NATIONAL ENDOWMENT FOR THE HUMANITIES

SUSTAINING CULTURAL HERITAGE COLLECTIONS

WHITE PAPER

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EVERGREENS ENVIRONMENTAL IMPROVEMENTS

EMILY DICKINSON MUSEUM

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The Homestead | The Evergreens

INTRODUCTION

The Emily Dickinson Museum (EDM) received a Sustaining Cultural Heritage Collections grant from the National Endowment for the Humanities to enhance environmental conditions renowned poet and her family. The largest and most varied collection of non-manuscript objects associated historically with the poet and her family had been stored since 1916 in The Evergreens, an Italianate two-story wood-frame house built by the Dickinson family in 1856—a building with little environmental control. A residential-grade forced hot air gas furnace heated five of the eleven first floor rooms and only two of the six rooms on the second floor through a distribution system that has changed little since the mid-20th century.

PROJECT RATIONALE

Decades-long temperature and humidity extremes, rising damp, and lack of environmental control in The Evergreens has threatened the loss of a unique collection of Dickinson family artifacts including fine art, family furniture, and personal possessions. Datalogging information used by the Conservation Assessment Program reviewer in 2004 noted that temperature and RH readings on an August day ranged from 72°F 74%RH in spaces on the shaded north side of the house to 82°F 77%RH in rooms on the exposed southern side, reflecting the poor collections environment. A 2014 study prepared by the Massachusetts Board of Library Commissioners confirmed that "there are major problems with the RH readings and levels" at The Evergreens with significant swings between different areas of the house and across seasons, resulting in very limited life expectancies for sensitive materials.

PROJECT ACTIVITIES

1. **Initial Scope of Work**
   Preservation architect Jeffrey Baker, Mesick Cohen Wilson Baker Architects (MCWB), and engineer Curt Wilsey, Quantum Engineering, Inc. (QE), proposed an initial scope of work to be confirmed or refined by closer study of the building's "comportment."
   - Reconstruction of basement areaway foundation wall, entrance steps, and plank doors
   - Membrane waterproofing and subsurface drainage at stone foundation
   - Cellar interior storm windows
   - Roller shade window treatments for light filtration
   - Plaster ceiling repair/replacement
   - Attic insulation and catwalk construction
   - Exterior roofing and chimney repairs
   - Door and window weatherstripping and hardware
   - Mechanical system, ductwork, supply and return grilles, automated controls, continuous BMS operation

2. **Report on Evergreens thermal and environmental behaviors and risks to collections.**
   Actions taken: Preservation environmental consultant Michael C. Henry and preventive conservator Wendy C. Jessup made two site visits to analyze environmental conditions within The Evergreens and assess risks to the collections. Dataloggers collected measurements for temperature, humidity, wetness, and dewpoint outside and inside the

building for a period of over a year. Henry and Jessup selected for analysis a 12-month period while the Evergreens was closed due to the Covid-19 pandemic, yielding a profile of the building's comportment uninterrupted by public tours.

Henry and Jessup facilitated an on-line workshop with EDM staff and board members, and the MCWB and Quantum Engineering design team. Henry and Jessup reviewed the environmental monitoring data and flagged several issues for attention before finalizing construction documents, including source moisture control, stack effect and infiltration of air/moisture vapor, and environmental vulnerabilities of the collection.

The workshop established consensus on goals for environmental management and the preferred non-mechanical and mechanical strategies for achieving objectives. Henry and Jessup delivered a final report documenting existing conditions and providing detailed analyses of collected environmental data, confirmation of design details in place, and recommendations for improvements. MCWB and QE incorporated those recommendations into the final construction drawings and specifications. Some recommendations were beyond the scope of the current project and will remain priorities for the Museum to address in the future.

