Always at Odds? - Preservation vs Mitigation

ASFPM 2018 Conference

June 4, 2018
Ellicott City Flood
Historic and Cultural Resources
Questions to Ponder

• What happens to historic properties that cannot be moved or modified to protect them from the next disaster?
• How do we protect these resources?
• Is it better to alter a building’s character-defining features and protect it than to risk losing it entirely?
• What are the best options that cause the least harm or alteration?
• Are Mitigation and Preservation both possible?
• Is there a compromise that allows for preserving and protecting?

Original Ellicott City Courthouse – Completely Destroyed in the May 2018 Flood
Case Study 1: Talbot County, Maryland

Villages:
- Neavitt
- Newcomb
- Royal Oak
- Tilghman

Focus areas:
- Sea Level Rise
- Flood Occurrence Intervals
Case Study 2: Commonwealth of Pennsylvania

Counties:
• Bedford
• Cameron
• Monroe
• Philadelphia

Focus areas:
• Flooding
• Wind events
• Winter Storms
• Hurricane/Tropical Storms
Background

Phase I

1. Purpose
2. Accomplishments
3. Funding
Key Players

County/City Government Staff
• Office of Emergency Management
• Planning and Zoning
• Historical Commissions
• GIS Offices

Consultants
• Vision Planning and Consulting
• EHT Traceries
• Indiana University of Pennsylvania (IUP)
• Eastern Shore Regional GIS Cooperative

SHPO Offices
• PA SHPO
• Maryland Historic Trust (MHT)

Communities
• General Public
• Stakeholder Groups

Agencies
• National Park Service
• Pennsylvania Emergency Management Agency
• Maryland Emergency Management Agency
Disaster Planning Process for Historic Properties

• Step 1: Perform Engagement and Outreach Efforts

• Step 2: Understand the County Historic Context

• Step 3: Perform Flood Risk Analysis

• Step 4: Perform Building Survey/Architectural Analysis

• Step 5: Develop Preservation-based Hazard Mitigation Actions
Step 1: Public Engagement Strategy

Audience Tiers:
- Tier 1: Government agencies staff - Planning and Zoning, Emergency Services, etc., and elected officials (Mayor, City Council)
- Tier 2: Organized/affiliated Groups - Homeowner's associations, chambers of commerce, civic membership groups, ad hoc committees, fraternal organizations, senior groups, social clubs, etc.
- Tier 3: Citizens - General public (not in any organized group)

Media Resources
- Facebook, Twitter, Blog,
- Email
- Newspaper, radio, and television
Step 2: Historic Context

Where are the oldest settlements located?

How does water help trade and industry?

What about flooding?
Step 3: Flood Risk Analysis

Phase II
GIS Analysis conducted to determine depth of flood estimates for Phase I properties.

Criteria for GIS Analysis:

1. Constructed prior to 1967
2. Identified during Phase I assessments
3. Located within 100-year floodplain
GIS Analysis

Methodology

- Flooding of buildings’ first finished floors established by subtracting recorded foundation heights from maximum flood depths.
- Land elevations were adjusted using USACE SLC values to simulate forecast changes to base water levels for the 2050 and 2100 scenarios.*

*For Talbot County
## Flood Risk Analysis Results

<table>
<thead>
<tr>
<th>KEY_NO</th>
<th>FF WATER DEPTH</th>
<th>% DAMAGE</th>
<th>BLDG_NAME</th>
<th>ADDRESS_12</th>
<th>BUILT</th>
<th>A_STYLE</th>
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Flood Vulnerability

Risk and Vulnerability to High Priority Historic Buildings
2015 Annual-Chance Flood Predictions
Tighe & Morse, Inc.

Risk and Vulnerability to High Priority Historic Buildings
2100 Annual-Chance Flood Predictions
Tighe & Morse, Inc.

