

Disaster Planning for Historic Properties

MAFSM 2018 Annual Conference



September 19th, 2018

Background

Phase I

1. Purpose
2. Accomplishments
3. Funding



Phase II

1. Goals
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
- WSP
- EHT Traceries
- Eastern Shore Regional GIS Cooperative
- Indiana University of Pennsylvania (IUP)

SHPO Offices

- PA SHPO
- Maryland Historical Trust (MHT)

Communities

- General Public
- Stakeholder Groups

Agencies

- National Park Service
- Pennsylvania Emergency Management Agency
- Maryland Emergency Management Agency

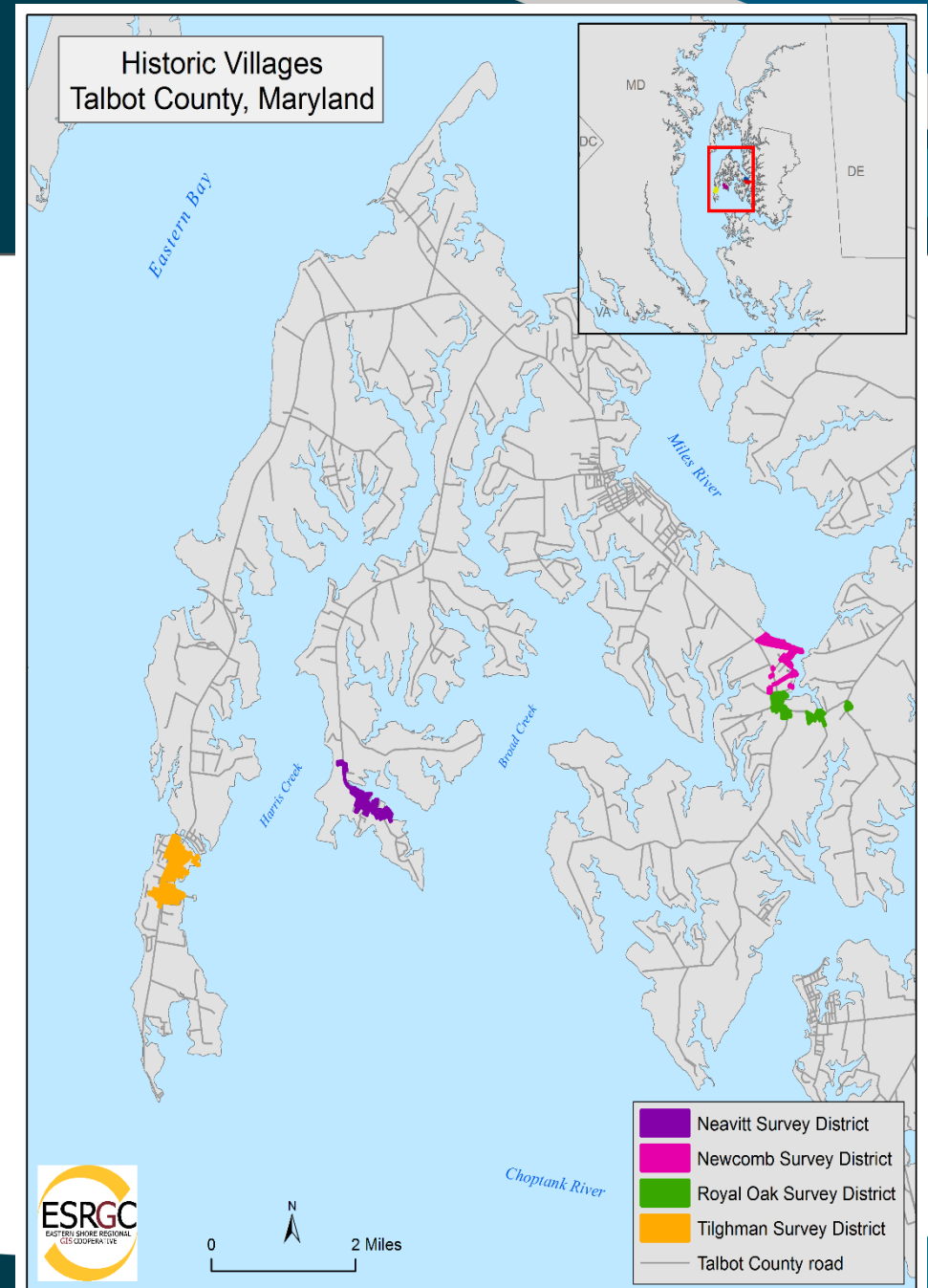
Case Study 1: Talbot County, Maryland

Villages:

- Neavitt
- Newcomb
- Royal Oak
- Tilghman

Focus areas:

- Sea Level Rise
- Flood Occurrence Intervals



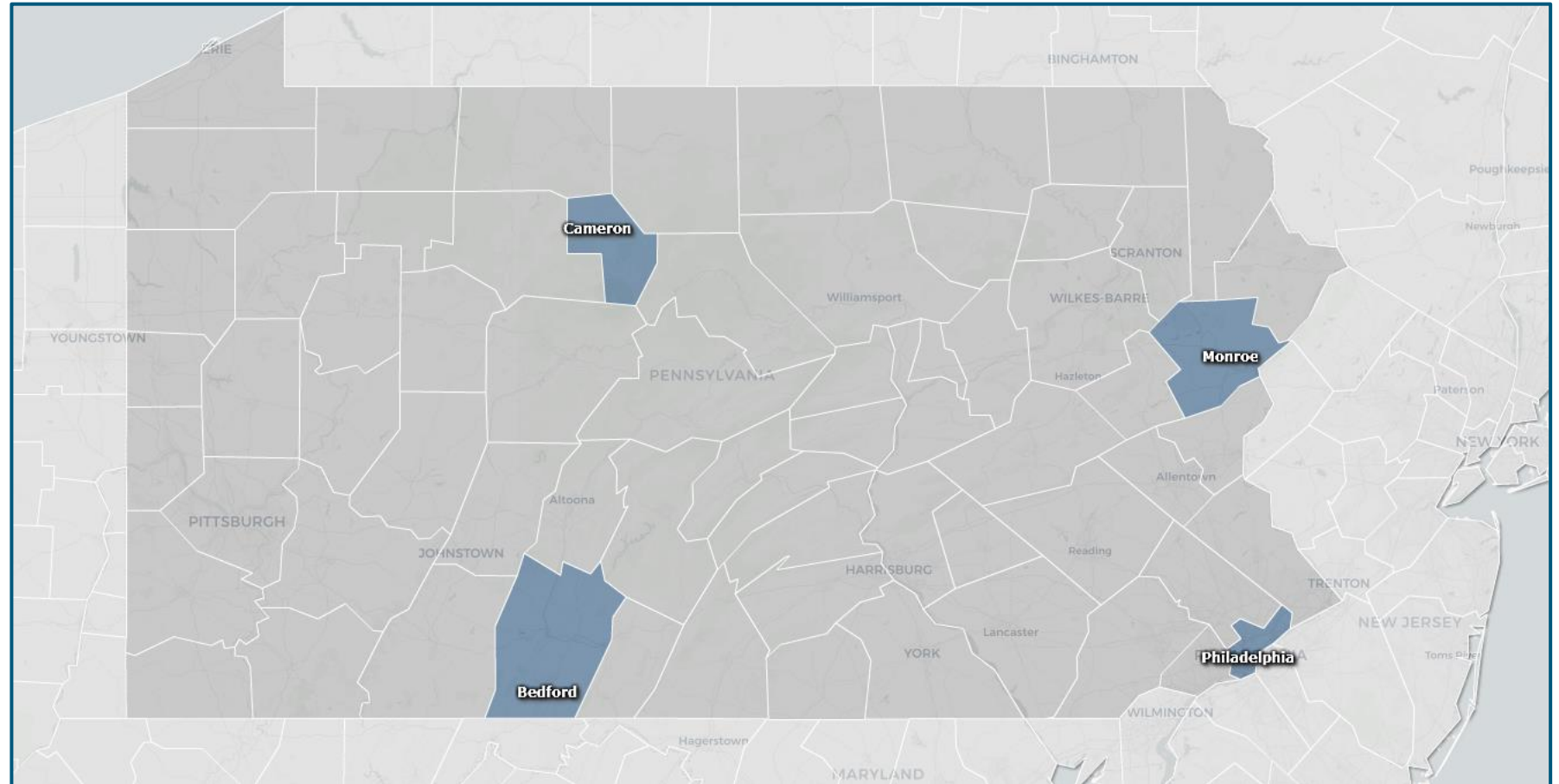
Case Study 2: Commonwealth of Pennsylvania

Counties:

- Bedford
- Cameron
- Monroe
- Philadelphia

Focus areas:

- Flooding
- Wind events
- Winter Storms
- Hurricane/
Tropical Storms



GIS Analysis Tools

Phase II

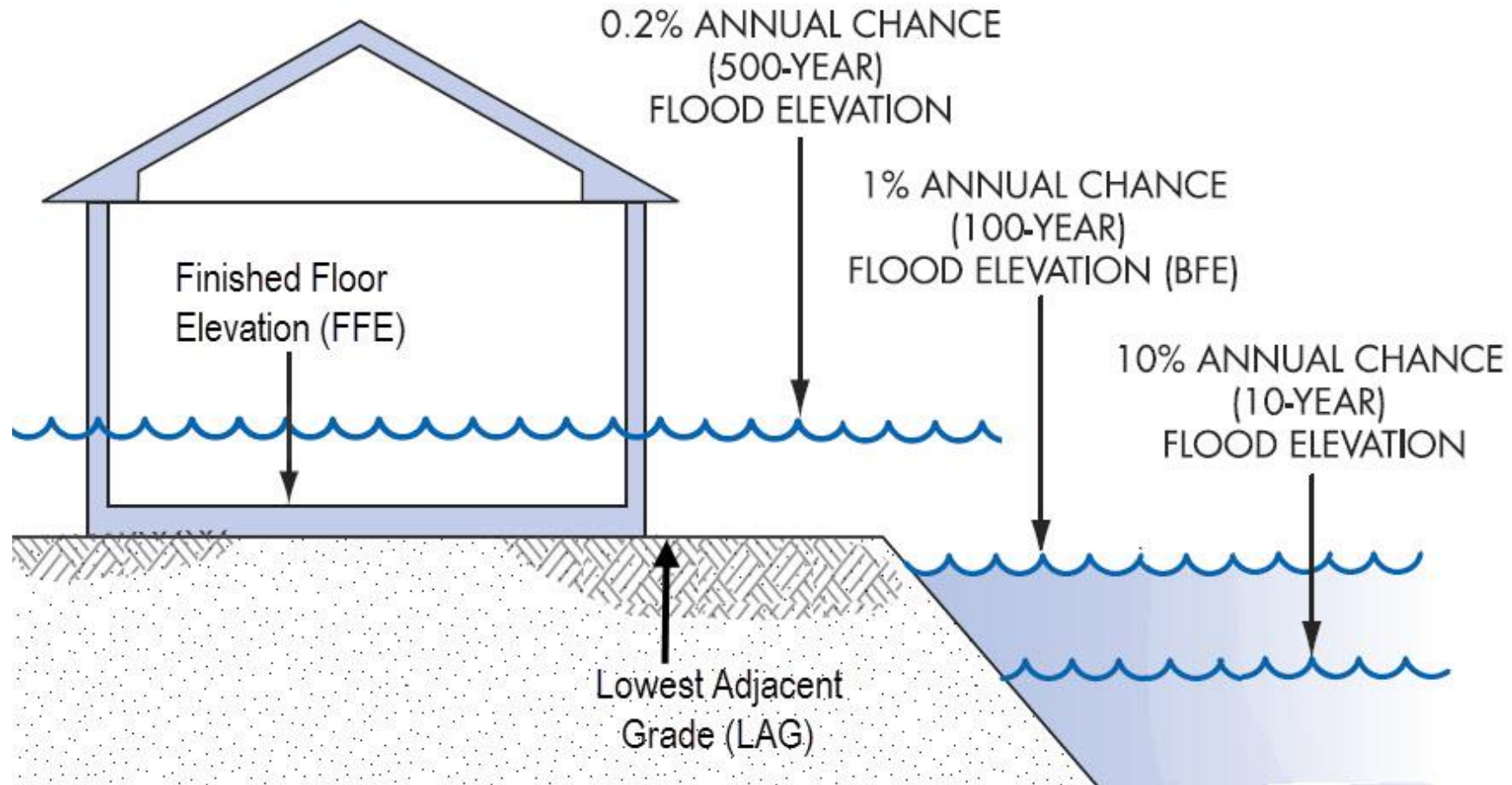
GIS Analysis conducted to determine depth of flood estimates for Phase I properties.

