

Report of a General Preservation Assessment

Sudbury Town Hall
Sudbury, MA

October 21, 2008

Submitted January 13, 2009 by:

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EXECUTIVE SUMMARY

Paper-based records in the Sudbury Town Hall were surveyed for preservation planning purposes by Angelina Altobellis, Survey Program Coordinator of the Northeast Document Conservation Center (NEDCC), on October 21, 2008. The preservation survey evaluated the building and environment as they relate to the preservation needs of the collections; examined current policies, storage methods and handling practices; and assessed the general condition of the collections. Observations and recommendations are based on a site visit and discussions with Rosemary Harvell, Town Clerk; James Kelly, Building Inspector; and Lee Swanson, Archivist of the Sudbury Historical Society. Recommendations for short-, medium- and long-term priorities are as follows:

Short-Term Priorities (problems requiring immediate action and/or projects that can be undertaken with existing resources):

- **Using the recommendations in this report as a starting point, develop a preservation plan.** The plan should identify the actions to take to address short-, medium- and long-term priorities, and it should be practical, taking into account local priorities and funding realities.
- **Begin working with other offices or departments storing records at the Town Hall to initiate appraisal of their records.** In order to plan for preservation, the Town Clerk needs to have a clear idea of the quantity of records stored there. Records scheduled for permanent retention will need to be rehoused; priority materials will need to be identified for disaster response; and eventually, a new vault and more appropriate shelving will need to be installed.
- **Recruit volunteers who would be willing to help with preservation activities.** Volunteers would be an excellent resource for help with projects such as rehousing of records, shelf and collections cleaning, and shelf maintenance.
- **Continue using dehumidifiers in the basement vault and records storage room.** If necessary, use an additional dehumidifier in the records storage room. Because environmental monitoring data have shown humidity levels above 50% in the first floor vault, if space permits, it would be worthwhile to use a dehumidifier there as well.
- **Begin work on a disaster plan for the Town Hall records.** Consider using dPlan™, an online disaster planning tool developed by NEDCC and the Massachusetts Board of Library Commissioners. It is available at <www.dplan.org>. Using the tool, the Town Clerk will only need to provide information about personnel, the building and the records; the tool will generate a complete plan.
- **Raise boxes off the floor by at least four inches.** Plastic or wood palettes can be used for this purpose. Since the basement vault is narrow, it will probably be necessary to move boxes on the floor there into the basement storage room.
- **Lay the groundwork for a shelf- and collections-cleaning project.** Such a project may require additional staff or volunteer time, which will take time to organize. For more information, see “Cleaning Books and Shelves,” leaflet 4.3 in *PLAM3*, or online at www.nedcc.org.

- **Where possible, straighten books that are leaning, and turn oversize books that are shelved on their foredge to be shelved on their spine.** When a book is shelved on its foredge, gravity pulls the text block away from the spine, eventually causing the text block to pull loose.
- **Open the cabinets that are painted shut or stuck to find out whether additional materials are stored in them.**
- **Remove the leaves piling up near the drain beside the basement door to prevent another flood resulting from a clogged drain.**

Medium-Term Priorities (projects that will require planning and organization or additional resources and staff time):

- **Offices or departments with records stored in the Town Hall should complete appraisal of their records.**
- **Prepare a written collection management policy for permanent records.** Prepare one document containing policies and procedures for preservation, including handling guidelines, maintaining security, storage methods, environmental monitoring and targets, preservation-quality microfilming, library binding, and maintaining records of any conservation treatments performed on Town records. The collection management policy will establish practices and will help ensure that they are implemented consistently over time. For more information, see “Collections Policies and Preservation,” preservation leaflet 1.5 in *PLAM3*, or online at www.nedcc.org.
- **Ensure that the inventory of Town Hall records is up-to-date.** The inventory should cover records scheduled for both interim and permanent retention so that it can be used to support implementation of retention schedules. The Massachusetts State Archives Records Management Unit (www.sec.state.ma.us/arc/arcrmu/rmuidx.htm) can provide assistance with inventory and records appraisal. For more information, contact Terry French, Senior Records Information Manager, at (617) 727-2816, ext. 259, or by email at terry.french@sec.state.ma.us.
- **Seek additional grant funding for preservation activities.** The Town Clerk might consider applying for a National Endowment for the Humanities Preservation Assistance Grant for Smaller Institutions. This grant could be used to fund the purchase of environmental monitoring equipment, shelving, and preservation supplies. The next application deadline will be May 14, 2009. For more information, see www.neh.gov/grants/guidelines/pag.html. Additional grant opportunities are listed in Section I.C of this report.
- **Identify priority materials, and store them in the first floor vault.** The basement vault can still be used for lower-priority materials because it offers the benefit of being fireproof and secure, but its environment should be monitored and staff should pay special attention to the conditions in the vault during periods of high humidity.
- **Seal the windows in the records storage room.** Line windows with aluminum foil, and seal them with plastic in the winter. The aluminum foil will block light as well as deflect heat during the summer, while the plastic will reduce moisture and heat loss in the winter.

- **Purchase environmental monitoring equipment, and begin an ongoing environmental monitoring program of all records storage spaces.** Consider using a datalogger, which records temperature and relative humidity levels at pre-set intervals, and stores the information to be downloaded to a computer for analysis. Software such as BoxCar Pro® can be used to enhance analysis of environmental monitoring data.
- **As recommended in the MBLC report, install UV-filtering sleeves on fluorescent lamps.** These are available from suppliers such as Gaylord; see, for example, item number WW-UVT4824. Other suppliers will offer similar products.
- **Install light-blocking shades over the windows in the basement records storage room.** Alternatively, consider covering windows with aluminum foil or gypsum wallboard.
- **Arrange for all staff members to receive fire extinguisher training.** Local Fire Departments are often willing to provide this.
- **Schedule annual building inspections by the Fire Department.** Regular inspection will help ensure that any fire hazards that may develop are found and corrected. It will also give the Town Clerk an opportunity to point out to firefighters the location of priority items for possible rescue in the event of a fire.
- **Install water alarms in the records storage room and in both vaults.** If the Historical Society approves, it would also be wise to install a water alarm to monitor the area beneath the leak in the second floor ceiling.
- **Consider installing motion detectors, at least in the records storage room.**
- **Use sticky traps to monitor for pests in records storage areas.** Pests that are captured can then be identified, and appropriate preventive measures taken.
- **Ensure that a complete disaster response kit is on hand for water-damaged materials.** A list of recommended supplies is included in the “Worksheet for Outlining a Disaster Plan” in *PLAM3*, and online at www.nedcc.org. There is also a list of recommended supplies in dPlan™.
- **Many of the records cartons opened during the site visit were only partially full.** To maximize available shelf space, replace partially-full cartons with half-size records cartons or with flip-top document cases. These would take up less room on the shelves.
- **Place damaged, very small, or especially fragile books in custom phase boxes.** These enclosures will support books structurally while also protecting them from light, water, and dust. CMI Micro-Climate™ boxes are recommended by NEDCC’s conservators. They are available for around \$7.00 each through Custom Manufacturing, Inc. (www.archivalboxes.com).
- **Transfer pamphlets and booklets to acid-free, buffered folders and document cases or records storage cartons.** The motion of pulling a pamphlet from its envelope and reinserting it can be damaging, for example when the edge of a fragile cover catches on the lip of the envelope. Several

pamphlets can be stored in the same folder provided they are roughly the same size and in good condition. The folder should be scored at the hinge to allow the pamphlets to rest flush with the bottom of the box.

- **Any additional unbound vital records certificates can be placed in polyester sleeves and vital records binders.** Records should not be housed in ring binders without sleeves, though, because they will pull away from the rings over time.
- **Rehouse all other unbound records in chemically stable folders and boxes.** Records need to be transferred to enclosures that will slow their deterioration, specifically acid-free, lignin-free, alkaline-buffered file folders and boxes. Either records cartons or flip-top document cases may be used. Document cases or half-size records cartons may be preferable to full-size cartons because a number of the records cartons examined during the site visit were only partially full, yet still took up a full-size records carton's worth of shelf space.
 - **Use spacer boards to keep folders upright in partially-full boxes.** Papers that slump inside their boxes will eventually develop a permanent curl.
 - **For product examples, see item number 613-1561 (Blue/Gray B-Flute Storage Cartons); 735-2510 (Blue/Gray Document Cases); 727-0912LT (Perma/Dur Reinforced File Folders); and 613-0821 (Document Case Spacer Board) from University Products (www.archivalsuppliers.com).** Other suppliers will offer similar products.
- **House all oversize items flat in acid-free, lignin-free, buffered map folders and oversize boxes.** Remove the maps from their kraft paper enclosures before placing them in folders. If they are roughly the same size and in good condition, several maps can be placed in the same folder. Folders should have roughly the same dimensions as the box to prevent shifting.
 - **For product examples, see item number 701-7048 (Perma/Dur Map & Print Folders) and 733-1233 (Drop-Front Storage Boxes) from University Products (www.archivalsuppliers.com).** Other suppliers will offer similar products.
- **Microfilm reels in plastic cases and older (possibly acidic) boxes should be rehoused in acid-free, lignin-free, buffered boxes to slow their deterioration.**
- **Place all audio and video recordings that will be retained permanently in protective cases to prevent damage from light, water, dust and debris.** Abrasion from dust and debris and extended exposure to high humidity are major causes of audio and video tape degradation. Audio and video cassettes that are not enclosed, or that are stored in sleeves, are not adequately protected from particulates. Moreover, manufacturers' boxes are typically made of chemically unstable materials, which further deterioration. Make sure to transfer any identifying information contained on the original box or sleeve to a label on the new enclosure.
- **Purchase a vacuum cleaner equipped with a HEPA (High-Efficiency Particulate Air) filter.** A HEPA filter captures up to 99% of particulates up to .3 microns in size, and prevents their

recirculation through the vacuum's exhaust. The longevity of records depends in great part on the quality of their storage environment, which should be as clear as possible of particulate contaminants.

- **Clean shelves, books and boxes in the records storage room and both vaults.** Particulate pollutants cause staining and abrasion of materials. Dust can serve as a substrate for mold growth and it can attract insects. After the initial cleaning, shelves, books and boxes should be cleaned at least once per year as a matter of routine.
 - **Thoroughly clean the space that will hold the volumes to receive conservation treatment.** Dust and dirt need to be removed from the floor and from shelves, books and boxes before the volumes return from treatment.

Long-Term Priorities (steps to be taken once short- and medium-term goals have been accomplished; and/or larger general goals that will require major funding and/or significant reorganization of resources):

- **Repair the roof leak around the chimney and replace deteriorating flashings.** Though the possible cost of these repairs places this recommendation in the category of long-term priorities, nevertheless it should be considered a high priority and addressed as soon as funding is available. A sound building benefits records preservation by serving as the primary barrier against the elements.
- **Increase the amount of shelf space for Town records.** Even once storage areas are cleared of unnecessary materials, it is likely that more shelf space will be needed, especially for proper storage of bound volumes. The Town Clerk might want to explore the possibility of installing compact shelving.
- **The Town should plan long-term to construct a climate-controlled vault for Town records storage.** Eventually, all permanent Town records should be stored in a single, secure location that is easily accessible to staff, and that is climate-controlled and fire resistant. For additional information, including more detailed specifications for vault construction, see Technical Leaflet 1, "Performance Standards of Safes and Vaults," from the Massachusetts Archives Records Management Unit, available at www.sec.state.ma.us/arc/arcrmu/rmutbl/tbl1.htm.
- **If their value merits it, engage a specialist in audiovisual preservation to assess the condition of audiovisual materials.** Once a complete inventory of the Town Hall records has been prepared (thereby locating and identifying all audiovisual materials), an audiovisual specialist could be hired to determine the condition of the tapes for the purpose of developing a reformatting strategy.
 - **Ultimately, any recordings that the Town Clerk selects to preserve long-term will need to be copied onto currently supported media, and redundant copies will need to be produced.** Recordings will need to be transferred to a format for which playback equipment is widely available.