3. **Source moisture control**
   Analysis: The Evergreens has experienced chronic issues with water entry through the north and east foundation walls and inadequate roof drainage directly above the north foundation wall. Surface water runoff on the northeast side of the house, soil saturation, and clay soils compound moisture problems.
   Recommendation and actions taken: Reconstruct the pitch and capacity of the gutter on the north roof to prevent overflow to the foundation wall below. Reconstruct the basement bulkhead entry and provide footing drainage to deter water flows.

Figure 1: Rebuilt basement bulkhead next to drainage assembly for rebuilt gutter.

Design Change: The original project design included excavation of the north foundation wall apply additional waterproofing. This could be done only if an access ramp was removed. Local building code required construction of a totally new access ramp rather than reinstallation of the existing. The increased costs of a new ramp would have been prohibitive. The new ramp and waterproofing were removed from the present scope and will be addressed in a future project.

4. **Stack Effect and Infiltration of air/moisture vapor**
   Analysis: Stack effect results from infiltration of cold outdoor air through crevices in masonry, gaps between window sash/frames and door frames, and openings for building systems, and exfiltration of warmed air through gaps on upper floors. The Evergreens open main hall and the difference in height between perforations in the three-story structure create the stack effect which reaches extremes in the winter. The effect is reversed in summer with exfiltration of cooled dehumidified interior air at perforations in lower stories and infiltration of warm moist air in upper stories and attics.
   Recommendation and actions taken: Use non-mechanical methods to tighten the building envelope, improve its thermal resistance, and reduce energy consumption. Apply interior storm windows in the basement. Add exterior storm windows in three locations where missing, cap all fireplace and stove flues and add trickle venting, provide a vapor control barrier to attic insulation. Seal openings in the building envelope by refitting doors and window sash and adding weatherstripping. Apply vapor barriers and blown-in loose cellulose insulation on attic floors. Repair and/or replace weakened plaster and lath to make sure the insulation will have full effect. Use rigid foam board insulation to protect the conditioned hallway in the rear ell from the unconditioned loft above an attached shed. Seal the second level of the central campanile from the third level with an insulated door to segregate conditioned from unconditioned space.

   Design Change: After closer inspection of existing exterior storm windows, it was determined that they are original to the nineteenth-century structure and should remain functional. If interior storm windows were applied as a third layer to operating sash and exterior storm windows, there would be a risk of condensation, soil, mold, and wood rot. These concerns led to the elimination from the project scope of interior storm windows on the first and second levels. Interior storm windows are an appropriate application to basement windows which do not have exterior storm glazing.

5. **Environmental vulnerabilities of the collection**
   Analysis: Conservator Wendy Jessup inspected objects that had been subject to long-term environmental instability in The Evergreens. Wide swings in relative humidity and surface heating have caused mechanical damage including lifting and cracking of painted surfaces, veneers, and decorative lacquer. Excessive light and UV have caused chemical damage such as fading and color shift of wood surfaces; high humidity and high temperature have caused metals corrosion. High humidity and warm temperatures have caused biological damage such as mold and insect activity.

   These findings, combined with analysis of existing environmental performance at The Evergreens, firmly established the degree of environmental risks to collections from temperature

and humidity. Summary statistics for seasonal monitoring data appear in Figure 1 (Table D in Watson/Jessup Final Report, p 25.)

Figure 2: Existing Environmental Performance at The Evergreens, 3/1/2021 – 3/1/2022

Table D ● Existing Environmental Performance at *The Evergreens* ● 01 March 2021 through 01 March 2022
indicated as: Minimum/**Mean**/Maximum/Standard Deviation
ASHRAE A24 Control Classification is based on Relative Humidity

