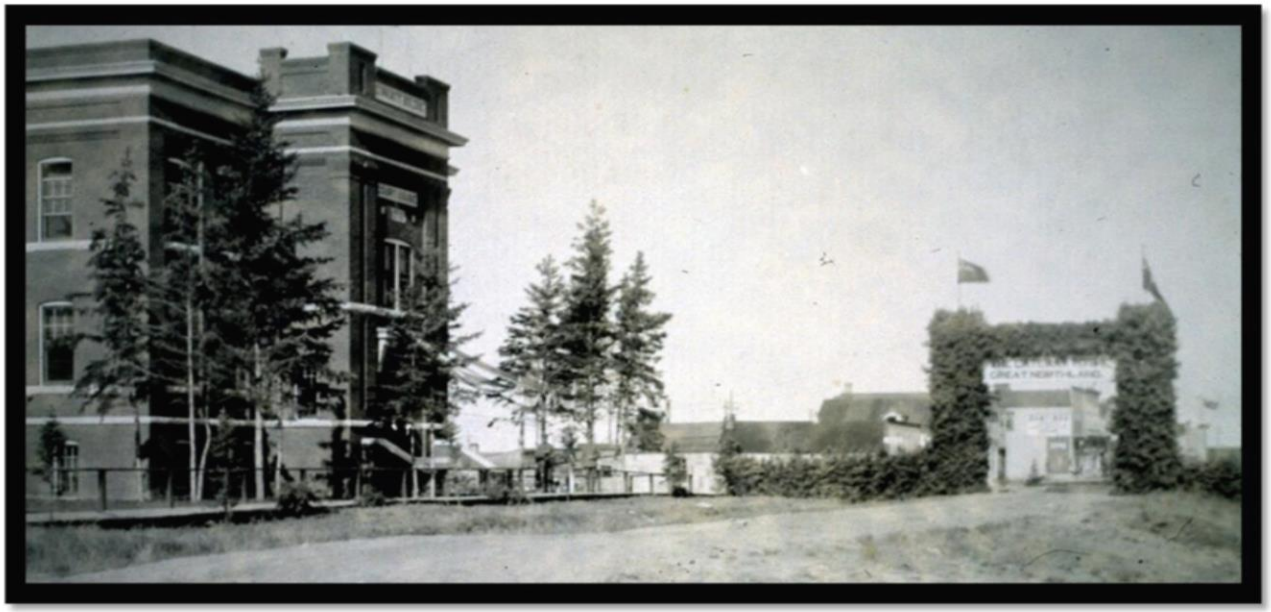
CRUCIAL CAUTIONS RE MUSEUM ADAPTIVE RE-USE OF HERITAGE STRUCTURES

See author's initial hour-long narrated PowerPoint at rb.gy/k5ptv .
This narrated PowerPoint with significant additions created by Paul C. Thistle, August 2023.

ADDITIONAL DETAILS ON PODCAST:

ADAPTIVE RE-USE PROJECT TO HOUSE THE SAM WALLER MUSEUM, 1984 - 1995



at https://miscellaneousmuseology.wordpress.com/2021/05/10/

THE SAM WALLER MUSEUM IN PROVINCIAL HISTORIC SITE

Courtesy of The Sam Waller Museum, The Pas, MB https://www.samwallermuseum.ca/

MUSEUM ADAPTIVE RE-USE RESOURCES

- **Thistle, Paul C. 2017. Adaptive Re-Use Project for The Sam Waller Museum NARRATION 2** [Narrated PowerPoint provides significant details on a complex $1.7 million capital project to move the Museum into a Manitoba provincially designated historic site that was successfully renovated to turn the structure into a professional museum standard facility.]
- **Thistle, Paul C. 2016. "Book Reviews: *Building Museums: A Handbook for Small & Midsize Museums"* by Robert Herskovitz *et al*. *Material Culture: The Journal of the Pioneer America Society* 48(1): 79-81** [best book for inexperienced] **at *https://miscellaneousmuseology.files.wordpress.com/2021/11/building-museums-review-by-thistle-revised-approved.pdf* .**
- **Paul C. Thistle's 10-page detailed suggestions for improving any potential second edition of Herskovitz (2012) that were forwarded to the publisher are found in Building Museums Recommendations for Second Edition by Thistle .**

AMONG PAUL'S EXPERIENCES IN HERITAGE STRUCTURES

MUSEUMS IN HERITAGE STRUCTURES

Dawson City Museum in Yukon's
Old Territorial Administration Building
National Historic Site, built 1899-1901

MUSEUMS IN HERITAGE STRUCTURES

Memorial Hall, Logan Museum of Anthropology, Beloit College, WI, USA, built 1867

MUSEUMS IN HERITAGE STRUCTURES

Hamilton Museum of Steam & Technology, built1856-59

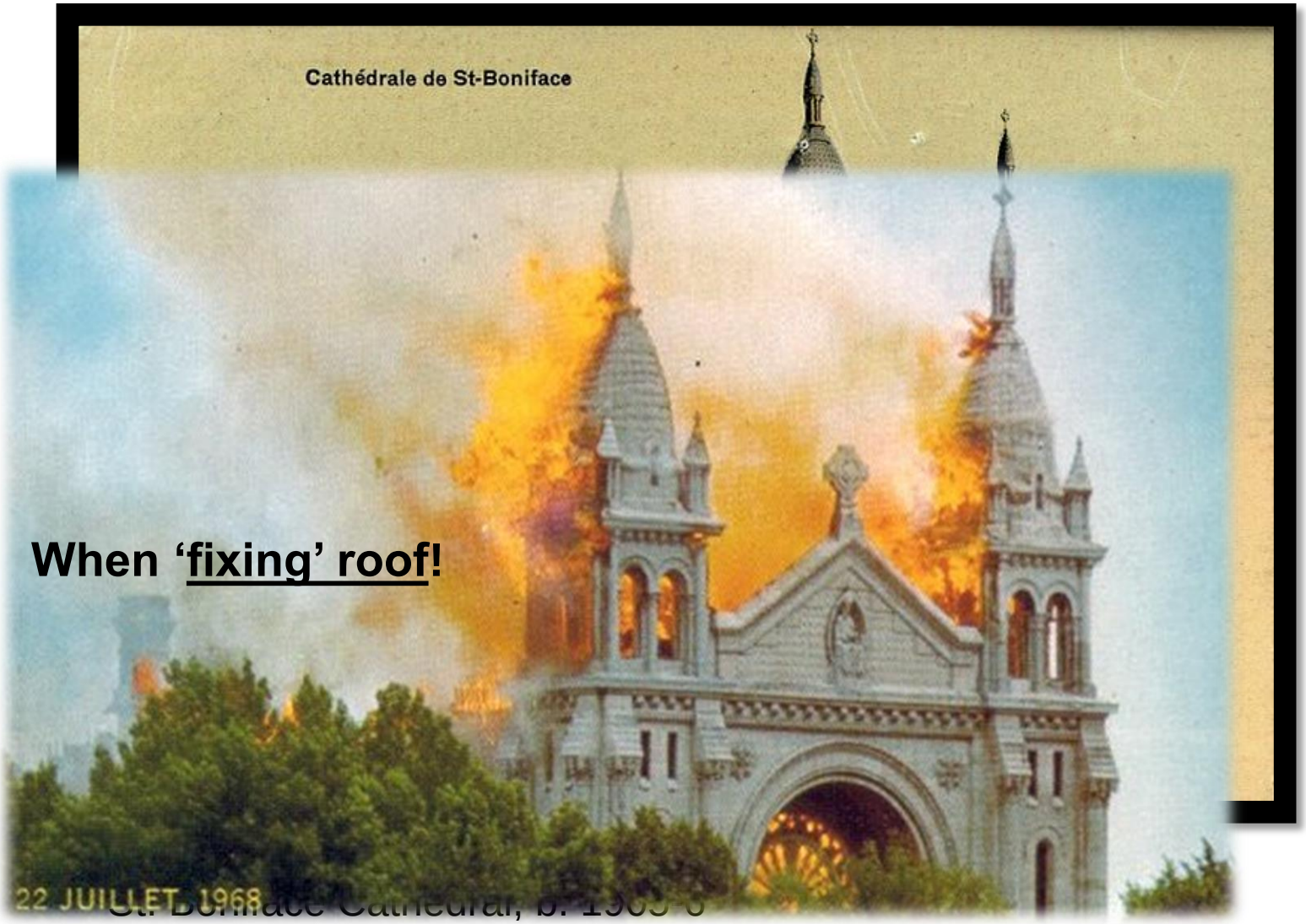
DANGERS!

CAUTIONARY TALES FOR ADAPTIVE RE-USE

FIRST CAUTIONARY TALE

St. Boniface Cathedral, Winnipeg, MB, built 1905-6

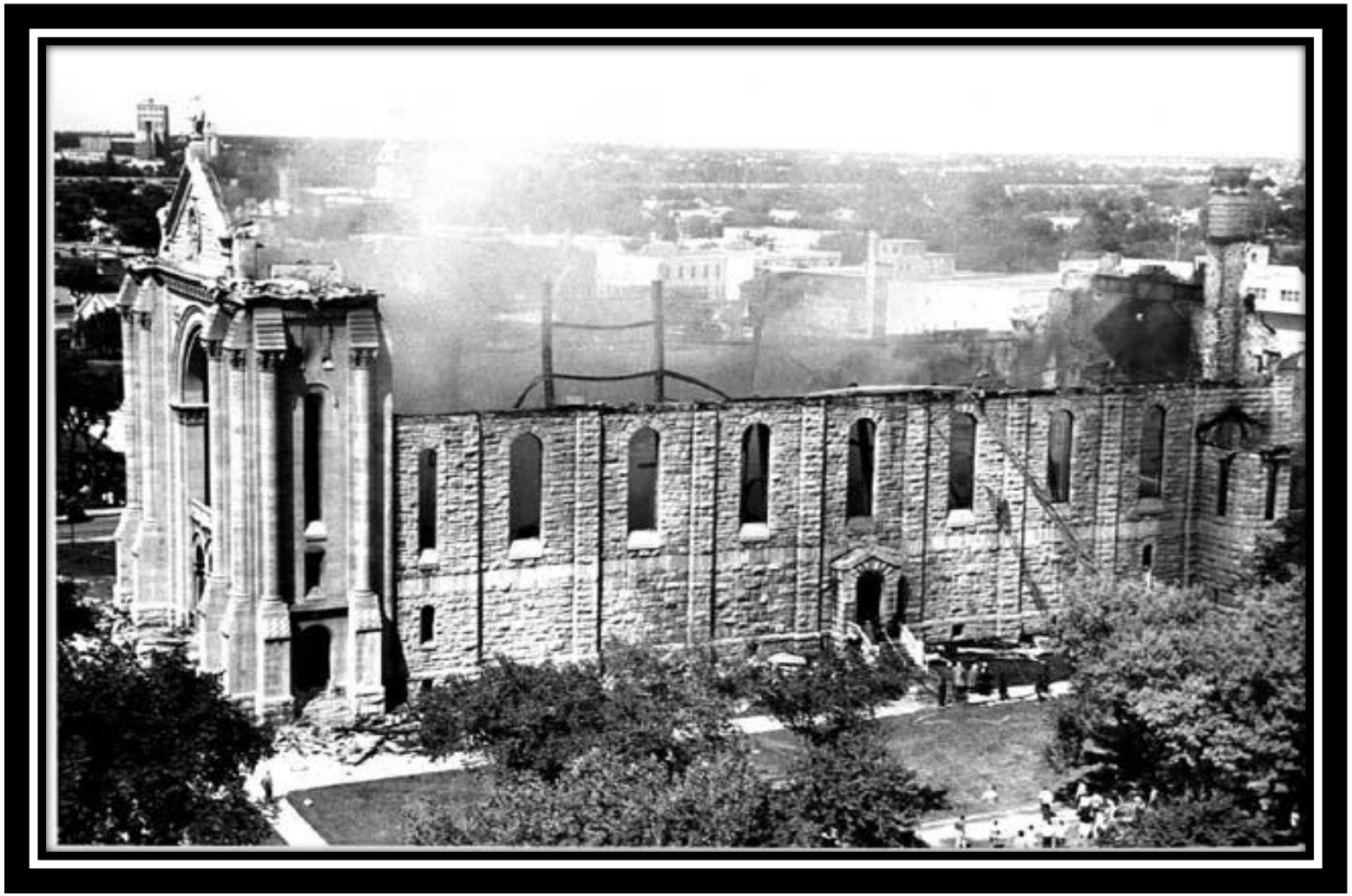
FIRST CAUTIONARY TALE



When '<u>fixing' roof</u>!

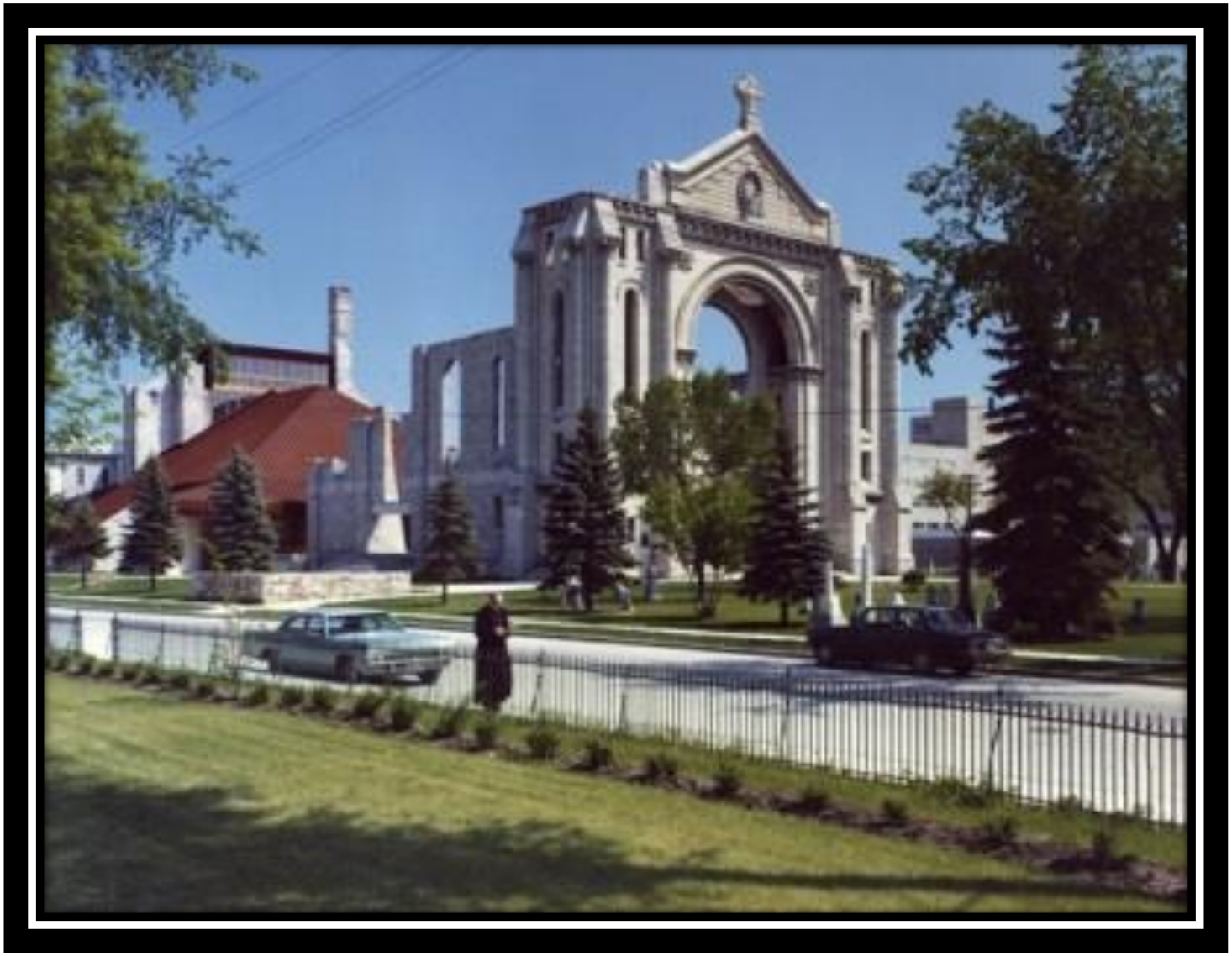
St. Boniface Cathedral, b. 1909-8

CATHEDRAL'S BURNED OUT SHELL



Contractors ***MUST*** **CARRY ADEQUATE INSURANCE!**

ADAPTIVE RE-USE OF SHELL



RENOVATIONS ARE FIRE HAZARDS!

Museum of Civilization, Quebec City, Sept. 2014, fixing roof 4 alarm fire

RENOVATION HAZARDS!

