



The Challenges of Upgrading Historic Buildings for Sustainability

Department of the Interior Conference on the
Environment
Portland, Oregon

April 28, 2010



National Park Service
US Department of the Interior



Solution meets
the Secretary
of the Interior's
Standards.

Solar panels are not
visible from public
view...





Balfour-Guthrie Building Portland, OR

LEED – Silver
Rating





Kelsey Building,
Grand Rapids, MI
LEED – NC Certified

New “sustainable”
construction requires
significantly more energy





When LEED was first introduced, you got 1 point for saving this...

...And 1 point for installing one of these





Historic buildings have many sustainable features and have access to existing infrastructure...

Global CO₂ Emissions by Sector

#1. Buildings

#2. Transportation

#3. Industry

Source: Energy Information Administration (2006). Emissions of Greenhouse Gases in the United States.

**The impact of building in the US
(and world-wide) is substantial...**

Historic buildings often tell stories....





Main Department
of the Interior Building
Washington, DC

Seeking Silver
LEED
Certification



Sustainable Initiatives in National Parks

Marsh-Billings-Rockefeller National Historical Park



Green Inside Out:

A National Park/Community Partnership for Sustainability



Marsh-Billings-Rockefeller National Historical Park Woodstock, VT

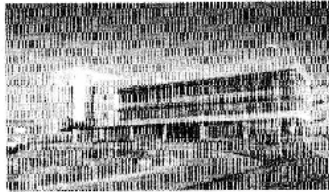
Golden Gate Park San Francisco, CA



Executive Orders mandate that 15% of all Federal Buildings over 5,000 sq. ft. be 'greened' by 2015



2008 Department of the Interior Sustainable Buildings Implementation Plan



LEED Gold - National Park Service Midwest Regional Office - Omaha, Nebraska - GSA Designated Low cost Space

Willie R. Taylor

Willie R. Taylor,
Director, Office of
Environmental Policy and
Compliance

Date

6/20/08

Debra L. Sonderman

Debra L. Sonderman,
Director, Office of Acquisition
and Property Management

Date

6/19/08

DOI SB A-C Tool FINAL Jan 27,2010 [Compatibility Mode] - Microsoft Excel

Home Insert Page Layout Formulas Data Review View Add-Ins

Clipboard Font Paragraph Alignment Number Styles Cells Editing

Security Warning: Macros have been disabled. Options...

C6 Use a collaborative, integrated planning and design process that:

1 U.S. Department of the Interior Sustainable Building Assessment and Compliance Tool
 2 Guiding Principles for Sustainable New Construction and Major Renovations
 3 Required for building projects with gross construction costs of \$2m or greater. To be used during all design and construction phases.
 4 Checklist also serves as compliance assessment and verification form, to be completed post-construction.

Name _____ Signature _____

Requirements

Title _____

Bureau _____ Location _____

Building FRPP ID # _____

Integrated Design

Use a collaborative, integrated planning and design process that initiates and maintains an integrated project team as design evolves.
 Integrate the use of OMB's A-11, Section 7, Exhibit 300.
 Establish performance goals for siting, energy, water, materials, and ensure incorporation of these goals throughout the project lifecycle.
 Consider all stages of the building's lifecycle, including design, construction, operation, and maintenance.

Commissioning

Employ commissioning practices tailored to the size and complexity of building components and systems and help ensure that an experienced commissioning provider.
 Include commissioning requirements in construction documents.
 A commissioning plan.
 Verification of the installation and performance of systems.
 A commissioning report.

Energy Efficiency

For new construction: reduce the energy use by 30% compared to ASHRAE 90.1-2007 baseline building design if design information is available.
 For major renovations: reduce the energy use by 20% compared to ASHRAE 90.1-2007 baseline building design if design information is available.
 Laboratory spaces may use the Labs21 Laboratory Mode.

On-Site Renewable Energy

Per the Energy Independence and Security Act (EISA) Section 432, implement renewable energy generation projects on agency property for agency use, when lifecycle cost effective.

Measurement and Verification

Per the Energy Policy Act of 2005 (EPAct) Section 103, install building level electricity meters to track and continuously optimize performance.
 Per EISA Section 432, include equivalent meters for natural gas and steam.

Benchmarking

Alternative 1: Compare actual performance data from the STAR® Portfolio Manager for building and space types to the design target, or the design target, or the design target.

NC-HR Checklist & Sig NC-MR Guidance

Ready

start

Next TAB

	A	B	C	D	E	F	G	H
1	U.S. Department of the Interior Sustainable Building Assessment and Compliance Tool							
2	Guiding Principles for Sustainable New Construction and Major Renovations							
3	Required for buildings with a Current Replacement Value of \$2m or greater.							
4	To be used during operations and maintenance. Checklist also serves as compliance assessment and verification form.							
5	Requirements							
6	Name _____ Signature _____							
7	Title _____							
8	Bureau _____ Location _____							
9	Building FRPP ID # _____							
10	Integrated Design			Meets (if grey, meet one option)	Does Not Meet	In Process (Provide Explanation)	Harms Historic Integrity	Explanation
11								
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15	Commissioning							
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21	Energy Efficiency							
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26	On-Site Renewable Energy							
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Intro NC-MR Checklist & Sig NC-MR Guidance EB-OM Checklist & Sig EB-OM Guidance HB Defs

DOI Sustainable Building Assessment and Compliance Tool – Sustainable New Construction & Major Renovation & Guiding Principles for Existing Buildings/Operations and Maintenance