Place	Measured Variable	Spring 2021	Summer 2021	Fall 2021	Winter 2021-2
Exterior	Dry Bulb Temperature (T)	12/**50**/86/13.8 °F	48/**71**/95/7.7 °F	22/**54**/82/12.7 °F	-1/**30**/65/11 °F
	Relative Humidity (RH)	17/**62**/99/21 %RH	33/**82**/100/15 %RH	31/**82**/100/14 %RH	28/**72**/100/17 %RH
	Dew Point Temperature (DP)	-6/**36**/68/14.7 °F	43/**65**/78/6.9 °F	13/**48**/74/14 °F	-10/**22**/59/13.1 °F
Room 103 Library	Dry Bulb Temperature (T)	51/**63**/76/4.6 °F	61/**74**/85/4.2 °F	46/**65**/78/6.2 °F	30/**57**/73/4 °F
	Relative Humidity (RH)	19/**39**/55/9 %RH	48/**58**/64/3 %RH	30/**54**/66/8 %RH	20/**35**/55/7 %RH
	Dew Point Temperature (DP)	13/**37**/56/8.5 °F	44/**58**/69/4.6 °F	25/**48**/63/8.9 °F	7/**29**/48/7 °F
	ASHRAE A24 Control Class	D	B	C	D
Rm 108B Dining Rm Closet	Dry Bulb Temperature (T)	57/**64**/74/3.2 °F	62/**74**/83/3.9 °F	48/**65**/76/5 °F	39/**61**/39/4 °F
	Relative Humidity (RH)	19/**40**/60/9 %RH	50/**64**/72/5 %RH	26/**59**/73/10 %RH	17/**33**/56/8 %RH
	Dew Point Temperature (DP)	19/**39**/56/8.5 °F	45/**60**/71/5.2 °F	31/**50**/64/8.5 °F	14/**31**/48/7 °F
	ASHRAE A24 Control Class	D	C	C	D
Rm 206 NE Bedroom	Dry Bulb Temperature (T)	61/**67**/74/3.2 °F	64/**76**/89/4.6 °F	49/**67**/78/4.8 °F	37/**66**/76/4 °F
	Relative Humidity (RH)	14/**36**/61/9 %RH	46/**60**/79/5 %RH	24/**56**/77/10 %RH	13/**28**/51/8 %RH
	Dew Point Temperature (DP)	19/**39**/63/7.9 °F	45/**61**/75/5.8 °F	31/**50**/69/8.4 °F	13/**31**/46/6 °F
	ASHRAE A24 Control Class	D	C-	C-	D

Recommendation and actions taken: Given The Evergreens architectural type, building materials, and climate zone, revise the original mechanical system specifications from the Ameri-can Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Class B for museums to a Hybrid Class B/C+ as shown in Figure 2 (Table A in Watson/Jessup final report, p 22.). Operational criteria for temperature and humidity will change with the seasons. Humidification will be considered only after the performance of the HVAC system and envelope improvements are evaluated.

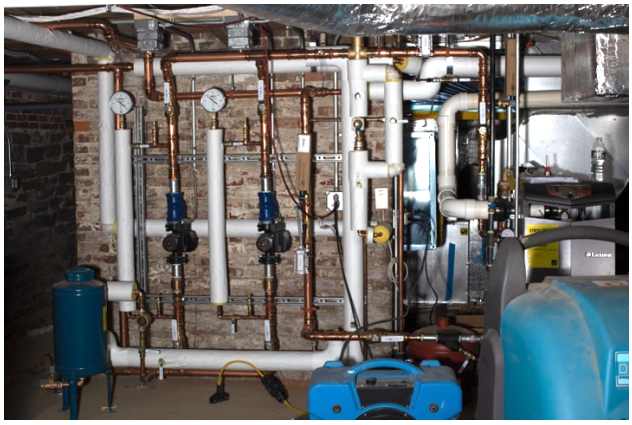
Figure 3: Specification for Proposed Class of Control for The Evergreens