Notable construction and renovation fires

Fire	Date	Probable cause	Refs
SS Normandie	1942	sparks from a welding torch used while being converted to a troopship.	
Nantes Cathedral	1972	started in roof by worker with blowtorch.	[4]
Montreal Biosphere	1976	started by worker with welding torch	[5][*circular reference*]
Hotel Margaret, Brooklyn	1980	heater used by workers?[*better source needed*]	[6]
Uppark, Sussex	1989	roof re-leading	[7]
Windsor Castle	1992	spotlight on curtains	[3]
Manhattan's Central Synagogue	1998	blowtorch used to install air conditioning on roof	[8]
University of Kentucky Main Building	2001	thought to be welding torch used to repair guttering	[9][10]
St. Catherine's Church, Gdańsk	2006	started in roof, short circuit of a tinkered cable	[11]
Trinity Cathedral, Saint Petersburg	2006	originated in exterior scaffolding	[12][13]
Cutty Sark	2007	industrial vacuum cleaner, AWOL firewatchers	[14][15]
Universal Studios Hollywood	2008	started when worker used blowtorch to heat asphalt shingles	[16]
Hôtel Lambert, Paris	2013	under investigation, started in roof	[17][18]
Basilica of St. Donatian and St. Rogatian, Nantes	2015	started in roof	[4]
Battersea Arts Centre, London	2015	under investigation, started in roof	[19][20]
Mackintosh Building, Glasgow School of Art (2018)	2018	under investigation; lack of precautions after 2014 fire	[21][3]

RENOVATIONS ARE HAZARDOUS!

Notable construction and renovation fires

Fire	Date	Probable cause	Refs
SS Normandie	1942	sparks from a welding torch used while being	
Nantes Cathed			
Montreal Biosp			*cular reference*]
Hotel Margaret			
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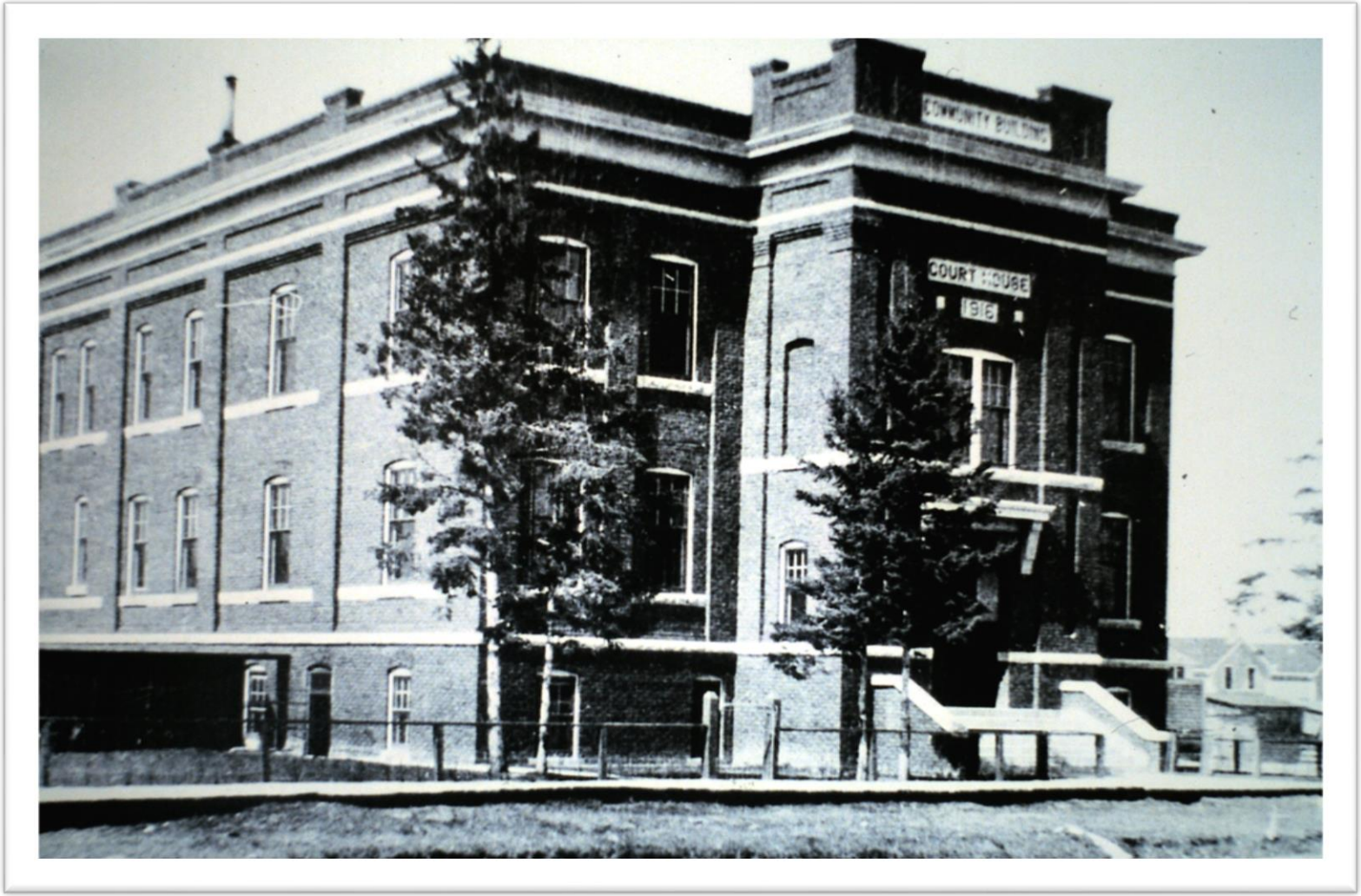
Manhattan's Ce			
University of Ke			]
St. Catherine's			
Trinity Cathedra			3]
Cutty Sark			5]
Universal Studi			
Hôtel Lambert,			8]
Basilica of St. D Rogatian, Nant			
Battersea Arts			0]
Mackintosh Bu of Art (2018)			]

https://en.wikipedia.org/wiki/Notre-Dame_fire#cite_note-six_questions-21

TARGET PROVINCIAL HISTORIC SITE FOR MUSEUM ADAPTIVE RE-USE

COMMUNITY BUILDING/COURT HOUSE, THE PAS, MB, BUILT 1916-1917



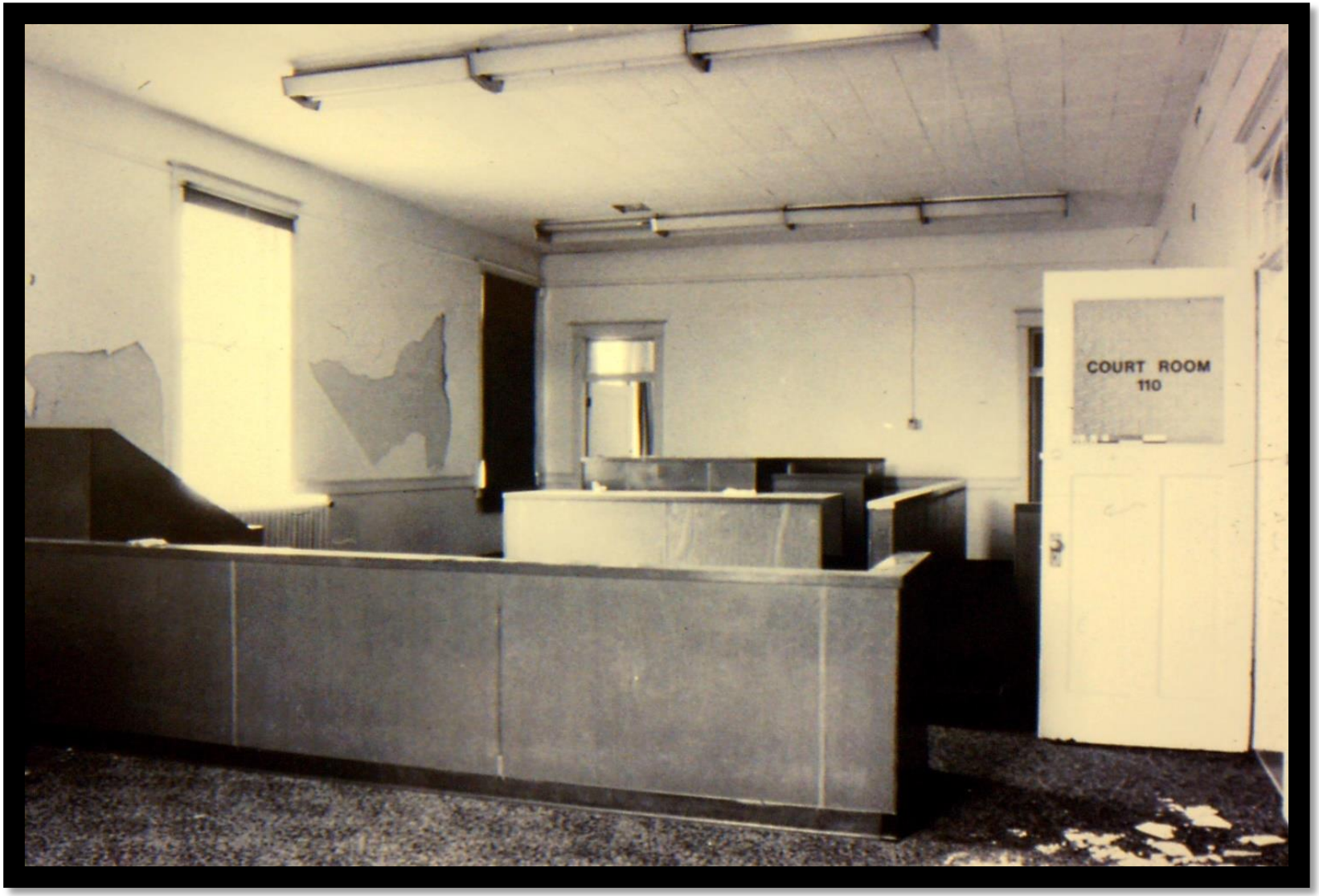
ORIGINAL TREES' PROMINENCE

ACCURATE MATURE TREE REPLANT, 1992

UNHISTORIC TREES PLANTED

RECENTLY VACATED, 1982

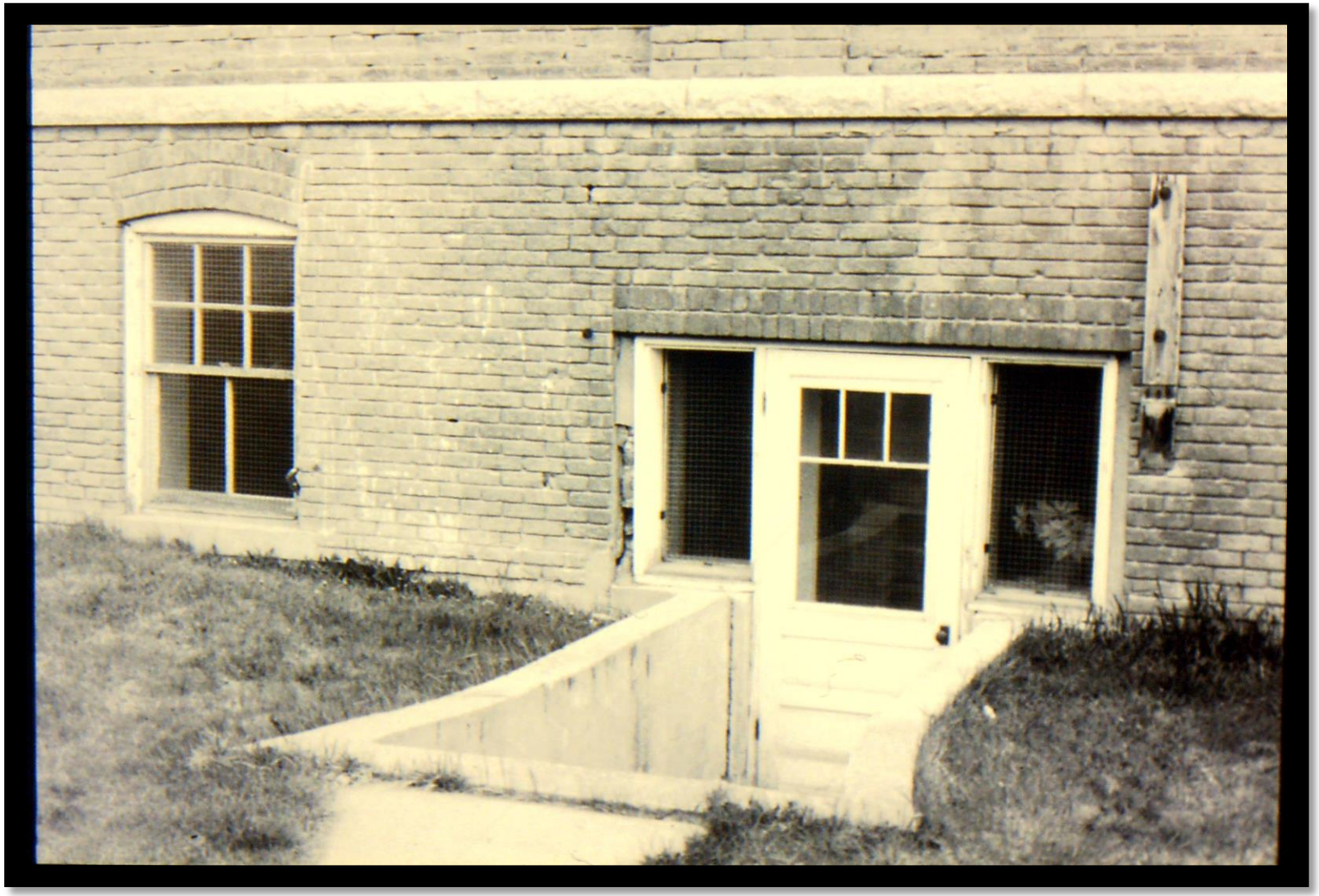
COMMUNITY BUILDING AT TAKEOVER



Since vacated, building was not heated, so plaster deteriorated.