Criteria for GIS Analysis:

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



Flood Risk Analysis



GIS Analysis



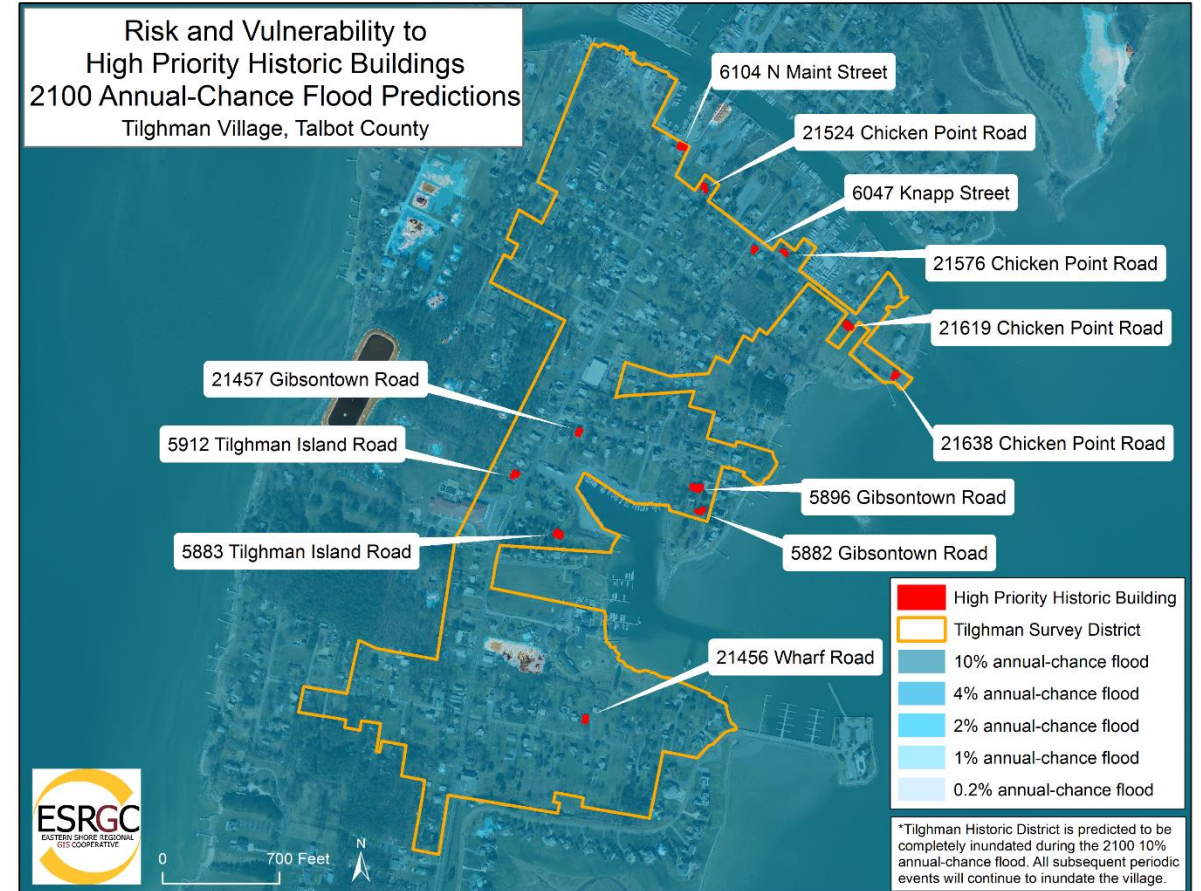
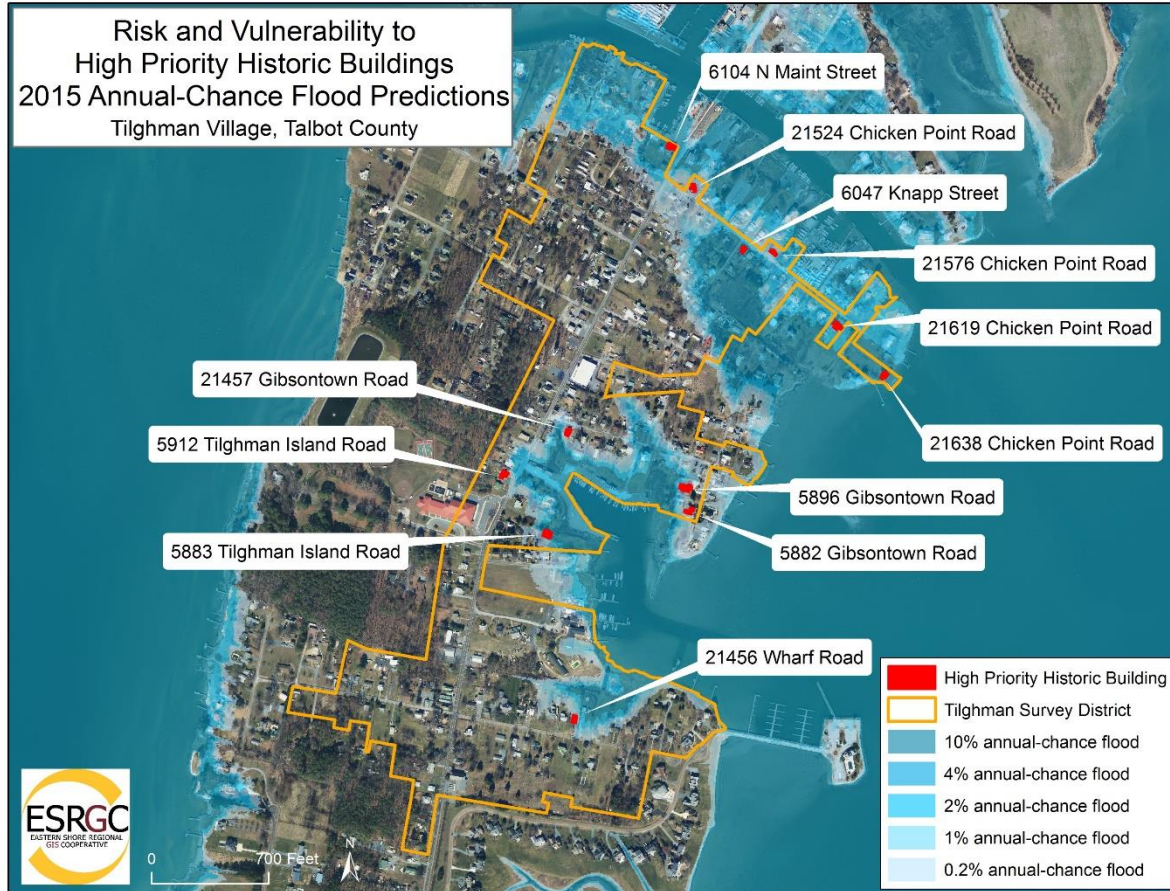
First Finished Floor