Table A ● Specification for ASHRAE Classes and Proposed Class of Control for *The Evergreens*									
Class of Control		Relative Humidity				Temperature			
		Annual average	Long term outer limits	Seasonal average	24-hour range	Annual average	Annual limits	Seasonal average	24-hour range
ASHRAE A24	Class B	Historic Value	≥30%RH and ≤70%RH	Historic Average ±10%RH	<20%RH	Historic Value	≥50°F and ≤86°F	+18°F -36°F	<18°F
	Class C	Historic Value	≥25%RH and ≤75%RH	No limit	No limit	Historic Value	Rarely >86°F preferably <77°F	No limit	No limit
Proposed Hybrid	Summer Class B	~45%RH	≥45%RH and ≤65%RH	55%RH	Seasonal average ±10%RH	~65°F	68°F to 78°F	73°F	Seasonal average ±5°F
	Winter Class C+		≥25%RH and ≤45%RH	35%RH			60°F to 70°F	65°F	
	Spring/ Fall Class B		≥35%RH and ≤55%RH	45%RH			64°F to 74°F	69°F	

6. **Heating, Ventilation and Air-Conditioning Installation**
   Actions taken: The new HVAC system as installed provides even distribution of conditioned air through new ducts while utilizing low air volume to avoid drafts. Two new AHUs (air handling units) are located in the basement and two new condensing units are located outside the building. A VRF (variable refrigerant flow) heat pump is supplemented by a high-efficiency boiler as a back-up in extremely low temperatures and delivers conditioned air through new low-leakage flanged and insulated ductwork. A centrally managed BMS (building management system with temperature and relative humidity recordkeeping enable a continuous commissioning process. The HVAC system design also includes reheat for the purpose of reducing summer-time excess humidity. The two air handling systems (heat pump and boiler) are configured with hot water heating coils down-stream from the cooling coils. The BMS will control the cooling and reheat coils to achieve both the temperature and indoor humidity set points. The system provides continuous circulation of air to filter and homogenize conditions and to avoid stagnant pockets of air that may lead to undesirable micro-climates. The filtration levels are designed to be MERV 13 or better as recommended by consulting conservators.

Figure 4 (left): Heat pump and boiler assembly in basement.

Figure 5 (right): New air handling unit in basement



7. **Light Control**
   Analysis: The Evergreens Italianate architectural style features large windows and French doors that conduct significant thermal loads through the glazing. The additional layer of historic storm windows moderates the thermal load only slightly and does not address light damage to architectural finishes and collections from UV, infrared, and visible light. Neither UV-reducing adhesive films nor acrylic inserts are appropriate for use with historic glass.
   Recommendations and actions taken: Install low-profile or historically compatible light-blocking roller shades on all windows and French doors. The Museum selected a solar shade product that obstructs 99% of UV light and limits visible spectrum light to acceptable levels. EDM is experimenting with keeping the shades lowered even while the rooms are open to visitors.

PROJECT TEAM CHANGES

The grant application included a Collections Manager position as a member of the project team. the position was to be filled through a national search after submission of the proposal. With the assistance of an IMLS grant for collections documentation, and after a national search, the Museum hired Megan Ramsey as Collections Manager. Her responsibilities included overseeing the care and safety of collection items remaining in or being removed from The Evergreens during the construction phase.

The change to the project team was reassignment of the architect's project manager, Mark Dahl, AIA (Mesick Cohen Wilson Baker Architects), to a different project. Gina Blenis, AIA (Mesick Cohen Wilson Baker Architects), served as project manager during the construction phase.

GOALS/ACCOMPLISHMENTS

The Emily Dickinson Museum established seven objectives for the environmental improvements project, and all have either been accomplished or will be born out through further monitoring and evaluation.

1. **Set realistic expectations for building and system performance.** Stage One of this project – Michael Henry and Wendy Jessup's study of building comportment – was invaluable in meeting this objective. It resulted in refined performance standards of ASHRAE B/C+ which are more suited to the architectural style, building materials, and New England climate than standards proposed at the outset.

2. **Reduce the loss of conditioned air and the intrusion of water vapor**. Non-mechanical improvements to the building envelope were essential to this objective. Attic insulation and vapor barrier were combined with storm window upgrades, weatherstripping, air-sealing, and segregation of unconditioned spaces to reduce exfiltration/infiltration.