BUILDING EXTERIOR AT TAKEOVER, 1987

HERITAGE VALUE AT TAKEOVER, 1987



BUILDING INTERIOR AT TAKEOVER, 1987

LAW LIBRARY WITH ORIGINAL FINISHES

SELECTIVE DEMOLITION PHASE 1

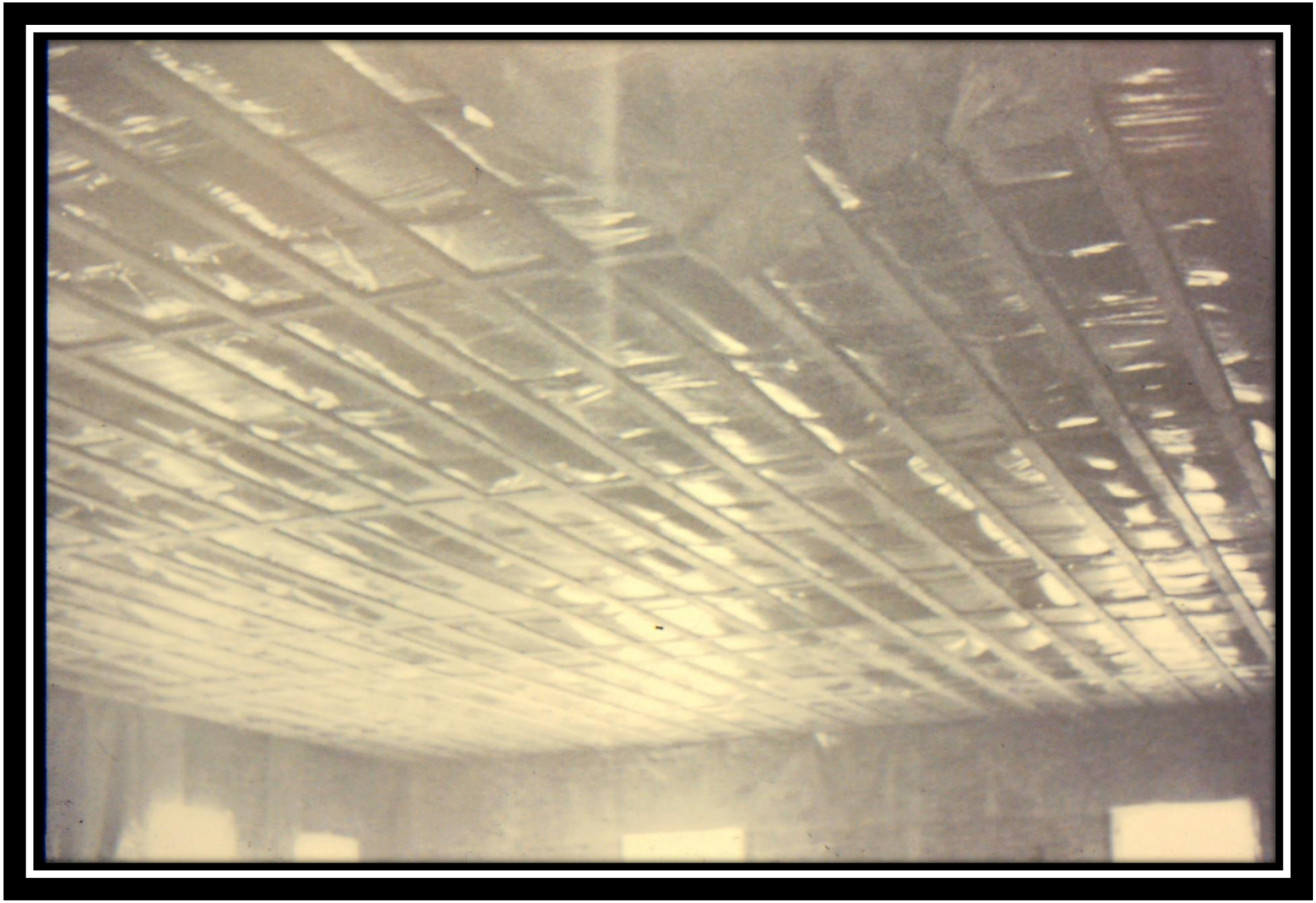
SELECTIVE DEMOLITION PHASE 1

ROOF NEEDED REPLACEMENT

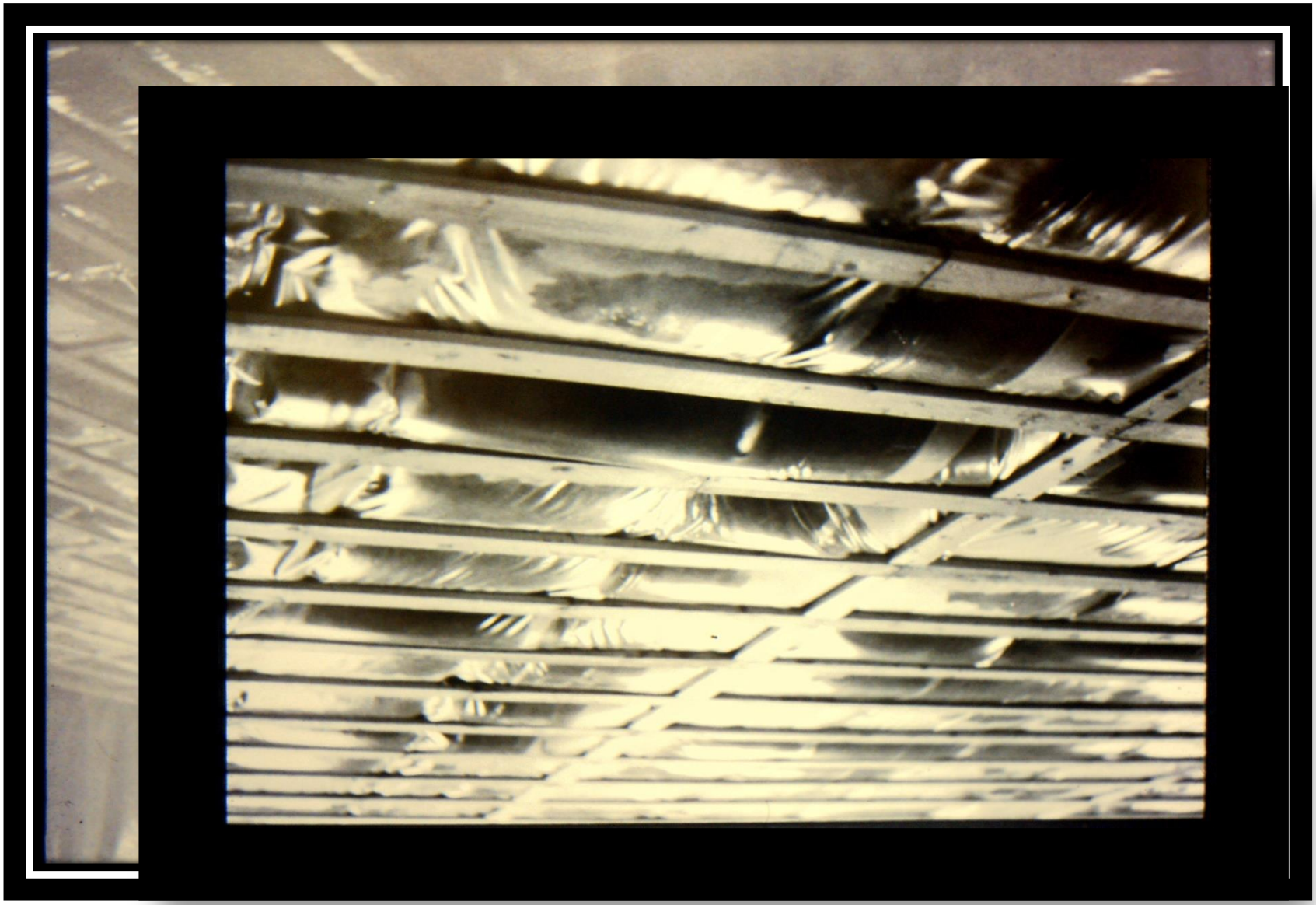
SKYLIGHT FEATURE RETAINED

SALVAGED MILLWORK

6” RAIN RESULT AFTER NEW ROOF BUILT!



6” RAIN RESULT



SELECTIVE DEMOLITION WINTER WORK

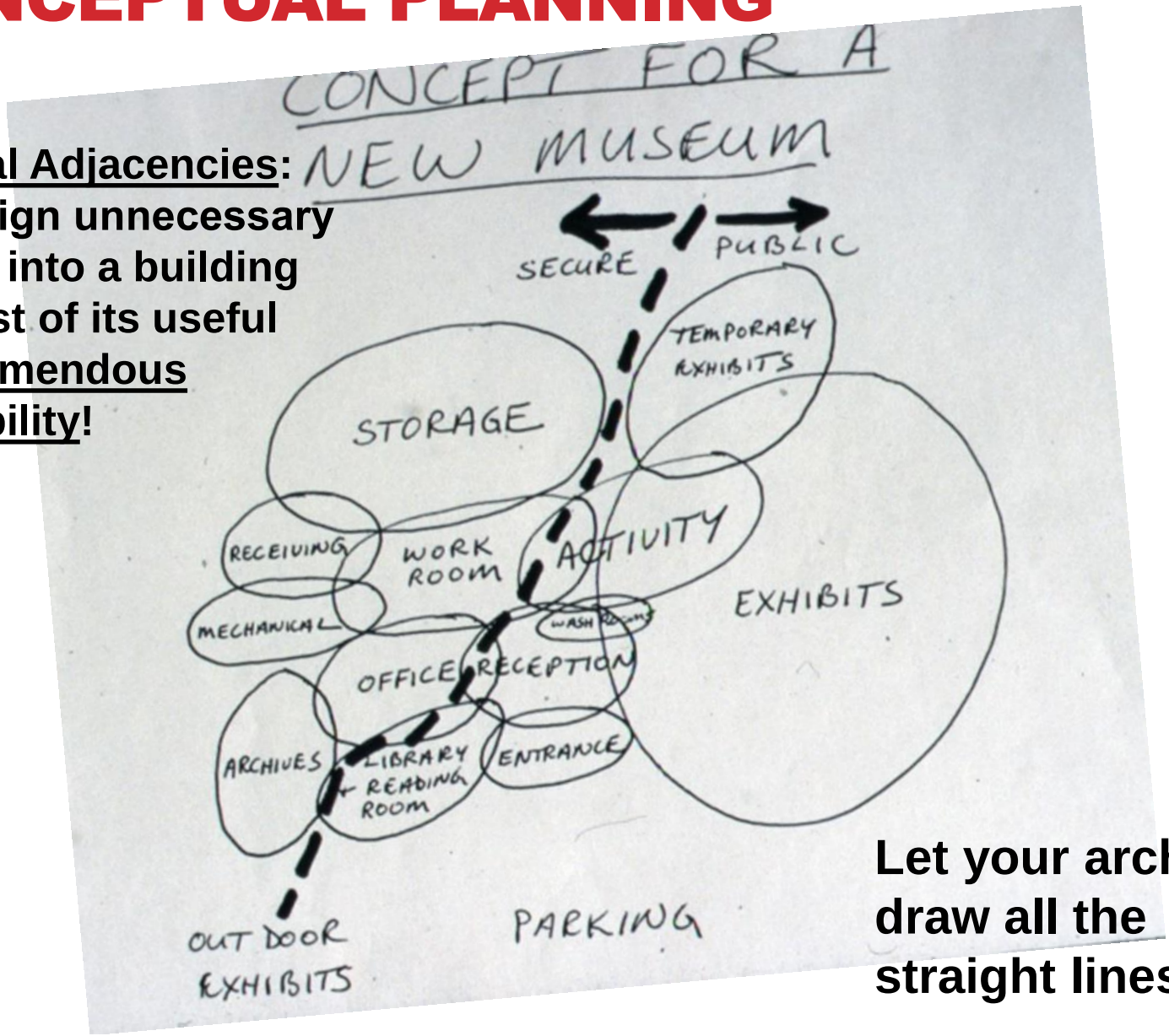
SELECTIVE DEMOLITION WINTER WORK

A CRUCIAL TASK OF IMAGINATION!

ADAPTIVE RE-USE PLANNING CHALLENGES

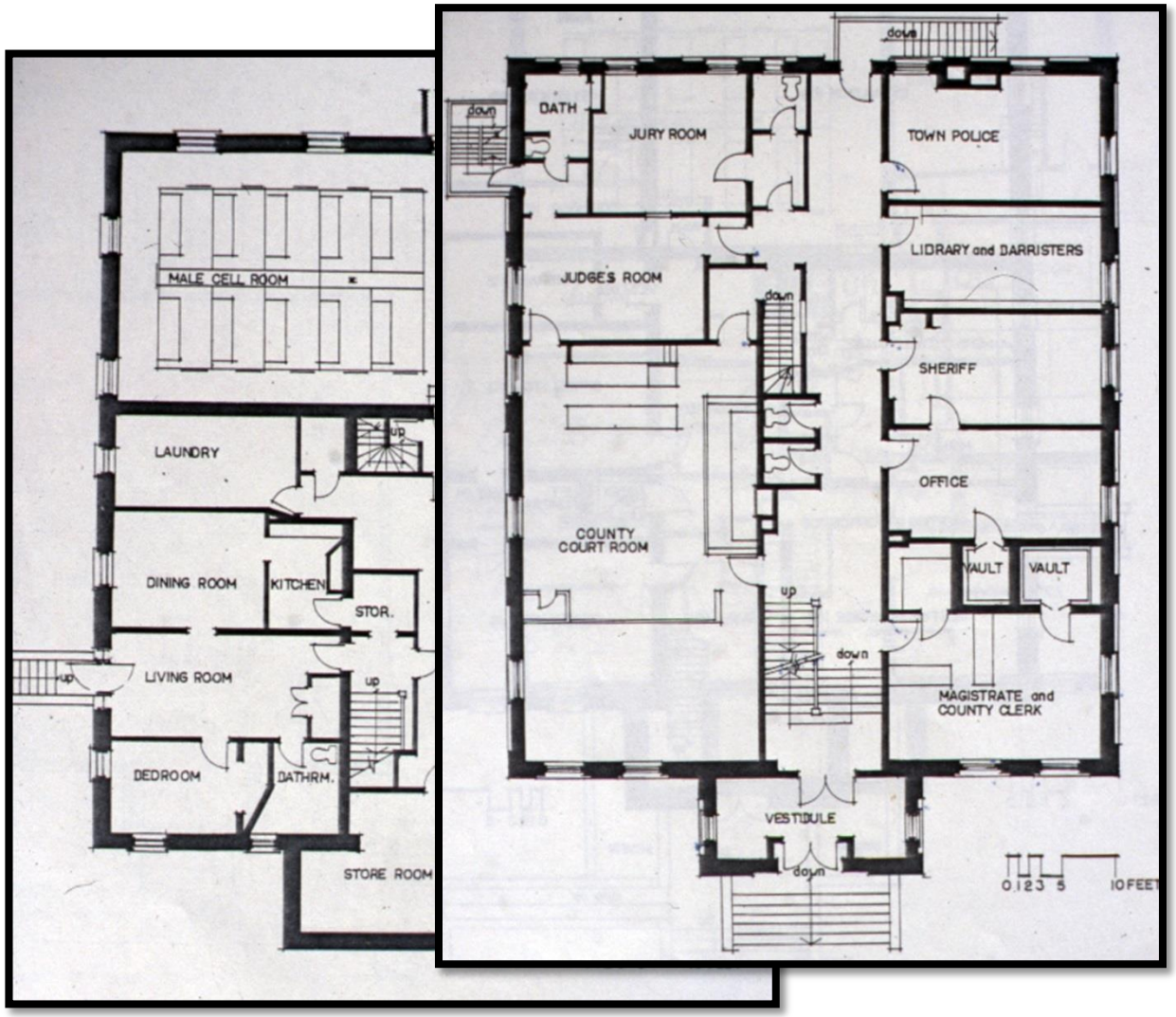
CONCEPTUAL PLANNING

<u>Functional Adjacencies</u>: Don't design unnecessary footsteps into a building for the rest of its useful life—a <u>tremendous responsibility</u>!



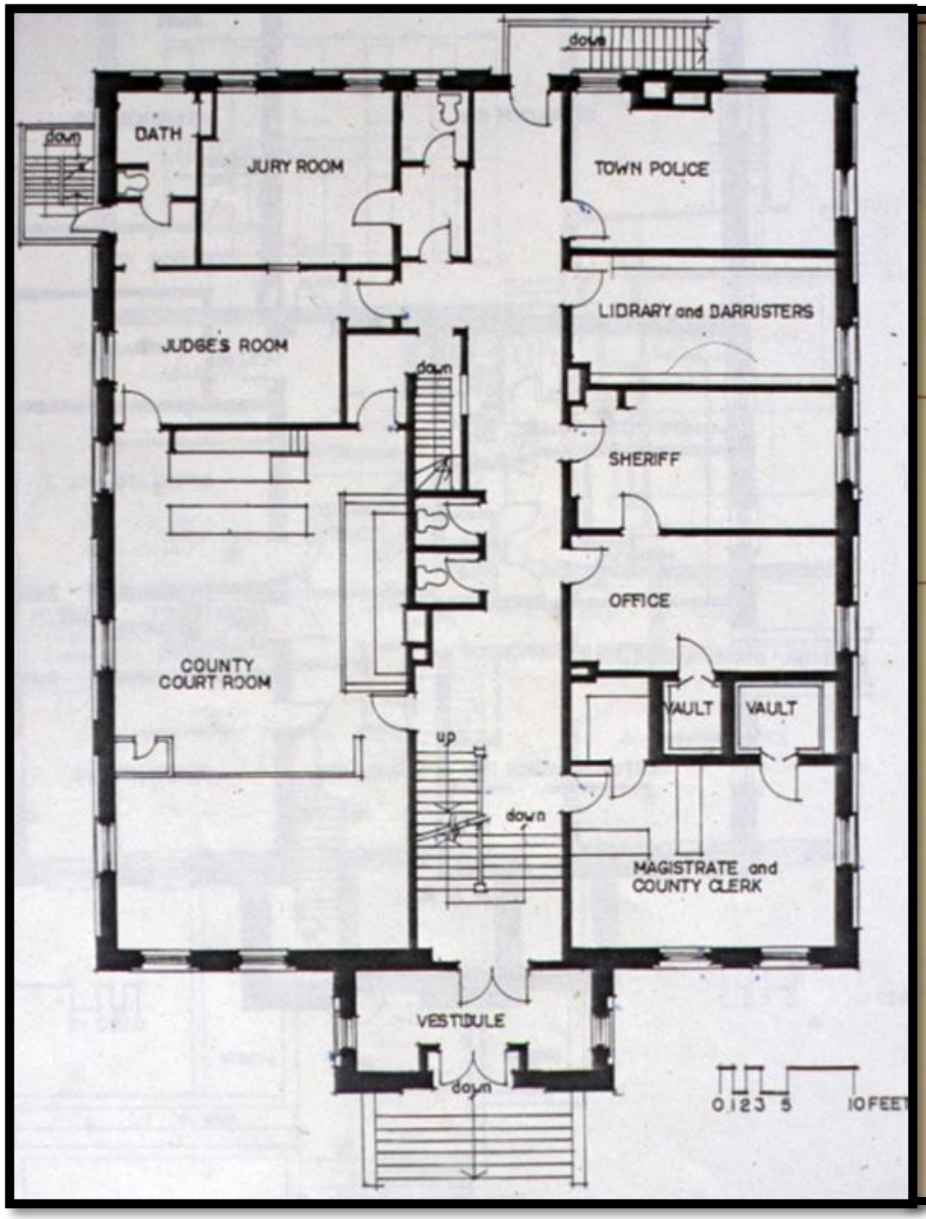
Let your architect draw all the straight lines!