The Sudbury Town Clerk's commitment to caring for the Town records was readily apparent. While some progress has been made toward preserving these materials, there is still much work to be done. If some of the initiatives recommended here seem overwhelming, it is important to remember that this report is intended as a long-term planning tool. It will be possible to implement some action soon, but

others may require diplomacy, education and funding efforts over several years. It is important to break these initiatives down into manageable tasks.

I hope this survey report will help the Town Clerk as she sets a course for future preservation efforts. Her hard work, dedication and support of preservation activities will help ensure the survival of Sudbury's Town records for future generations.

Respectfully submitted,

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Introduction

Paper-based records in the Sudbury Town Hall were surveyed for preservation planning purposes by Angelina Altobellis, Survey Program Coordinator of the Northeast Document Conservation Center (NEDCC), on October 21, 2008. The preservation survey evaluated the building and environment as they relate to the preservation needs of the collections; examined current policies, storage methods and handling practices; and assessed the general condition of the collections. Observations and recommendations are based on a site visit and discussions with Rosemary Harvell, Town Clerk; James Kelly, Building Inspector; and Lee Swanson, Archivist of the Sudbury Historical Society.

Two concepts are necessary for evaluating the adequacy of preservation in any library or archives:

“Responsible custody” is defined by the Commission on Preservation and Access Task Forces on Archival Selection as the provision of “a level of environmental management, housing, care and maintenance that will retard further chemical deterioration and protect materials from physical damage.”¹ These preventive measures include climate management, protective enclosures, fire detection and suppression, effective security, disaster planning, and training staff and users to handle and care for the collection appropriately.

“Optimal Storage” is defined as meeting or exceeding the guidelines proposed by professional organizations and national standards-setting organizations. Such guidelines and standards are authored by committees made up of professionals in the field, and they are informed by recent scientific research into the deterioration of collections. The challenge for standards-setting organizations (and for collections-holding institutions) is to translate scientific findings into practical and affordable recommendations for storage. In many cases, optimal storage may not be achievable, but institutions should be aware of the ideal as they work towards providing the best conditions possible.

Every institution should provide responsible custody for all its collections. The provision of optimal storage conditions for collections of long-term value to the institution should be a primary goal.

This report is intended for continuing reference. General background information at the beginning of each section provides a summary of current standard preservation practices, which underlie the observations and recommendations that follow. For clarity’s sake, this background information is printed in standard type, while observations and recommendations specific to the collection are in bold.

For additional best practice information, reference will be made to *Preservation of Library and Archival Materials: A Manual*, 3rd edition, edited by Sherelyn Ogden (Andover, MA: Northeast Document Conservation Center, 1999), referred to hereafter as *PLAM3*. The preservation leaflets contained in *PLAM3* are also available electronically on the NEDCC Website. A complete list of available leaflets may be found at www.nedcc.org.

Archival and preservation supplies will be recommended throughout the report. Most of these supplies are available from multiple suppliers, and staff should select the supplier that best meets the Town Clerk’s

¹ Task forces on Archival Selection. *The Preservation of Archival Materials*. Washington, D.C.: The Commission on Preservation and Access, April 1993, p. 3.

needs in terms of cost, shipment method, etc. An extensive list of suppliers is available on the NEDCC Website at www.nedcc.org/resources/suppliers.php. Examples of particular items given in the text are intended as illustrations, not recommendations of one supplier over another.

I. Collection Management

A. Evaluation of Records

Evaluation and weeding of collections is an essential part of preservation management. Resources (financial and otherwise) are always scarce, and it is important not to waste valuable resources on records that do not have long-term historical value. It is also important to make a distinction between materials that are valuable only for the information they contain and those materials that have intrinsic value and must be retained in their original form.

For public records (e.g., those created by town officials and governed by state records retention/disposition schedules), evaluation is fairly straightforward. Certain types of records are designated as permanent, while others can be disposed of (usually only with the approval of the public records administrator) after a certain amount of time has passed. In some cases the retention/disposition schedules will indicate whether records need to be retained in their original form or whether a microfilm copy is sufficient.

For private historical records (such as those of town organizations or prominent individuals whose disposal is not governed by statute), deciding what to retain can be more complicated. For these types of records, a mission statement and collecting policy is essential. Preservation priorities cannot be set solely on the basis of condition of the collections—they must also reflect the relative importance of the collections to the institution. A mission statement enunciates an institution's overall goals (whether for its entire collection or for a part of it, such as a local history collection), while a collecting policy provides specifics about the scope of current collecting and indicates areas in which additional materials may be collected in future. A good collecting policy will also take into consideration the holdings and collecting activities of other local (and national, if appropriate) repositories.

Collection management policies spell out the nuts and bolts of caring for historical records: storage methods, target environmental conditions, access procedures, preparation of materials for use, microfilming procedures, environmental monitoring procedures, etc. These procedures are needed for both public and private records. Clear and well-considered policies that are universally enforced will make preventive preservation measures routine and lengthen the useful life of collections.

Observations & Recommendations

The Town Clerk is working with other Town departments regarding adherence to state records retention schedules. The Town Hall contains a number of records that need to be reviewed for retention or disposal. Many of these were stored for approximately 20 years in the first floor vault. They were moved to the records storage room in the basement in 2006, where they are stored with other “abandoned records from offices that moved” from the building. Additional records in need of review are stored on the landing between the first floor and the basement.

In addition to Town records, the Town Hall also contains church records and a few small collections of personal papers.

- **Continue to work with other Town departments to evaluate records for retention or disposal.**
In order to plan for preservation, the Town Clerk needs to have a clear idea of the types and quantities

of records stored in the Town Hall. Records scheduled for permanent retention will need to be rehoused; priority materials will need to be identified for disaster response.

- **Prepare a written collection management policy for permanent records.** Prepare one document containing policies and procedures for preservation, including handling guidelines, maintaining security, storage methods, environmental monitoring and targets, preservation-quality microfilming, library binding, and maintaining records of any conservation treatments performed on Town records. The collection management policy will establish practices and will help ensure that they are implemented consistently over time. For more information, see “Collections Policies and Preservation,” preservation leaflet 1.5 in *PLAM3*, or online at www.nedcc.org.
- **If the Town Hall will continue to serve as a repository for church records and personal papers, a collecting policy is needed to guide future acquisition decisions.**
- **Determine whether the Town has official ownership of the church records and personal papers in the Town Hall.** Ultimately, the Town Clerk may want to explore the possibility of transferring these records to another repository since storage space for Town records is in short supply.

B. Intellectual Control

Intellectual control of collections is essential for access and for preservation. Staff and researchers cannot use collections easily and effectively unless the materials are indexed and/or described. In addition, prioritizing materials for preservation cannot occur without good intellectual control, since relative values and priorities cannot be assigned unless staff is familiar with the content of collections. This process can be difficult, since in practice, preserving one group of records often means not preserving another.

The basic purpose of records description is to enable the researcher to find both the records he/she needs and the information within those records by using various types of written guides. This prevents rummaging through large numbers of boxes, drawers or documents, which can cause handling damage and general disorder. It also means that the researcher is not solely dependent on the personal knowledge of the staff to access the materials. Finally, it allows materials to remain intellectually linked even when they must be physically separated; for example, if oversize maps and plans must be stored separately from associated files.

For the purposes of description, records are generally organized in groups, since the individual items are often related. This means that instead of describing each individual item, materials that are related are described together, as one unit.

Observations & Recommendations

It appears that a good portion of the records in the Town Hall have been inventoried over the years. Vital records and Town meeting records have been indexed. Many of these and other records in the Town Hall have been included in the index and online database created through the Sudbury Archives Project. Currently this database includes records dating to 1850, but the Sudbury Archives website states that the project team is “exploring the possibility of expanding the database to include Sudbury records up to the year 1900.”

- **Ensure that the inventory of Town Hall records is up-to-date.** The inventory should cover records scheduled for both interim and permanent retention so that it can be used to support implementation of retention schedules. The Massachusetts State Archives Records Management Unit (www.sec.state.ma.us/arc/arcrmu/rmuidx.htm) can provide assistance with inventory and records appraisal. For more information, contact Terry French, Senior Records Information Manager, at (617) 727-2816, ext. 259, or by email at terry.french@sec.state.ma.us.
- **When possible, add more records to the Sudbury Archives index and database.**

C. Staffing & Budget

Adequate staffing is crucial to maintaining and preserving library and archival collections. Some preservation projects such as weeding and shelf maintenance do not require an investment in equipment or supplies, but do require a commitment of time. In addition, someone on staff must be assigned the responsibility of being knowledgeable about preservation issues, and of making (or overseeing) preservation decisions. An investment in staff time to carry out collections care and preservation activities will result in a longer life for the records.

Another essential for effective preservation planning is the ability to "liberate" at least a small amount of money for supplies, training and equipment. Effective preservation requires a dependable budget with active administrative coordination, even if the budget is not large at the beginning. A budget line for preservation should be part of the institution's annual budget, to ensure an ongoing commitment to preservation and allow better tracking of expenses.

Observations & Recommendations

The Town Clerk is knowledgeable about preservation issues. From 2006 to 2007, the Town Clerk participated in the year-long "Managing Preservation" workshop organized by the Northeast Document Conservation Center. Her office is staffed with three full-time and two part-time employees. The Town has a budget line item of \$1,750 "which is primarily used to bind Town Meeting Proceedings and to microfilm other departments' records." In October 2008, the Town Clerk requested additional funds from the Town to conserve 16 records volumes.

- **If available staff time is inadequate for carrying out preservation activities, consider recruiting volunteers.** Volunteers would be an excellent source for help with projects such as rehousing of records, shelf and collections cleaning, and shelf maintenance. Since the Town Clerk has been trained in preservation management, she could provide training to volunteers in proper handling of materials and rehousing needs.
- **Seek additional grant funding for preservation activities.** The Town Clerk might consider applying for a National Endowment for the Humanities Preservation Assistance Grant for Smaller Institutions. This grant could be used to fund the purchase of environmental monitoring equipment, shelving, and preservation supplies. The next application deadline will be May 14, 2009. For more information, see www.neh.gov/grants/guidelines/pag.html.
 - **Also consider applying for an American Heritage Preservation Grant, administered by the Institute of Museum of Library Services (IMLS).** Grants of up to \$3,000 are awarded for activities including treatment and rehousing, as well as staff time to carry out

preservation projects. The next deadline for this grant will be in September 2009. For more information, see www.ims.gov/collections/grants/boa.htm.

- **See also the National Historic Publications and Records Commission (NHPRC) Grant Program.** For more information, see www.archives.gov/nhprc/apply/program.html.

D. Preservation Planning

This preservation survey report may be viewed as the first step in creating a preservation plan, but it is not itself a plan. This report identifies preservation needs and provides an executive summary that offers some guidance in prioritizing these needs. However, it cannot take into consideration many other factors that must be considered when weighing the needs of collections against institutional resources.

Some factors change as institutional circumstances change; these include available funding for preservation, staff time and expertise and user demand for collections. Others require an in-depth understanding of the institution and its collections that only staff members possess, such as political considerations and the relative value of collections to the institution.

There is general consensus regarding the factors to be considered when prioritizing potential preservation actions:

- **Use**—materials that are used frequently, whether consulted by researchers or exhibited routinely, may be at higher risk than other collections.
- **Storage**—collections that are stored under adverse conditions, whether environmental or in damaging enclosures, may require prompt preservation action.
- **Condition**—items or collections in fragile condition may be at risk of loss unless they receive attention quickly.
- **Value**—either absolute value (rarity, monetary worth, intrinsic or associational value, etc.) and/or relative value of collections to an institution may influence preservation priorities. Whether collections have long- or short-term value to an institution will also influence decision-making.
- **Format**—whether or not materials need to be preserved in their original format will also influence priorities.