	A	B	C	D	E
1		U.S. Department of the Interior Sustainable Building Assessment and Compliance Tool			
2		NEW CONSTRUCTION AND MAJOR RENOVATION GUIDANCE			
3		(Required for building projects with gross construction costs of \$2m or greater)			
4		Compliance with Guiding Principles (GP) for NC/MR Projects (after completion of construction)	Examples: How to Document Compliance	Examples: How to Make Progress Toward Compliance	Guidance for Renovations of Historic Buildings (Required for Buildings listed in or eligible for the National Register of Historic Places, and National Historic Landmarks)
5		Is the building historic? Is it eligible for or listed in the National Register of Historic Places or is it a National Historic Landmark?	See Historic Status field in the Federal Real Property Profile (FRPP). If the Historic Status of a building is (1) National Historic Landmark, (2) National Register Listed, or (3) National Register Eligible, all considerations in the "Guidance for Historic Buildings" column must be followed. External modifications to (4) Non-contributing Element of NHL/NRL District should be reviewed for potential adverse impacts to the historic character of the district. If the Historic Status of a building is (5) Not Evaluated, then steps must be taken to evaluate the building for its eligibility on the National Register of Historic Places. If the Historic Status of a building is (6) Evaluated, Not Historic, then the building is not subject to the Guidance for Historic Buildings column.	For historic buildings, rehabilitation is equivalent to renovation. For a definition of rehabilitation and more information on proper rehabilitation techniques for historic buildings and historic building materials, refer to the Secretary of the Interior's Standards for Rehabilitation With Guidelines for Rehabilitating Historic Buildings: http://www.nps.gov/history/hps/tps/tax/rh/b/stand.htm For basic guidance on defining the character of a historic building, refer to Preservation Brief 17 - Architectural Character - Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character: http://www.nps.gov/history/hps/tps/briefs/brief17.htm For a topical index of preservation-related publications, please reference Technical Preservation Services' Publications and Online Materials: http://www.nps.gov/history/hps/tps/topics	This column outlines key preservation concerns and requirements for historic buildings. See <i>Definitions for the Guidance for Historic Buildings Checklist and Other Pertinent Information Relating to Historic Buildings</i> on the Historic Building Definitions tab for additional guidance. For each Guiding Principle and subtopic that applies to historic buildings, the key question to keep in mind is, "Will the proposed changes maintain the historic character and integrity of the building?" If yes, continue on to the next checklist question. If no, evaluate whether proposed changes can be modified using the guidance provided so that the changes to the historic character and integrity of the building are minimized.

“New Construction/Major Renovation Guidance”
First question...Is the Building Historic?

	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2	Definitions and Other Pertinent Information for the Guidance on Historic Buildings												
3													
4	Advisory Council on Historic Preservation - The mission of the ACHP is to promote the preservation, enhancement, and												
5	productive use of the Nation's historic resources, and to advise the President and Congress on national historic preservation policy.												
6	http://www.achp.gov/												
7													
8	Character - The visual aspects and physical features that comprise the appearance of every historic building.												
9													
10	Preservation Brief 17 – <i>Architectural Character – Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their</i>												
11	<i>Character</i> http://www.nps.gov/history/hps/tps/briefs/brief17.htm												
12													
13	Preservation Brief 18 – <i>Rehabilitating Interiors in Historic Buildings – Identifying and Preserving Character-Defining Elements</i>												
14	http://www.nps.gov/history/hps/tps/briefs/brief18.htm												
15													
16	Character-Defining Features/Elements - These include the overall shape of a building, its materials, craftsmanship, decorative												
17	details, interior spaces and features, as well as the various aspects of a building's site and environment.												
18													
19	Preservation Brief 17 – <i>Architectural Character – Identifying the Visual Aspects of Historic buildings as an Aid to Preserving Their</i>												
20	<i>Character</i> http://www.nps.gov/history/hps/tps/briefs/brief17.htm												
21													
22	Compatible Treatment - Any alteration or addition to the interior or exterior of a historic building that is harmonious or appropriate to												
23	the character of the building in design, scale, massing, materials, texture, and other visual qualities.												
24													
25	Cultural Landscape - A geographic area, including both cultural and natural resources and the wildlife or domestic animals therein,												
26	associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.												
27													
28	<i>Secretary of the Interior's Standards for the Treatment of Historic Properties and Guidelines for the Treatment of Cultural</i>												
	<i>Landscapes.</i> http://www.nps.gov/history/hps/hli/landscape_guidelines/index.htm												
	Preservation Brief 36: <i>Protecting Cultural Landscapes: Planning, Treatment, and Management of Historic Landscapes.</i>												

Checklist includes a section with definition and other
Guidance on how to respect historic resources...

National Register of Historic Places

NATIONAL *of Historic Places 1966 to 1994* REGISTER



NATIONAL REGISTER BULLETIN

Technical information on the the National Register of Historic Places:
survey, evaluation, registration, and preservation of cultural resources