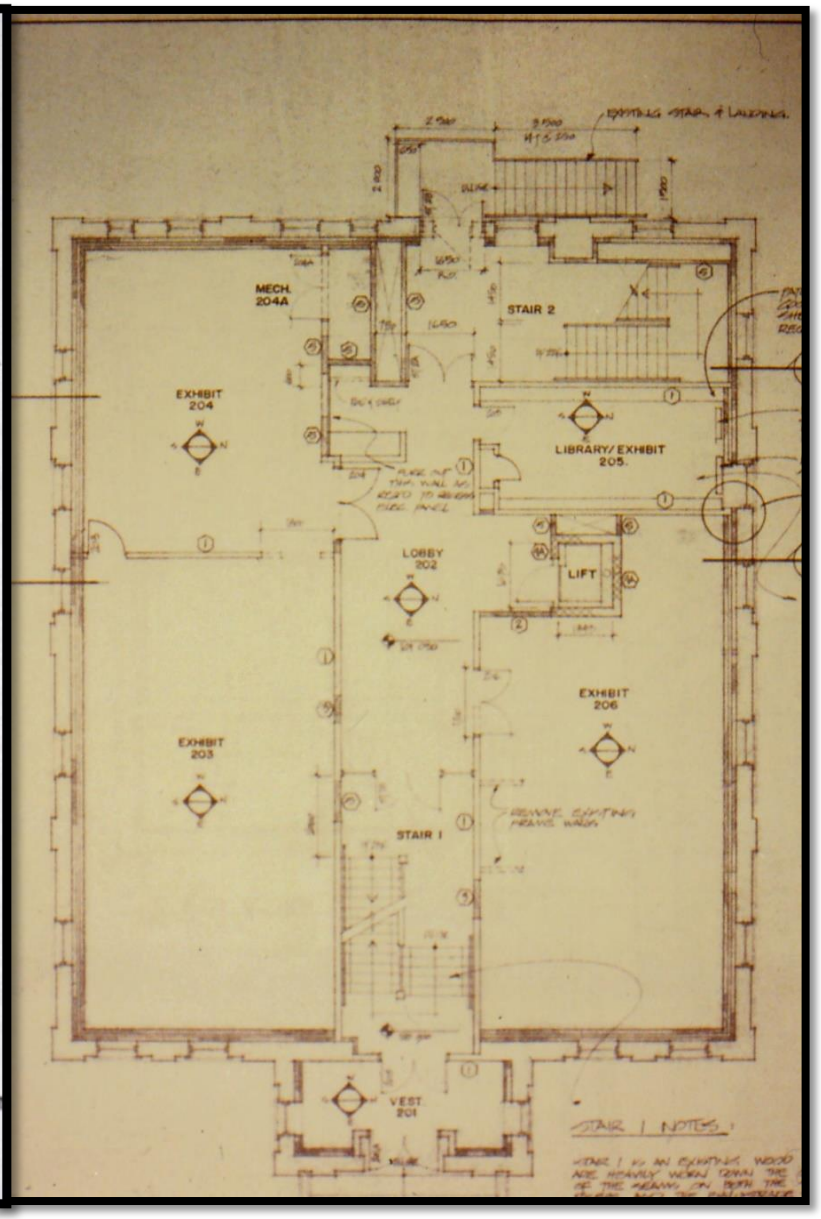
EXISTING FLOOR PLAN CHALLENGES



Existing Level II spaces rather small & limited adaptability

EXISTING FLOOR PLAN SOLUTION





NEW CONSERVATION APPROACHES

https://www.nytimes.com/2023/02/01/arts/design/museums-energy-climate-control.html

Also see:

Robin [surname not given]. 2011. "The “NEW” Environmental Standards for Museums." *Ah-Tah-Thi-Ki Museum Blog* [Seminole Tribe of Florida] posted on March 16, 2011 [based on Hatchfield (2011) reference in next slide]) at https://ahtahthiki.wordpress.com/2011/03/16/the-new-environmental-standards-for-museums/

AAM *MUSEUM NEWS* (JAN/FEB 2011)

CRACK WARP SHRINK FLAKE

A NEW LOOK AT CONSERVATION STANDARDS

By Pamela Hatchfield

In the high humidity of summer, bronzes erupt with powdery green corrosion and paper becomes speckled with mold. Droplets of liquid form on glass or enamel inside museum exhibition cases. When the heat is on in the winter, white salts exude from the pores of stone. Long cracks appear in wood or ivory sculpture. Skins, parchment or paper can cockle or tear.

With such diverse materials and so many different reactions possible, how do we best preserve entire collections? For decades, museums adhered to certain prescribed "ideal" conditions of relative humidity and temperature in an attempt to protect the objects in their care. But uncertainty about the efficacy of these guidelines for all types of materials—along with concerns about the environment and the economy—have now motivated many in the museum profession to consider new standards for the storage, loan and exhibition of museum holdings. As part of this movement, the American Institute for Conservation of Historic and Artistic Works (AIC), the national association of conservation professionals, has created a working group to revise recommendations and provide guidance to the museum community.

Objects can hardly be expected to respond in similar ways to environmental conditions. Some materials are vastly more sensitive than others to specific conditions or certain agents of deterioration. And profoundly different states of preservation are observed in similar artifacts and works of art. Just consider the diversity of materials and methods used in their creation and the history of their use and restoration. Some crack, warp, shrink and flake when exposed to climatic fluctuations, while others seem impervious. In addition to relative humidity and temperature, environmental agents such as light, particulates, pollutants, mold and insects contribute to the general state of collection preservation. The damage these agents inflict may be further enhanced by certain humidity and temperature levels. Research and practice over

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Pamela Hatchfield is Robert P. and Carol T. Henderson Head of Objects Conservation, Museum of Fine Arts, Boston, and vice president, American Institute for Conservation of Historic and Artistic Works (AIC), Washington, D.C. For a more in-depth discussion on environmental guidelines and bibliographic references, visit conservation-us.org.

NEW CONSERVATION STANDARDS

ICOM https://www.google.com/search?client=firefox-b-d&q=%22new+museum+conservation+standards%22

Hatchfield, Pamela. 2011. "Crack Warp Shrink Flake: A New Look at Conservation Standards." *Museum News* Vol 90, No. 1 (Jan.-Feb.) pp. 40-41, 51 [See with login at https://www.aam-us.org/?s=new+conservation+standards].

AIC Wiki, A Collaborative Knowledge Resource. 2020. "Environmental Guidelines: Museum climate in a changing world" at https://www.conservation-wiki.com/wiki/Environmental_Guidelines (accessed 1 August 2021)

- **Conclusion:**
- **"The museum community acknowledges the practical difficulties, high cost and non-sustainability of maintaining flatlined relative humidity and temperature in the exhibition environment, and that a single standard is not suitable or necessary for all collection objects. . ."**

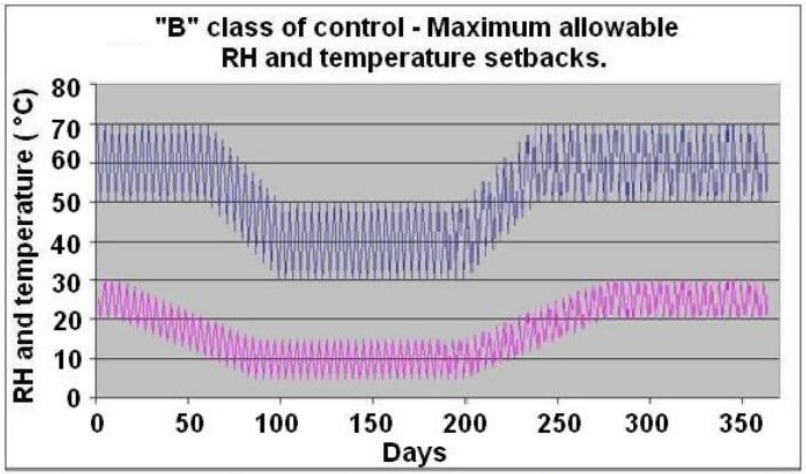
NEW CONSERVATION APPROACHES

https://www.canada.ca/en/conservation-institute/services/preventive-conser 80% Search

B (control, some gradients plus winter temperature setback)

This degree of control allows short-term fluctuations of ±10% RH and ±5°C, with a seasonal temperature change of up to 10°C. Note that the temperature can not be allowed to rise above 30°C but can fall as low as necessary to maintain RH control.

The image below shows the worst case scenario with maximal permissible fluctuation.



Canadian Conservation Institute
https://www.canada.ca/en/conservation-institute/services/preventive-conservation/environmental-guidelines-museums/classes-control.html

Graph 5: The relative humidity is ramped down during the fall period from a summer level of 50% to 70%, to a winter level of 30% to 50%, and then ramped up again in the spring. These changes are gradual over a period of a couple of months, rather than abrupt. The temperature is ramped down during the summer and fall period from a summer level of 20°C to 30°C, to a winter level of 5°C to 15°C, and then ramped up again in the spring. These changes are gradual over a period of 3 months, rather than abrupt.

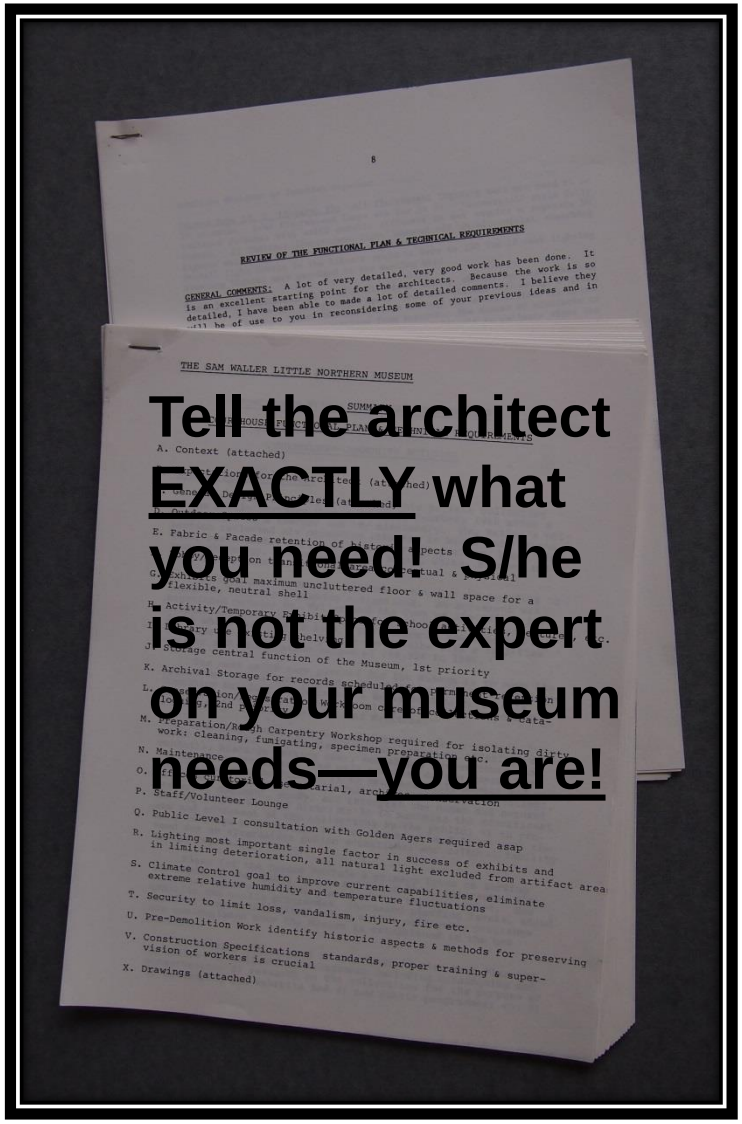
NEW CONSERVATION APPROACHES

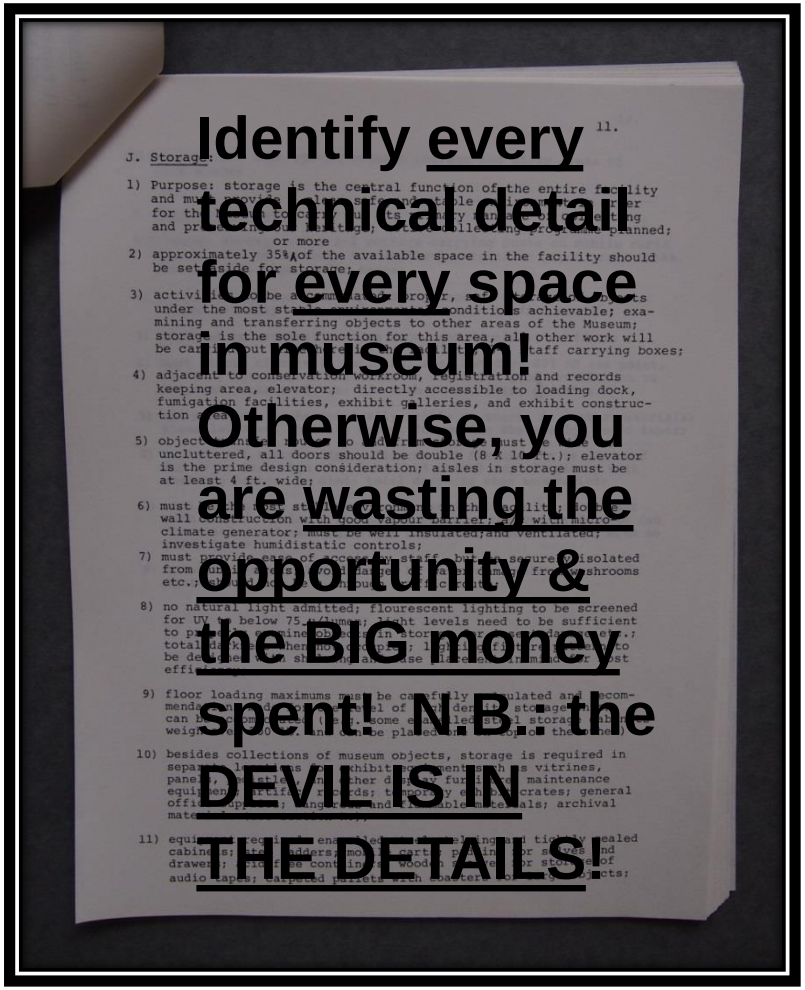
Caitlin Southwick founder of Key Culture, an international organization working on the Nexus between sustainability and culture.

- **"We have put together a declaration on climate control asking museums to address and change their climate control and their loan agreements so that we can reduce carbon emissions in the sector and just yeah get a handle on it."**

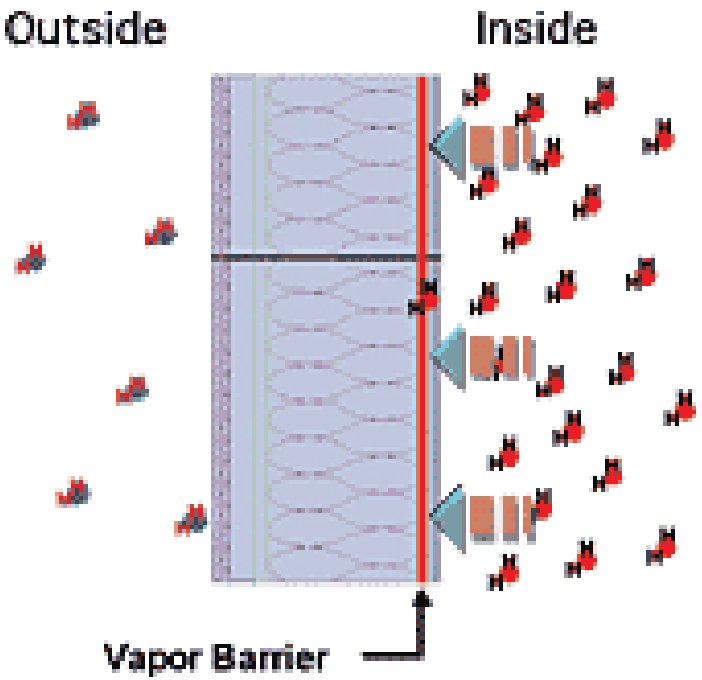
Southwick *et al.* 2022 "Soup-Slinging Syrup Showdown: Why Galleries and Museums Are Increasingly Sites of Climate Protests." British Columbia Museums Association podcast on Thursday, December 8, 2022 at https://museum.bc.ca/brain/bcma-panel-soup-slinging-syrup-showdowns/ (accessed 19 January 2023) [A txt file closed captioning transcript is provided by the British Columbia Museums Association is found at Soup Slinging Webinar auto_generated_captions (1)] (accessed 3 August 2023).

