold mechanical stirring devices and conservation hot-plates for preparing adhesives.
- There should be a second fume hood and venting and a basin for working with solvents.
- A second counter-top with nearby drying racks and a vacuum table should serve as work stations for flattening documents.

.602 Box Production Station (50 ft^2)

Requirements:

A four-foot by eight-foot (4' x 8') formica-topped counter with underneath storage for large boards and other materials is needed to produce specially-sized containers for bound volumes, glass plate negatives, and other items of unusual characteristics or size. The counter should have a one-quarter-inch (1/4") grid for measuring and squaring, a large cutting knife, a paper-roll holder at one end, and nearby cabinets for other supplies.

.603 Dry Cleaning Station (50 ft^2)

Requirements: A four-foot by eight-foot (4' x 8') formica-topped counter with underneath storage for supplies. There should be a large dispenser roller for paper at one end so that the entire table can be covered with a clean sheet of acid-neutral paper after each job is completed.

.604 Encapsulation Station (75 ft^2)

Requirements: A four-foot by eight-foot (4' x 8') formica-topped counter with underneath storage. A large roll dispenser for "Mylar"[9] should be at one end. The table should be marked out in a precise one-quarter-inch (1/4") grid for measuring and squaring, and it should be equipped with "T-squares". A rack to hold mylar rolls and sheets of different sizes should be convenient so that rolls can be quickly changed at the table-end as needed.

.605 Flattening Station (150 ft^2)

Requirements: A four-foot by eight-foot (4' x 8') formica-topped counter with underneath supply storage is needed. Flanking this should be two additional tables, one holding a book-press and the other a dry-mount heating press, each capable of accommodating pages up to fourteen inches by eighteen inches (14" x 18"). Storage racks and shelves adjacent to the table are needed for storing stocks of heavy-weight museum board, acid-neutral tissue paper, sheets of plate glass, and glass bricks for weighting jobs too big for the book press. A sink and drain need to be handy. Several plastic barrels should be available to hold water for humidification, and there should be lengths of plastic tubing for siphoning water back to the drain.

.606 Mending Station (100 ft^2)

Requirements: A four-foot by eight-foot (4' x 8') formica-topped counter with underneath storage for supplies. A roll-dispenser at one end is needed for acid-neutral paper. There need to be sets of drying racks nearby (stands of nylon mesh "shelves") on which items are placed to "cure" and dry. Storage shelves adjacent to the table should hold supplies.

.607 Document Examination Station (50 ft^2)

Requirements: A four-foot by eight-foot (4' x 8') formica-topped counter with underneath storage for supplies is needed. A roll-dispenser at one end of the table should be available for producing acid-neutral paper as a changing "work table cloth". There should be a light-table adjacent to this for checking watermarks and locating thin spots in paper. The table should have a lighted magnifying glass and a small, hand-held vacuum cleaner..

.700 Electrostatic Duplication (150 ft^2)

Activities: Documents are copied here onto paper using the standard, office-copier based on a carbon-toner heat-fixing process.[10] Both large-volume collating copying and fine copying of single sheets are done here.

Requirements: At least two copiers with dedicated electrical circuits powered to suit the machines are needed. Shelving and tables for setting out large quantities of material to be copied, and supply stores of paper, toner, and other needed items should be below the work tops.

.800 Automated Information Management (150 ft^2)

Activities: This is where the archives' automated information systems manager and technical staff work and control or modify the internal automated

information support system and link it through networks to other systems. It is also where the electronic storage, retrieval, and communication system for locator lists, finding aids, and other archives management tools are controlled and managed.

Requirements: Several master computer stations are needed. If the archives maintains its own "mainframe" mini-computer or server, then a separate room for that equipment is needed.

.900 Management, Administration, and Staff Offices

Activities: The management and administrative functions of the director of the archives, personnel and budget, reception, and correspondence are performed here.

Requirements: Several individual offices (from 120 ft^2 to 220 ft^2) and perhaps a large central office, with standard office furniture and supplied with electronic communications are needed.

200 PUBLIC ACCESS

.000 Foyer/Reception/Security/Lockers
.100 Public Lavatories
.200 User/Materials Use Control Station
.300 Main Reading Room and Research Reference Library
.400 Microfilm and Microfiche Reading Room
.500 Motion Picture Film and Video Viewing Room
.600 Audiotape Listening Room
.700 Copying Services and Overnight Holding Space
.800 Conferences
.900 Lunch Room and Lounge

Introduction

"Public" areas of the archives are those accessible to members of the general public. They include the spaces where members of the public examine the archival records with the assistance and under the supervision of the archives staff. They also include other areas that support the reference and examination function such as lobbies, conference rooms, and lavatories.

It is preferable that all the public areas be held to the standard base-line temperature and humidity shown below. This reduces the chance that the steadiness of conditions in the archival areas may be compromised.