High Priority Historic Buildings
- Tighe & Morse Survey District
- 10% annual-chance flood
- 4% annual-chance flood
- 2% annual-chance flood
- 1% annual-chance flood
- 0.2% annual-chance flood

*Tighe & Morse Historic District is presently in the process of updating to the 2100 10% annual-chance flood. All subsequent periodic exams will continue to mandate the village.
Flood Vulnerability

**2015**

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<th>1% Annual-Chance Flood</th>
<th>0.2% Annual-Chance Flood</th>
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<td>Maximum stillwater depth (feet) at structure’s first finished floor*</td>
<td>0.0</td>
<td>0.29</td>
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<td>Building first floor flooding damage rate</td>
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<td>Dollar damage experienced</td>
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**2050**

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<td>Building first floor flooding damage rate</td>
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<td>Dollar damage experienced</td>
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Flood Vulnerability
Flood Vulnerability
Step 4: Building Survey and Architectural Analysis

Goal: Identify mitigation measures for a representative sampling of resources that could then be applied to similar properties as might be needed in response to damage caused by flooding.

Property Selection Criteria:
1. Location
2. Vulnerability
3. Structure Type/Typology
4. Specific building styles or components/characteristics
5. Representative of important historic theme
Building Styles

- Federal
- Greek Revival
- Italianate
- Late Victorian
- Georgian Revival
- Colonial Revival
- Tudor Revival
- Beaux Arts
- Shingle
- Classical Revival
- Bungalow
- Art Deco
- Second Empire
- Log Construction
- Vernacular
- Romanesque Revival
# Building Typologies

## Architectural Typologies and Subtypes

<table>
<thead>
<tr>
<th>Types</th>
<th>Residential</th>
<th>Commercial</th>
<th>Industrial</th>
<th>Transportation</th>
<th>Institutional</th>
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</thead>
<tbody>
<tr>
<td><strong>Subtypes</strong></td>
<td>• Single Dwelling</td>
<td>• Commercial Storefront</td>
<td>• One Story Industrial Building</td>
<td>• Railroad Station</td>
<td>• Institutional Building (Fire Station, Post Office, Library)</td>
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<tr>
<td></td>
<td>• Row House</td>
<td>• Commercial Block</td>
<td>• Multi-story Industrial Building</td>
<td>• Bridge</td>
<td></td>
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<tr>
<td></td>
<td>• Apartment Building (Low, Mid, High Rise)</td>
<td>• Commercial without Storefront</td>
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<td><strong>Tertiary Types</strong></td>
<td>• Residential Building with Opening at or Below Grade</td>
<td>• Commercial Building with Opening at or Below Grade</td>
<td>• Industrial Building with Opening at or Below Grade</td>
<td>• Transportation Structure at or Below Grade</td>
<td>• Institutional Building with Opening at or Below Grade</td>
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<tr>
<td></td>
<td>Residential Building with Opening Above Grade (elevated)</td>
<td>• Commercial Building with Opening Above Grade (elevated)</td>
<td>• Industrial Building with Opening Above Grade (elevated)</td>
<td>• Transportation Structure Above Grade (elevated)</td>
<td>• Institutional Building with Opening Above Grade (elevated)</td>
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<table>
<thead>
<tr>
<th>Types</th>
<th>Recreation</th>
<th>Religious</th>
<th>Mixed-Use</th>
<th>Piers</th>
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<tr>
<td><strong>Subtypes</strong></td>
<td>• Boathouse</td>
<td>• Church</td>
<td>• Storefront Row House</td>
<td>• Municipal Pier</td>
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<tr>
<td></td>
<td>• Boathouse with Opening at or Below Grade</td>
<td>• Cemetery</td>
<td></td>
<td>• Ferry House</td>
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<tr>
<td><strong>Tertiary Types</strong></td>
<td>• Boathouse with Opening Above Grade (elevated)</td>
<td>• Religious Building with Opening at or Below Grade</td>
<td>• Storefront Rowhouse with Opening at or Below Grade</td>
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<td>• Boathouse with Opening Above Grade (elevated)</td>
<td>• Religious Building with Opening Above Grade</td>
<td>• Storefront Rowhouse with Opening Above Grade (elevated)</td>
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At-Risk Features

Photo 1: Tower
Photo 2: Columns and Spindle Work
Photo 3: Cupola
Photo 4: Stone Masonry Building
Photo 5: Steel Truss Bridge

Photo 6: Mill
Photo 7: Mill Wheel
Photo 8: Covered Bridge
Photo 9: Damaged Exterior Envelope
Photo 10: Brackets & Dentil Molding
Philadelphia Property Selections – by building type