Maximum Flood Depth

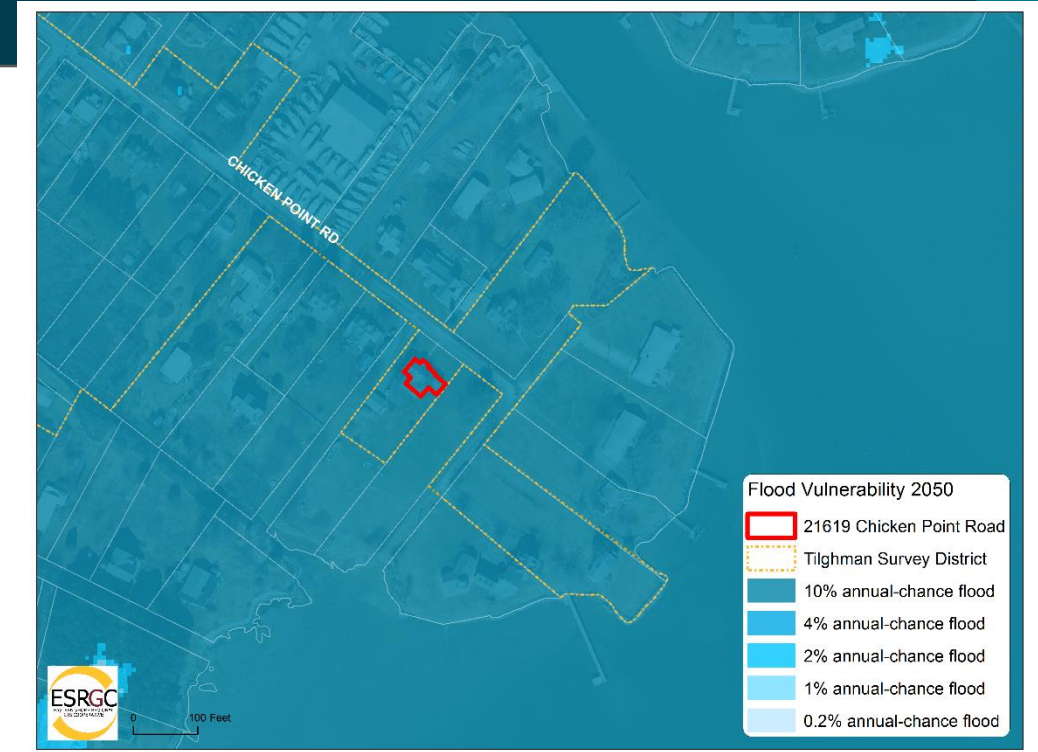
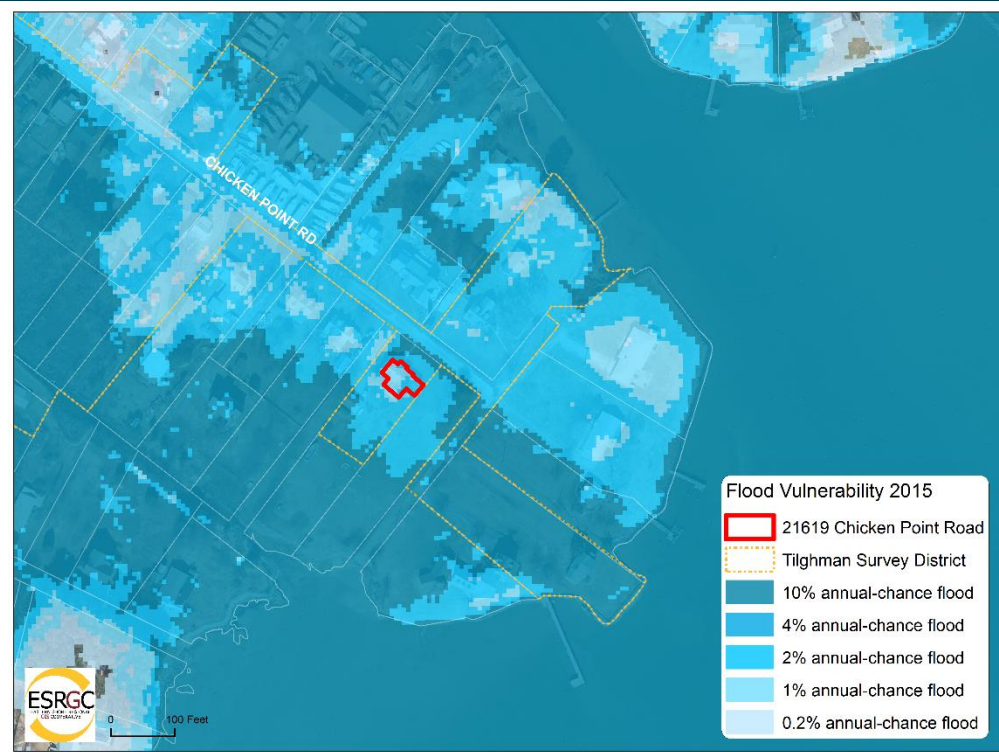
Methodology

- 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 2050 – 2ft and 2100 – 6ft.

Flood Vulnerability



Flood Vulnerability



2015	No Event	1% Annual-Chance Flood	0.2% Annual-Chance Flood
Maximum stillwater depth (feet) at structure's first finished floor*	0.0	0.29	1.19
Building first floor flooding damage rate	0.0	19.17	22.58
Dollar damage experienced	\$0	\$21,238.14	\$25,014.21

2050	No Event	1% Annual-Chance Flood	0.2% Annual-Chance Flood
Maximum stillwater depth (feet) at structure's first finished floor*	0.0	2.4	3.3
Building first floor flooding damage rate	0.0	26.21	28.6
Dollar damage experienced	\$0	\$29,036.25	\$31,693.23