In general, the following preservation activities will have the highest priority:

- Those with high impact, those that will result in dramatic improvement, or that will affect the greatest number of items will often be the highest priority (for example, improving climate control, rehousing a collection or microfilming fragile materials).
- Those which are feasible, given practical considerations such as staffing levels and expertise, financial considerations (outside funding, capital outlay, operating costs, expenses for materials and services), policy and procedural changes required and political considerations. Even if the impact of a preservation action is high, it may be given a low priority if implementation is not feasible.

Those which are urgent and require immediate action; collections that may be damaged or lost, or an opportunity to act on a particular project may be lost, if action is not taken.

Observations & Recommendations

During the site visit, the Town Clerk explained that there is considerable interest within the Sudbury community in preservation of its historic records. The Town provided funding for this general preservation survey, which is the Town Hall's first. The Town Clerk considers unstable environmental conditions in records storage spaces, and inadequate vault space, to be the most serious preservation problems for the Town records under her care. She has begun to address these issues by placing a dehumidifier in the basement vault, and by organizing the first floor vault, moving to the basement records storage room infrequently used materials that had been stored there for at least 20 years.

- **Using the recommendations in this report as a starting point, develop a preservation plan.** The plan should identify the actions to take to address short-, medium- and long-term priorities, and it should be practical, taking into account local priorities and funding realities. Recommendations for priority actions are outlined in the executive summary of this report.
- **Create a timetable for specific actions so that the plan is carried out effectively.**
- **Consider the preservation plan a living document, reviewing and revising it annually.** Periodic revision may be needed as circumstances change, and as preservation needs are addressed and new ones identified.

II. The Building & Storage Environment

A. The Building

The most effective way to preserve large quantities of library and archival materials is to control temperature, relative humidity, air quality and light; to provide routine housekeeping; and to use good storage and handling techniques. Installation of fire detection and suppression systems is also a high priority. In addition, protection from water damage, theft and vandalism is critical for collections as a whole.

The building is central to all these efforts and must remain in good condition to provide the maximum protection. Regular preventive maintenance should be provided on a fixed calendar basis, with inspection of roof, gutters, skylights, flashings, drains, HVAC equipment, security systems and fire safety equipment. Cleaning and repair should be performed as needed. A log of building maintenance and problems should be kept.

Observations & Recommendations

The Sudbury Town Hall building is home to the Town Clerk's office and the Office of the Veterans Agent, which occupy separate spaces on the first floor; and to the Sudbury Historical Society on the second floor. It was constructed in 1932 after the original Town Hall burned. An addition to the building was made at some point, but the dates for this construction were not available. The building is maintained by the Town, and the Building Inspector keeps records of repairs and maintenance, which is excellent.

- **Perform a weekly walk-through of the entire building to check for emerging problems.** Damage to Town records can be prevented by spotting problems with the building or systems early.

B. Temperature, Relative Humidity & Air Quality

Paper is a hygroscopic material, absorbing and releasing moisture readily. As a result, it is greatly affected by the environment in which it is stored. Seasonal and daily fluctuations in relative humidity cause paper-based materials to expand and contract, weakening cellulose fibers and accelerating deterioration. Excess moisture can cause or encourage foxing and mold. In winter, central heating often results in extremely dry conditions, causing materials to dry out and become brittle.

Control of temperature is also very important. Heat speeds deterioration, with the chemical rate of deterioration in paper doubling with every 18° F increase in temperature.

Although there is no national environmental standard for storage of paper collections, the scientific evidence is clear. Low temperatures and a moderate, stable relative humidity greatly extend the useful life of paper-based collections. The National Information Standards Organization (NISO) has issued a technical report (William K. Wilson, *Environmental Guidelines for the Storage of Paper Records*, NISO Technical Report [NISO-TR01-1995], Bethesda, MD: NISO Press, 1995. Available from NISO Press, PO Box 338, Oxon Hill, MD, 20750-0338; 1-800-282-NISO.) This publication recommends the following values for temperature and relative humidity for storage of paper records:

Situation	Temperature	Relative Humidity
Combined stack and user areas	70° F maximum*	30-50% RH**
Stacks where people are excluded except for access and retrieval	65° F maximum*	30-50% RH**
Optimum preservation stacks	35-65° F***	30-50% RH**
Maximum daily fluctuation	±2° F	±3% RH
Maximum monthly drift	3° F	3%

* These values assume that 70°F is about the minimum comfort temperature for reading and 65°F the minimum for light physical activity. Each institution can make its own choice.

** A specific value of relative humidity within this range should be maintained ±3%, depending on the climatic conditions in the local geographic area or facility limitations.

*** A specific temperature within this range should be maintained ±2°F. The specific temperature chosen depends on how much an organization is willing to invest in order to achieve a given life expectancy for its records.

-from *Environmental Guidelines for the Storage of Paper Records*, p. 2

These conditions should be maintained 24 hours a day, 365 days a year. The climate control system should not be turned off, nor should settings be altered, when the building is unoccupied.

In most buildings in the northeastern United States, mechanical systems for both humidification and dehumidification are required to maintain the specified relative humidity. Air conditioning equipment alone does not usually provide adequate humidity control.

Monitoring the Environment

Temperature and relative humidity where collections of permanent value are stored should be systematically monitored and recorded. This data will serve to:

- establish existing environmental conditions
- support the need for improved environmental controls, should the need exist
- indicate whether climate control equipment is operating optimally, if such equipment is already in place.

Monitoring devices vary greatly in their complexity and efficacy, so institutions should take care to choose the instrument most appropriate to their needs. See *PLAM3* for further information about monitoring environmental conditions.

Sometimes, a good choice for small institutions just beginning a monitoring program is the digital “min/max” thermometer/hygrometer. This instrument provides a record of the highest and lowest readings for temperature and relative humidity since the previous reset. This time period can range from one hour to several days.

Modifying the Environment

Once conditions are known, remedial measures that can be taken to improve environmental conditions might include one or more of the following:

- installing central environmental controls
- using portable air conditioning units, attic fans, humidifiers, and dehumidifiers (preferably connected to a drain)
- removing collections from attics, which tend to be hot, or basements, which are usually moist
- improving insulation with weather-stripping, caulking, or storm windows
- reducing sunlight in order to control heat in summer
- providing good routine maintenance for mechanical equipment (including radiators and air registers)
- decreasing moisture by installing vapor barriers.

Since temperature and relative humidity are related, correcting one factor may alter the balance of the other.

Observations & Recommendations

From February to July 2006, the Town Hall participated in the Massachusetts Board of Library Commissioners' environmental monitoring program. Dataloggers were used to collect temperature and relative humidity (RH) readings during this period, which covered two seasonal changes. The data collected showed variations in environmental conditions among the three records storage spaces as follows:

	Min/Max Temp.	Min/Max RH	Temp./RH Difference
First floor vault	65.4°F/ 76°F	15.5%/ 57.5%	10.6°F/ 42%
Records storage room	48°F/ 76.1°F	19.7%/ 82.2%	68.1°F/ 62.5%
Basement vault	60.5°F/ 70.7°F	26.1%/ 51.6%	10.2°F/ 25.5%

Although the environmental monitoring data collected show that temperature and humidity fluctuations in the first floor vault are greater than those in the basement vault, the first floor vault has the benefit of being well-ventilated because it is constantly opened. On the day of the site visit, the basement vault smelled musty, which could be an indication of mold growth. Because there is little air movement there, a spike in humidity (over 60%), perhaps following a period of heavy rain, would create an environment conducive to a mold outbreak. Many basements are susceptible to "rising damp," or the upward movement of ground water through permeable building materials. They are also prone to flooding. These factors combined make basement storage inadvisable. Given that space limitations in the Town Hall require basement storage, though, risks to Town records can be mitigated somewhat by identifying priority materials and storing them in the first floor vault. In addition, the Town Clerk might be able to reduce the temperature and RH fluctuations in the records storage room, at least to some extent, by sealing the windows there. Dehumidifiers are used in the basement vault and in the records storage room, which is good.

- **Identify priority materials, and store them in the first floor vault.** The basement vault can still be used for lower-priority materials because it offers the benefit of being fireproof and secure, but its environment should be monitored and staff should pay special attention to the conditions in the vault during periods of high humidity.
- **Seal the windows in the records storage room.** Line windows with aluminum foil, and seal them with plastic in the winter. The aluminum foil will block light as well as deflect heat during the summer, while the plastic will reduce moisture and heat loss in the winter.

- **Purchase environmental monitoring equipment, and begin an ongoing environmental monitoring program of all records storage spaces.** Consider using a datalogger, which records temperature and relative humidity levels at pre-set intervals, and stores the information to be downloaded to a computer for analysis. Software such as BoxCar Pro® can be used to enhance analysis of environmental monitoring data.
- **Continue using dehumidifiers in the basement vault and records storage room.** If necessary, use an additional dehumidifier in the records storage room. Because environmental monitoring data have shown humidity levels above 50% in the first floor vault, if space permits, it would be worthwhile to use a dehumidifier there as well.
- **The Town should plan long-term to construct a climate-controlled vault for Town records storage.** Eventually, all permanent Town records should be stored in a single, secure location that is easily accessible to staff, and that is climate-controlled and fire resistant. For additional information, including more detailed specifications for vault construction, see Technical Leaflet 1, “Performance Standards of Safes and Vaults,” from the Massachusetts Archives Records Management Unit, available at www.sec.state.ma.us/arc/arcrmu/rmutbl/tbl1.htm.

C. Light Protection

All light accelerates the deterioration of paper by providing energy to fuel oxidative changes. This can cause paper to fade, yellow or darken and media to fade or change color. Damage is cumulative and irreversible. The intensity of the light and the length of exposure determine the total damage. Most destructive is the ultraviolet energy associated with natural light and with artificial fluorescent, mercury vapor or metal-halide lamps. However, the visible light spectrum also damages paper. Collections of permanent value are best stored in areas with no natural light under low levels of incandescent illumination.

A great deal can be done to control natural light through careful use of shades, drapes or blinds. Simply covering windows at times of direct sunlight will protect collections from light damage; it can also help minimize the amount of heat that builds up inside during the day.

After total light exposure is reduced, the amount of UV in the remaining light may be further reduced through the use of filters. These filters, made of special plastics, can control ultraviolet energy in both fluorescent and natural light. Incandescent lights emit relatively little UV energy and do not require UV-filtering. Fluorescent lamps emit significant UV light and should be covered with UV-filtering sleeves wherever collections of special value are kept. UV-filtering plastic film or Plexiglas can also be applied to windows and exhibit cases, in order to control the amount of damaging ultraviolet energy.

See “Protection from Light Damage” in “The Environment” section of *PLAM3* for further information about light and for suppliers of UV-filtering plastics.

Observations & Recommendations

Light levels in each of the three records storage spaces were measured in February and July 2006, corresponding with the start and end dates of the MBLC’s environmental monitoring. In his report on conditions, Preservation Specialist Gregor Trinkaus-Randall observed, “The light levels in all three locations are excellent. However there are problems with the UV radiation readings.”

He recommended installing UV-filtering sleeves on fluorescent lamps, and blocking light from the windows in the basement records storage room.

- **As recommended in the MBLC report, install UV-filtering sleeves on fluorescent lamps.** These are available from suppliers such as Gaylord; see, for example, item number WW-UVT4824. Other suppliers will offer similar products.
- **Install light-blocking shades over the windows in the basement records storage room.** Alternatively, consider covering windows with aluminum foil or gypsum wallboard.

D. Fire Protection

All other preservation activities become moot if collections are destroyed by fire. For this reason fire prevention and protection come under the purview of a preservation survey.

Speed is of the essence in responding to fires, and in limiting the damages they cause.