Temperature: sixty degrees Fahrenheit (**70º F**) [20º C] with tolerable seasonal variation of plus or minus two degrees (+/- 2º F) [+/- 1º C]

Humidity: forty-five percent relative humidity (**45% RH**) with tolerable seasonal variation of plus or minus five percent (+/- 5 %).

COMPONENT SUB-SPACES

.000 Foyer/Reception/Security/Lockers

Activities: This is where members of the public enter the archives and receive their first impression of the place and its functions. It is where they are welcomed and receive information on where to go and how to get their needs satisfied. It is an important control point for receiving and directing incoming services and general inquiries to appropriate places and parts of the archives. It provides security for visitors' outdoor wear in inclement weather and their briefcases, etc., that they cannot take with them into the reading rooms. It is also the "command post" for building security and emergency services.

Requirements: The lobby should have an open and welcoming appearance that clearly identifies the function of the archives. It may include display cases and bulletin boards. A manned reception desk with information and visitor register should be the central focus of the lobby. There must be a place where visitors may check their coats, hats, and umbrellas, and it must have individual lockers in which visitors may store their personal belongings securely.[11]

.100 Public Lavatories

Public lavatories for men and women should be located just off the lobby, but outside the reception desk/control point. They should be equipped with facilities for the handicapped.

.200 User/Materials Use Control Station

Activities: This is the point at which

- archives users place their requests for materials,
- archives staff deliver materials to visitors for use inside the research room,[12]
- materials are received and checked before being returned to the stacks, and
- necessary administrative information on what is checked in and out is recorded.

Requirements: A physical barrier between the control point and the users should emphasize the control and formal procedures of users identify themselves

as having registered with the main control point in the lobby and accepting responsibility for the materials while they are examining them; but, the appearance should be open and helpful rather than forbidding. There must be space behind the barrier, perhaps even a separate room or staging area behind the control point, to hold material awaiting use (including material left overnight by users for use the next day) and material awaiting return to the stacks.[13] The control station requires computers and access to the central archives management information system, where information on user activity and the tracking of use of materials is recorded.

.300 Main Reading Room and Research Reference Library

Activities: This is where most users sit to examine documents, read books, and take notes.

Requirements: The reading room should have chairs and tables for the direct examination of archives, and a small but useful reference library of books. It should be quiet, open, comfortable, conducive to concentrated study, well-lit, and pleasant. A combination of indirect (but ultra-violet filtered) sunlight, general area lighting, and localized task lighting at work tables is desirable. Computers, files, and shelves of finding aids should be available to users so they can search for and identify items they wish to examine. Unlike the rest of the archives, a carpeted floor minimizes noise, but the carpet nap should be of some inert material that does not shed, is easily cleaned of dust, and may be vacuumed daily without damage over a span of years.

.400 Microfilm and Microfiche Reading Room

Activities: Users sit and read film images on screens at microfilm or microfiche reading machine stations. They may also print out paper copy if they are using reader-printer machines.

Requirements: The number of machines and stations depends on demand and capacity. Subdued lighting is required. The room should preferably be separate from the main reading room. In addition to microform readers and reader-printers, there should be storage cabinets for self-service reference copies of microfilm. [Only reference copies are kept here—not originals and not print-masters.] The reference copies must be replaced periodically due to wear and inherent deterioration.

.500 Motion Picture Film and Video Viewing Room

Activities: Users sit at video monitors and watch and listen to videos and films and take notes.[14]

Requirements: The number of monitors and stations depends on demand and capacity. They should be equipped with earphones so that several users can work simultaneously without mutual disturbance. Subdued lighting is required. The room should preferably be separate from the main reading room. In addition to monitors, there should be storage cabinets for self-service reference copies of videos. [Only reference copies are kept here—not originals and not print-masters.] The reference copies must be replaced periodically due to wear and inherent deterioration.

.600 Audiotape Listening Room

Activities: Users sit at audio monitors and watch and listen to audio recordings on audiotape or CD ROM discs and take notes.[15]

Requirements: The number of monitors and stations depends on demand and capacity. They should be equipped with earphones so that several users can work simultaneously without mutual disturbance. The room should preferably be separate from the main reading room. In addition to monitors, there should be storage cabinets for self-service reference copies of tapes and discs. [Only reference copies are kept here—not originals and not print-masters.] The reference copies must be replaced periodically due to wear and inherent deterioration.

.700 Copying Services and Overnight Holding Space

[See 200.200, above]

Activities: Users present requests for copying to the control desk, and staff members perform the copying on standard office copiers. Material that users have not finished with at the end of the day is turned in to the control desk and placed on shelves for return to the users the next working day.