3. **Reduce the sensitivity of the internal environment to external conditions**. Early indications since project completion in the fall suggest that upgraded insulation and reduction of cold air and moisture infiltration are reducing the close patterning of internal to external conditions. Dataloggers and the BMS will provide constant monitoring.

4. **Filter pollutants and inhibit conditions leading to pest infestation and growth of mold and mildew**. The system criterion for MERV 13 filtration standard, recommended by previous conservation assessments, has been implemented in this project. Standards for RH are set to inhibit mold/mildew growth, which had been a persistent issue in the uncontrolled Evergreens environment. In past years, some visitors remarked on the house's dank air quality. Although the general public may not be aware of the specific benchmarks the Museum wishes to achieve, those familiar with the house who have entered since the system has become operational have remarked on the improvement and comfort for people.

5. **Reduce thermal, solar radiation, and ultraviolet loads at windows and French doors**. Figure 6: Example of reduction in visible light with use of solar shades, recorded by Conserv dataloggers. Separate light meter is used for UV.

Evergreens light levels

January 30, 2024

Room	Library	Library	Parlor	Parlor	Dining Room
Location & weather	South wall window 2 feet from window (2pm, overcast)	East wall window 2 feet from window (2pm overcast)	South wall window 2 feet from window (2pm, overcast)	West wall window 2 feet from window (2pm, overcast)	West wall window 2 feet from window (2pm, overcast)
NO shade	585 lux	130 lux	177 lux	109 lux	230 lux
WITH shade	100 lux	30 lux	34 lux	23 lux	60 lux

Least sensitive objects (metal, ceramic, stone, glass) should have a maximum of 300 lux / 30 foot candles
Less senstivie objects (wood, oil paintings, leather) should have a maximum of 150 lux / 15 foot candles
Most sensitive objects (textiles, works on paper, photographs) should have a maximum of 50 lux / 5 foot candles

6. **Control temperature and humidity within acceptable ranges**. The first months of monitoring, after the system became operational and necessary corrections made, indicate that the building improvements and new HVAC system has proven its ability to control temperature and humidity during variable winter conditions. Continuous monitoring and immediate response to anomalies will solidify RH and T control.

7. **Significantly enhance the building and collections environment while controlling operating costs**. EDM will evaluate utility and maintenance costs over the next twelve months and beyond to assess how the project has met this objective.

EVALUATION

The decision to adopt ASHRAE Hybrid Class B/C+ with its seasonal RH and T ranges means that the Emily Dickinson Museum will need a full twelve months of environmental data for thorough evaluation of the non-mechanical and mechanical improvements to the building and its systems. The Museum will be able to align results from three separate data collection systems: BMS sensors placed in return ducts to measure adherence to specifications; hard-wired HOBO dataloggers that have collected data continuously from the beginning of the project period, and wireless Conserv units that can measure conditions near any object to determine whether HVAC operational specifications are achieving target ranges or need to be adjusted. Data from each system will be reviewed monthly as well as during specific weather events that warrant closer attention.

Although there are limits to what can be expected of a balloon-frame structure from the mid-nineteenth century, an important evaluation criterion is observable reduction across seasons in the response of internal conditions to external changes in temperature, humidity, and dew point. The BMS and HOBO systems will provide that data for regular review.

Energy sustainability will be monitored through comparison of pre- and post-project energy use and costs. Natural gas is expected to be used only as a back-up when external temperatures dip below 10°F. The VRF heat pump should provide cleaner energy and additional operational savings. BMS controls set target ranges for occupied and unoccupied conditions on both a seasonal and 24/7 schedule for greatest energy efficiency. The Museum tracks maintenance costs to generate a 360-degree analysis of net advantages of the system upgrade.