FUNCTIONAL PLAN (DETAILS, DETAILS…)

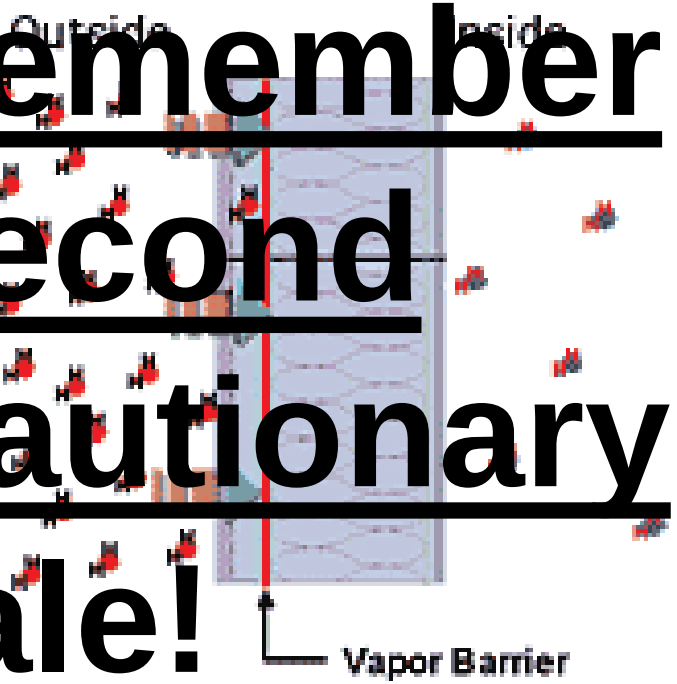




KEY COLD CLIMATE SNAG FOR MUSEUMS

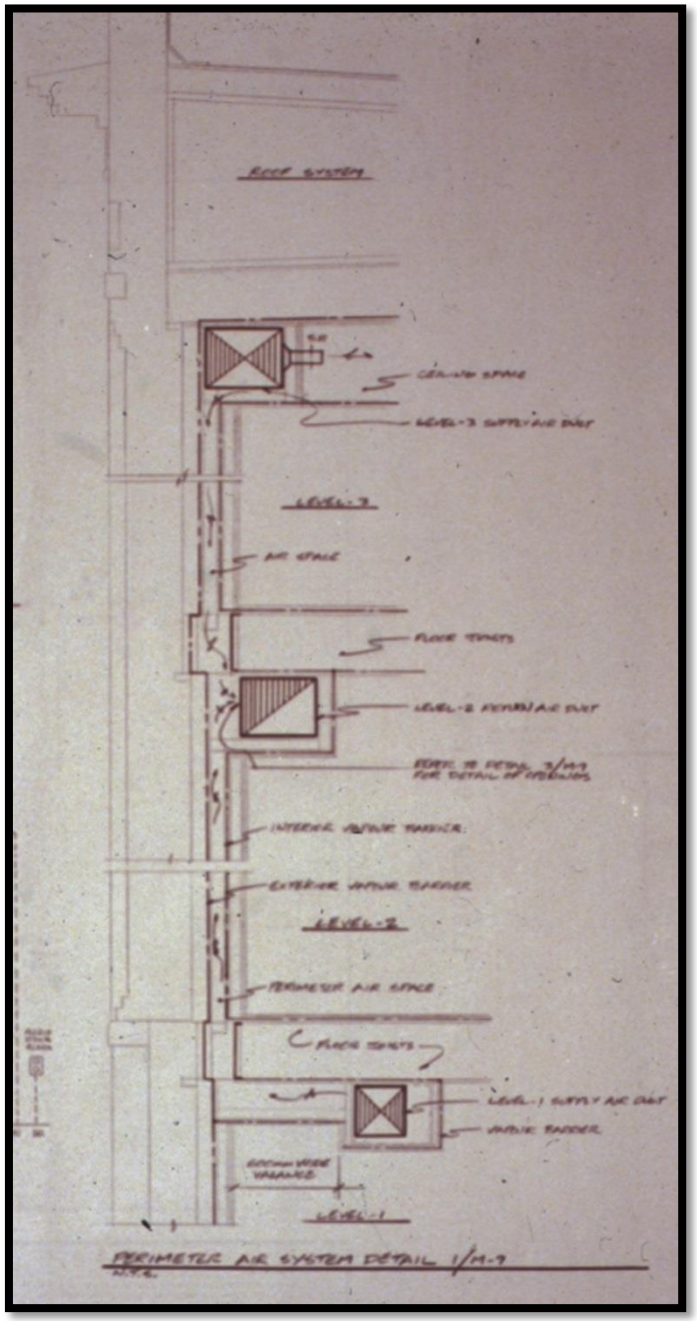


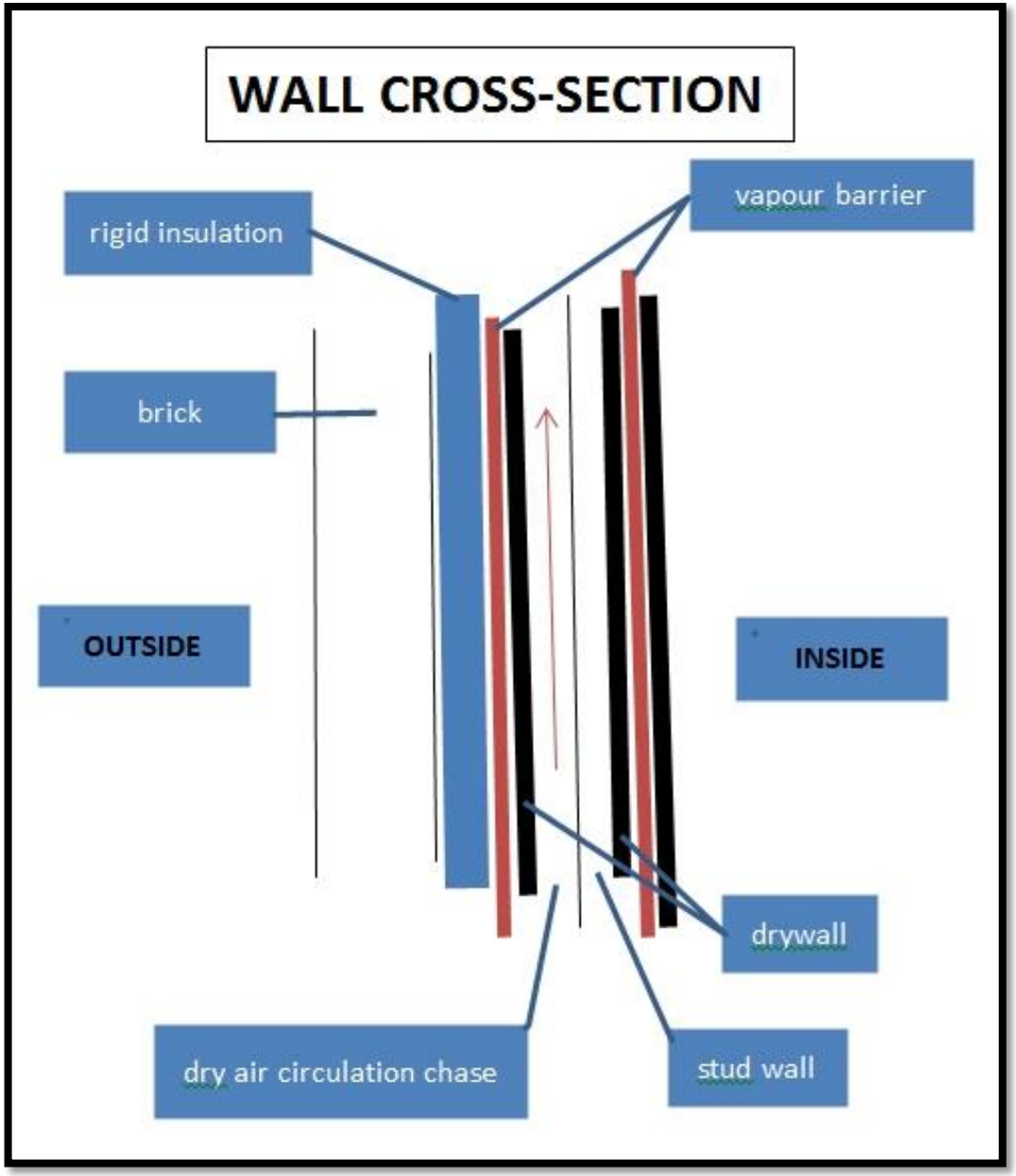
Remember Second Cautionary Tale!



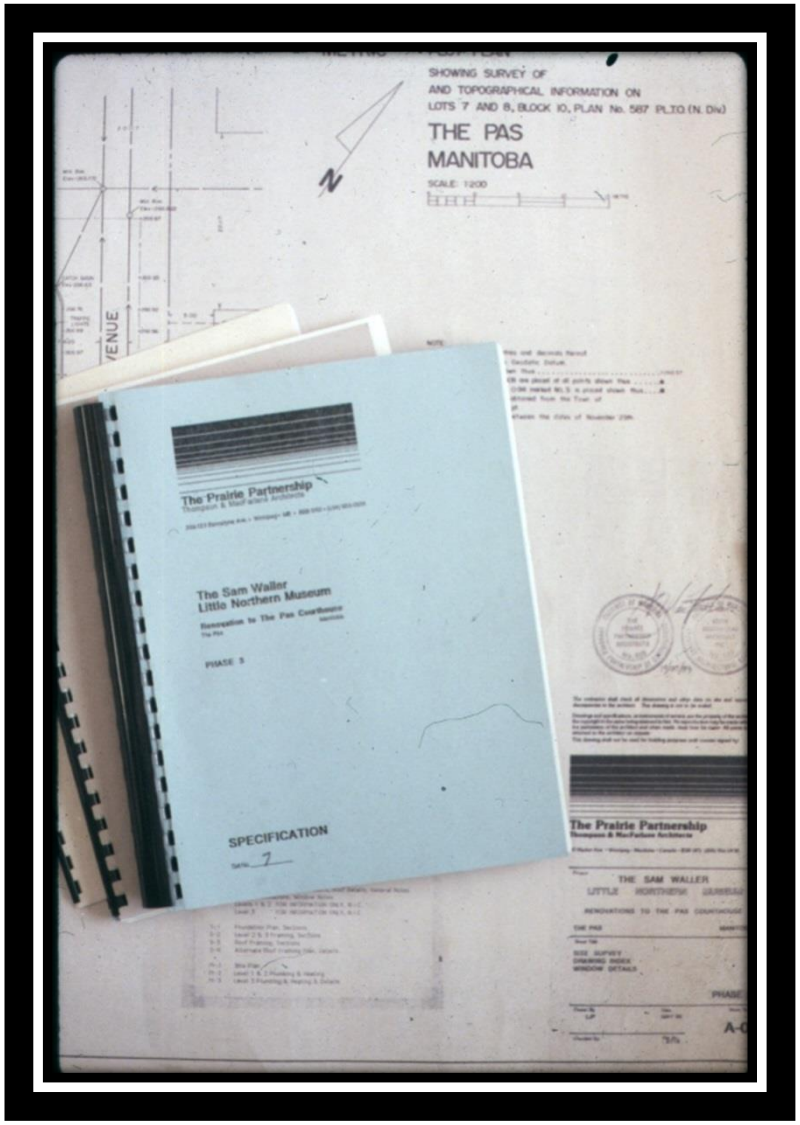
Museum Vapour Pressure Under Winter Conditions (on left):

- **Low humidity outside**
- **Humidity added inside**
- **High humidity is forced powerfully into low humidity air**


PERIMETER AIR SYSTEM DETAIL 1/M-1

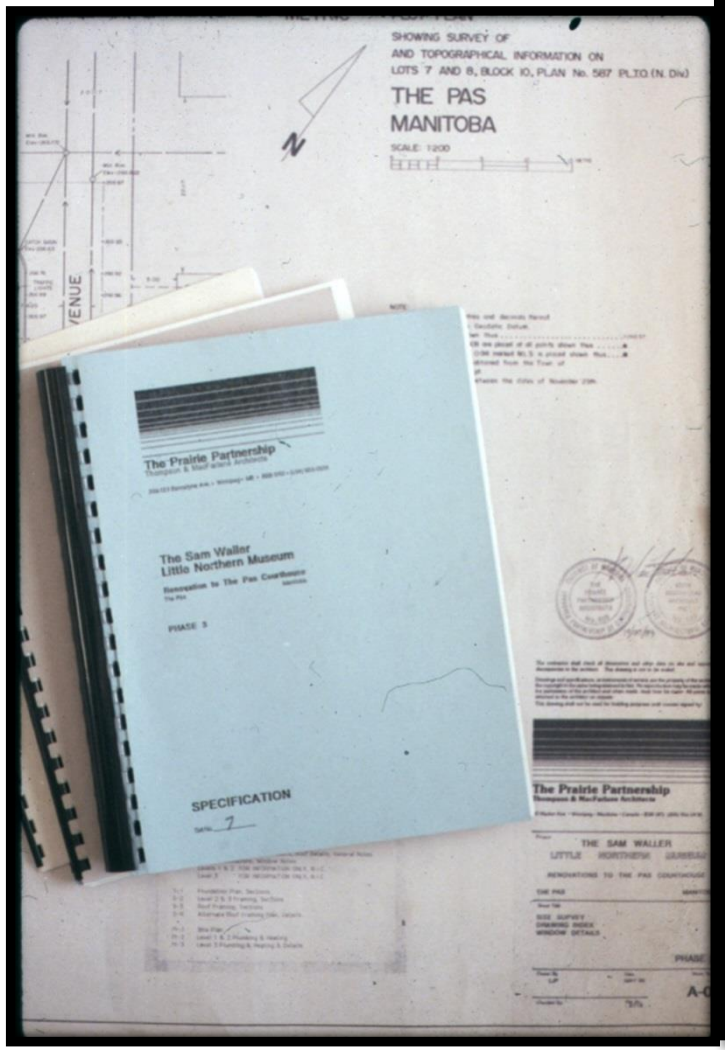

WALL CROSS-SECTION
rigid insulation
vapour barrier
brick
OUTSIDE
INSIDE
drywall
dry air circulation chase
stud wall

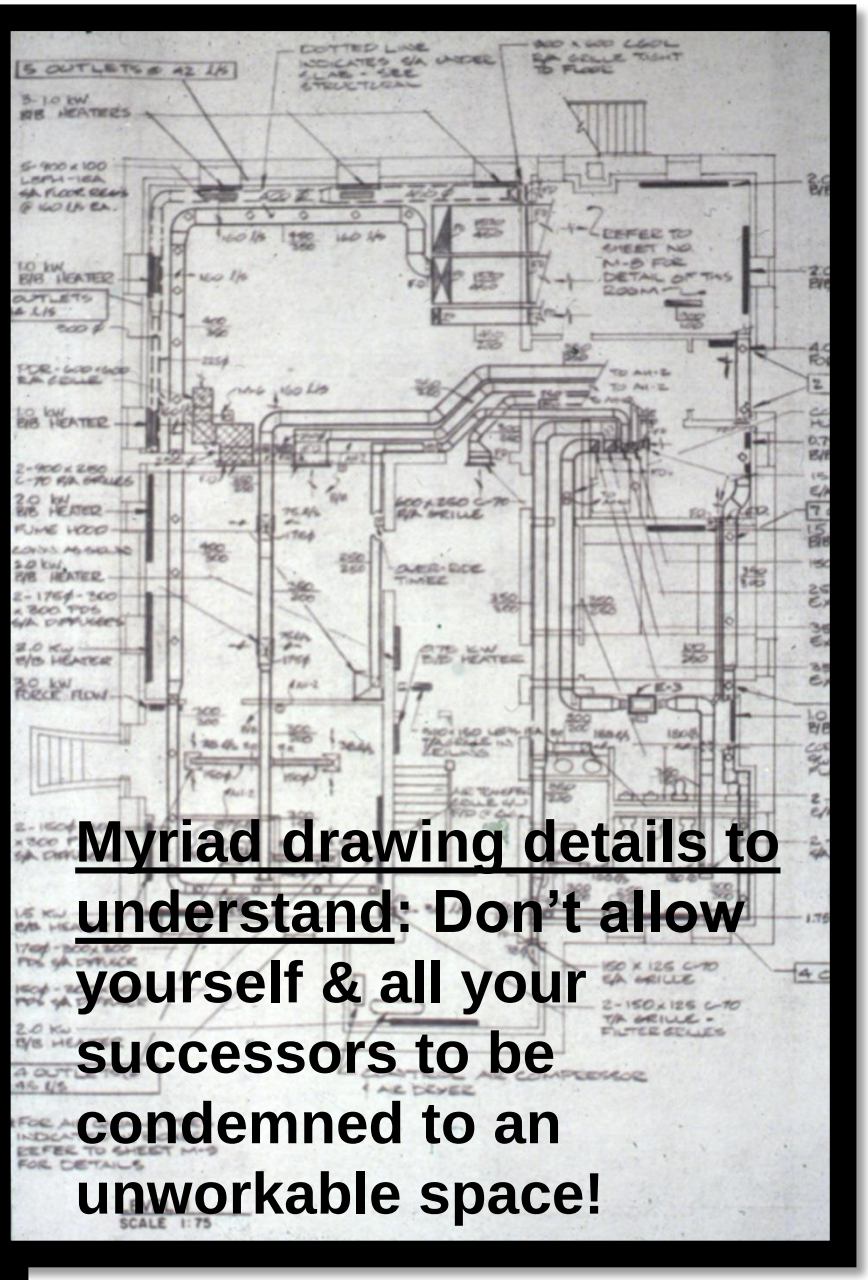
ARCHITECTURAL PLANNING



The technical requirements in your Functional Plan now are put into the construction Specifications & Drawings to allow potential contractors to bid on the project & the successful one to build exactly what you need. You must hold the contractor's nose to these Specifications!