- Residential: 20
- Commercial: 12
- Mixed Use: 8
- Industrial: 6
- Transportation: 1
- Recreation: 5
- Religious: 3
- Institutional: 4
- Piers: 2
- Religious: 3
- Institutional: 4
- Piers: 2
Philadelphia Property Selections
– by neighborhood

- Manayunk, 18
- Navy Yard, 10
- Rittenhouse, 12
- Old City, 1
- Shawmont Valley, 1
- Southwest City Center, 2
- Chesnut Hill, 1
- East Fairmount Park, 5
- East Falls, 1
- Frankford, 1
- Laurel Hill Cemetery, 1
- Logan Square, 7
- Wissahickon Valley Park, 1
Step 5: Mitigation Strategy Development

**Historic Resource Goals**

1. Protect each community’s historic character and economic vitality from flooding impacts by minimizing loss to structures and buildings, cost to stakeholders, and impact on the economy.

2. Ensure flood mitigation goals for historic properties are consistent with other Philadelphia plans by encouraging integration between local hazard mitigation plans and the historic and cultural resources component plans.

3. Encourage Philadelphia and its communities to become more proactive and less reactive regarding the preservation of historic resources in hazard areas.
### Plan Integration

#### Philadelphia2035 Citywide Vision

<table>
<thead>
<tr>
<th>Plan Topic</th>
<th>Page Number</th>
<th>Item Type</th>
<th>Current Clause</th>
<th>Recommendation</th>
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<tr>
<td>Land</td>
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<td>Action</td>
<td>Promote adaptation of vacant buildings for creative, mixed-use development; much of Philadelphia’s vacant building stock is worthy of preserving through adaptive reuse.</td>
<td>This action should be retained, as much of the “vacant building stock” may be of historical significance and value.</td>
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<td>Transportation</td>
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<td>Objective</td>
<td>----</td>
<td>An additional objective should be included that states: “Evaluate and maintain historic infrastructure (roads, railways, covered bridges, etc.), to address the stress and wear on these structures to the greatest extent possible.”</td>
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<tr>
<td>Open Space</td>
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<td>Action</td>
<td>Create neighborhood walks that follow paths of historic streams allowing for interpretive experiences in the corridor network.</td>
<td>This action emphasizes preserving natural historic features, and should be retained.</td>
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</tbody>
</table>
| Historic Preservation | 157       | Objective & Actions | Preserve culturally, historically, and architecturally significant buildings, sites, structures, and districts.  
a. Create and maintain a preservation plan to identify and designate resources.  
b. Ensure adequate funding for City-owned historic properties to provide proper maintenance and preservation.  | This objective and associated actions should be retained and considered when developing hazard mitigation recommendations for historic properties.                                                                 |
Preservation-based Hazard Mitigation Actions: Solutions to protect these resources from the impacts and potential damages from natural hazards, and do not jeopardize historic integrity and/or historic designation/eligibility.
Sample Mitigation Actions

**Temporary**
- Pre-fit closures
- Sandbagging
- Temporary floodwalls

**Permanent**
- Building elevation
- Utility elevation
- Dry/Wet floodproofing
Gothic Revival Style

Sample Hazard Mitigation Actions

Inspect church tower on an annual basis and repair any structural deficiencies, and ensure the steeple is in sufficient condition to withstand imminent wind events.

Develop an evacuation plan to utilize church members to remove materials from the church when flooding is forecasted.

Install sump pump to remove potential flood waters from the basement and, during loss of power, pump the basement once flood waters surrounding the structure retreats, and install a backflow device to prevent sewage from entering the building during a flood event.

First United Church of Christ, 112 Maple Street, Hyndman Borough, c 1881

2869 Belden Road, Bedford Township, c 1875
Vernacular Style

Sample Hazard Mitigation Actions

Inspect wood features for rotting and deterioration, and restore any rotted or deteriorated wood features (window trim, architectural features, etc.) in kind, and paint to keep them water resistant.

Maintain/Treat historic accessory buildings, including character-defining features like primary materials, roof materials and form, windows, doors and architectural details, using similar preservation-based hazard mitigation recommendations as the primary building.