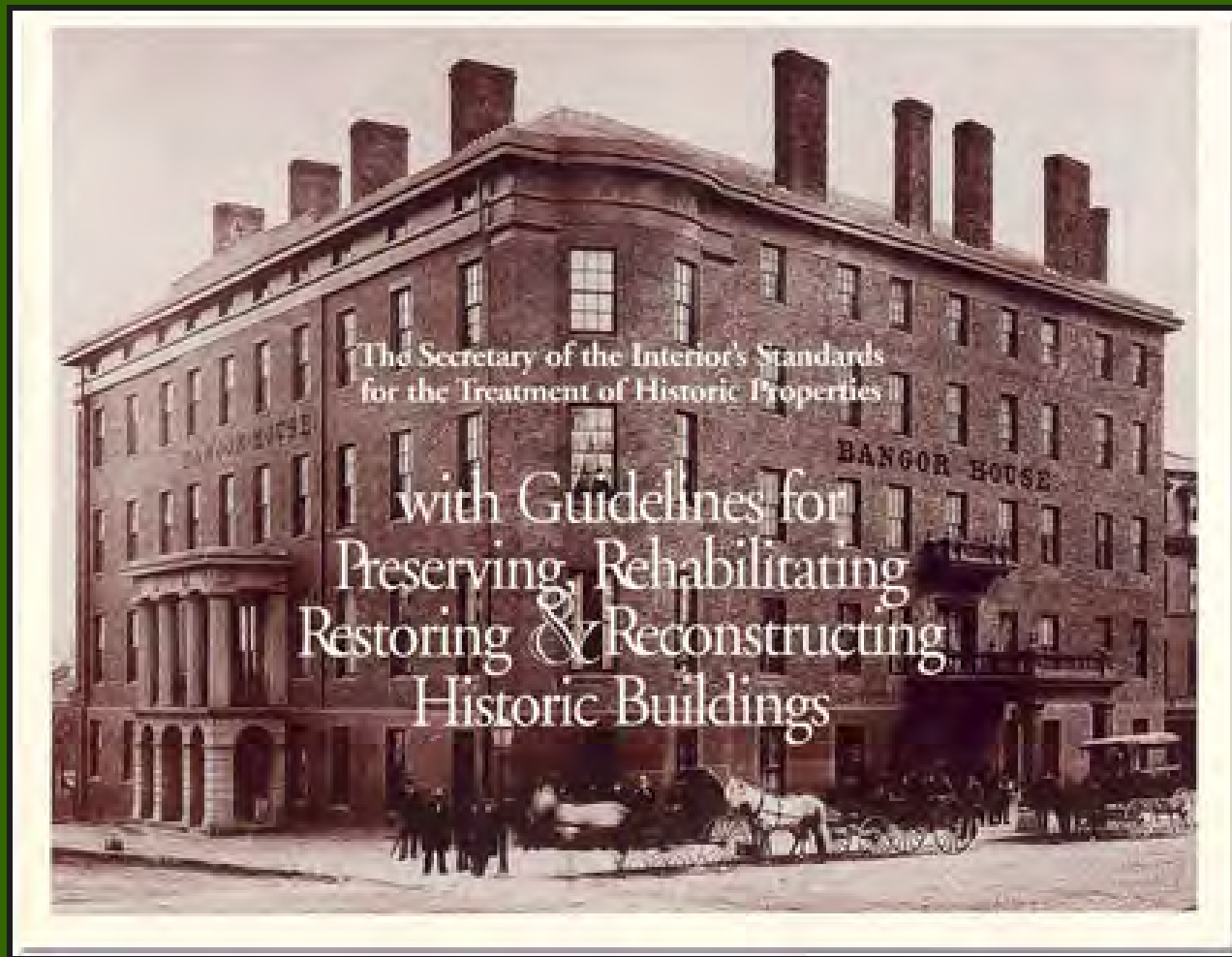


U.S. Department of the Interior
National Park Service
Cultural Resources
National Register, History and Education

How to Complete the National Register Registration Form



The Secretary of the Interior's Standards



The Pearly Gates...





The Secretary
of the Interior's
Standards for
Rehabilitation &

Illustrated
Guidelines
for
Rehabilitating
Historic
Buildings



U.S. Department of the Interior
National Park Service
Cultural Resources
Heritage Preservation Services

The Secretary of the Interior's Standards for Rehabilitation

The most flexible of the four "Treatment Standards"...

Principles of Rehabilitation

1. Repair and retain rather than replace...



2. Retain the historic character of a building even if its use changes...



3. New additions or related new construction must be compatible with the historic building... including adding new features for sustainability





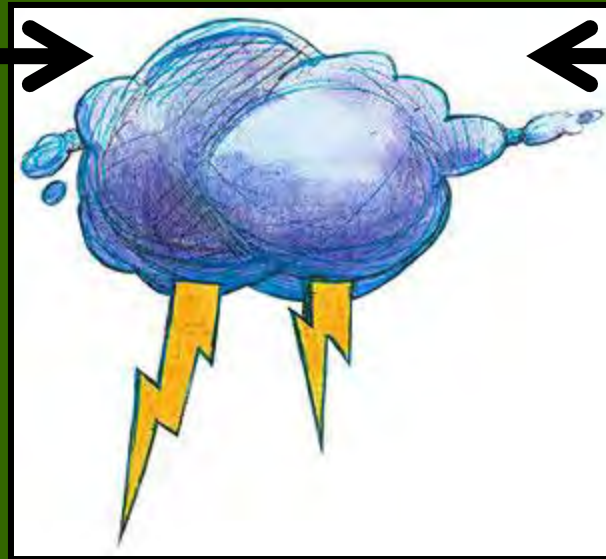
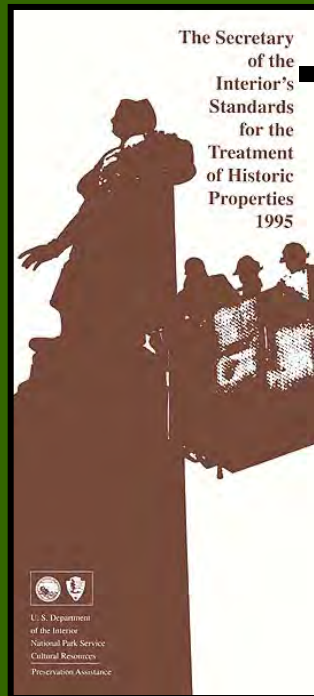
“It’s not easy being green!!”...Kermit the Frog

Principles of Sustainability

1. Optimize Site Potential
2. Minimize Energy Consumption
3. Protect and Preserve Water
4. Conserve Materials and Resources
5. Enhance Indoor Environmental Quality
6. Optimize Operational and Maintenance Practices



Where are there disconnects
between
historic preservation and
sustainable design and where
do they work together nicely?



Or other “green”
rating systems...

Few points are given for keeping materials in place and retaining historic character



Before

Crawford Manufacturing
Building
(The Dutch Roof Building)
Richmond, VA



Reuse or recycling of materials preserves the character of the building



Crawford Manufacturing
Building
Richmond, VA

After

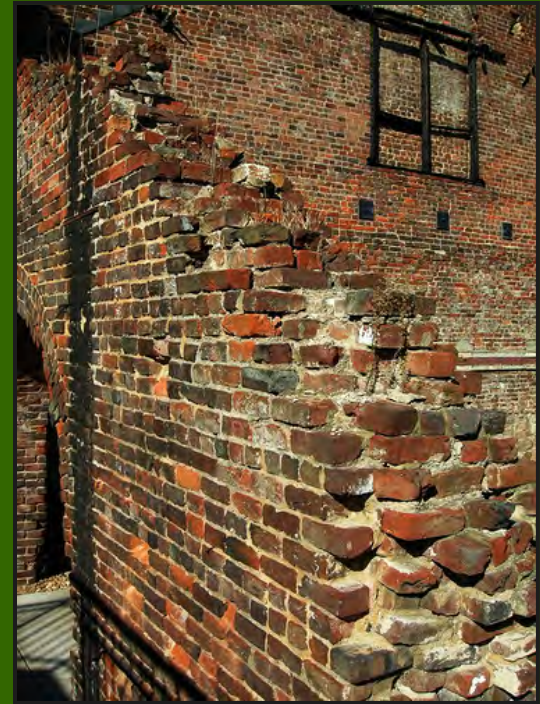
New Use: Office
sensitively inserted in
industrial interior



Historic buildings were often designed to be energy efficient...