All repositories housing collections of value should therefore be equipped throughout with heat and smoke sensors, wired directly to the local fire department and/or to another central monitor. Fixed-temperature heat sensors by themselves are insufficient in that they will not detect smoldering fires; rate-of-rise sensors are better in that they are activated by a sudden, small increase in temperature. Smoke detectors alone are not ideal since they have a relatively high rate of mechanical failure. Therefore, both rate-of-rise heat sensors and smoke sensors should be used. All detectors should be tested on a regularly scheduled basis, preferably quarterly and maintained regularly as recommended by the manufacturer.

All existing fire hazards should be eliminated and regular fire drills should be held. Repositories should be equipped throughout with portable fire extinguishers; these must be inspected annually. Most local fire departments will provide fire inspections and assist institutions in developing a fire safety program. This should include training staff in evacuation procedures and the use of portable fire extinguishers. If local firefighters are acquainted with the building and its collections before a fire, they may be able to take collection priorities into account in their fire-fighting strategies.

The subject of automatic sprinklers in buildings that house paper-based collections has traditionally been controversial. In the past, there has been substantial anti-sprinkler sentiment on the part of conservators. However, modern wet-pipe sprinkler systems are increasingly recommended for records repositories, due to their relative low cost, ease of maintenance and dependability. The rate of accidental discharge has been estimated at only 1 in 1,000,000 heads or better.

Studies indicate that 43% of fires are extinguished by only one sprinkler head and that 70% are extinguished by no more than three heads. The average sprinkler head discharges 20-25 gallons per minute in a relatively gentle spray. Such limited sprinkler action would cause water damage to a relatively small portion of collections, in contrast to the devastating damage resulting to both building and collections from the deluge of pressurized fire hoses during an uncontrollable fire. These statistics, combined with the fact that we now have technologically sophisticated methods of drying water-damaged materials, make the installation of sprinklers in repositories much less ominous than it might once have seemed. It should be noted that the Smithsonian Institution and the National Archives have both installed wet-pipe sprinkler systems in their collections storage areas.

National Fire Protection Agency Publication No. 909, *Code for the Protection of Cultural Resources*, 2001 Edition, (available from the NFPA, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269, 1-800-344-3555, or on the web at www.nfpa.org) provides useful guidance for fire prevention. See also "An Introduction to Fire Detection, Alarm and Automatic Fire Sprinklers" in NEDCC's *PLAM3*.

Observations & Recommendations

The building is protected from fire by smoke detectors and an alarm monitored by the local Fire Station. They are inspected annually by the Fire Department. There also appears to be a heat detector in the large meeting room/auditorium outside the Town Clerk's office. The Building Inspector reported that upgrades to the fire alarm have taken place within the last year. The building does not have a fire suppression system, but the first floor vault, and possibly the basement vault, is fireproof. In addition, one portable fire extinguisher is available on each level, but staff members have not been trained to use them. The building is not inspected regularly by the Fire Department, nor are fire drills conducted. Smoking is not permitted anywhere inside the building.

- **Arrange for all staff members to receive fire extinguisher training.** Local Fire Departments are often willing to provide this.
- **Schedule annual building inspections by the Fire Department.** Regular inspection will help ensure that any fire hazards that may develop are found and corrected. It will also give the Town Clerk an opportunity to point out to firefighters the location of priority items for possible rescue in the event of a fire.
- **As part of an overall fire safety program, schedule two fire drills per year in the Town Hall.**

E. Water Protection

Protecting library and archival materials from water is central to their preservation. Even a minor water accident such as a leaky pipe can cause extensive and irreparable damage to collections through mold, staining and physical distortion.

The best insurance against possible water damage is to perform regular inspection of roof covering and flashings, with repair and/or replacement as needed. Gutters and drains must be cleaned frequently. Storage of collections under water pipes, steam pipes, lavatories, air conditioning mechanical equipment or other sources of water must be avoided. Sprinkler pipes, which must undergo rigorous testing to meet fire code, may be located over collections, as the protection provided by a sprinkler system dwarfs the risk of leaks. Collections should never be stored on the floor, but should always be raised at least four inches from the floor on shelving or pallets. Storage in basements or in other areas where the threat of flooding is great must be avoided.

If collections must be stored in areas vulnerable to flooding, water-sensing alarms should be installed so that water is detected quickly. Staff should familiarize themselves with the location and operation of water mains and shut-off valves in case the water supply must be shut off during an emergency.

Observations & Recommendations

The Town Hall's pitched roof is composed of its original slate shingles. The flat portion of the roof was replaced in the summer of 2008. The Building Inspector reported that the roof is inspected routinely as a matter of practice, and noted that the flashings on the gutter roof are starting to deteriorate.

Leaks have been a problem in two locations in the building. In the records storage room in the basement, a water leak has occurred several times, most recently because a gutter had been removed from the building during the flat roof replacement. Beside the entrance to this room, water flooded below an adjacent exterior door and down the stairs when an outside drain became clogged. The water reached the middle of the storage room. A box of assessor's records had been left on the floor and became wet, but fortunately the Town Clerk was able to dry them out, so no records were lost. During a tour of the second floor, the Historical Society's archivist pointed out an area in the ceiling that leaks during heavy rains. (Figure 1) Major damage to records could result if the leak worsened or reappeared unnoticed over a weekend.

A row of shelving is situated directly underneath water pipes in the records storage room, exposing the records stored there to risk of water damage if a pipe were to leak. A number of boxes containing records are stored directly on the floor in the basement vault and on the landing between the basement and the first floor.



Figure 1. A fairly large area on the second floor ceiling shows water damage, the result of leaks that appear during heavy rains.

- **Ideally, basement storage would be avoided because it places records at high risk of water damage. Since this is not feasible at the moment, however, measures need to be taken to minimize the risk of additional water damage. These measures include:**
 - **Raise boxes off the floor by at least four inches.** Plastic or wood palettes can be used for this purpose. Since the basement vault is narrow, it will probably be necessary to move boxes on the floor there into the basement storage room.

- **Instruct staff to return records boxes to shelves when they are finished working with them, rather than leaving them on the floor.**
- **Install water alarms in the records storage room and in both vaults.** If the Historical Society approves, it would also be wise to install a water alarm to monitor the area beneath the leak in the second floor ceiling.
- **Repair the roof leak around the chimney and replace deteriorating flashings.** Though the possible cost of these repairs places this recommendation in the category of long-term priorities, nevertheless it should be considered a high priority and addressed as soon as funding is available. A sound building benefits records preservation by serving as the primary barrier against the elements.
- **Remove the leaves piling up near the drain beside the basement door to prevent another flood resulting from a clogged drain.**

F. Security

Any building that houses collections of permanent value must be well secured during hours when it is closed to the public. It is best to install perimeter intrusion alarms and internal motion detectors, wired directly to the local police department and/or to another outside monitoring agency. These detectors must be correctly positioned to detect intrusion and must be tested regularly and frequently.

Collections-holding institutions should not use master key systems. Building keys or access codes to areas where historical collections are kept should be strictly controlled. A list of keyholders or people with access codes should be kept current and staff members should be required to return keys or cards when they leave the employ of the institution. Similarly, access codes should be changed or deactivated.

Use of valuable or historical materials by researchers must be carefully controlled and strictly monitored. Researchers should enter the reading room without personal possessions—coats, bags and books should be left in a locker. They should bring only pencils and paper with them. Laptop computers are also acceptable. Researchers should fill out and sign a register, present photo identification and leave an identification card or personal key in the hands of the staff person who retrieves materials. The card or key should not be released until materials have been returned intact.

Staff should give researchers one item at a time. If several objects need to be examined at one time, the staff member should carefully count them out in front of the researcher before and after use. Staff should check materials visually before and after use for evidence of vandalism (for example, cutting out of plates, etc.). The institution should retain call or request slips to help identify the last date of use or the last user in case of loss.

Institutions must have some way of demonstrating ownership of unique or otherwise valuable objects. Difficult-to-remove cataloging or ownership marks on an object are undesirable because of their disfiguring effect. Detailed written descriptions and/or photographs of identifying details are essential to proving ownership.

Observations & Recommendations

The building is protected from unwanted intrusion by window locks. Keys to the building are held by the Town Clerk and her office staff, the Town Selectmen, and the Building and Maintenance Department. All building locks were rekeyed in early 2007, and the Town Clerk keeps a sign-in sheet for distributing keys. The Board of Selectmen or Town Manager must approve any key loans. Around a dozen frequently-used record books and a few other items (e.g., audio cassettes of Town meetings) are stored in a safe in the Town Clerk's office that is locked every night. Likewise, the "working vault" (referred to in this report as the "first floor vault") is also locked every night.

Only the Town Clerk and Assistant Town Clerk know the combination to the basement vault. That vault is located in the garage, which serves as an "all-purpose storage area for the Town offices." The garage doors are opened only upon request by the Town Clerk or a member of her staff, so use of the space is monitored somewhat. The Town Clerk holds the "clickers" for the doors, and does not distribute them. The door to the records storage room is secured with a padlock. That room contains two "frosted" windows that open to the outside, and two windows that open onto the garage. Given that there is no way to detect a break-in, the records in this room could be stolen or vandalized if an intruder were to enter by breaking one of the windows.

- Consider installing motion detectors, at least in the records storage room.

G. Housekeeping & Pests

Paper-based records are appealing to insects and rodents, who may cause permanent damage. All possible steps should be taken to control these pests. Because food remains attract insects and rodents, eating and drinking should not be allowed where collections of long-term value are stored. Clutter should not be allowed to accumulate because it too attracts pests. Moist conditions may also encourage pests. Consuming food and drink in the same room where valuable materials are kept can result in staining of collections materials through spills.

Staff should rigidly restrict their own consumption and storage of food and beverages to defined areas. All food should be refrigerated or kept in tightly sealed glass or metal containers. Food remains should be stored in closed metal trashcans. All organic garbage should be removed from the building every day.

Droppings, insect bodies, unusual deposits and damaged paper are obvious clues to the presence of pests. If problems do not respond to preventive measures, direct treatment for insect infestation may be necessary. Non-chemical treatments are preferred and might include controlled freezing or use of modified atmospheres.

Current preservation practice does not recommend extermination for pest problems except as a last resort, due to the toxic nature of pesticides. Instead, a strategy termed "integrated pest management" is suggested. This involves removing pests' habitats and food sources and regularly monitoring the space for their presence. See the technical leaflet "Integrated Pest Management" in "Emergency Management," *PLAM3* for more information.

Observations & Recommendations

Food and drink are permitted in the building, but not in any of the records storage spaces. The Town Clerk has not noticed any evidence of pests inside the building. Routine chemical extermination is not performed, which is good.

- **Continue to avoid chemical extermination, except as a last resort.**
- **Use sticky traps to monitor for pests in records storage areas.** Pests that are captured can then be identified, and appropriate preventive measures taken.

H. Emergency Preparedness

Having an up-to-date written disaster plan before a disaster occurs is highly recommended. The plan should include the following:

- **Phone numbers and contact names** for providers of local freezing services, building dry out services and vacuum freeze drying services. For materials that become wet, quick freezing (within 24 hours) prevents mold growth and can keep damage to a minimum. A local supermarket or college food service may be able to provide freezer space, but it is a great advantage to have made arrangements ahead of time.
- **Sources for the purchase of disaster supplies**, such as fans, plastic milk crates, mops, blank newsprint, etc. Note that a source of emergency funds will be needed to purchase such items—how will money be accessed during the night or on a weekend? It is a good idea to keep a few basic supplies on hand, but be sure to note their location so they can be easily found.
- **Identification of staff and volunteers** who will assist in case of a disaster, including home phone numbers.
- **Identification of proper procedures for drying books, documents and photographs.** A training session should be held so that all staff are generally familiar with first response procedures and are not expected to sit down and read detailed instructions as the disaster is happening.
- **Information about insurance coverage.** This should include evening and weekend contact information and specify what procedures the insurance company requires if a disaster happens.
- **Identification of priority items to be rescued in a disaster.** Priority items (both historical records and current administrative records needed for continuing operation) should be identified and their locations marked on a map of the building. If certain areas are normally locked, the location of the keys should be indicated. For security reasons, this section of the plan would be distributed only to a few key staff members. Also note that backups of collection records (e.g., a complete inventory) and administrative records (e.g., backups of computer files, etc.) should be stored offsite in case of disaster. It is also a good idea to keep microfilm copies of land records and vital records in off-site storage.