ARCHITECTURAL PLANNING





<u>Myriad drawing details to understand</u>: Don't allow yourself & all your successors to be condemned to an unworkable space!

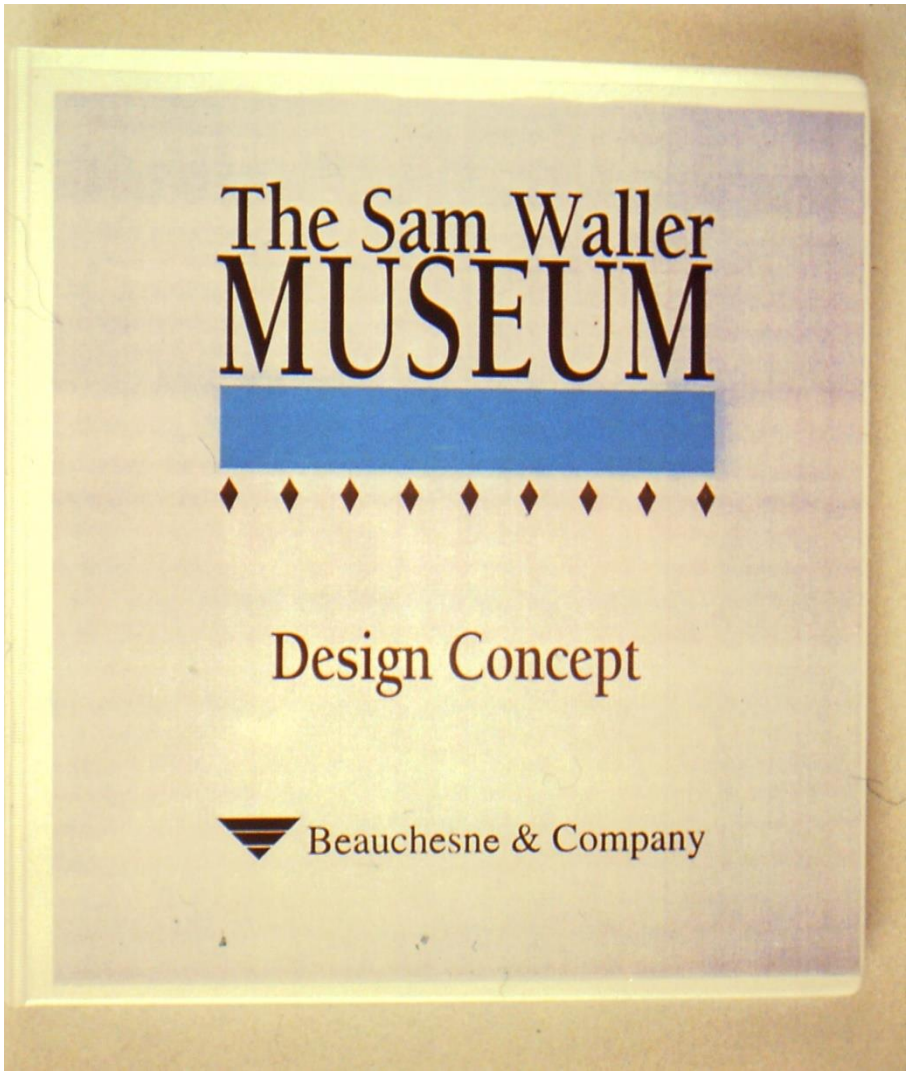
WINDOW APPEARANCES

Memorial Hall built 1867, Logan Museum, Beloit College, WI

WINDOW APPEARANCES

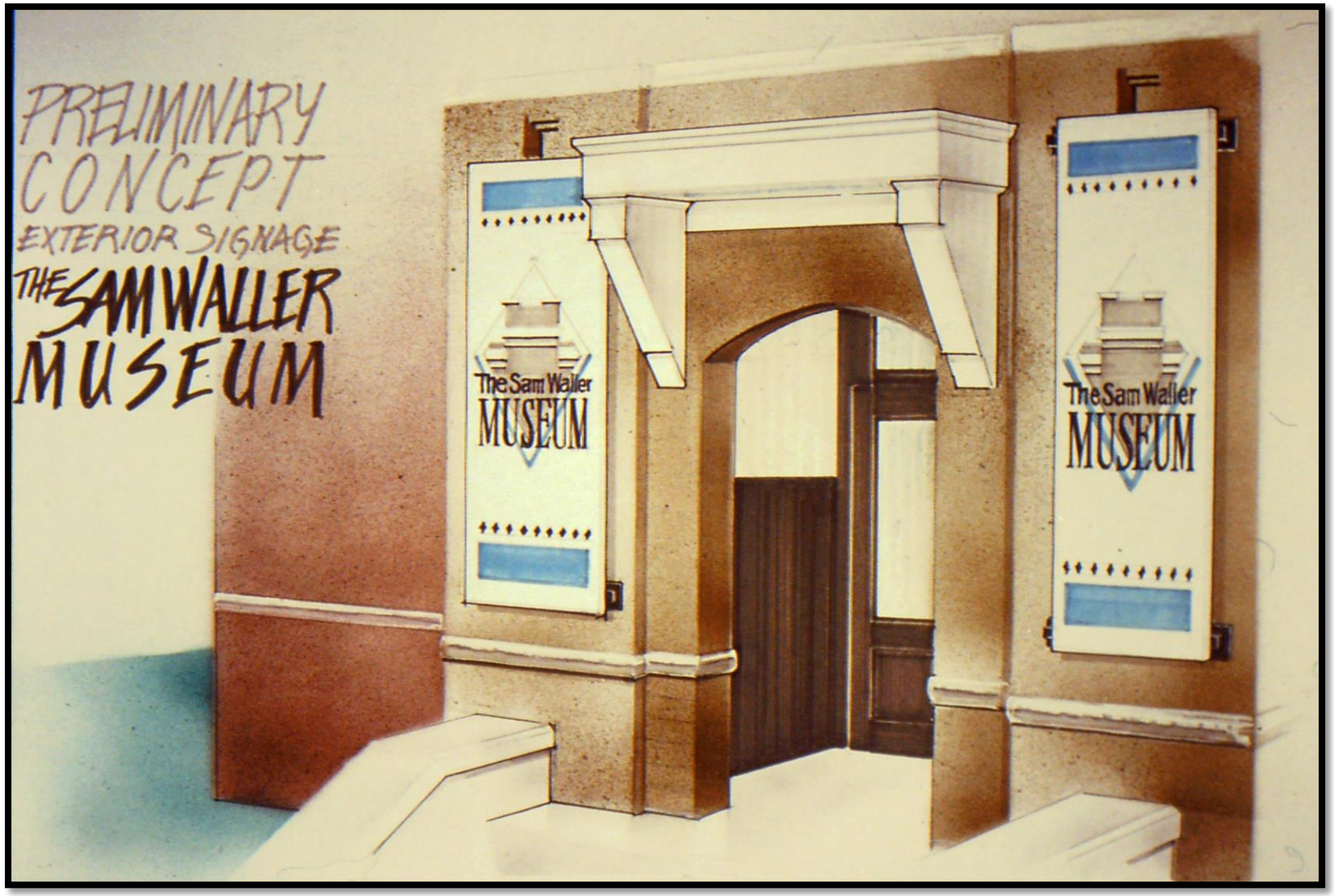
UNANSWERED QUESTION

PHASE 3 DESIGN REVIEW IS CRUCIAL



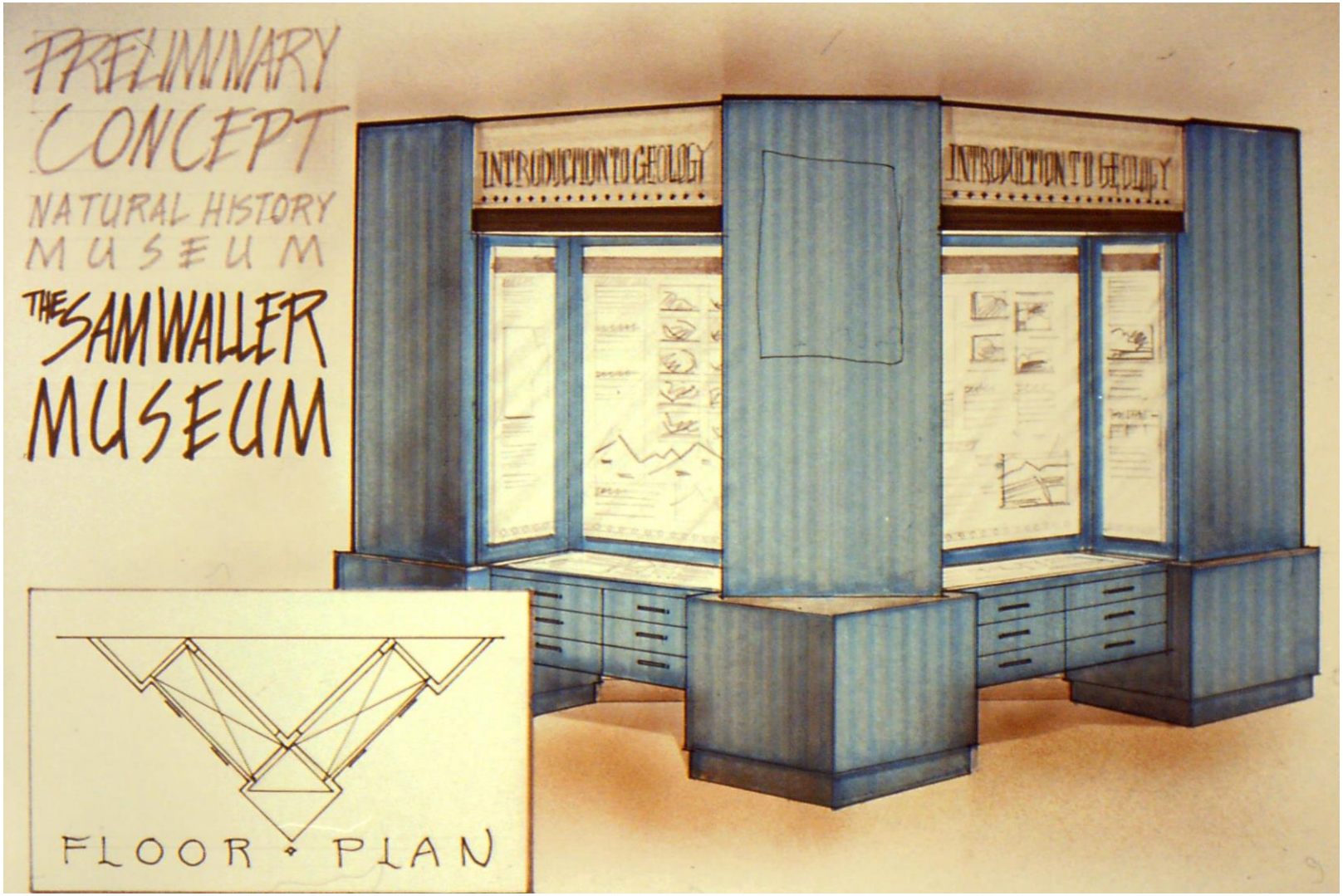
- Are key functional programme details addressed?
- Review construction drawings & specifications with architect & his/her structural, electrical, & other project engineers to catch all foreseeable problems with implementation of the museum's professional museum facility requirements.
- Museum staff need to be sure to avoid overlooking any critical details in the plans as happened in The Sam Waller Museum project above.
- A significant amount of project funds were wasted due to one 'small dental'.