Building Survey and Architectural Analysis



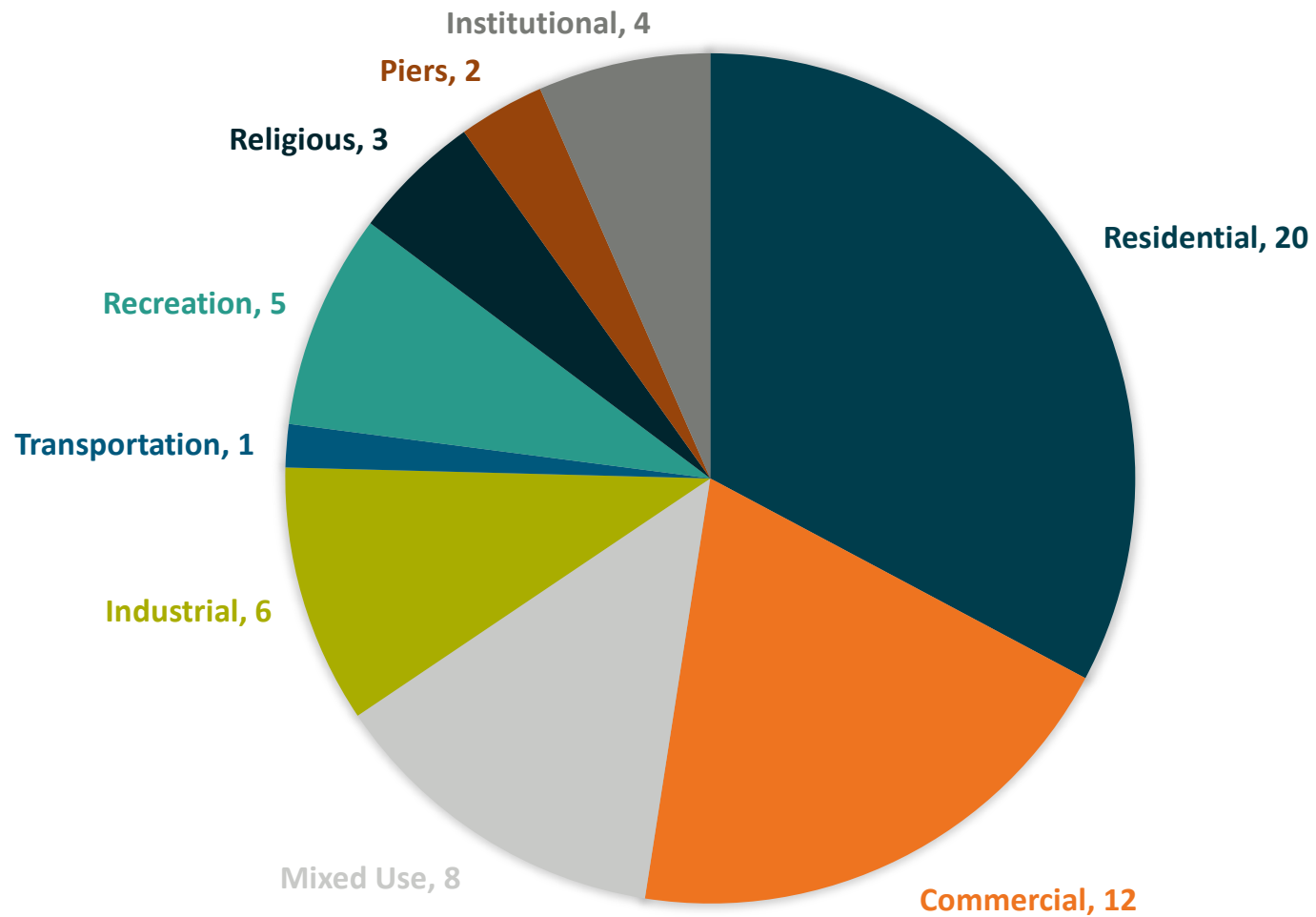
Goal: Identify mitigation measures for a representative sampling of resources that could then be applied to similar historic properties as might be needed in response to damage caused by flooding.

Property Selection Criteria:

1. Location
2. Vulnerability
3. Type/Typology
4. Character Defining Features
5. Representative of important historic theme



Property Selections - Building Typology



Building Styles



- Vernacular I-House
- Gothic Revival
- Craftsman
- Vernacular W-House
- Dutch Colonial Revival
- American Four-Square
- Queen Anne
- Bungalow
- Cape Cod

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

**All Phase 1 photos courtesy of AECOM for PA SHPO (2015)

Hazard Mitigation Action Development Process

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.



Mitigation Actions

Structural

- Reservoirs
- Levees and floodwalls
- Channel improvements
- Crossings and roadways
- Drainage and storm sewer improvements



Non-Structural

- Acquisition
- Building elevation
- Flood-proofing
- Sewer backup protection
- Relocation



Mitigation Actions: Historic Preservation Technical Resources



Integrating Historic Property and Cultural Resource Considerations Into Hazard Mitigation Planning

State and Local Mitigation Planning How-To Guide

FEMA 386-6 / May 2005



FEMA



THE SECRETARY
OF THE INTERIOR'S
STANDARDS FOR
THE TREATMENT
OF HISTORIC
PROPERTIES

WITH

GUIDELINES FOR
PRESERVING,
REHABILITATING,
RESTORING &
RECONSTRUCTING
HISTORIC
BUILDINGS



U.S. Department of the Interior
National Park Service
Technical Preservation Services

Residential: Single Dwelling with Entrance at or Below Grade

Sample Hazard Mitigation Actions

Elevate the building and utilities above the BFE and freeboard requirement, and install minimization measures to reduce the visual impact, as necessary.