Conserv wireless sensors provide a continuous record of lux levels in each room to evaluate the effectiveness of the light-filtering window shades in reducing thermal and solar radiation loads. Museum staff will monitor UV levels with a light meter on a regular schedule before and after hanging mylar panels are installed to supplement solar shades. Water sensors in the basement will help to evaluate the effectiveness of previous and current water control measures.

CONTINUATION OF PROJECT

Since 2003, the Emily Dickinson Museum has charted a steady course to improve its historic physical plant. Focusing first on a healthy infrastructure, EDM has undertaken numerous infra-structure projects to stabilize and protect The Evergreens as a singular expression of nineteenth-

century history and culture and as a unique component of Emily Dickinson's life and legacy.

This environmental improvement project is the last in a series of "invisible" upgrades leading to the goal of conserving the evocative interior finishes and collections as they were left by the Dickinson family. Ultimately, this project has enabled the planned conservation and interpretation of a unique collection for its highest humanities purposes as well as the preservation of distinctive decorative and architectural finishes representing the evolution of provincial nineteenth-century New England aesthetic values.

Specific measures to continue this project plan are to install UV-blocking mylar panels at window and door openings. The Emily Dickinson Museum will continue to monitor and adjust system specifications to achieve optimal environmental conditions within this less than optimal mid-nineteenth century building. EDM will build upon the accomplishments of this project and prior infrastructure improvements to conserve architectural and decorative finishes. In addition, EDM is assigning a portion of its annual operating budget to artifact conservation.

LONG-TERM IMPACT

Planned environmental improvements will have deep and lasting impact on the Emily Dickinson Museum's humanities mission. For the first time, the EDM will have interpreted spaces and storage spaces at The Evergreens with conditions that can be relied upon to protect and preserve objects related to Emily Dickinson and her family ranging from ordinary furniture to impressive oil paintings, from leather briefcases to musical instruments, from cooking equipment to silver services, from doll clothes to Turkish carpets, from commonplace books to fine engravings.

Improved storage conditions will enhance access to the collections by museum staff for interpretive and educational purposes and to scholars for research purposes. Improved environmental conditions will facilitate physical control of collections by enabling more rational object location and housing. This level of access to locating and using collection objects usefully is unprecedented in the Museum's twenty-year history.

An important by-product, not originally included in proposed outcomes, is the beneficial effect of a controlled environment on The Evergreens decorative finishes. For example, few of the documented wallpapers used in The Evergreens have been replaced since the 1880s; all bear the soiling, water-staining, mold, and brittleness of those many decades. Historic architectural paint, graining and plaster finishes have also been subject to deterioration. Cleaning and conservation of these finishes is part of the Museum's ongoing work, which will be so much more successful and valuable when climate and light standards assure prolonged integrity.

AUDIENCES

The Emily Dickinson Museum has an annual audience of approximately 25,000 who visit the site and participate in virtual programs. EDM views all restoration and infrastructure projects as opportunities for its staff, board, and general public to learn more about its historic assets and how the Dickinson family interacted with them. Academic and general audiences have responded enthusiastically to programs that explain and illustrate project planning and execution, and the EDM will develop similar programs for this project. The environmental improvements project

will have an immediate and positive impact on these constituents.

Even while The Evergreens has been closed for completion of this project, interest in The Evergreens as a "time capsule" of Dickinson family life has grown substantially. This is due in large part to an Apple TV show, ***Dickinson***, which has highlighted the relationship of the poet with family and friends, and especially with her sister-in-law Susan who lived at The Evergreens. In the last year, the Museum has received numerous questions about when the structure will be open to the public, and we expect an enthusiastic response to the re-opened Evergreens, its furnishings, artwork, and other collection objects in particular.