DESIGN REVIEW

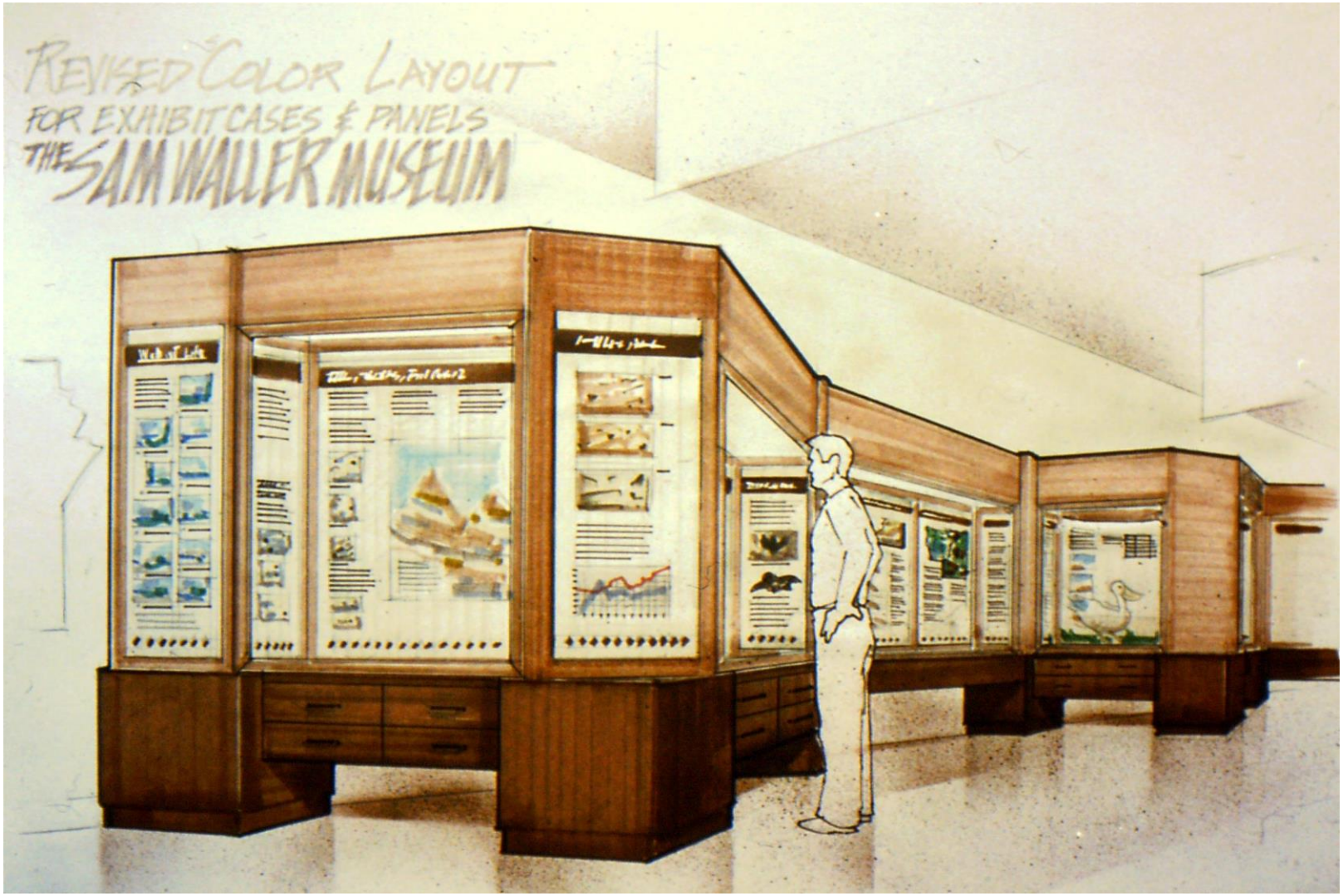


FAÇADE VALUE PROTECTION SOLUTION

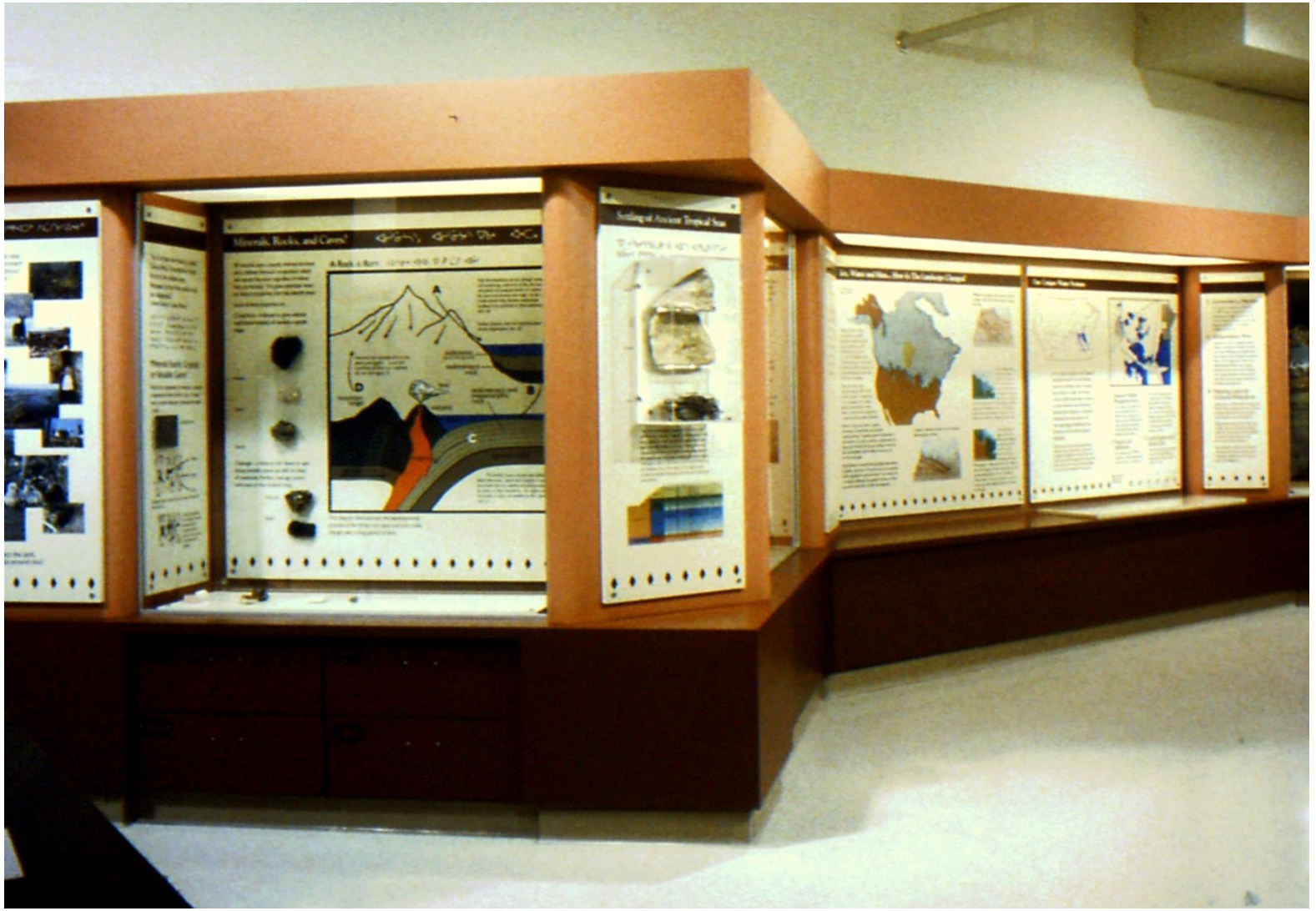
INTERIOR EXHIBIT DESIGN REVIEW



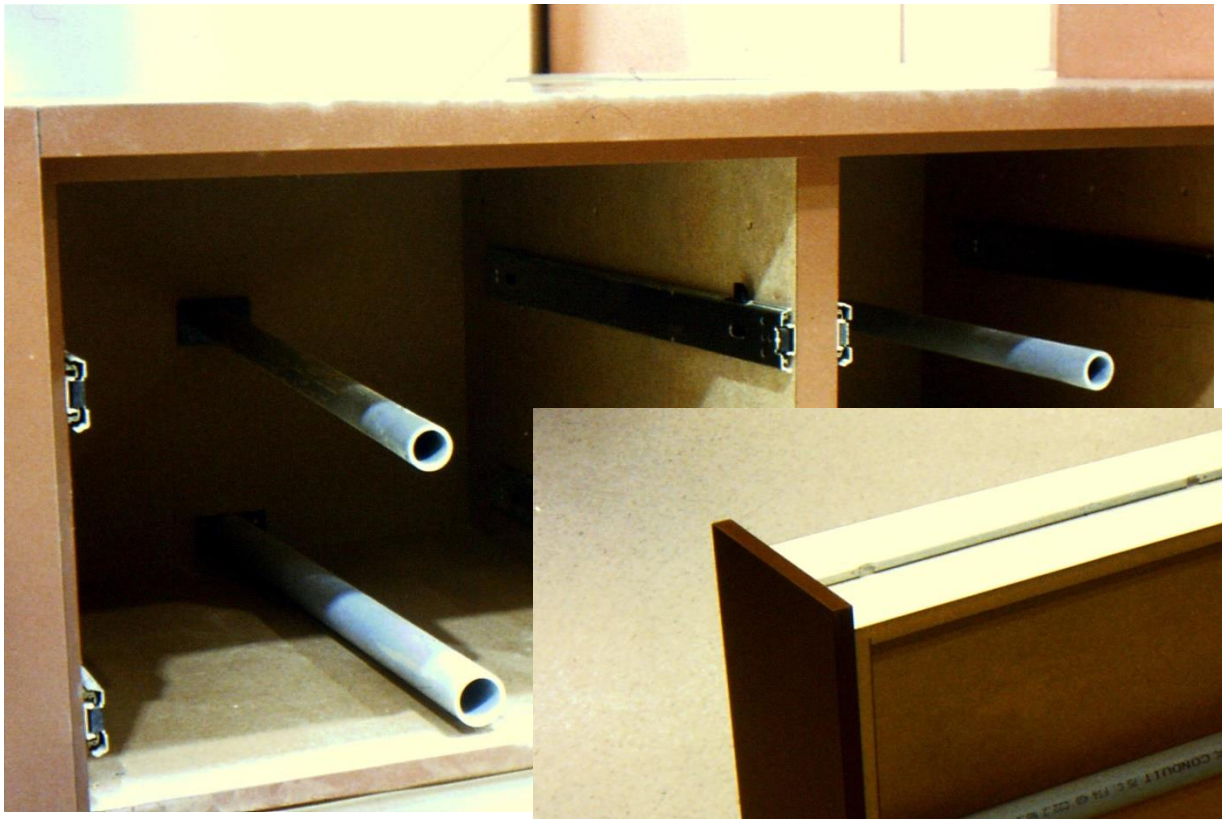
DESIGN CORRECTION



DESIGN AS BUILT



VISIBLE STORAGE DRAWER INNOVATION



VISIBLE STORAGE DRAWER INNOVATION

***Critical Museology Miscellanea* blog Search Results https://miscellaneousmuseology.wordpress.com/?s=%22visible+storage%22 (accessed 7 August 2023).**

Thistle, Paul C. 1987. "Research Report: Visible Storage for the small Museum." The Pas, MB: The Sam Waller Little Northern Museum at https://miscellaneousmuseology.files.wordpress.com/2021/04/thistle-visible-storage-research-report-1987-cameron-ames-1988-1.pdf [Analysis of the visible storage mode of museum presentation using 8 examples of its use & recommendations on how it should be improved as well as comments on this report from 2 museum directors whose museums were employing this concept.]

Thistle, Paul C. 1990. "Visible Storage for the Small Museum." *Curator* 33 (1): 49-62 provides a clean copy of the full article at https://miscellaneousmuseology.files.wordpress.com/2021/05/thistle-visible-storage-curator-1990-cover-offprint-r2.pdf (accessed 25 May 2021). [This piece also was reprinted in *Care of Collections. Leicester Readers in Museum Studies*. (London & New York: Routledge, 1994), pp. 187-196 with editorial comment "essential reading for anyone considering the visible storage option."].

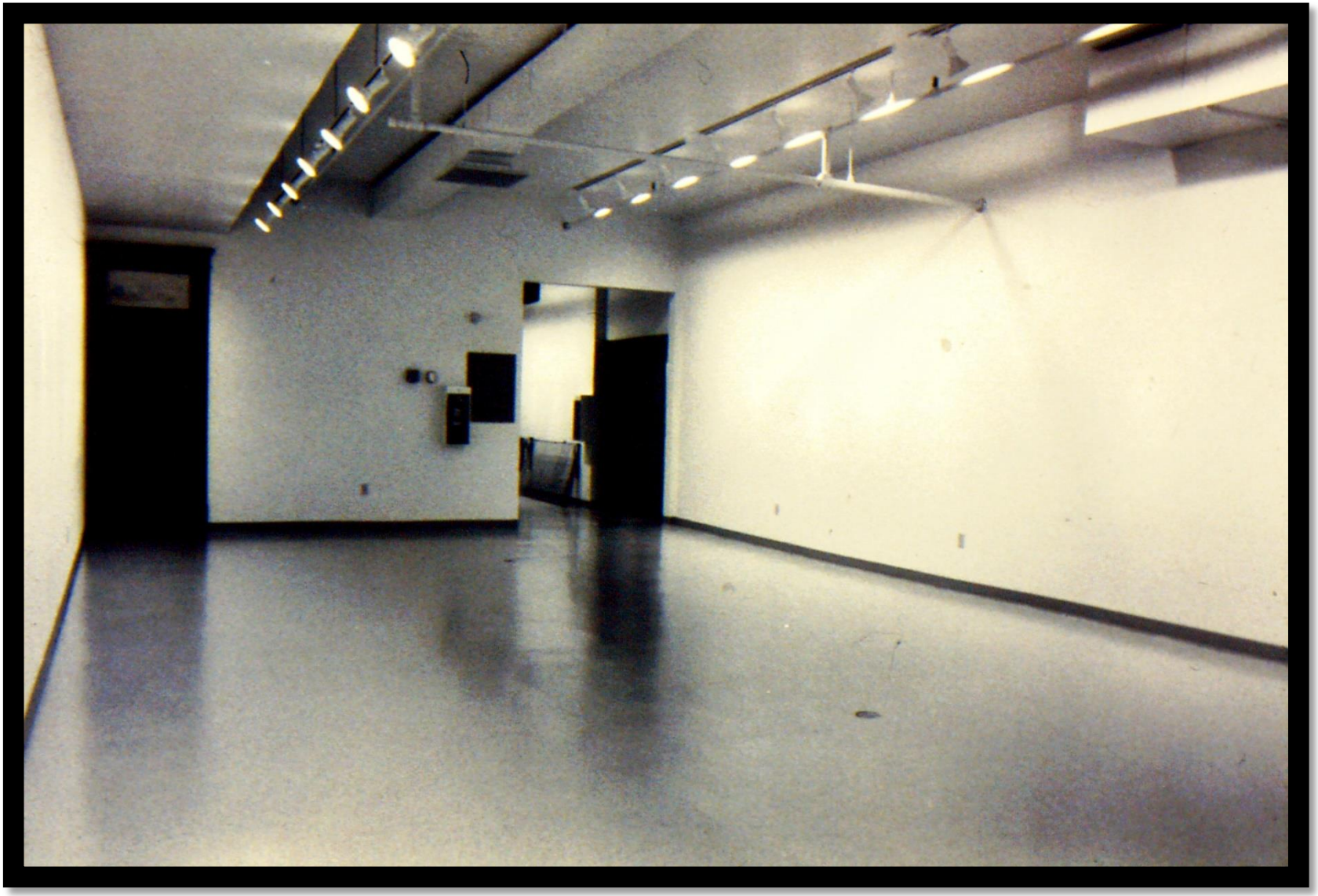
VISIBLE STORAGE DRAWER INNOVATION

Thistle, Paul C. 1997 [reprint of *Curator* article above] **In Simon Knell ed. *Care of Collections. Leicester Readers in Museum Studies* (London & New York: Routledge, 1994 & 1997),** pp. 187-196 [with editorial comment "essential reading for anyone considering the visible storage option." [begins at page 207] **https://books.google.ca/books?id=7q2IAgAAQBAJ&pg=PA207&lpg=PA207&dq=Paul+C.+Thistle&source=bl&ots=34N9LCLhiR&sig=dCIT7-tyFlEm25V13YtligTB7LE&hl=en&sa=X&ei=9TUtVaXEDI62yQSCwYCYDw&ved=0CC4Q6AEwBTgK#v=onepage&q=Paul%20C.%20Thistle&f=false ; first page abstract at http://onlinelibrary.wiley.com/doi/10.1111/j.2151-6952.1990.tb00977.x/abstract .**

Thistle , Paul C. 2003. "Too Much of a Good Thing?: Critical Reflection on Visible Storage" 35 mm slides for the Logan Museum of Anthropology Logan Lunch & Lecture, Beloit College, WI, 19 June [Slides with many later additions are seen in my blog post below.]

Thistle, Paul C. 2021. "Visible Storage Report Updated with 180+ Images." *Critical Museology Miscellanea* blog posted May 11, 2021 at https://miscellaneousmuseology.wordpress.com/2021/05/11/visible-storage-report-updated-with-180-images/ [analysis of the visible storage mode of museum presentation & recommendations of improvements]**.**

BUILDING RENOVATION FINISHED!



BUILDING RENOVATION UNDERMINED!

N.B. INSPECT FOR “DEFICIENCIES”

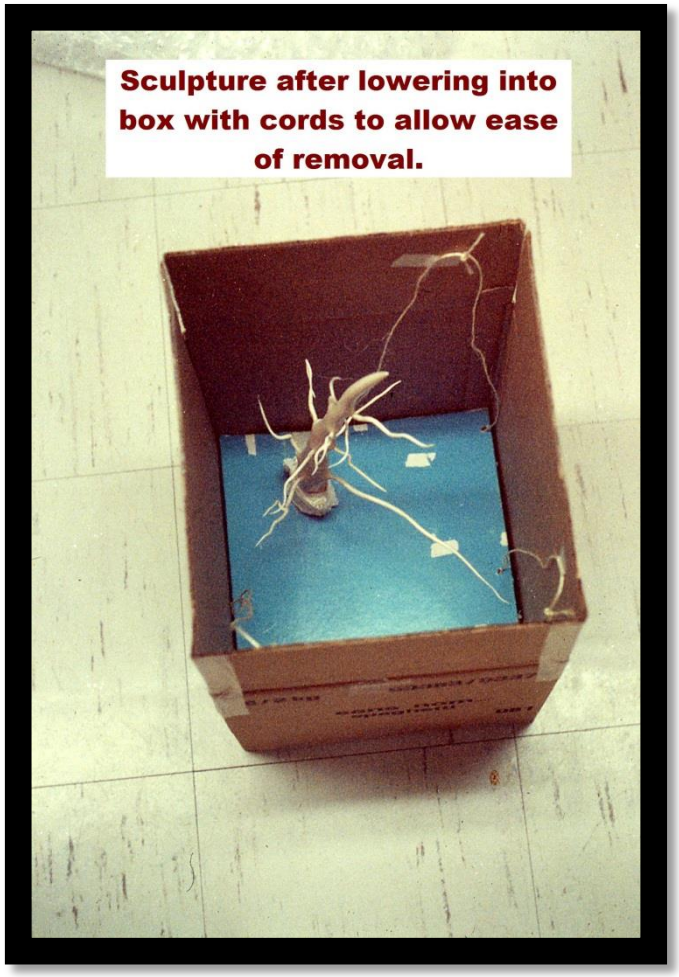
OCCUPYING RENOVATED BUILDING

PREPARING MUSEUM MOVE

Box lists created during packing maintained intellectual control over every object throughout the move.