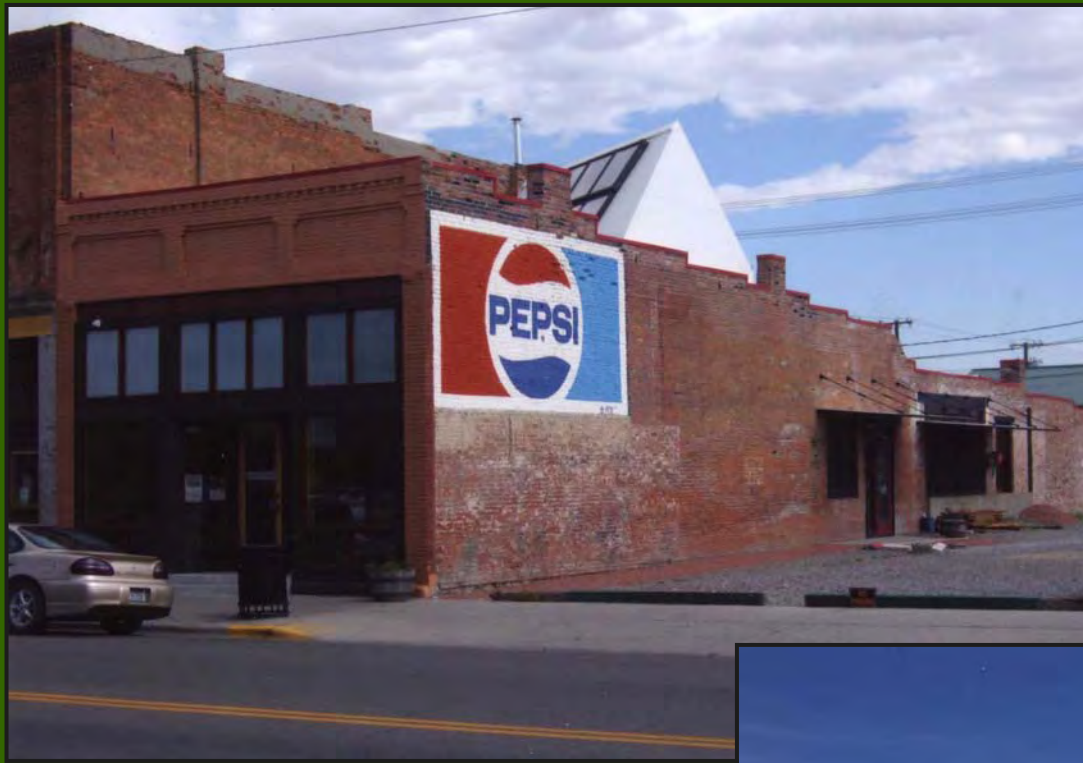
Side porch on house in historic Charleston, SC catches ocean breezes



Thick masonry walls have insulating properties



Covered porches, eaves and awnings provide shade and open, operable windows provide ventilation

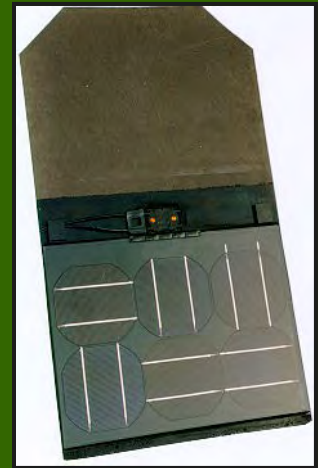


Does **NOT** meet
the Standards!!

Large and highly visible
solar panel
negatively impacts
the historic character of the
building and the
historic district



Solar panels don't have to be HUGE and can be hidden...



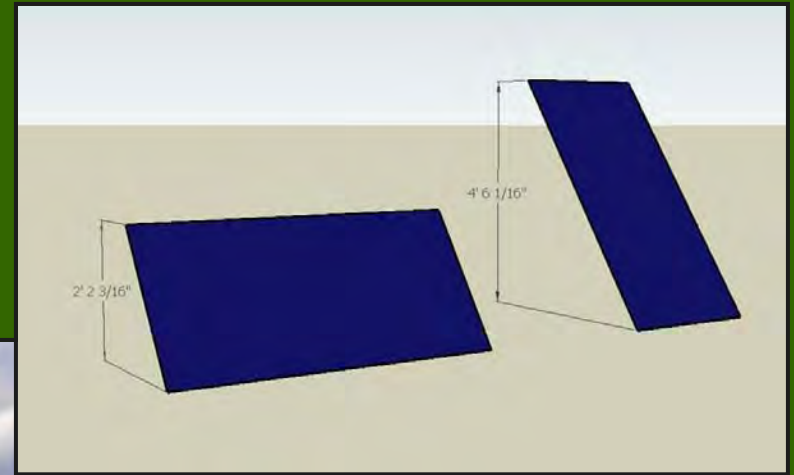
Obama and Biden, Denver, CO
Washington Post – 2/28/09

Solar laminate roofing
and solar shingles
are promising....



Solar panels are:

- Low in profile
- Hidden by parapet
- Inset from perimeter walls



A more
horizontal
orientation
reduces
visibility

Davis and Furber Machine Company Complex
North Andover, MA



Front of building

Treatment meets the Standards....

On a more modern addition at rear of building, which is not visible from public view

Solar panels may be appropriate on rear or secondary elevations



Roof Gardens





This green roof does
NOT meet the
Standards...

New elements, such as
roof-top gardens,
shouldn't be overly
visible or too
distracting





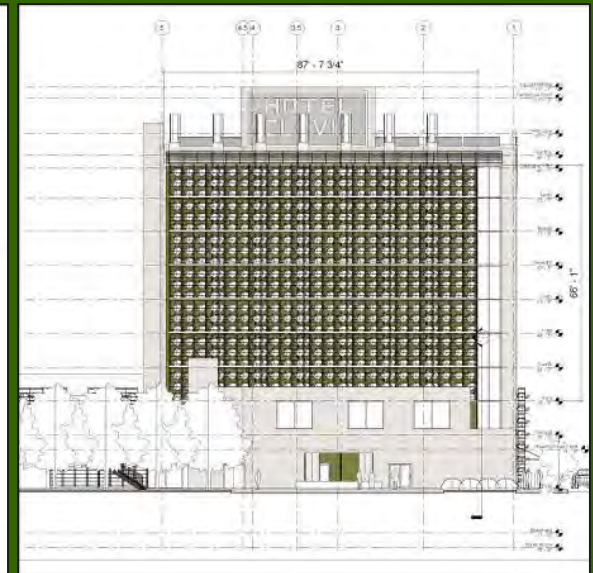
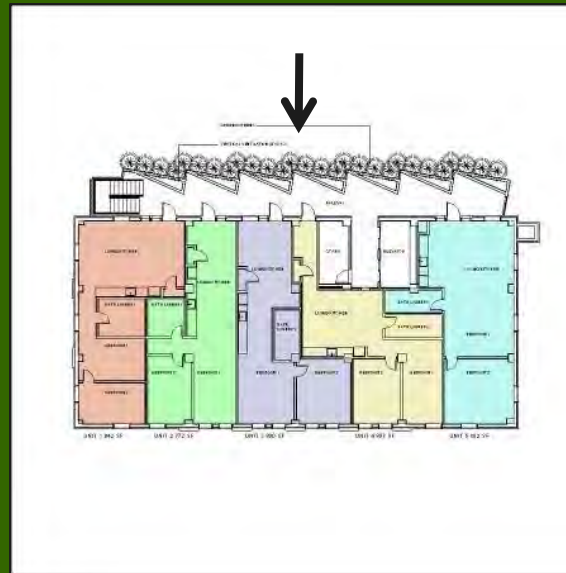
Green roof at large office
building in
Pittsburgh, PA

Meets the Standards....