The information in the “Emergency Management” section of *PLAM3* will be helpful in writing a disaster plan. See especially “Disaster Planning,” “Worksheet for Outlining a Disaster Plan” and the leaflets on emergency salvage of various materials.

Observations & Recommendations

The Town Clerk was trained in disaster recovery during the year-long preservation management course she attended at NEDCC. She has begun a disaster plan. The Town has an Emergency Preparedness Committee, and preparation of a Town-wide disaster plan is reportedly on their agenda.

- **Prepare a disaster plan for the Town Hall records.** Consider using dPlan™, an online disaster planning tool developed by NEDCC and the Massachusetts Board of Library Commissioners. It is available at www.dplan.org. Using the tool, the Town Clerk will only need to provide information about personnel, the building and the records, and the tool will generate a complete plan.
 - **Share the disaster plan with the entire staff so that they will be prepared to assist in the event of an emergency.**
 - **Keep copies of the disaster plan off-site, in the event that the house is inaccessible in an emergency.** Some institutions have several staff members keep copies at home, so that the plan will always be accessible.
 - **Review the disaster plan annually and update contact information as necessary.**
- **The Town Clerk might want to consider getting involved in the Town-wide emergency planning effort.** This would provide her with the opportunity to make known the rescue and salvage needs of the historic records stored in the Town Hall, possibly incorporating them into the Town-wide disaster plan.
- **Ensure that a complete disaster response kit is on hand for water-damaged materials.** A list of recommended supplies is included in the “Worksheet for Outlining a Disaster Plan” in *PLAM3*, and online at www.nedcc.org. There is also a list of recommended supplies in dPlan™.
- **For disasters that overwhelm local staff and supplies, identify service providers to perform salvage operations.** Service providers should be notified that they are listed on the Town Hall’s disaster plan. Advance discussion will facilitate cooperation in the event of a disaster and save valuable time.

III. Collections Storage & Use

A. Storage Furniture & Space

Adequate space is essential for proper collections maintenance and preservation. Overcrowding materials on shelves and stacking materials on the floor exposes them to distortion, damage during removal and reshelving, and damage from water. For any library or archival institution, collections represent a capital investment that must be maintained in the same way that buildings and equipment are maintained. The most basic element of such maintenance is the provision of safe, appropriate storage space.

The choice of shelving materials is important for the preservation of collections of long-term value. Storage furniture can produce by-products that react to form acids and other damaging chemicals in the presence of moisture and oxygen. This may be a serious problem in closed furniture like map cases, file drawers, locked bookcases, or exhibit cases, where pollutants can build up. Archival materials stored in closed cabinets should always be protectively enclosed.

Wood has traditionally been used in the manufacture of furniture, but it emits numerous reactive chemicals that can damage collections. This can also be a problem with wood composites, sealants, and adhesives. Emissions are highest when the furniture is new, but some off gassing continues for the life of the furniture. If wooden shelving, map cases, or file cabinets must be used, the wood must be sealed—moisture-borne polyurethane or latex or acrylic paint are the best choices, although they will not completely prevent off-gassing of chemicals. Oil-based paints or polyurethanes should not be used since they can be damaging. It is important to line wood shelves and drawers in addition to sealing them. Melinex or 100% ragboard are no longer thought to be sufficient barriers by themselves. Inert metallic laminate (such as Marvelseal, available through conservation suppliers), box board containing zeolites that will absorb damaging chemicals (called MicroChamber, available from Conservation Resources, Inc.), glass, or Plexiglas are among the materials now recommended. Ragboard can be used in addition for cosmetic purposes. For the best protection, all exposed wood surfaces should be completely covered (e.g., sides, tops, and undersides of shelves and drawers).

Standard open metal library shelving with a baked enamel finish has generally been recommended for storing unenclosed books or boxed collections. It is possible, however, that baked enamel coatings may give off formaldehyde and other volatiles harmful to collections if the coating has not been baked long enough at high enough temperatures. This is primarily a concern when collections are stored on bookshelves in an area that is enclosed or has poor air circulation, or are stored in closed furniture such as map cases, file cabinet drawers, and book cases with solid doors. The only way to be sure that baked enamel furniture is not harmful is to have it tested.

Alternatives that appear to avoid the problems of baked enamel are powder-coated or anodized aluminum furniture, but be aware that these are somewhat more expensive. Open chrome-plated steel shelving, made of heavy-gauge, chrome-plated steel wire, can also be used, but only for boxed materials. The wires can leave permanent marks on items that are not protected with boxes.

See “Storage Furniture: A Brief Review of Current Options” in *PLAM3* for more information.

Observations & Recommendations

The Town Hall has a shortage of space for records storage. As explained in Section II above, permanent records are stored in a safe and in a vault in the Town Clerk's office; in a large storage room in the basement; and in a vault in the basement. Both of the vaults are crowded with materials; the basement vault is so full that it is difficult to maneuver through it. (Figure 2) Shelves are crowded as well. (Figure 3) A number of boxes are stacked on the floor, and still more boxes are stored on very high shelves for lack of any other space to put them. (Figure 4) Storage furniture includes metal records-center shelving, wood shelving, old metal cabinets and, as already noted, a safe. One shelf is buckling under the weight of the records volumes shelved on it. (Figure 5) The customer service area in the Town Clerk's office suite contains a long built-in wooden cabinets housing several dozen volumes of *Massachusetts Reports*. The top half of the cabinet has glass doors, which expose the volumes to the fluorescent office lighting. The lower half of the cabinets has three sets of solid wood doors, two of which seem to be painted shut.



Figure 2. The basement vault is difficult to maneuver around because stacks of boxes and books fill the narrow floor space.



Figure 3. Some shelves are quite crowded. The volumes pictured here are shelved awkwardly and several volumes deep.



Figure 4. Boxes are stacked on top of a shelving unit in the basement vault for lack of anywhere else to put them. They are very difficult to access and could easily topple if the stack were to become unbalanced.



Figure 5. One shelf in the basement vault buckles under the weight of the volumes stored on it.

- **As recommended in Section I.B above, work with departments that have records stored in the Town Hall to review those records for retention or disposal.** This would not only alleviate clutter, but it could also potentially free up a great deal of shelf space, allowing the Town Clerk to more accurately estimate the amount of additional shelf space needed.
- **Increase the amount of shelf space for Town records.** Even once storage areas are cleared of unnecessary materials, it is likely that more shelf space will be needed, especially for proper storage of bound volumes. The Town Clerk might want to explore the possibility of installing compact shelving.
- **Many of the records cartons opened during the site visit were only partially full.** To maximize available shelf space, replace partially-full cartons with half-size records cartons or with flip-top document cases. These would take up less room on the shelves.
- **When new shelving is purchased, select units that are made of powder-coated steel or anodized aluminum, that are appropriate for materials of different sizes and formats, and that maximize use of the available storage space.** Shelving units with adjustable shelves are needed to make maximum use of vertical space and to properly store oversize volumes and any oversize boxes. Standard-size books need shelving units with end panels to prevent them from falling off the side of the shelf.
- **Line the shelves in the wooden cabinets with Marvelseal or with boxboard containing zeolites to provide a vapor barrier between books and the shelf surface.** As wood deteriorates, it releases acidic gases. These gases are absorbed by paper, speeding its deterioration.
- **Open the cabinets that are painted shut or stuck to find out whether additional materials are stored in them.**

B. Handling Procedures

Careless handling—whether during shelving, retrieval, photocopying or research—can cause significant damage to collections over the long-term. Such damage, caused by carelessness, is perhaps more common than theft or vandalism, but it often goes unrecognized. It is essential to educate staff and users in the proper ways to handle collections.

Handling procedures can cause unnecessary damage to bound materials. Volumes should not be stacked too high when they are moved or carried, to minimize the chance that they will be dropped. Photocopying can damage bindings and should be done on an edge copier whenever possible.

Documents should be handled carefully to avoid accidentally tearing, folding or marking them. Researchers and staff must not be allowed to use pens, tape, glue or scissors near historical materials. They should not take notes on top of collection materials, as the pressure can emboss the paper. Staff, rather than researchers, should always photocopy fragile documents.

There has been considerable debate about the use of cotton gloves when handling paper. In most cases, the loss of dexterity is more damaging to paper than are oils from the skin, so gloves should not be used. However, staff and researchers should always wash their hands immediately before handling collections. They must not apply moisturizing lotions before examining materials.

Sufficient workspace is essential to proper handling. Aisles and work surfaces where oversize materials are used must be large enough to allow them to be handled without damage.

Staff must explain proper handling techniques to researchers on their first visit and as needed throughout their research. Often, proper procedures are described in writing on the registration form, which all researchers must sign before using historic collections. This helps emphasize researchers' individual responsibility to handle materials carefully.

Observations & Recommendations

Town records are rarely handled by the public. The Town Clerk has been trained in proper handling techniques, and staff members have received some training. Photocopies are made by staff members only. Records are not exhibited or loaned. These practices are appropriate and should be continued.

C. Storing Bound Volumes

1. Books

Shelving practices often cause unnecessary damage to books. For example, when oversize books are shelved with the spine up, the weight of the pages will pull the text block away from the cover. Such books should always be shelved spine down or stacked horizontally. Books should not be allowed to lean because this too causes unnecessary strain on covers and binding. They should instead be shelved upright, standing on their tails, supported by each other and by bookends. However, books should not be shelved so tightly that retrieval requires force. This causes abrasion of covers as the books are removed and reshelved. Broad-edged (“non-knifing”) bookends are safer than the flat (“knifing”) variety, whose sharp edges may damage books. Staff can modify knifing bookends by slipping a piece of acid-free

foam-core covered with bookcloth over the sharp metal edge. A brick covered with bookcloth fastened with PVA adhesive also makes a good book support.

Heavy, oversize volumes should not be shelved vertically. Instead, they should be stored flat on shelves, giving them the overall support they require. They should be stacked no more than two or three high in order to facilitate safe handling. This may necessitate inserting additional shelves at narrow intervals. Shelves must be wide enough to support oversize volumes completely and books must not be allowed to protrude into aisles where they will likely be bumped. Care should be taken to remove all acidic inserts like bookmarks, scraps of paper, etc., from books so that the acid they contain does not migrate to the book pages and cause staining.

Books of enduring value should be shelved by size. Very small volumes will not support large bindings and can be crushed by the weight of larger books. Small hard-covered volumes may be shelved. Soft-covered volumes should be laid flat in piles or boxed together by size. Identifying information should not be painted on books that have special value, nor should it be typed on labels that are taped to the volumes with pressure sensitive tape. Paint is unattractive and disfiguring; tape may discolor and stain the binding. Instead, information should be typed onto heavy, buffered paper flags placed inside the volume. The flags should be about two inches wide and two to three inches longer than the book is high. Commercially available “notched” flags have a tendency to break brittle paper.

Damaged bindings should not be held together with rubber bands, which will deteriorate and cause further damage. If detached covers must be tied onto books as temporary protection, ties should be made of undyed cotton or linen tape or undyed polyester ribbon. Any knots should be at the top or fore edge of the text block to prevent damage from pressure against other books.