Develop a plan to temporarily elevate/relocate industrial mill equipment/mechanical elements that are integral to the historic function of the building, to above the BFE, freeboard, and historic flood heights, if feasible, ensuring that moving will not damage historic equipment.
## Sample Hazard Mitigation Actions

<table>
<thead>
<tr>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Install temporary flood shields on mausoleum doorways in the floodplain.</td>
</tr>
<tr>
<td>Ensure proper drainage of the burial ground to direct runoff away from the stones and artifacts.</td>
</tr>
<tr>
<td>Consider anchoring markers/artifacts/vaults/coffins to prevent flotation during a flood event.</td>
</tr>
</tbody>
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[Carl F. Lauber Mausoleum at Laurel Hill Cemetery, 1921](image)

[G.W.F. Sulzer Mausoleum at Laurel Hill Cemetery, 1911](image)

[Laurel Hill Cemetery](image)
Sample Property Sheet

**Property Description**
The Juniata Woolen Mill comprises six historic buildings. For the purposes of this study, the mill building will be the focus as it is the most at risk. The mill is a three-story stone structure constructed of irregular rough-cut coursed ashlar, thick mortar joints, 6½-inch walls with windows on 2nd and 3rd stories, hipped wood doors on lower level, side-gable roof, roof level door with stone doorstop and wood beam lintel.

**Hazards**
- Category: Storm Surge - No
- Wind Event - Yes
- 100-Year Flooding Area - Yes
- Flood Zone: No-Flood Zone (NOFA)
- Potential Depth of Flood (NOFA) - 12.9 ft.
- Percent Damage from Flood (NOFA) - 73.7%

**Alt-Risks Features**
- All grade entrance and windows at grade.
- Stone masonry exterior prone to freeze-thaw damage from winter storm and snow/ice accumulation.
- River façade constructed of timber, not stone.
- More exposure to wind damage based on location along river.

**Mitigation Actions**
1. Keep interior envelope water resistant by applying paint to historically painted surfaces, and/or repaint masonry with materials compatible to historic masonry. Apply a water repellent coating to masonry surfaces only after consulting with PRMC.
2. Replace impermeable concrete surface with a permeable surface allowing for higher capacity of ground filtration.
3. Develop a procedure for installing temporary protection measures such as sandbags and/or floodproof sheeting to be assembled when flooding is expected.

**Additional Property Photos**

**Additional recommended actions:**
1. Encourage historic property owners located in the flood zone to purchase flood insurance.
2. Relocate valuable contents, including family heirlooms or other historic items or collections to a location that is above the 1% floodplain.
3. Ensure proper maintenance and protection for any outbuildings located on the property, including barns, workshops, sheds, toolshouses, etc.
Standard Operating Guide Update

- Historic and Cultural Resources
- Federal/State/Local Regulations
- Developing Mitigation Actions
- Funding Sources
Challenges & Lessons Learned

• Phase I and Phase II disconnect
• Lack of county participation/buy-in
• Inconsistent data, format, and availability
• Inadequate public outreach outlets
• Inability to run project concurrently with the HMP update
Answers

• What happens to historic properties that cannot be moved or modified to protect them from the next disaster?

  A plan for preservation-based mitigation solutions should be developed.

• How do we protect these resources?

  Through dedicated planning efforts, and preservation-sensitive mitigation actions.

• Are Mitigation and Preservation both possible?

  Yes, with the right amount of planning and the involvement of specialists and professionals.
Answers

• Is there a compromise that allows for preserving and protecting?

  Yes, if the recommended mitigation actions do not disturb the historic integrity of the resource.

• Is it better to alter a building’s character-defining features and protect it than to risk losing it entirely?

  This is a question every property owner will need to ask themselves.

• What are the best options that cause the least harm or alteration?

  Temporary actions, and actions that do not touch the resource are always preferred. However each resource needs to evaluated on a case-by-case basis.
Why VPC?

We...

Identify sound approaches to address future vulnerabilities.

Develop tailored public outreach campaigns.

Engage and educate community stakeholders.

Prepare emergency management related materials.

Provide technical assistance to communities.