The proposed
green wall covers
an entire elevation



Historic



Proposed

Treatment
does NOT
meet the
Standards...



White roofs may meet the Secretary's Standards provided they're not too visible...

White roofs on urban flat-roofed buildings cannot be seen from the street



Image credited to "underdown.files.wordpress.com"

You Get LEED Points for DEMOLITION???



Roosevelt School, Salina, KS

This tax incentives project was awarded LEED points for demolishing a non-contributing wing. An unsympathetic alteration to the property was removed and waste material was sorted and recycled.

Windows

Inserting new insulated windows saves energy, but where do the old windows go? And, where do the “new” windows go once their modern materials fail?



The landfill of course!



Modern
vinyl and aluminum
insulated
units generally
CANNOT
be repaired or
recycled like
traditional wood
windows

Saving windows is a green solution!



New storm
window installed



Greysolon Hotel
Duluth, MN

Hundreds of windows were saved in this former hotel by installing new storm windows

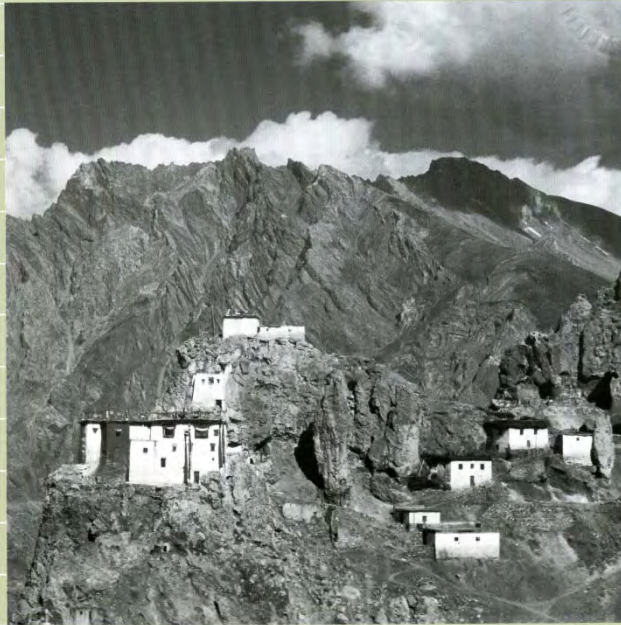
Yes!! to storm windows on industrial steel sash...



Interior storms,
similar to
sliding
patio doors,
align with
window
divisions



Saco-Lowell Shops
Building #15
Lowell, MA



THE JOURNAL OF PRESERVATION TECHNOLOGY

The Association for Preservation Technology

Association pour la préservation et ses techniques

An Analysis of the Thermal Performance of Repaired and Replacement Windows

ROBERT SCORE AND BRADFORD S. CARPENTER

Data and analysis of in-situ thermal monitoring reveal that the repair of aging steel windows offers the opportunity to retain historic building fabric and secure a level of energy performance that can match or exceed that of modern aluminum-framed replacement windows.

Introduction

As federal buildings that were constructed to support the expanding role of the U.S. government and the war effort during the late 1930s and 1940s reach the end of their useful lives, their caretakers are embarking on rehabilitation and modernization projects to meet modern and often greatly expanded performance standards. The original window systems often lack the construction detailing and other characteristics needed to provide a level of performance acceptable for modern office space, such as humidification and energy performance. Many of these window systems have suffered years of neglect and deferred maintenance and owe their longevity largely to the durability of original materials, the robustness of the original construction, and layers upon layers of paint.

A common and as-yet unresolved issue is the final fate of these windows. More often than not, building-renovation projects call for the replacement of original windows with modern replicas rather than the rehabilitation of the existing windows, often under the guise of improving energy performance or occupant safety (blast resistance), with little thought given to the embodied energy in the existing windows or the whole-life energy commitment of the new product. This consideration becomes even more crucial when considering the demands of achieving LEED ratings in a renovation project.

One structure currently being considered for such renovation is the Lafayette Building, a federal office building located in downtown Washington, D.C. (Fig. 1). Originally housing the Export-Import Bank of the United States and more recently the Department of Veteran Affairs, the Lafayette Building has had a long and storied history of federal

use and is being proposed for a significant modernization project. Built in 1940 and designed by the Chicago architectural firm of Holabird and Root, it is a National Historic Landmark.

The building has nearly 1,200 windows along the primary facades and a single interior light court. The windows are constructed of steel shapes and were installed in a double-hung configuration (Fig. 2). The windows are approximately 54 inches wide and 72 inches high and have single glazing without intermediate muntins. Many of the windows exhibit paint flaking and some surface rusting, while others have more significant rusting, particularly at the base of the jambs (Fig. 3). The windows are currently operable and have counter weights in concealed weight pockets. This paper discusses a brief study comparing two options for treating the windows during the planned repair program.

Performance Requirements and Design Options

The Lafayette Building is scheduled to undergo a comprehensive renovation, including upgrades to the mechanical and electrical systems, reprogramming and renovation of interior spaces, and renovations to all exterior facades, including upgrading the windows for blast resistance in accordance with requirements of the General Services Administration (GSA), the building owner. In order to assist the building owner in selecting the most appropriate treatments for the windows, an overall design program for the windows was developed. It identified the performance requirements for the windows, including the following:

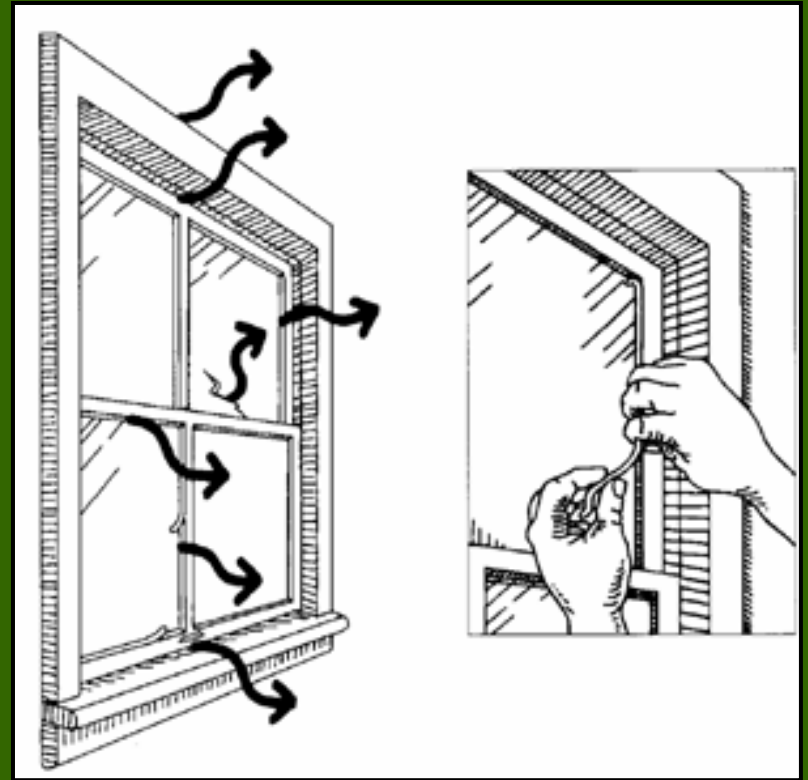
- provide blast resistance per GSA requirements.



Fig. 1. Southwest elevation, Lafayette Building, Vermont Avenue and H Street NW, Washington, D.C. The building's neoclassical exterior has regularly placed, double-hung steel windows. All images by authors.



Caulk and weather strip
historic doors, windows and
other penetrations
to eliminate air infiltration



Back to the Basics....to improve energy
efficiency, treat areas of infiltration first...



Removing historic finishes in primary spaces to add insulation is problematic



Most air escapes vertically, so insulate attics first, followed by other secondary spaces such as basements and crawl spaces...



Using wind power or other forms of energy generated off site, is an easy way to be green without impacting a historic building

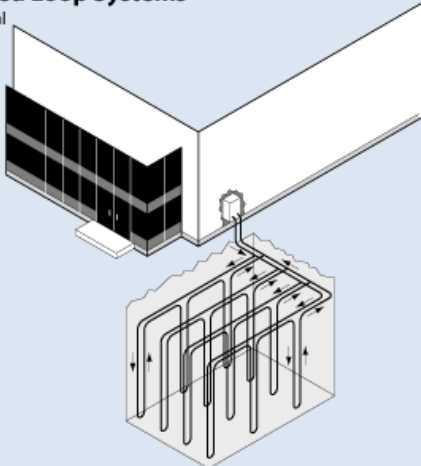




Geothermal heating systems

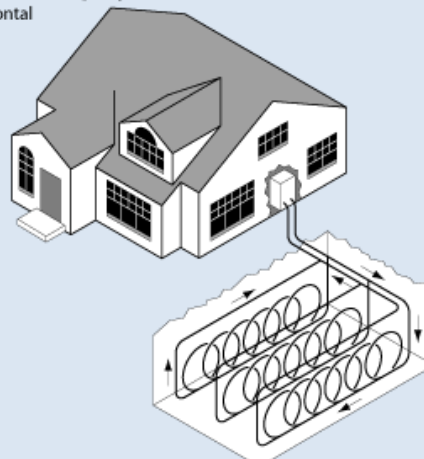
Closed Loop Systems

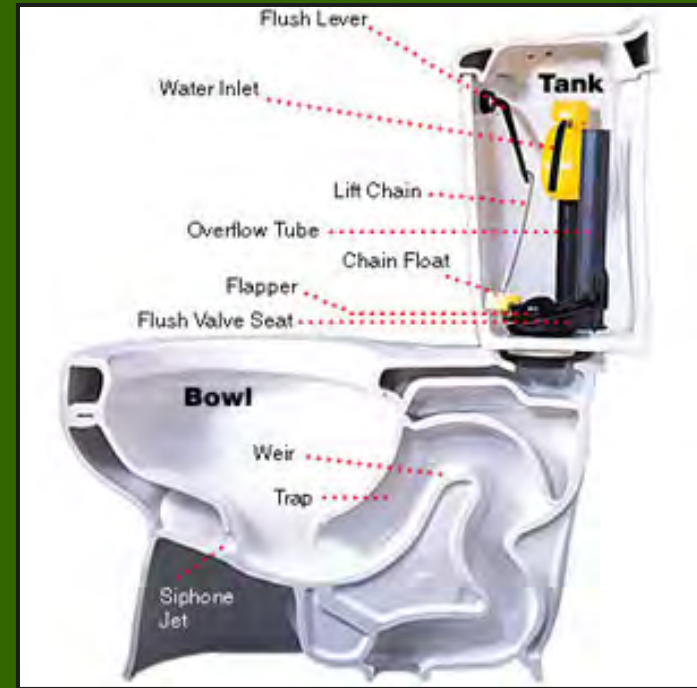
Vertical



Closed Loop Systems

Horizontal





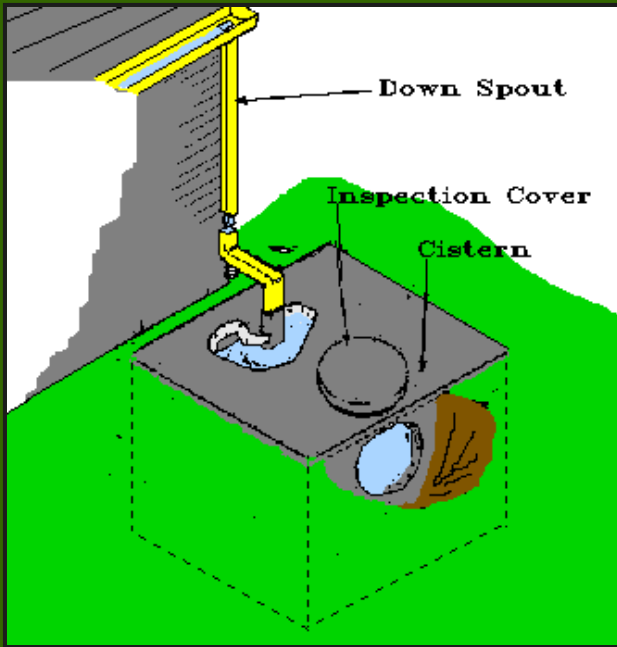
Low flow plumbing
fixtures
have little impact
on historic buildings...

Take into account the impact of water-reduction measures on historic landscapes

North Wales, Warrenton, VA

Working horse farm with
c. 1776 manor house,
early-20th century horse barns
and formal and informal
landscapes





A cistern can be placed below ground and collect water from downspouts with minimal impact



Above ground rain barrel



Start with the basics – a simple pump and hose to irrigate...

