

# Risk MAP (Jefferson Co. Preliminary Flood Maps)

## Risk **M**apping (Review New Flood Risk Maps)

### Map Changes

- BFE's (e.g., 24' BFE change at Harpers Ferry)
- Floodplain Width (e.g., Shepherdstown)

### SFHA Building Changes

- Mapped-in/Mapped Out Bldgs.
- LOMAs (SFHA bldgs. mapped out)

### Risk Communications

- Outreach Letters for building changes in SFHA/Floodway

### Future Map Discovery

- Map [Zone AE Upgrades](#) for Potomac / Shenandoah Rivers?

## Risk **A**ssessment (Quantify Flood Risk)

### Statewide Risk Assessment

(aggregate level or summary reports)

- *River/Stream Scale*
- *County Scale*
- *Unincorporated Area Scale*
- *Incorporated Area Scale*
  - *Shepherdstown*
  - *Harpers Ferry*

### Building Level Risk Assessments

- *Unmitigated Structures*
- *Mitigated Structure*

## Risk **P**lanning (Build Flood Resiliency)

### Pre-Disaster Planning

- Preload WV Flood Tool [Structures](#) into FEMA's SDE Software
- Update Emergency Response & Hazard Mitigation Plans using risk assessments for major storm event

### Higher Standards - Municipalities

- Apply for CRS status
- Adopt higher Freeboard value of 3 ft. in floodplain mgmt. ordinance

### Verify Risk Layers on WV Flood Tool

- Building-level assessments
- Open space properties
- Repetitive Loss Areas



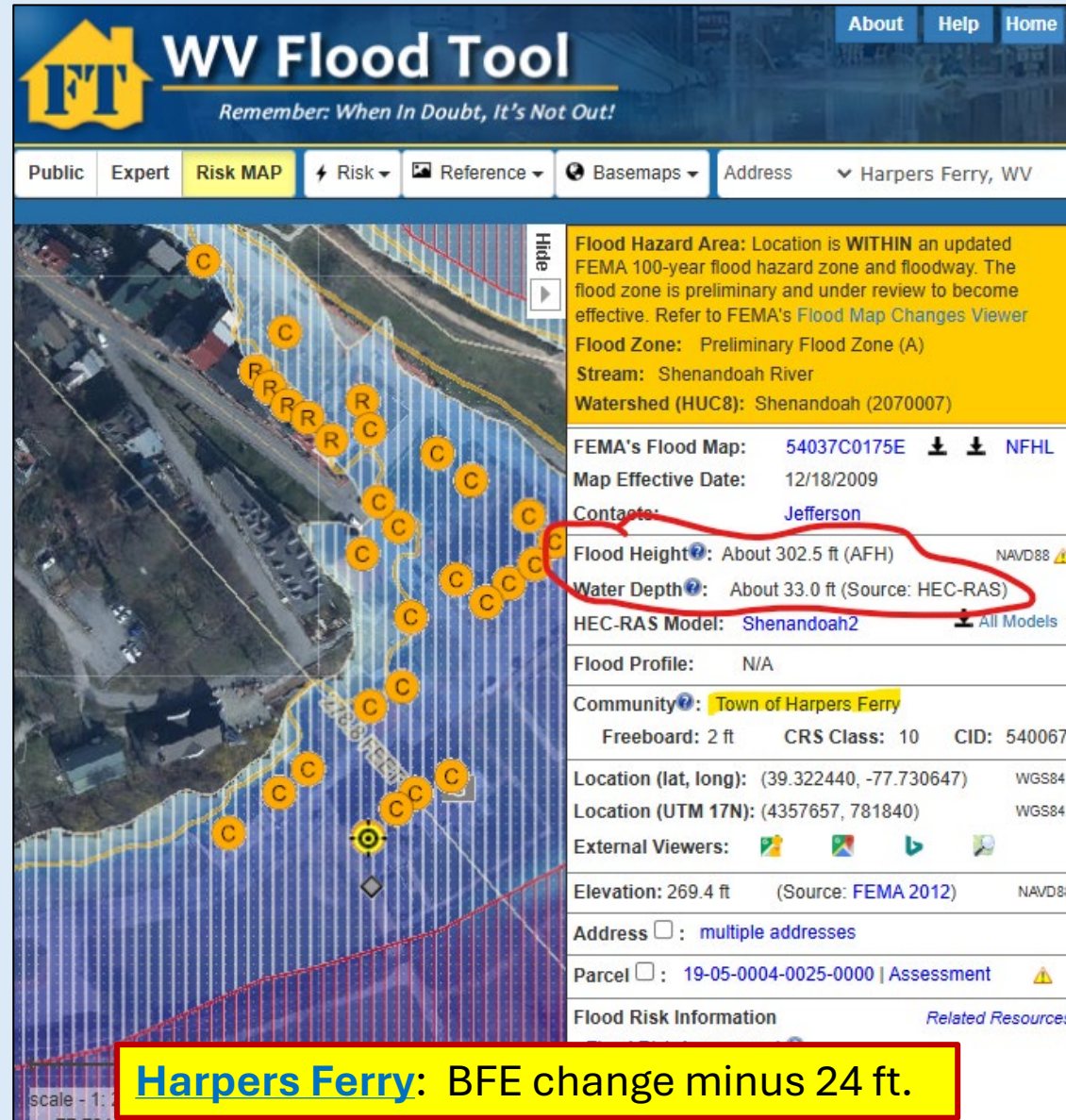
WV Flood  
Resiliency  
Framework

Risk MAP: Reduce Loss of Life and Property

Web link to [Slide Deck](#)