Requirements: At least two standard office copiers able to copy in both black-and-white and in color, and to accommodate items up to twenty-four inches by thirty-six inches (24” x 36”). Space for carts holding boxes with items awaiting copying and boxes of items awaiting return. Shelving for the temporary storage of boxes being held overnight.

.800 Conferences

Activities: Staff and visitor conferences of any sort, whether consultation between staff and users or conferences among the staff are required as part of normal work.

Requirements: A carpeted room with table and chairs and some sort of display board are needed. The conference space should be able to

accommodate both one-on-one consultations and meetings involving as many people as are on the staff. The room(s) should be equipped to handle computers, conference calling, video monitors and motion picture film projection, overhead projectors, and other conference-aid and teaching-aid equipment.

.900 Lunch Room and Lounge

Activities: Here, staff and visitors may gather informally or eat lunch.

Requirements: This space should be well away from and well-insulated from any area that holds records. It should be equipped with tables, chairs, vending machines, a sink, refrigerator, and microwave.

301 ARCHIVES RECEIVING SERVICES

.000 Collections receiving
.100 Vacuuming and General Cleaning
.200 Freeze-drying
.300 Deacidification
.400 Archival Supplies Storage
.500 Film Developing and Processing

Introduction.

This is the principal service entry and supply-receiving function of the archives.

COMPONENT SUB-SPACES

.000 Collections Receiving

[See also 100.000]

Activities: Cars, vans, and even fairly large trucks back up to a loading dock and off-load boxes of records. Records are stacked and held awaiting removal to the preliminary sorting and processing work described in 100.00. Archives supplies, custodial supplies, building services repairs, and the like, all enter through this loading dock.

Requirements: The loading dock should be spacious and under cover, perhaps with a roll-up door and drive-in to the elevated dock proper. Space is required for both incoming materials and outgoing trash [or records for disposal if the archives also serves as a records center]. The space must be well insulated from the rest of the building, properly vented, fireproof, and well-served by fire alarm and fire-suppression, since vehicles may have to be parked inside the

space overnight. Space for carts, a fork-lift, and other loading/unloading equipment is needed.

The roll-down door must be lockable, and the door(s) leading to the archives proper must also be lockable.

.100 Vacuuming and General Cleaning

Activities: Many materials come in covered with dust or in poor containers, and they need to be at least superficially cleaned before being transported into the relatively cleaner atmosphere of the initial processing area.

Requirements: Shelving, a work table, electrical outlets, stores of boxes, several hand-held vacuum cleaners, brushes, and other cleaning equipment need to be stored and used here.

.200 Freeze-drying

Activities: Some materials arrive infested with insects, mold, and other biological contaminants. The approved process nowadays is freeze-drying rather than fumigation. The materials are placed in a freeze-drying chamber and subjected to several hours of freezing to kill the biological contaminants. The freeze-dryer is also used to treat materials that have been damaged by water.

Requirements: Space for holding shelves for material awaiting freezing; a freeze-drying chamber and associated plumbing for water supply; and associated space for carts of materials being loaded and removed.

.300 Deacidification

Activities: Some records were put onto highly-acidic paper, or they have become acidic through association with other materials. They are placed for several hours in closed chambers with deacidification chemicals to neutralize the acid.

Requirements: Space for holding shelves for material awaiting deacidification; a deacidification chamber, properly vented to the outside; associated storage cabinets for chemicals; and associated space for carts of materials being loaded and removed.

.400 Archival Supplies Storage

Activities: Large quantities of archives boxes, folders, paper, and other materials are kept for use in the processing work. They are periodically removed for use and replaced with new stock.

Requirements: A spacious room with shelving and cabinets.

.500 Film Developing and Processing[16]

Activities: If the archives processes its own film, this is where film will be developed and dried in chemical processors. It is also where prints may be made and enlarged from negatives, and other similar work may be done.

Requirements: Basically, this is a "wet-room" laboratory that must be properly vented to the outside, with water supply and drains, tile surfaces, and work space on counters and tables, with associated shelving. A film processor and chemicals are kept here. The kinds of equipment and degree of sophistication of the work and materials very much depends on how self-sufficient the archives must be in this matter.

400 BUILDINGS SYSTEMS AND GENERAL SERVICES

.000 Receiving and Storage for Custodial Supplies and Equipment
.100 Building Systems (Mechanical, Electrical, Fire, Hydraulic, Security, etc.
.200 Staff Lavatories, Showers, etc.
.300 Lunch Room
.400 Entrances, Exits, Perimeter Security
.500 Cleaning and Custodial Maintenance
.600 Communications (Telephones, Computers, Mail, etc.)
.700 Administrative Supplies Receiving, Storage, & Distribution
.800 Security Office and Monitoring Station

Introduction.

These are the associated building systems and their maintenance and supply and the custodial and security functions of the archives that support the main work and functions.