Target water usage...

Drip irrigation systems target where water is most needed...



Soaker hoses are efficient



Avoid broadcasting water

Use solar- powered Irrigation systems with timers



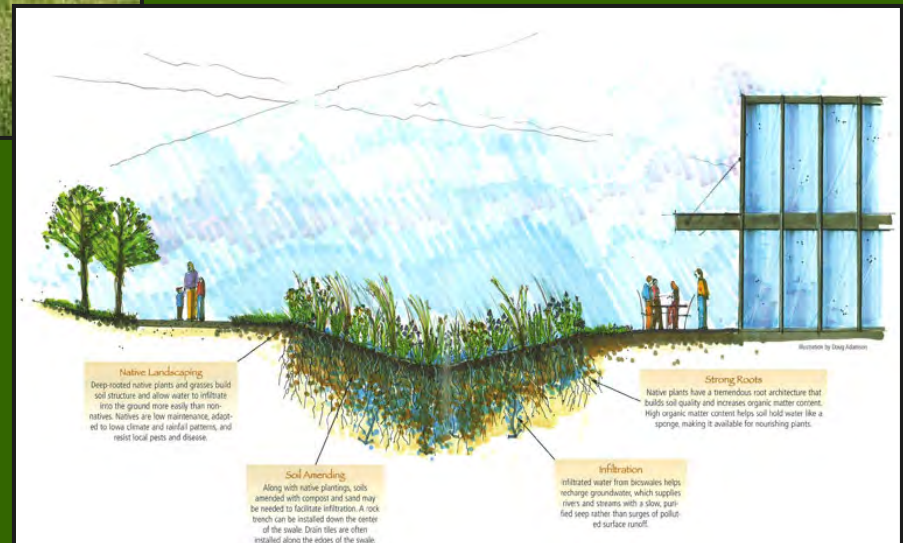
Rain Gardens and Bio-Swales

- Reduce run-off...water goes into the ground as opposed to into storm sewers and then rivers
- Act as a filtration device
- “Rekindle” the absorption/evaporation cycle
- Help irrigate
- Improves ecosystem

A decorative rain garden is appropriate in certain applications...



Bio-swales are more appropriate in areas with less-designed landscapes.



If features are deteriorated beyond repair,
specify compatible, durable and repairable
replacement components...



In Conclusion...

- ❑ Historic preservation principles call for the preservation of historic materials, which is inherently green
- ❑ Sustainable practices should give value to retaining existing materials and character and bolstering energy efficiency
- ❑ The public benefits both from preserving our historic heritage and protecting the earth through environmental care



ITS
NUMBER 52

Interpreting The Secretary of the Interior's Standards for Rehabilitation

Subject: Incorporating Solar Panels in a Rehabilitation Project

Applicable Standards: 2. Retention of Historic Character
9. Compatible Additions/Exterior Alterations

Issue: Enhancing the energy efficiency of a historic building is important. To that end, it is often possible to install features such as solar panels and photovoltaic cells provided they are installed in a sensitive manner. Because these elements must be positioned to take advantage of unobstructed sunlight, the roof of a historic structure is an obvious location. The roofline of a historic building is often a distinctive feature. Therefore, the installation of solar panels should conform to guidance regarding rooftop additions, i.e. that they be minimally visible, to avoid altering the historic character of the building. Historic buildings with a flat roof or parapet can usually accommodate solar panels because the panels will be hidden, while properties with a hipped or gabled roof are generally not good candidates for a rooftop solar installation. Solar panels on historic buildings should not be visible from the public right of way such as nearby streets, sidewalks or other public spaces.

In circumstances where solar collectors are not placed on rooftops, they should only be positioned in limited or no-visibility locations in secondary areas of the property. Vegetation or a compatible screen may also be an option to further reduce the impact of these features on a historic property. For some historic buildings, it may not be possible to incorporate solar panels and meet the Secretary of the Interior's Standards for Rehabilitation.

Application 1 (Compatible treatment):

The rehabilitation of this mid-nineteenth century mill incorporated a large, roof-mounted photovoltaic installation. Although the historic building does not have a parapet wall at the roofline, the height of the building and the arrangement of the panels render the entire installation invisible from the ground. It is important to note that the panels are placed horizontally. Had the panels been installed with a vertical tilt, the angle required to maximize efficiency would have caused the panels to extend significantly higher above the roof. Simply changing the direction in which the panels are tilted can affect their visibility and reduce their impact on the character of the historic property.



Because of the size of this historic mill, a large array of solar panels could be installed on the flat roof without being seen from the ground.



Solar panels installed on the flat roof.



By placing the panels horizontally, the overall height of the installation and its visibility is reduced.

ALTERNATIVE ENERGY

“Interpreting the Standards Bulletin No. 52 – Incorporating Solar Panels In Rehabilitation Projects”

Forum Journal – National Trust For Historic Preservation Spring 2009

ForumJournal

NATIONAL TRUST FOR
HISTORIC PRESERVATION

Spring 2009
Vol. 23 No. 03

POSITIONING PRESERVATION IN A GREEN WORLD



THE SECRETARY'S STANDARDS AND LEED: WHERE THEY WORK TOGETHER AND WHERE THEY DIVERGE

By Audrey T. Tepper

“Cultural resource preservation is intrinsically a form of sustainable conservation. The built environment represents the embodied energy of past civilizations... historic preservation is conservation in every sense of the word.”¹

Preserving a building is often called the ultimate recycling project, yet preservationists commonly fight the stigma that historic buildings are inefficient and require daunting corrective measures to retrofit with energy-saving devices and systems. Green and sustainable design has become an increasingly popular issue in both the preservation and new construction industries. This article will identify the basic principles behind sound preservation practice and green design—when they work well together and when they do not. Preservation and “green” goals overlap, and reconciling their differences is possible, provided both sides strive to be as creative and flexible as possible.

Two different sets of guiding principles are the focus of this discussion: The Secretary of the Interior's Standards for the Treatment of Historic Properties, and Leadership in Energy and Environmental Design, more familiarly known as LEED.

THE SECRETARY'S STANDARDS

The Secretary's Standards lay the groundwork for sensitive preservation practice in the United States and were implemented to

ensure that historic resources are protected. They are used by nearly everyone in the preservation field on local, state, and federal levels.