Replace impervious surfaces with a permeable surface allowing for higher capacity of ground filtration, where possible and feasible.

Remove any high cost or hazardous items, and install a temporary flood shield to reinforce the hatch doors to create a water tight seal, when flooding is expected.

**All Phase 1 photos courtesy of AECOM for PA SHPO (2015)



4432 Ridge Avenue, 1870



Leech House, Worrell/Winter House, 1718



22 River Road, 1940

Residential: Rowhouse (elevated)

Sample Hazard Mitigation Actions

Inspect the structure annually to ensure that all masonry joints are water tight, and/or for loose bricks, and repoint masonry joints as necessary with like mortar or a better water tight mortar that provides the same appearance as the historic mortar.

Permanently fill in low opening basement windows using in kind materials or with a similar material that mimics the original historic material.

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.



Harry Haney Rowhouses, 1895



611 S 27th St, 1890



2606 Pine Street, 1890

***All Phase 1 photos courtesy of AECOM for PA SHPO (2015)*

Transportation: Bridge

Sample Hazard Mitigation Actions

Inspect the stone foundation for loose stones and decaying mortar and repair the masonry abutments and piers, as needed, with in-kind materials. If the same type repointing materials cannot be matched, the same color mortar should be utilized.

Keep wood superstructure and deck water-sealed and inspected regularly for rotting or deterioration. Replace the wooden members in-kind, as necessary, and paint to keep them water resistant, using similar and/or acceptable historic colors and texture.

Restore and repair roofing materials in kind, where materials are available and with appropriate materials that are compatible with historic materials if kind materials are not available.



Thomas Mill Bridge, 1855



Thomas Mill Bridge, 1855



Thomas Mill Bridge, 1855

**All Phase 1 photos courtesy of AECOM for PA SHPO (2015)

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 Talbot County plans by encouraging integration between local hazard mitigation plans and the historic and cultural resources component plans.
3. Encourage Talbot County and its communities to become more proactive and less reactive regarding the preservation of historic resources in hazard areas.

Plan Integration

Plans and Recommendations

- Bedford County Comprehensive Plan
 - Bedford Township Floodplain Ordinance
1. Provide information to City/County residents regarding disaster planning and management, including owners of historic properties that are vulnerable to hazards.
 2. Limit any new excavations next to historic foundations to avoid undermining the structural stability of the building or adjacent historic buildings.
 3. Retrofit housing to improve energy efficiency while ensuring any alterations to historic houses are consistent with the Secretary of the Interior's Historic Preservation Guidelines.



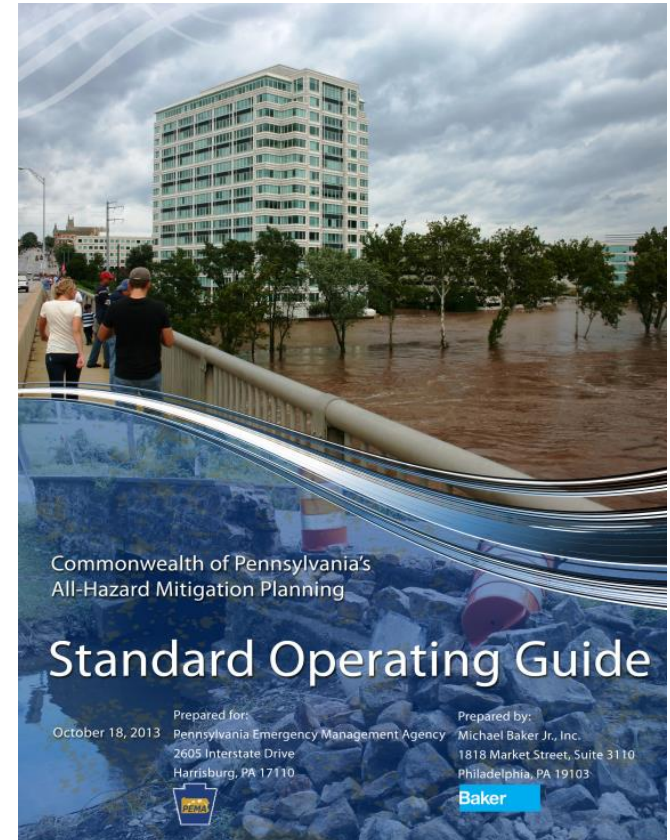
Standard Operating Guide Update

Historic and Cultural Resources

Federal/State/Local Regulations

Developing Mitigation Actions

Funding Sources



Q&A