Volumes with artifactual value, where the fragile binding is to be retained in its present condition, should be boxed. Fitted boxes support a volume and protect it from dirt, dust, light and mechanical damage. They may also slow a book’s response to climate changes. Permanent or decorative boxes (clam-shell or drop-spine) can be custom-made for books of very special value by conservation facilities. A simpler, less expensive option is called a “phase box” (so-named because enclosure in these boxes is the first phase of treatment for volumes at the Library of Congress). Volumes that have low value or are rarely used and do not warrant binding repair may also be candidates for boxing. “Easy rare book boxes” (which are really wrappers made of pre-scored, acid-free cardstock) are available from conservation suppliers. They are a good choice for such volumes.

Observations & Recommendations

To a great extent, it will be difficult to address problems with shelving of bound materials until more shelf space is available. As explained in Section III.A above, books are crowded onto shelves and into cabinets, and some are in stacks between various boxes. (Figures 6 and 7) There are many oversize volumes, which are stored flat and generally in tall stacks; shelved on their foreedge; or shelved upright. Many oversize volumes are not entirely supported by their shelf, and extend past the edge by a few inches. Volumes in the old metal cabinets are positioned upright or on their foreedge, and are supported by steel dividers. (Figure 8) In a few instances, volumes of very different sizes are shelved together, which can crush small volumes and offers inadequate lateral support to larger ones. Some records books are stored in boxes, either stacked or resting on their foreedge. Non-oversize volumes are not always kept upright, and some volumes have dirty covers. Adhesive labels have been attached to a few volumes. Both leather and cloth-bound volumes can be found throughout the holdings; many have abraded covers or torn spines.



Figure 6. Many books are crowded onto shelves, where they are physically unstable, as well as difficult to access and identify.



Figure 7. A few books are stacked between boxes. The weight of the boxes strains and weakens the bindings, and makes accessing them difficult.



Figure 8. Volumes of very different sizes are shelved together between metal dividers in metal cabinets. Smaller volumes are squeezed between larger ones, and the larger volumes receive insufficient lateral support. Note that several of the volumes pictured here stick out past the shelf edge.

- **As recommended in Section III.A above, increase shelf space for Town records.** Proper shelving of bound records will require additional shelf space. Specifically, the Town Hall needs more shelf space to:
 - **Shelve books of like size together.** When books of roughly the same size are shelved together, they provide one another with lateral support that enables them to remain upright.
 - **Shelve oversize volumes flat in stacks no more than three volumes high.** Tall stacks of oversize volumes are difficult to handle. Oversize volumes may be shelved on their spine, but flat shelving provides them with better support overall.
- **Place damaged, very small, or especially fragile books in custom phase boxes.** These enclosures will support books structurally while also protecting them from light, water, and dust. CMI Micro-Climate™ boxes are recommended by NEDCC’s conservators. They are available for around \$7.00 each through Custom Manufacturing, Inc. (www.archivalboxes.com).
- **Where possible, straighten books that are leaning, and turn oversize books that are shelved on their foredge to be shelved on their spine.** When a book is shelved on its foredge, gravity pulls the text block away from the spine, eventually causing the text block to pull loose.
- **Avoid using adhesive labels on books.** The chemical properties in adhesives can be damaging. Place labeling information instead on acid-free paper flags.

2. Pamphlets

Pamphlets and small booklets can be stored in custom-made enclosures, in folders and boxes or in hanging folders in file cabinets. Pamphlets of the same cover size can be stored together in drop-spine or phase boxes. Pamphlets may also be housed vertically, in boxes or file cabinets. In this case, they should be sorted by size and organized into folders. Pamphlets more than one-quarter inch thick should be stored spine down in individual folders. Pamphlets that differ in size may be stored according to guidelines given for manuscripts and documents.

If individual pamphlets must be shelved between books, they should be boxed individually. Groups of pamphlets shelved between books can be boxed together if the guidelines above are followed. If pamphlet binders are used for pamphlets of special value, they must be of preservation quality throughout. They should never be glued directly to pamphlets. Instead, pamphlets should be placed in four-flap enclosures, which should then be attached to the binder. Where stitching is used to join pamphlet and binder, it should be done through the fold or in original fastener holes where possible.

Observations & Recommendations

Pamphlets and booklets are stored in the records storage room in the basement and in the first floor vault. Some are housed in stacks in older records boxes that do not appear to be of archival (i.e., chemically stable) quality. Others are housed in groups inside Hollinger pH 8.5 (i.e., alkaline-buffered) envelopes. These are stacked on top of a box lid in the first floor vault.

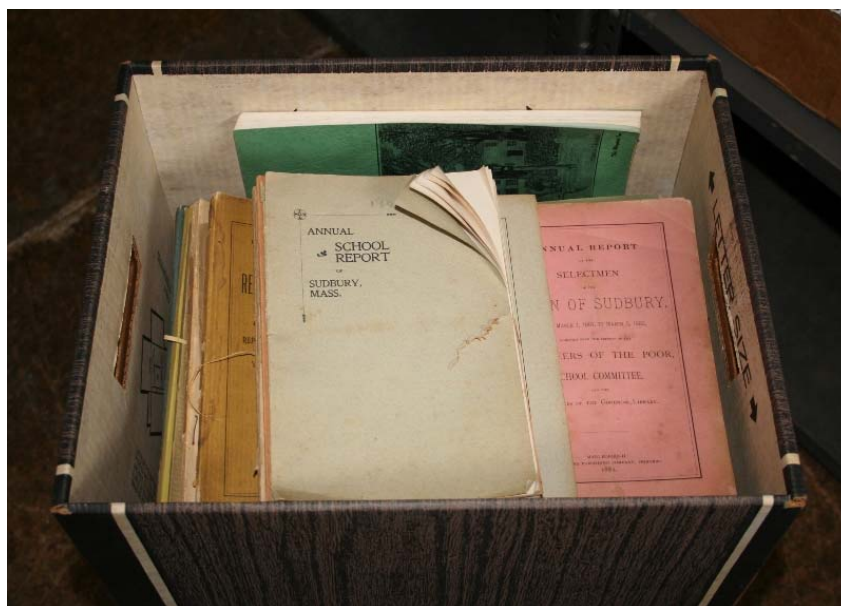


Figure 9. A number of pamphlets/booklets are stacked in older records boxes.

- **Transfer pamphlets and booklets to acid-free, buffered folders and document cases or records storage cartons.** The motion of pulling a pamphlet from its envelope and reinserting it can be damaging, for example when the edge of a fragile cover catches on the lip of the envelope. Several pamphlets can be stored in the same folder provided they are roughly the same size and in good

condition. The folder should be scored at the hinge to allow the pamphlets to rest flush with the bottom of the box.

D. Storing Unbound Materials

When processing library and archival collections, staff should keep in mind that some papers are inherently acidic due to the papermaking process. Much of the paper produced since the mid-nineteenth century was made with wood pulp, which contains an acid called lignin. Other papers have been sized with alum-rosin sizing, which combines with the water normally found in paper to form acid. Unfortunately, acid will migrate from inferior quality paper to other materials with which it comes in direct contact. For this reason it is important to use non-acidic storage materials that will not contaminate the collections materials they hold. These storage materials should also resist the formation of acids.

“Acid-free” or neutral enclosures are chemically neutral (pH 7.0-7.5) and therefore do no chemical damage to the objects they are designed to protect. It should be noted, however, that acid-free materials have a limited capacity to absorb acid-producing chemicals before they themselves become acidic and begin to decay. “Lignin-free” paper is either produced from cotton or linen or it has had lignin chemically removed. Lignin-free buffered paper enclosures (pH 8.5 or above) have been treated with a buffer, an alkaline substance that absorbs and/or neutralizes acid as it forms. These enclosures actively reduce the amount of acid in the storage complex and are therefore recommended for storage of most paper with enduring value. However, acid-neutral *unbuffered* enclosures are recommended for art on paper, blueprints, color photographs and albumen photographic prints, all of which can be damaged by alkaline chemicals.

Because acid will migrate from poor quality paper to any other papers with which it comes in direct contact, it is very important to separate poor quality papers from those that have a high rag content. News clippings and other obviously inferior papers must be removed from direct contact with historical documents and manuscripts. Informational news clippings should be photocopied onto buffered paper and the originals discarded.

Plastics used for storage enclosures vary greatly in chemical stability. Conservation grade polyester (Melinex or equivalent), polyethylene and polypropylene are stable. Many common plastics contain plasticizers or vinyl, including polyvinyl chloride (PVC), which react readily with many other materials. They are therefore considered unstable.

The terms “archival-quality” and “acid-free” are sometimes misused, so suppliers’ catalogs and product descriptions must be read carefully. Firms that specialize in conservation supplies have usually developed their reputations based on their willingness to provide information and dependable products.

Storage materials must also protect objects physically from the damaging effects of environment and handling. Enclosures that fit properly and provide good support can reduce abrasion, tearing, breakage and other physical and mechanical damage.

Librarians, archivists and other records custodians should be careful to store objects with like objects. Because of differences in bulk and weight and the potential for physical damage, it is not advisable to store single-sheet documents in the same folder or box as books or booklets. Generally speaking, heavy objects should be stored separately from light objects, as should bulky objects that cause uneven pressures inside boxes.

1. Documents & Manuscripts

Documents and manuscripts should be unfolded for storage if they can be unfolded without resistance, splitting or breaking. If unfolding threatens the integrity of the paper, a conservator should be contacted. All foreign objects such as staples, paper clips and pins should be carefully removed since fasteners produce physical damage.

Documents should be stored in low-lignin, buffered file folders, each containing no more than fifteen sheets. The folders should then be placed in document storage boxes, as close to the size of the folders as possible. All folders in a single box should be the same size. Boxes should be full enough to prevent slumping of the contents. Boxes should not be stuffed too full, since this can cause damage when folders are removed or refilled. Partially empty boxes can be filled with document spacers available from conservation suppliers. Crumpled acid-free tissue paper can also be used to fill excess space, although tissue is likely to compress over time and allow materials to sag.

An alternative to boxed storage is a powder-coated steel file cabinet equipped with hanging racks and hanging folders. Materials should always be placed inside an acid-free file folder, then into a hanging file. Several file folders may be placed into each hanging file, provided that they do not extend above the top of the drawer. Archival-quality hanging folders are available from some general conservation suppliers, but conventional "Pendaflex" folders are acceptable if materials are protected from direct contact by acid-free folders.

Observations & Recommendations

Many unbound records are stored in file folders in older records storage cartons. The quality of the file folders used is not known, but the records storage cartons did not appear to be of archival quality. Many cartons are only partially full, and because the files are unsupported, they slump, with the result that some records have developed a curl. (Figures 10 and 11) Other unbound records are stored in various types of drawers. Records of the First Parish Church, stored in the basement vault, are stored in a single, enclosed file drawer on a shelf, inside file folders. Some documents are still folded and inside their envelopes, and they are stored in the drawer with other types of materials, including 7-inch reel tapes and bound records volumes. In the records storage room in the basement, conventional-quality boxes and metal file drawers of records are stacked on two tables. Documents are stuffed inside some of these boxes, and they are folded into thirds to fit in the file drawers. (Figures 12 and 13) Unbound records are also housed in three-ring binders; some of the binders are of archival quality, such as the vital records certificates housed in a University Products vital records binder and polyester sleeves.



Figure 10. Files slump inside many of the records boxes examined.



Figure 11. Over time, papers that are not kept upright in their boxes develop a curl, as shown here.



Figure 12. Some records are housed in conventional cardboard boxes.



Figure 13. The records storage room holds several older metal cabinets with narrow drawers for records storage that require the records to be folded to fit inside.