Two terms commonly used in the Standards—and in historic preservation in general—are important for this discussion: the “historic character” and the “integrity” of a property. “Historic character” is, in essence, the things that make a building special—its “visually distinctive materials, features and spaces,” for example, or the architectural styling of a structure or its unique methods of construction or craftsmanship.² Historic character may include the features that distinguish one building from another—a dome, smokestack, steeple, grand staircase, stained-glass windows, or mosaic tile floor. The character of a historic building may also be defined by its simplicity, as in a more industrial or modern structure, where a stripped-down appearance is part of its inherent character. “Integrity” refers to whether or not a building retains these important “character-defining” features and has not been inappropriately changed over time. These two concepts are central to the preservation of historic buildings. Therefore, modifications undertaken to make historic structures more sustainable must be sensitively done to retain the buildings' character and integrity.

There are four standards for treatment:

“The Secretary of the Interior's Standards &LEED – Where They Work Together and Where They Diverge”

<http://www.nps.gov/history/hps/tps/weather/>

Technical Preservation Services for Historic Buildings, National Park Service - Windows Internet Explorer

<http://www.nps.gov/history/hps/tps/weather/>

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Technical Preservation Services for Historic Buildings, ...

National Park Service

National Park Service
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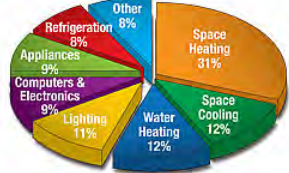
Weatherizing and Improving the Energy Efficiency of Historic Buildings

Weatherization means implementing cost-effective measures to make a building's envelope more energy efficient. Weatherizing a historic building requires undertaking those measures in ways that have minimal impact on the historic building's design and materials.

Develop a weatherization plan

Developing a plan tailored specifically to your building, site, climate, and occupancy will be an effective tool in reducing energy consumption. By broadening your scope to include not just the building envelope but also systems, appliances, and lighting, you can also develop a more comprehensive energy-efficiency plan. Any work should be evaluated based on its effect on the historic building and its potential to increase energy efficiency. After first conducting an **energy audit**, the following are common energy conservation measures that should be considered for most historic buildings:

- Eliminate air infiltration.



Category	Percentage
Space Heating	31%
Space Cooling	12%
Water Heating	12%
Lighting	11%
Computers & Electronics	9%
Appliances	8%
Refrigeration	8%
Other	8%

How we use energy in our homes
Heating accounts for the biggest chunk of a typical utility bill (Source: *Energy Savers, Energy Efficiency and Renewable Energy, U. S. Department of Energy*)

Modify user behavior

User behavior and climate have a great effect on energy use and should be considered before developing a weatherization and energy efficiency plan. For example, reducing air infiltration around a door will not be effective if a tenant has a habit of propping the door open. Similarly, in a hot and humid climate, reducing heat loss is less important than adequate ventilation and air circulation. Some easy ways to modify user behavior are to:

- Install a timer or motion detector to ensure that lights are off when rooms are not in use.
- Attach a self-closing mechanism to doors likely to be left open.
- Install fans to increase comfort instead of lowering the thermostat during warm months.
- Lower the thermostat during cold months and raise it during hot months.
- Program the thermostat to modify temperatures based on occupancy patterns.
- Replace incandescent bulbs with compact fluorescent bulbs.
- Use operable window shades or shutters to reduce heat

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Watch this web site for new information
on historic buildings and sustainability...

National Park Service National Park Service
U.S. Department of the Interior

Historic Preservation Tax Incentives

Technical Preservation Services

About the Tax Incentives

Incentives!
A Guide to the Federal Historic Preservation Tax Incentives Program for Income-Producing Properties

Annual Report

Program Regulations - 36 CFR 67

Certification Application

Check the Status of Your Project
This database is best read with Internet Explorer 5 and above and Netscape 6 and above browsers.

Program Administration

National Park System Advisory Board Committee

The Federal Historic Preservation Tax Incentives program encourages private sector rehabilitation of historic buildings and is one of the nation's most successful and cost-effective community revitalization programs. It generates jobs and creates moderate and low-income housing in historic buildings.

The program is administered by National Park Service and the [Internal Revenue Service](#) in partnership with [State Historic Preservation Offices](#).

New Features - December 2007
We are pleased to present several additions to our website.

[Planning Successful Rehabilitation Projects](#) provides guidance on interpreting and applying the Secretary of the Interior's Standards, windows, interior treatments, new additions and related new construction, modern requirements and new technologies and materials, and functionally-related complexes.

[Search by topic](#) for all Technical Preservation Service's information on

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“WBDG”

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The Whole Building Design Approach

The goal of 'Whole Building' Design is to create a successful high-performance building. To achieve that goal, we must apply the integrated design approach and the integrated team approach to the project during the planning and programming phases. [Read more](#)



WBDG Focus

New National BIM Standard Released

The NBIMS Executive Committee has released National BIM Standard Version 1 - Part 1: Overview, Principles, and Methodologies for public use. This document, which includes contributions by more than thirty subject-matter experts in the capital facilities industry, incorporates industry comments and now contains new and expanded information about the NBIMS production and use process. [Read more](#)



Services

 Construction Criteria Base

Popular Links

- [Construction Waste Management Database](#)
- [Building Envelope Design Guide](#)
- [Executive Order 13423 Technical Guidance](#)
- [Federal Green Construction Guide for Specifiers](#)
- [Unified Facilities Criteria](#)
- [Unified Facilities Guide Specifications \(UFGS\)](#)

Periodicals

JBM Journal of Building Information Modeling

Spring 2008:
Integration Today Using Open Standards: BIMStorm™, Rotterdam to Los Angeles and Beyond
[Download and/or subscribe](#)

New and Updated Pages

[Mechanical Insulation Design Guide](#)

The National Institute of Building Sciences (NIBS) through the National Mechanical Insulation Committee (NMIC) has developed the Mechanical Insulation Design Guide (MIDG) to provide a comprehensive source of information on the performance, use, testing and standardization of mechanical insulation in buildings and industrial facilities. (1-7-2008)



News and Events

High Performance Federal Buildings: Meeting EISA Requirements Through 2030

The Federal Facilities Council and coordinating private sector organizations are pleased to provide the initial venue for an ongoing dialogue on the EISA requirements. [Read more](#)

BIMStorm Hits LA

On January 31, 133 design professionals from 11 countries participated in BIMStorm LAX, a 24-hour, online design charrette in which another 700 people participated as observers. [Read more](#)

New Version of the United States National CAD Standard Now Available

AIA, CSI and NIBS unveil version 4.0 with greater efficiency, updated symbols, and other improvements. [Read more](#)

[More News and Events](#)

Participating Agencies



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www.WBDG.org

The End