The project impacts a growing audience of college students and faculty absorbed in the study of poetry and literature. The Museum is in an area with four highly regarded liberal arts colleges (Amherst, Hampshire, Mount Holyoke, Smith) and the University of Massachusetts. Education groups focusing on literature become fascinated, upon an in-person visit, with the contexts of Dickinson family lives and the objects that surrounded them. The Museum also has a large worldwide virtual audience which appreciates our remote programs on collections objects and issues in historic preservation.

AWARD PRODUCTS

The Emily Dickinson Museum is creating a web page based on the content of this white paper to explain the project, its goals, and accomplishments. EDM will disseminate information about project outcomes through its electronic newsletter and virtual events. EDM staff have shared engage managers of historic house museums, especially literary sites, facing similar challenges.

CHALLENGES AND LESSONS LEARNED

1. **Adjustment to severe and unpredictable external circumstances.** Most project activities were undertaken during the Covid-19 pandemic. Some activities, such as remote consultations or analysis of objective data, were relatively easy to maintain during the Museum's nearly three-year closure. Others, such as procurement of qualified contractors and subcontractors and equipment, cost escalation and schedule adherence were much more difficult to control. It is difficult to explain succinctly the many impacts of pandemic disruptions. The essential lesson is to be alert to finding and create unanticipated pathways to achieve project goals.

2. **Backup, backup, backup.** Gathering environmental data via Hobo dataloggers began in March 2019, with the intention of collecting data across four seasons to generate a comprehensive profile of the building's comportment. Unfortunately, an unknown and unannounced change in the College's Wi-Fi and server system during winter 2019-2020 disconnected the dataloggers from the host website (HOBOlink). The problem was not recognized for several months and was not resolved until mid-September 2020. Michael Henry managed to reconstruct the data for analysis, but this event caused a considerable delay in holding the second workshop and finalizing design and construction documents. The silver lining is that a full year of data gathering in almost laboratory conditions furnished even more useful data.

3. **Cost escalation.** Prior to submission of the NEH grant proposal, multiple cost estimates placed HVAC equipment, fabrication, installation, commissioning and testing at approximately $368,250. By the time construction documents were completed and regulatory approvals were in place, pandemic-related supply chain delays, labor shortages, and cost escalation had taken full effect. Cost estimates and bids for the same scope had at least tripled. Finding acceptable bids was severely impacted by the ongoing pandemic. If possible, obtain cost estimates at critical junctures in project planning even if there are no changes to design documents.

4. **Procurement/ Prevailing Wage.** In the pandemic-induced construction climate, there was limited interest from general contractors and even greater difficulty securing trade subcontractors; only two qualified regional general contractor firms could be found to submit bids. More alarming was the reluctance of subcontractors to meet Davis-Bacon prevailing wage guidelines, claiming a burdensome administrative process. EDM's contractor could not guarantee prevailing wage, which disqualified most project expenses from NEH grant funding. Beware.

5. **Time for multiple approvals.** Significant construction projects at The Evergreens are subject to interlocking historical reviews and approvals at the local, state, and federal levels, and these need to occur in a particular sequence. The Evergreens sits within a Local Historic District and a National Register Historic District. The Massachusetts Historical Commission holds a preservation restriction on the building and property in perpetuity, and MHC acts as the State Historic Preservation Officer for the National Park Service which requires Section 106 review. In addition, the Town's Disability Advisory Access Board must review plans and render a finding to the Massachusetts Architectural Access Board if the Museum, as a historic house museum, seeks any access variances to existing codes. These reviews, in addition to the usual local building code and site plan reviews, make for a time-consuming approval process. Build ample time into project schedules to accommodate regulatory approvals.

6. **Quality control.** An issue requiring a lengthy pause was exploration of options for plaster ceiling repair and replacement. For ceilings needing full replacement, the Museum prioritized replacement-in-kind with a full three-coat lime-based plaster. Various approaches were discussed with multiple potential subcontractors until one was identified who could replace in kind using appropriate materials and techniques. Thoroughly probe details of the contractor's and subcontractor's approach to specialized work even when they have a track record of preservation projects.