- **Any additional unbound vital records certificates can be placed in polyester sleeves and vital records binders.** Records should not be housed in ring binders without sleeves, though, because they will pull away from the rings over time.
- **Rehouse all other unbound records in chemically stable folders and boxes.** Records need to be transferred to enclosures that will slow their deterioration, specifically acid-free, lignin-free, alkaline-buffered file folders and boxes. Either records cartons or flip-top document cases may be used. Document cases or half-size records cartons may be preferable to full-size cartons because a number of the records cartons examined during the site visit were only partially full, yet still took up a full-size records carton's worth of shelf space.
 - **Use spacer boards to keep folders upright in partially-full boxes.** Papers that slump inside their boxes will eventually develop a permanent curl.
 - **For product examples, see item number 613-1561 (Blue/Gray B-Flute Storage Cartons); 735-2510 (Blue/Gray Document Cases); 727-0912LT (Perma/Dur Reinforced File Folders); and 613-0821 (Document Case Spacer Board) from University Products (www.archivalsuppliers.com).** Other suppliers will offer similar products.
- **Unfold records prior to placing them in folders.** If any records cannot be unfolded without damage, consult with a conservator before proceeding.
- **Remove records from envelopes prior to placing them in folders.**
- **Avoid housing unbound records in folders or boxes with heavier materials, such as reel tapes or bound volumes.** Heavier items can cause crushing or tearing of unbound papers.

2. Oversize and Framed Materials

Prints, maps, broadsides and other oversize objects are best stored flat in the drawers of flat file cabinets or in large covered boxes of preservation quality. The objects should be placed in neutral or buffered folders cut to fit the size of the drawer or box. Blueprints, cyanotypes and hand-colored objects should not be stored in alkaline (buffered) folders because some pigments may react and change color. Only lignin-free, neutral folders should be used for these materials. Folders should be as large as possible, since small folders tend to shift position inside boxes or inside drawers as they are opened and closed, thus allowing objects to get jammed at the back of the drawers. Several objects may be placed in a folder. Interleaving with neutral or buffered paper is desirable, especially if the object has special value.

Oversize materials may be rolled if they are too big for the largest boxes or for the drawers of flat file cabinets. Several items may be wrapped around a wide diameter acid-free cardboard tube (4-8" wide) or around an ordinary wide diameter cardboard tube that has a sheet of Melinex wrapped around it as an acid barrier. Once the items have been rolled around the tube, the entire package should be wrapped with acid-free wrapping paper and tied at both ends with cotton tying tape. This will serve to protect items from physical damage by giving them internal support; it will also protect against light and dust. Adhesive tape should never be used to seal the package.

Any prints, drawings or other objects that have been matted or backed with acidic materials or wood should be removed from those mounts. They may be reframed in their original frames using museum-quality materials. These objects may also be safely stored unframed, matted or unmatted, in

folders inside boxes or drawers, as described above. Frames should not use eye screws or other protruding hardware for hanging. They can cause damage to other frames or glazing. These should be replaced with D-rings on brackets, available from framers. See “Matting and Framing for Art and Artifacts on Paper” and “How to Do Your Own Matting and Hinging,” both in *PLAM3*, for more information.

Observations & Recommendations

Unbound oversize materials in the Town Hall include a group of maps, housed in kraft paper enclosures and a wooden crate leaning against a wall on the floor of the basement vault. A few oversize items are tied together in a roll kept on the floor of the first floor vault. There are a few newspaper pages encapsulated in polyester with double-sided tape which are stored flat on a shelf in the basement vault.

- **House all oversize items flat in acid-free, lignin-free, buffered map folders and oversize boxes.** Remove the maps from their kraft paper enclosures before placing them in folders. If they are roughly the same size and in good condition, several maps can be placed in the same folder. Folders should have roughly the same dimensions as the box to prevent shifting.
 - **For product examples, see item number 701-7048 (Perma/Dur Map & Print Folders) and 733-1233 (Drop-Front Storage Boxes) from University Products (www.archivalsuppliers.com).** Other suppliers will offer similar products.

3. Photographic Materials

Photographic prints and negatives are best stored separately from other collections materials and in individual enclosures. Enclosures reduce damage to these materials by giving them physical support and protection. Acceptable enclosures can be made of either paper or plastic. Paper enclosures require photographs to be removed for examination; plastic enclosures allow the researcher to view the image without handling the object, thereby reducing the danger of scratching or abrasion. Oils from human skin damage emulsions. People who handle original or valuable prints and negatives should always wear cotton gloves; such gloves are available at low cost from many industrial suppliers.

The storage of photographs and negatives poses an exception to the general desirability of buffered enclosures. Buffering material can react with color pictures, cyanotypes or albumen prints to cause damage. For this reason, neutral lignin-free or plastic enclosures are usually preferred. Buffered storage enclosures should be used for cellulose nitrate (nitrate film) and cellulose acetate (early safety film), both of which deteriorate to produce acids. Since these negatives are highly susceptible to deterioration, they should be identified and stored separately from other types of photographs. They are high-priority candidates for photoduplication. Buffered enclosures are also recommended for brittle prints and photographs on brittle mounts.

Polyester, polypropylene and polyethylene are currently the only plastics acceptable for photo storage. Uncoated transparent polyester (i.e., Melinex) is the material of choice, but it is also the most expensive. Plastic enclosures can be either envelopes or two-sided sleeves. An envelope is an enclosure with one open end; it may or may not have a protective top flap. The seams in paper envelopes should be located at the sides and, if unavoidable, across the bottom. With seamed envelopes, the photograph should be inserted emulsion side away from the seam.

Seamless envelopes do not have any adhesive. The envelope is formed with three or four flaps that fold over to produce a pocket. The fourth flap closes the envelope completely and protects the object from dust and dirt.

Plastic sleeves are enclosures that open at two opposite sides. Often they are a one-piece construction held together with a fold-over lip that can be opened. This fold provides for easy insertion and removal of the photograph without abrading the image.

Once they have been individually enclosed in paper or plastic, photographs are best stored flat in acid-free drop front boxes that fit the size of the photographs as closely as possible. Boxes for the standard photographic formats are widely available. Boxes should be housed on shelves or in metal cabinets. All enclosures within a box should be the same size. Neutral file folders may be used to help organize photographs within the box.

Horizontal storage is preferable to vertical storage since it provides over-all support and prevents mechanical damage such as bending or slumping. However, vertical storage can be used successfully. With vertical storage, protected photographs should be placed in neutral file folders, which are themselves placed in hanging file folders. Several photographs may be stored in each folder and several folders may be placed in each hanging file. The use of lightly filled hanging file folders will prevent photographs from sliding down under each other and will facilitate handling.

Special care must be given to the storage of oversize photographic prints that have been mounted on cardboard. This cardboard is often acidic, causing the mounts to become brittle with age. Embrittlement of the support can endanger the image itself, should the cardboard break in storage or during handling. Such prints must therefore be carefully stored; they should be placed in individual folders inside preservation-quality boxes of appropriate size, labeled to lie flat on shelves. They should be handled with great care.

Observations & Recommendations

Photographic prints can be found in the Rice Collection, and include photographs mounted on board and photographs housed in vinyl or plastic sleeves stored upright. The Town Clerk holds numerous reels of microfilm. They are stored on wood shelves in her office and are housed in black plastic cases and in yellowing boxes. Master negatives for the microfilm reels are stored with Iron Mountain.

- **Transfer unmounted photographs to acid-free, lignin-free, buffered folders and document cases or drop-spine boxes.** Select folders that fit the dimensions of the box that will contain them.
- **Transfer photographs mounted on cardboard to individual acid-free, lignin-free, buffered folders and a drop-spine box.** Because the cardboard used for mounting is likely to be acidic, the prints can become brittle as they absorb acids from the cardboard. Buffered folders are a good choice because they will absorb some of the acids released by the cardboard.
- **Microfilm reels in plastic cases and older (possibly acidic) boxes should be rehoused in acid-free, lignin-free, buffered boxes to slow their deterioration.**

4. Magnetic & Optical Media

Research collections frequently include recorded sound media, videos, computer records and other non-traditional materials. Unfortunately, none of these is “archival,” that is, capable of surviving with minimal deterioration for long periods of time.

Video- and audiotapes (along with computer tapes and some computer disks) are magnetic media and as such they have a considerably shorter life expectancy than do paper-based materials. The binders used to couple magnetic media to their film base break down quickly. Damage from playback equipment and the susceptibility of magnetic media to migration and abrasion add to the difficulty of preserving video and recorded sound. Stringent handling procedures are essential. The best predictions for the life expectancy of these materials extend only twenty to thirty years. The estimated life expectancy of magnetic media that are in active use is only about ten years.

There is little consensus on the ideal climate for preservation of magnetic media, but desirable conditions would be within the range given for paper-based materials. Cold storage can significantly increase the life expectancy of magnetic media, so long as temperatures remain above freezing. Videotapes should be stored in an area with the coolest possible temperatures and the most tightly controlled conditions. As with paper, fluctuations in climate should be avoided as much as possible.

An equally important preservation activity for magnetic media is regular copying. A master should be created of each recording, which will be stored in a stable environment (in cold storage if possible) and restricted from use. Only duplicate copies should be used for viewing. In addition, all tapes should be copied onto new tape about every ten years. All playback machinery should also be kept clean and in good condition to minimize damage to the tapes from playback. Even with the most careful use, some damage is inevitable.

It was hoped that optical media—that is, CDs and DVDs—would solve the life expectancy problems posed by magnetic media. Unfortunately, while CDs and DVDs are more stable than floppy disks, they are still far from stable, over the long-term. The window of opportunity to preserve the information these materials contain must be considered in years—not decades, as for paper-based materials.

Although some researchers estimate that CDs and DVDs will last for ten to fifteen years, custodians of these materials should be aware that estimates of media life expectancy vary greatly, and generalizations are difficult. Due to variations in the manufacturing process—both from one company to another, and from one disc to the next in the same production facility, the only way to know for sure whether a particular disc is suitable for long-term storage is to test it individually. These tests are highly specialized and cannot be performed without the proper equipment. Anecdotal evidence suggests that average, untested CDs and DVDs may begin to fail within three to five years. As for magnetic media, a regular program of copying is necessary. Alternatively, files may be stored on a server and backed up regularly, as are files in active use.

Further complicating preservation of all digital files—whether stored on magnetic or optical media—are the twin problems of hardware and software obsolescence. To combat the former, files must be migrated to new media—for example, moving files from floppy disks to CD or DVD—while equipment capable of reading older media is still available. Saving files on a server will also solve this problem. Addressing software obsolescence is more difficult, as simply resaving files in the newer format (before backwards compatibility is lost) will sometimes cause the loss of important metadata.

A discussion of optical media longevity is online at <http://www.msscience.com/longev.html>. The National Institute of Standards and Technology and Council on Library and Information Resources have recently published *Care and Handling for the Preservation of CDs and DVDs - A Guide for Librarians and Archivists*. The guide is online at www.clir.org/pubs/reports/pub121/contents.html.

Observations & Recommendations

Audiovisual materials in the Town Hall include tapes of sermons, concerts and meetings in the First Parish Church collection, and tapes of Town meetings. Formats appear to include 7-inch reels, and video and audio cassettes. They are stored in their manufacturers' cases. The majority of audiovisual materials are stored in the basement records storage room which, as observed in the MBLC's environmental monitoring report, experience relative humidity levels as high as 82.2% and as low as 19.7%. Magnetic tapes are extremely sensitive to high and fluctuating temperature and relative humidity, and it is likely that deterioration of some of the recordings stored in the basement records storage room has accelerated considerably due to environmental conditions.