PREPARING MUSEUM MOVE

PACKING ON A BUDGET



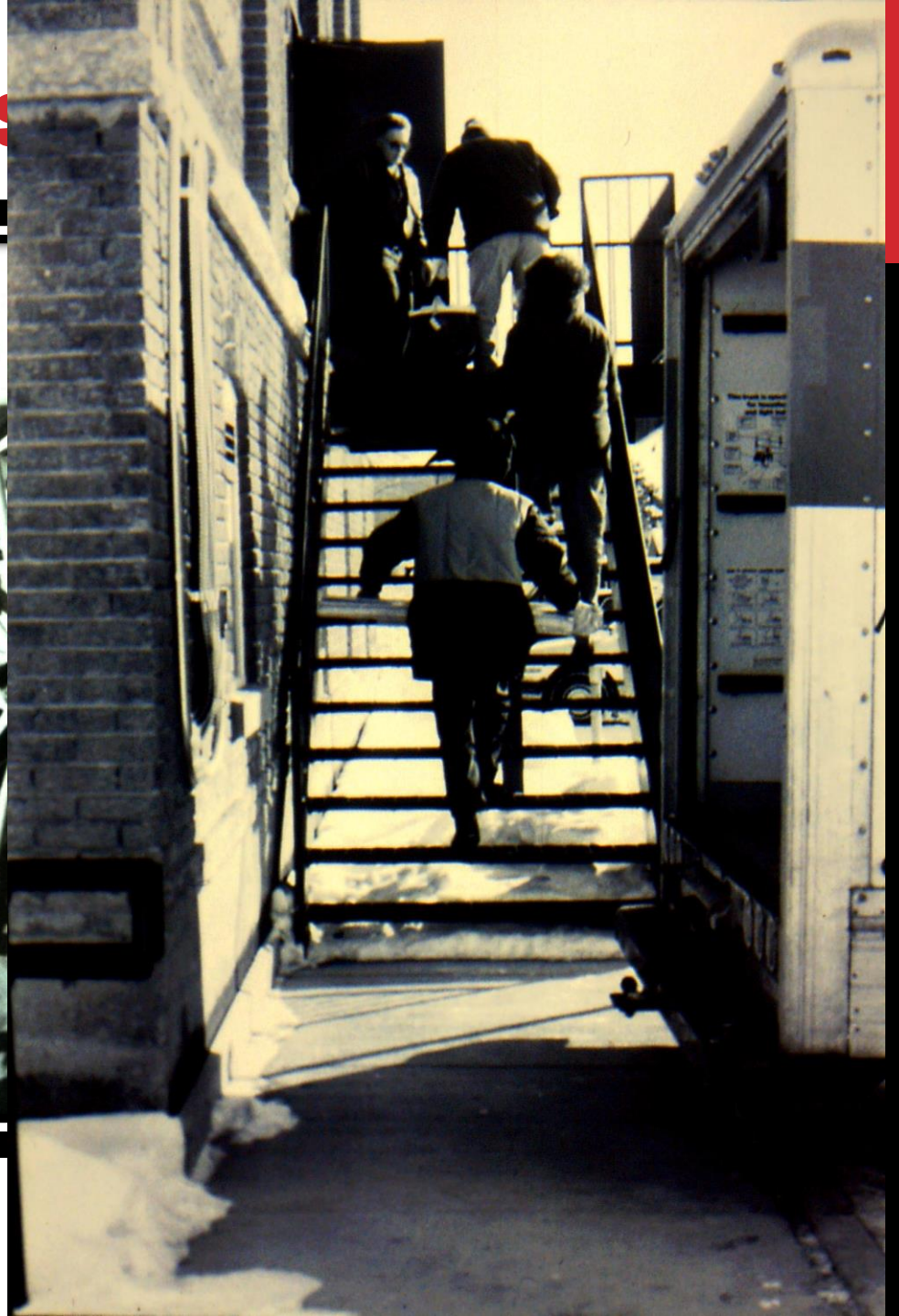
REHOUSING ENCLOSURES

EQUIPPING ‘UNDER-ENGINEERED’ STORAGE

EQUIPPING STORAGE WITH VOLUNTEERS

MOVING THE MUSEUM COLLECTIONS

MOVING THE MUS



STORAGE MOVE SORT

Boxes each had unique number & target location code to maintain intellectual control through box packing lists.

STORAGE *SANS* STRUCTURAL STEEL *DETAIL*

<u>Without mobile storage units</u>, nearly full after unpacking.

CONSOLIDATE COLLECTIONS

EXHIBIT DEVELOPMENT

Founder Sam Waller's background.

EXHIBIT DEVELOPMENT

EXHIBIT DEVELOPMENT

New exhibits on Mr. Waller installed

PHASE 1 EXHIBIT AS BUILT

DOORLITE FIX

PHASE 4 EXHIBIT DEVELOPMENT

TEMPORARY EXHIBIT SPACE

Small office walls removed. Photo taken from middle of former County Court Clerk's Office shown earlier.

TEMPORARY EXHIBIT SPACE

TEMPORARY EXHIBIT SPACE

INTERPRET HOW TO LEARN FROM OBJECTS

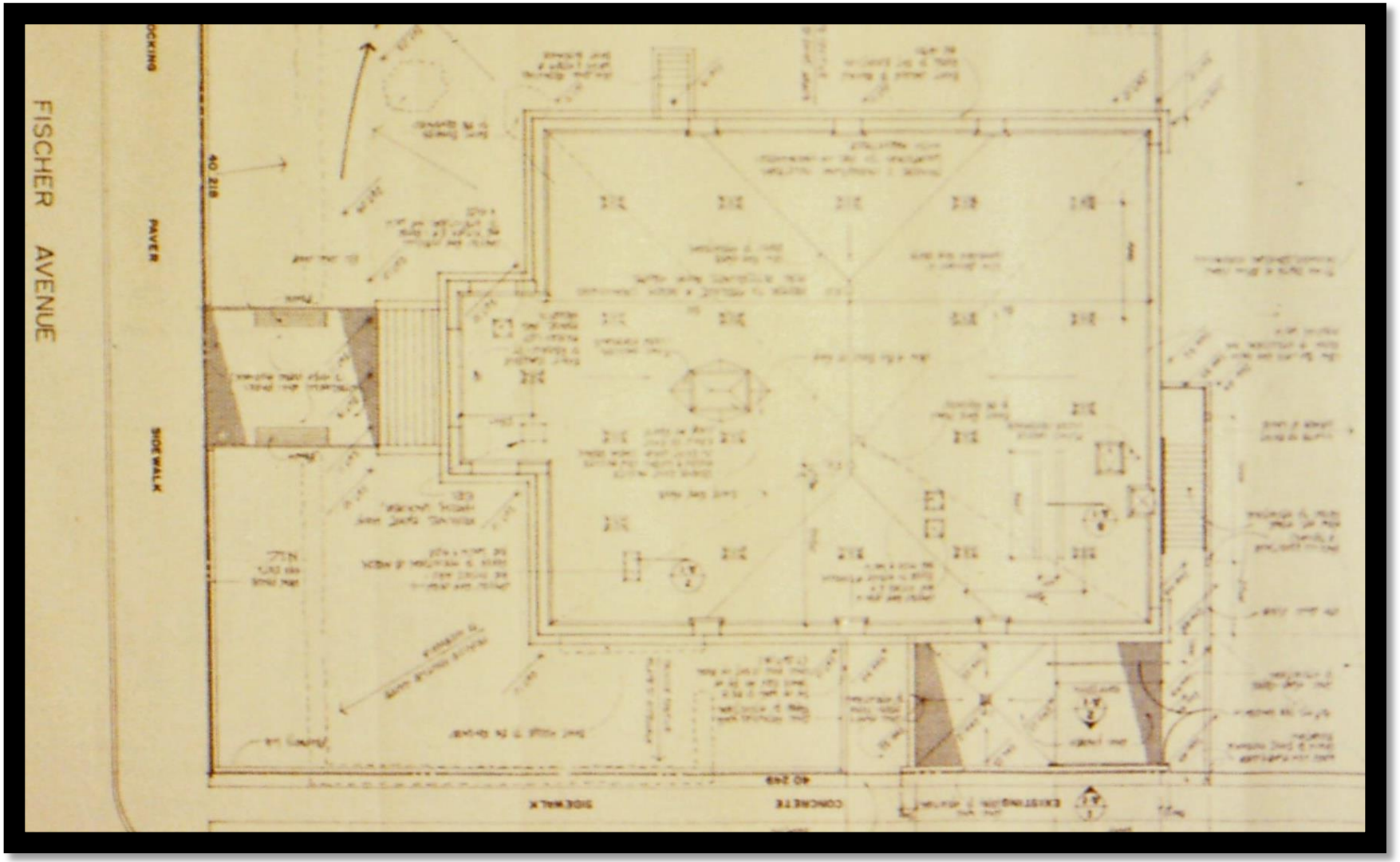
CONSIDERATIONS IN ADAPTIVE RE-USE PROJECTS

COMPROMISES

SIDE ENTRANCE AT TAKEOVER, 1987

SIDE ENTRANCE DEMOLITION

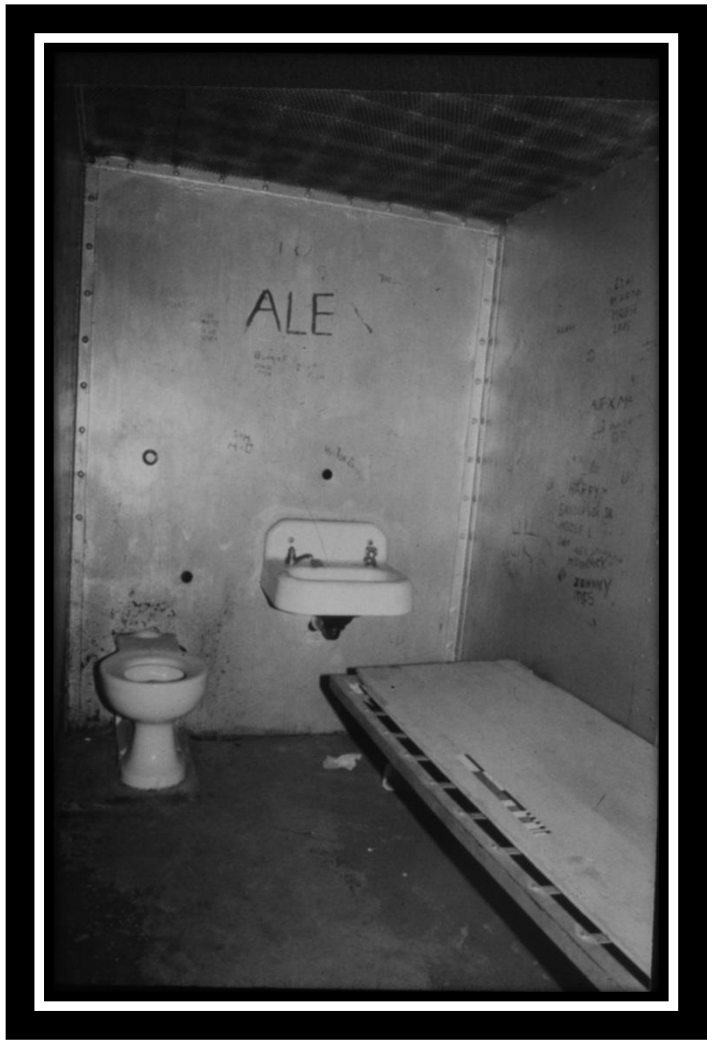
SIDE ENTRANCE HANDICAPPED RAMP



DELIBERATE DESTRUCTION OF ORIGINAL HERITAGE FEATURES

PROGRAMMING SPACE?

Remember the male cells?



Female cells kept for exhibit purposes.

PROGRAMMING SPACE

Former male cell block now functional programming space

KEY SUPERVISORY CAUTION

One cold night, <u>water cascaded down the front steps!</u> Some insulation had been neglected. Sprinkler pipe froze & burst. <u>Daily on-site supervision of construction by owner is crucial</u>!

KEY PROJECT PLANNING RESOURCES

Herskovitz, Robert *et al*.2012. ***Building Museums: A Handbook for Small & Midsize Museums****.* St. Paul: Minnesota Historical Society Press **[PLEASE, don't carry out ANY museum building project without studying this important resolutely practical resource first!** Preview at https://www.google.ca/books/edition/Building_Museums/BDKsM6pCjOYC?hl=en&gbpv=1&printsec=frontcover].

See Thistle, Paul C. 2016. **"Book Reviews: *Building Museums: A Handbook for Small & Midsize Museums* by Robert Herskovitz *et al*."** *Material Culture: The Journal of the Pioneer America Society* 48(1): 79-81 [substantial excerpt found at https://www.questia.com/library/journal/1P3-4000556711/building-museums-a-handbook-for-small-and-midsize & full text as approved by journal editors prior to publication at https://miscellaneousmuseology.files.wordpress.com/2018/02/building-museums-recommendations-for-second-edition-by-thistle.pdf].

N.B. SEE Paul C. Thistle's additional 10 pp. 2013 submission to the publisher "Building Museums Recommendations for Second Edition" at https://miscellaneousmuseology.files.wordpress.com/2018/02/building-museums-recommendations-for-second-edition-by-thistle.pdf**.**

PROJECT PLANNING RESOURCES

Thistle, Paul C. 2017. "Adaptive Re-Use Project to House The Sam Waller Museum, 1984 – 1991." Narrated PowerPoint presentation with significant details on a *very* complex $1.7 million capital project to successfully renovate a provincially designated historic site to create a professional museum standard facility. To view this large file with narrated PowerPoint, click Enable Editing / Slide Show / OK graphics card warning / From Beginning [local history slides 2-29 can be skipped] at https://miscellaneousmuseology.files.wordpress.com/2017/12/adaptive-re-use-project-for-the-sam-waller-museum-narration-2.pptx

Thistle, Paul C. 2015. "Bordering on Folly: Adaptive Re-Use of a Heritage Structure to House The Sam Waller Museum (or Murphy's Law Run Amok)" presented at the Ontario Museum Association Annual Conference Redefining Borders, Windsor, ON, 6 November 2015 [abstract & author biography are available] at https://members.museumsontario.ca/programs-events/conference/Conference2015/Heritage-Buildings-Adaptive-Reuse .

Thistle, Paul C. 1986 12 Waller Museum Redevelopment Value *Little Northern Museum Scene* No. 16, Dec. 1986 [Museum values & support issues; Waller Museum adaptive re-use values. Delays in the project gave cause for outlining its important values for the institution & the community.]

FINAL CAUTION (from Paul's suggestions to publisher)

Green URL below now replaced by
https://solvetasksaturation.files.wordpress.com/2021/03/fullyloadedcamelspositionpaper4.pdf

http://groups.yahoo.com/group/museumworker/ accessed 1 May 2013), *Building Museums* makes no mention of the impact of a design and build project on the well-being of museum board, staff, and volunteers. The onerous tasks of preparing to construct new museum spaces, raising sufficient funds, supervising the project, & the extremely strong pressures to open the finished product as soon as possible are characterised by extremely high stakes. These overbearing pressures & additional work take a *very* heavy toll on everyone involved in a museum construction project. It is crucial, therefore, that rest and recovery also are part of the planning for a capital project. Otherwise, museum workers

Chronic Stress Syndrome

Healthy stress allows Rest & Recovery; harmful stress does not.

(from Dr. David Posen's 2013 book *Is Work Killing You?*)

FINAL CAUTION

The Sam Waller Museum founder did some taxidermy & had a sense of humour.

Heavy demands of an adaptive re-use project puts museum staff & volunteers at risk of harm to their physical, mental, family, social, & spiritual health.

Scheduling rest & recovery for all concerned is an absolute necessity!

See analysis & help in *Solving Task Saturation for Museum Workers* blog [first Google hit] https://solvetasksaturation.wordpress.com/

BAD ADAPTIVE RE-USE EXAMPLES!

Rethinking the Future. n.d. "10 Most Creative Adaptive Reuse Projects" [author of this podcast judges most as absolutely atrocious examples of inappropriate & totally incompatible modern insertions cut into the heritage buildings historic fabric as seen] at **https://www.re-thinkingthefuture.com/architects-lounge/a318-10-most-creative-adaptive-reuse-projects/. This is architectural *DESIGN RUN AMOK*!**

Convent de Sant Francesc in Spain by David Closes © Jordi Surroca

Elbphilharmonie in Germany by Herzog & de Meuron © Iwan Baan

OTHER ADDITIONAL RESOURCES

PDF of this PPT: ???

Urban Design. 2023. "What are the benefits and challenges of adaptive reuse of heritage buildings?" *LinkedIn* [NOTE: "Powered by AI"] at https://www.linkedin.com/advice/0/what-benefits-challenges-adaptive-reuse-heritage-buildings .

Gravagnuolo, A., Micheletti, S., & Bosone, M. A. 2021. 'Participatory Approach for "Circular" Adaptive Reuse of Cultural Heritage. Building a Heritage Community in Salerno, Italy.' *Sustainability* 4812 at https://doi.org/10.3390/su13094812 .

Mısırlısoy, Damla & Günçe, Kağan. 2016. "Adaptive reuse strategies for heritage buildings: A holistic approach." *Sustainable Cities and Society* Vol. 26, Oct. 2016, pp. 91-98 at https://www.sciencedirect.com/science/article/abs/pii/S2210670716301044?via%3Dihub#preview-section-abstract .

Bullen, Peter A. & Love, Peter E.D. 2011 "Adaptive reuse of heritage buildings." *Structural Survey* Vol. 29 Iss. 5 pp. 411 – 421 http://dx.doi.org/10.1108/02630801111182439 .