COMPONENT SUB-SPACES

.000 Receiving and Storage for Systems Maintenance and General Custodial Supplies and Equipment

Activities: The receiving and storage of custodial supplies and spare parts for equipment takes place here. Minor repairs to machinery and carpentry takes place here.

Requirements: In addition to storage shelves and cabinets, a small machine shop and a small woodworking shop are required.

.100 Building Systems (Mechanical, Electrical, Fire, Hydraulic, Security, etc.

Activities: The basic operating systems for the facility deliver heat, air, water, light, etc. to the spaces, and they must be kept in good working order.

Requirements: These systems take up space and must be accommodated, but they should not intrude into, interfere with, or endanger the archives or the principal work on archives and research.

.200 Staff Lavatories, Showers, etc.

Activities: Standard cleanliness and hygiene.

Requirements: If the public lavatories cannot accommodate the staff, then separate staff lavatories are needed, probably in the vicinity of the loading and receiving area. It is a good idea to equip the staff lavatories with showers so that chemical spills or the accumulated dust and grime from working with soiled documents can be washed off.

.300 Lunch Room

Activities: The staff eats lunch and meets informally here, if the public lunch room cannot accommodate them.

Requirements: Tables, chairs, vending machines, refrigerator, and microwave.

.400 Entrances, Exits, Hallways, Perimeter Security

These are generally passageways that must be taken into account in calculating the overall capacity and size of the building.

.500 Cleaning and Custodial Maintenance

Activities: Localized storage of equipment such as brooms, mops, pails, vacuum cleaners, etc.

Requirements: Some sort of custodial closets located strategically in different parts of the facility for easy access.

.600 Communications (Telephones, Computers, Mail, etc.)

Activities: Communications of various sorts.

Requirements: A mail room may be needed for sorting and distribution of incoming mail and collection and dispatch of outgoing mail. A central telephone for incoming calls or some device for routing calls internally from outside lines is needed. The building should be thoroughly wired with "raceways" for various types of wiring for computers and telephone communications as well as electricity.

.700 Administrative/Office Supplies Receiving, Storage, & Distribution

Activities: General office supplies and equipment need to be received, inventoried, stored, and distributed.

Requirements: A general office supply room or closet, equipped with shelves and cabinets is required

.800 Security Office and Monitoring Station

Building security and protection personnel monitor and control the comings and goings of people and monitor the condition of building systems and the security of archival storage spaces.

Two manned entrance/exit control points should be at the front entrance and the loading dock. The latter can be on-call for in-person supervision and otherwise video-monitored. The front entrance post should have two functions: (1) greeting, identification, and registration of incoming visitors, and this requires an open counter to the front lobby; (2) monitoring video screens and meters and gauges that report on the building's security and engineering systems.

500 OTHER STORAGE [As needed]

600 EDUCATION/TRAINING CONFERENCE

Activities: Staff meetings, training and orientation for visitors and school groups with focus on the purpose, value, and research use of archives, including basic historiography and the use of archives as historical evidence.

Requirements: If these functions cannot be accommodated in the general conference room described in 200.800, above, then an additional conference room or rooms with comparable furnishings need to be added.

[1] A thorough orientation and briefing of the local fire department, once the building is constructed, is essential; and the briefing should include an introduction to the nature of archives—both materials and operations.

[2] Except as noted, estimates of required square footage for work spaces do NOT include estimates for associated aisles, passageways, etc. When working with architects, those spaces must be additional calculations.
[3] See also 300.000 ARCHIVES RECEIVING SERVICES
[4] Note: As electronic scanning and digital image recording become more and more available and economical for use as the "reference copy" of archives, a very similar facility for preparing, scanning, and quality control of scanned images may have to be added. Since scanned images are not so durable as microfilm, however, scanning must not be allowed to replace microfilming.
[5] See also 300.500.
[6] This can be done commercially if the archives does not have its own photo lab.
[7] A scroll in the Tibetan Archives in Lhasa is 300 meters long.
[8] A trade name for a conservation product named after a Chinese temple guardian spirit.
[9] Polyethylene terephthalate or "PET", for which "Mylar" is the DuPont trade name that has become almost a generic common name for the material.
[10] Commonly-referred o as "xerox" after the early principal manufacturer.
[11] The Freer Gallery at the Smithsonian Institution has an arrangement whereby a visitor may insert a quarter in a slot to operate the locker door, and then when he returns to take his material out, the quarter is returned to him.
[12] Note: Archives are never checked out of the archives building except under special loan arrangements in which the borrower must go through formal procedures of accepting responsibility for the items, including insurance against loss, and only for purposes of manifest public benefit—not personal use or private examination.
[13] See 200.700, below.
[14] NOTE: For preservation purposes, it is preferred that all motion picture film be converted to videotape for reference.
[15] NOTE: For preservation purposes, it is preferred that all sound recordings be converted to CD-ROM for reference.
[16] See also 200.203.