- **Place all audio and video recordings that will be retained permanently in protective cases to prevent damage from light, water, dust and debris.** Abrasion from dust and debris and extended exposure to high humidity are major causes of audio and video tape degradation. Audio and video cassettes that are not enclosed, or that are stored in sleeves, are not adequately protected from particulates. Moreover, manufacturers' boxes are typically made of chemically unstable materials, which further deterioration. Make sure to transfer any identifying information contained on the original box or sleeve to a label on the new enclosure.
- **If their value merits it, engage a specialist in audiovisual preservation to assess the condition of audiovisual materials.** Once a complete inventory of the Town Hall records has been prepared (thereby locating and identifying all audiovisual materials), an audiovisual specialist could be hired to determine the condition of the tapes for the purpose of developing a reformatting strategy.
- **Ultimately, any recordings that the Town Clerk selects to preserve long-term will need to be copied onto currently supported media, and redundant copies will need to be produced.** Recordings will need to be transferred to a format for which playback equipment is widely available.

E. Cleaning & Maintenance

Staff should perform a general cleaning of books and archival storage boxes at least once a year to prevent soiling and abrasion. Feather dusters should not be used since they just rearrange the dust. Instead, heavy dust and dirt should be carefully vacuumed, preferably with a three-stage-filter vacuum to prevent recirculation of dust through the exhaust.

Books and boxes are best cleaned with a magnetic wiping cloth, which attracts and holds dust with an electrostatic charge. This cloth is sold commercially under the names Dust Bunny and Dust Magnet. If dust is not heavy or sooty, chemically treated dust cloths may be used safely on storage boxes and on books with no artifactual value. Two options are One Wipe, a cloth chemically treated to hold dust and a soft, lint-free dust cloth sprayed with Endust or similar product and allowed to dry overnight. These products are available in local markets.

Books should be held tightly closed during cleaning so that dirt will not migrate into the pages. When cleaning storage boxes and books, staff should work from the top to the bottom of each shelf range. Materials should be removed from each shelf in shelf order to a book cart. The shelf and its contents can then be cleaned and the contents returned to the shelves in shelf order.

Since cleaning has the potential of damaging collections, staff or volunteer assistants assigned this task must be taught careful handling techniques.

Observations & Recommendations

Cleaning all three records storage areas needs to be a high priority. The floor in the basement vault is gritty, and shelf surfaces, boxes and books are dusty. (Figure 14)



Figure 14. Thick dust is visible on some surfaces.

- **Clean shelves, books, and boxes in the records storage room and both vaults.** Particulate pollutants cause staining and abrasion of materials. Dust can serve as a substrate for mold growth and it can attract insects. After the initial cleaning, shelves, books, and boxes should be cleaned at least once per year as a matter of routine.
 - **Thoroughly clean the space that will hold the volumes to receive conservation treatment.** Dust and dirt need to be removed from the floor and from shelves, books and boxes before the volumes return from treatment.
- **Purchase a vacuum cleaner equipped with a HEPA (High-Efficiency Particulate Air) filter.** A HEPA filter captures up to 99% of particulates up to .3 microns in size, and prevents their recirculation through the vacuum's exhaust. The longevity of records depends in great part on the quality of their storage environment, which should be as clear as possible of particulate contaminants.

IV. Replacement & Treatment Strategies

A. Reformatting: Microfilming, Photocopying & Digitization

Reformatting strategies like photocopying or microfilming should be considered when the value and condition of collections materials make it necessary to limit their handling or when only intellectual content needs to be preserved. In the case of original photographs, unique or valuable materials or fragile items, a copy is preferable for researchers' use, at least for initial examination.

Preservation Photocopying

In-house photocopying onto permanent durable paper is an excellent way to preserve information from acidic paper materials such as news clippings. Electrostatic copiers that fix an image with heat (“Xerograph”) produce long-lived copies when durable paper is used. Paper used for preservation photocopying should meet the ANSI Z39.48 1984 or 1992 standards for paper permanence. Such paper is available from preservation suppliers and some traditional office supply sources. The label will say “low-lignin” or “lignin-free” and “buffered.” The Library of Congress has a handout available on the Web that gives more detail on preservation photocopying (see “Preservation Photocopying,” Library of Congress Preservation Directorate, available at <http://www.loc.gov/preserv/care/photocopy.html>).

For frequently used local history books that are damaged, brittle and out-of-print, preservation photocopying—also called facsimile reproduction—can provide a use copy. It is not the best choice for a book that is valuable as an artifact, since the photocopying process can be damaging, but it is a good option for books that are only valuable for their content. A number of facilities specialize in facsimile reproduction of brittle books on buffered paper. Some of them are listed in “Resources for Facsimile Replacement of Out-of-Print and Brittle Books” in *PLAM3*.

Unfortunately, the photocopying process itself can seriously damage collections. Copiers with flat or curved platens may not readily copy text at the gutter of a tightly bound book. Materials of enduring value should never go through a roller feed. Careful handling during the photocopy process is essential. Historical materials and volumes with permanent research value should only be photocopied by staff members, not researchers and then only if it will not damage the objects themselves. Staff must not press down on the spine of a book or the cover of the copier to insure a good quality image. Sometimes positioning a book gutter perpendicular to the edge of the platen will reduce the shadow. Edge copiers protect the spine by allowing book to be copied without being entirely opened.

Preservation Microfilming

Despite increasing interest in new technologies, preservation microfilming remains an established and valued preservation strategy. Properly produced and properly stored preservation microfilm has a lifespan of about 500 years. Filming can provide a use copy for artifacts that are too fragile to be used and can provide a preservation copy for materials that are badly deteriorated and valuable only for their informational content. In most cases, preservation microfilming is contracted out. High-volume commercial operations usually lack equipment, time and expertise to process fragile materials without damage. A special service filmer should be employed.

See “Microfilm and Microfiche” in *PLAM3* for an overview of film types, film production standards and storage requirements.

Digitization

Administrators and staff must be aware that large segments of the preservation community do not yet consider digitization to be a means of preservation. Those conservation and preservation professionals who do accept digitization for preservation have begun to do so only recently, and have not yet agreed on the best strategy to preserve digital materials. More conservative members of the conservation and preservation communities still recommend that digitization be partnered with microfilming to ensure long-term preservation of the information.

Among those who do believe digitization may be used for of preservation, consensus is developing around several likely strategies. A good place to start—particularly for digital images—is Cornell University’s online tutorial, “Moving Theory Into Practice,” at <http://www.library.cornell.edu/preservation/tutorial/contents.html>. Any digital preservation strategies will require a significant on-going commitment of time and resources, which may be beyond the means of smaller institutions acting independently; it is likely that consortia and other cooperative efforts will be required.

Leaving aside the question of digitization as a direct means of preservation, digitization can definitely improve preservation indirectly, by reducing handling. It can also be an effective means of increasing access, particularly for off-site users.

Observations & Recommendations

Town records are microfilmed on an annual basis. Use copies are stored in the Town Clerk’s office, and master negatives are stored off-site at Iron Mountain. This is appropriate. A number of pre-1850 records have been digitized by the Sudbury Archives Project mentioned in Section I.B of this report. The Town Clerk has applied for Community Preservation Act funding to conserve, scan and microfilm 16 volumes of Town records.

- **Continue microfilming Town records, and storing master negatives off-site.**
- **Proceed with plans to scan and microfilm Town records being sent for conservation.**

B. Library Binding

In recent years numerous discussions of considerations for binding research materials have appeared in the library literature. Any institution that uses commercial library binding for preservation purposes should be familiar with the options that have replaced oversewing/"Class A" binding, and should make decisions for its own collections based on those options. Contracts with library binders should specify standards, procedures, and guidelines covering the range of materials in a library's binding program. Books returned by the binder should be individually inspected for quality of work and adherence to these specifications. Volumes with value as artifacts should never be rebound using library binding techniques or materials. Paper must be strong enough to withstand library rebinding without additional treatment.

Oversewn or side-sewn volumes can have poor openability and it can be difficult to photocopy or read information near the inner margin. Ideally, the following guidelines would produce the most useful and long-lived bindings: 1) any sewn volumes that are suitable for recasing should be recased; 2) volumes with intact signatures should be sewn through the fold; and 3) volumes without intact signatures and with a text block 2" thick or less should be double-fan adhesive bound. Oversewing should be used only on volumes that have flexible paper and inner margins of at least 5/8 inch on each page, and only when the above options are not possible. Serials issued in separate stapled signatures may either be sewn through the fold or double fan adhesive bound. Those issued in adhesive-bound format should be double-fanned.

Binders used for binding research materials should be members of the Library Binding Institute (LBI, at www.lbibinders.org), the library binding professional organization. Formal standards have been adopted by the binding industry for commercial high-volume or library binding. At present, ANSI/NISO/LBI Z39.78–2000 *Library Binding* (Bethesda, MD: National Information Standards Organization, January 2000) is the library-binding standard of record. A free .pdf copy can be downloaded from the NISO web site at www.niso.org.

Observations & Recommendations

The basement vault contains several volumes of chattel mortgage records, which have been bound in such a way that their text runs into the inner margin. The first floor vault contains several library bound volumes that appear to be somewhat newer (e.g., “Real Estate Preliminary”), and appear to meet current library binding standards.

- **Consider having older library bound records disbound, then rehousing the loose records in archival-quality folders and boxes.** This recommendation pertains to those records that are bound into the inner margin of their volume. Given other, larger preservation needs, though, this should not be a high priority.

C. In-House Repair & Professional Conservation Treatment

In-House Repair

Book repair procedures for general circulating collections should never be used on historical materials with artifactual or permanent research value. Some techniques can be used safely by non-conservators. Other treatments must be performed by professional conservators who have experience with these treatments and proper equipment to insure that the treatments are performed safely and effectively. Paper collections with artifactual or permanent historical value should not be treated in-house; if you are unsure whether an object is appropriate for in-house treatment, consult a conservator before proceeding.

In the context of historical collections, "safe" in-house techniques include rehousing; simple cleaning of books and some paper; simple repairs of book pages or documents; and polyester film encapsulation of documentary materials. Paper that has artifactual or permanent research value should only be mended using conservation-approved methods and materials. Pressure-sensitive tapes and many other adhesives have proven unstable over the long term, and many will cause permanent damage.

Professional Conservation Treatment

Treatment of individual books or other objects by a conservator should be determined by their value to the collections and the availability of funds for conservation. Setting priorities should be the first step in treatment: criteria to be considered include condition; monetary, historical, or artifactual value; importance for research; and expected use. The choice of a treatment for any category or object in a collection will depend on the value of the object in its original form, the importance of the information it contains, the condition of the object, and the need to provide access to the original artifact itself, rather than to its contents alone. "Conservation Treatment Options for Works of Art and Artifacts on Paper" and "Conservation Treatment Options for Bound Materials of Value," and "Choosing and Working with a Conservator," all found in *PLAM3*, provide additional information on conservation treatment.

Observations & Recommendations

In-house treatment of materials is not performed, which is appropriate. Professional conservation treatments have included encapsulation and post-binding of a number of records, and treatment of 16 records books by NEDCC between 1976 and 1979. As noted above, the Town Clerk has applied for Community Preservation Act funds to conserve, scan and microfilm an additional 16 records volumes.

- **Following conservation, scanning and microfilming of the 16 records volumes, preservation efforts at the Town Hall should focus on transferring records to chemically stable enclosures, cleaning shelves and storage areas, and increasing the amount of available shelf space.** The funds needed to conserve individual items could be used to address the preservation needs of the Town Hall's records as a whole.
- **Be sure to retain all records of conservation treatments performed on permanent records.** The information they contain is part of each record's history, and could be useful in the event that a problem arose in the future.

Conclusion

The Sudbury Town Clerk's commitment to caring for the Town records was readily apparent. While some progress has been made toward preserving these materials, there is still much work to be done. If some of the initiatives recommended here seem overwhelming, it is important to remember that this report is intended as a long-term planning tool. It will be possible to implement some action soon, but others may require diplomacy, education and funding efforts over several years. It is important to break these initiatives down into manageable tasks.

I hope this survey report will help the Town Clerk as she sets a course for future preservation efforts. Her hard work, dedication and support of preservation activities will help ensure the survival of Sudbury's Town records for future generations.

Respectfully submitted,

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