**RiskMAP**  
Increasing Resilience Together

# Map Changes – Harpers Ferry



**WV Flood Tool**  
Remember: When In Doubt, It's Not Out!

Public Expert **Risk MAP** Risk Reference Basemaps Address Harpers Ferry, WV

**Flood Hazard Area:** Location is **WITHIN** an updated FEMA 100-year flood hazard zone and floodway. The flood zone is preliminary and under review to become effective. Refer to FEMA's Flood Map Changes Viewer

**Flood Zone:** Preliminary Flood Zone (A)  
**Stream:** Shenandoah River  
**Watershed (HUC8):** Shenandoah (2070007)

**FEMA's Flood Map:** 54037C0175E [Download](#) [Share](#) [NFHL](#)  
**Map Effective Date:** 12/18/2009  
**Contacts:** [Jefferson](#)

**Flood Height:** About 302.5 ft (AFH) NAVD88 ⚠️  
**Water Depth:** About 33.0 ft (Source: HEC-RAS)

**HEC-RAS Model:** [Shenandoah2](#) [All Models](#)

**Flood Profile:** N/A

**Community:** [Town of Harpers Ferry](#)  
**Freeboard:** 2 ft **CRS Class:** 10 **CID:** 540067

**Location (lat, long):** (39.322440, -77.730647) WGS84  
**Location (UTM 17N):** (4357657, 781840) WGS84

**External Viewers:** [Google Earth](#) [ArcGIS](#) [YouTube](#) [Print](#)

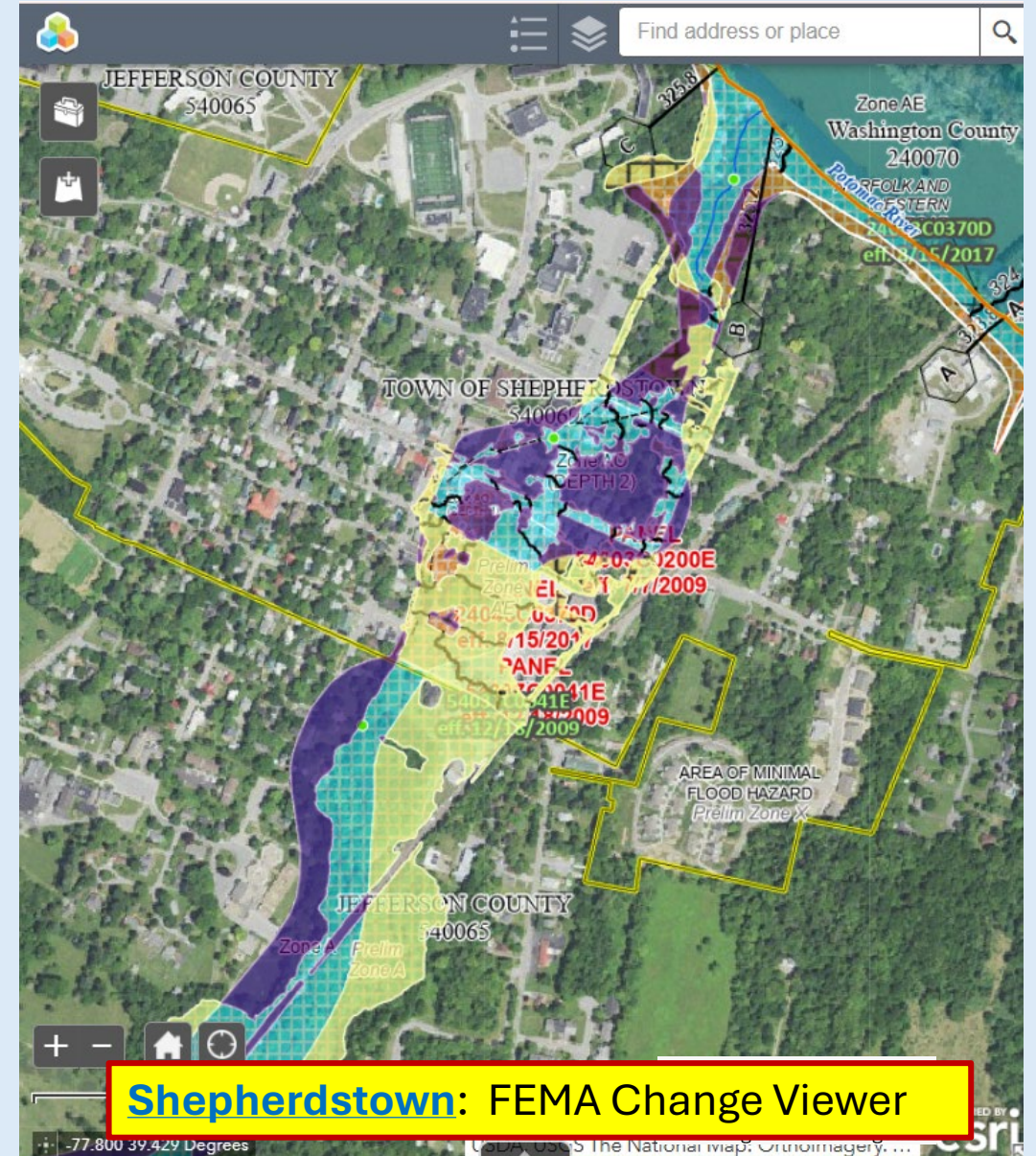
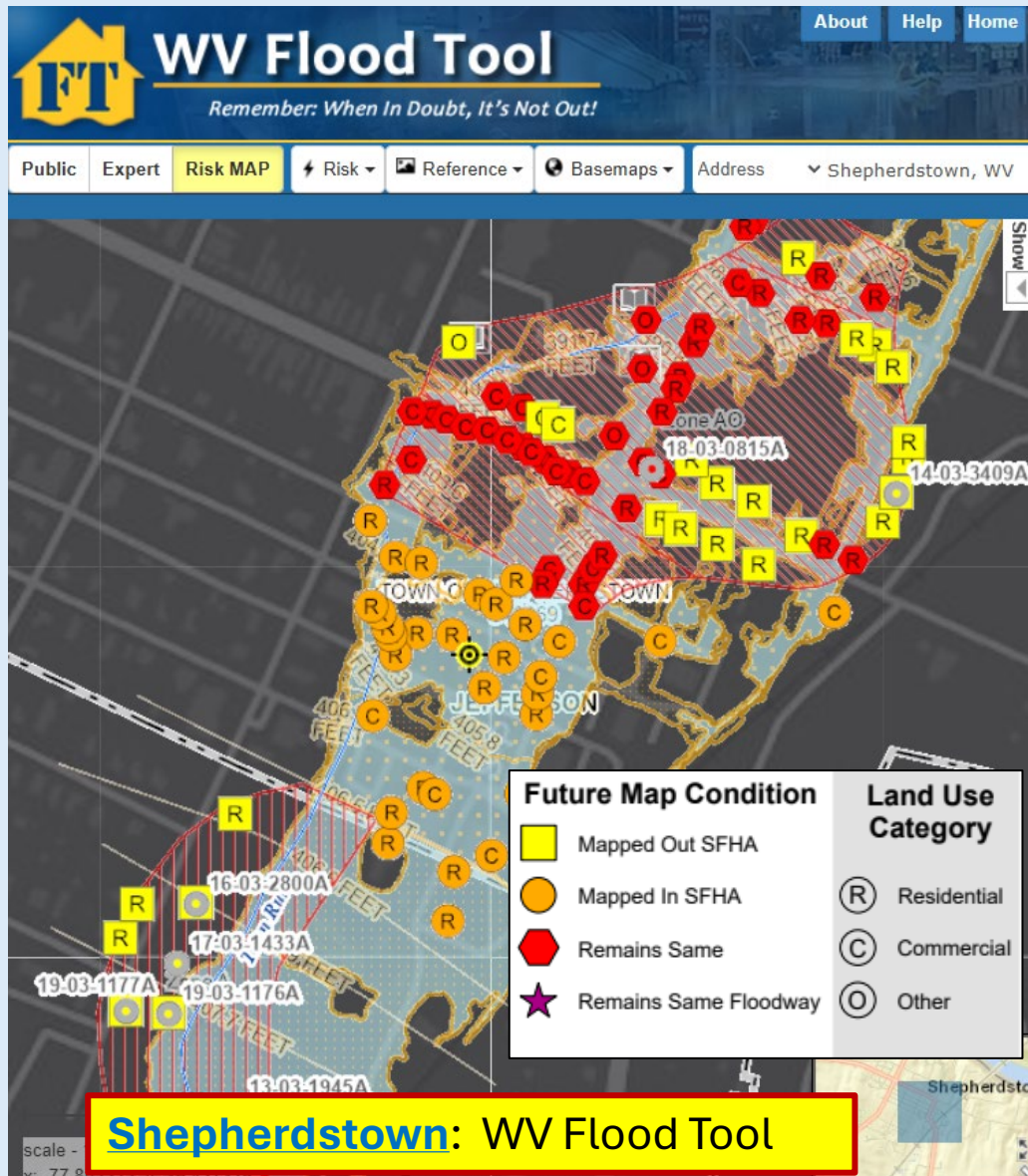
**Elevation:** 269.4 ft (Source: FEMA 2012) NAVD88

**Address:**  : multiple addresses  
**Parcel:**  : 19-05-0004-0025-0000 | [Assessment](#) ⚠️

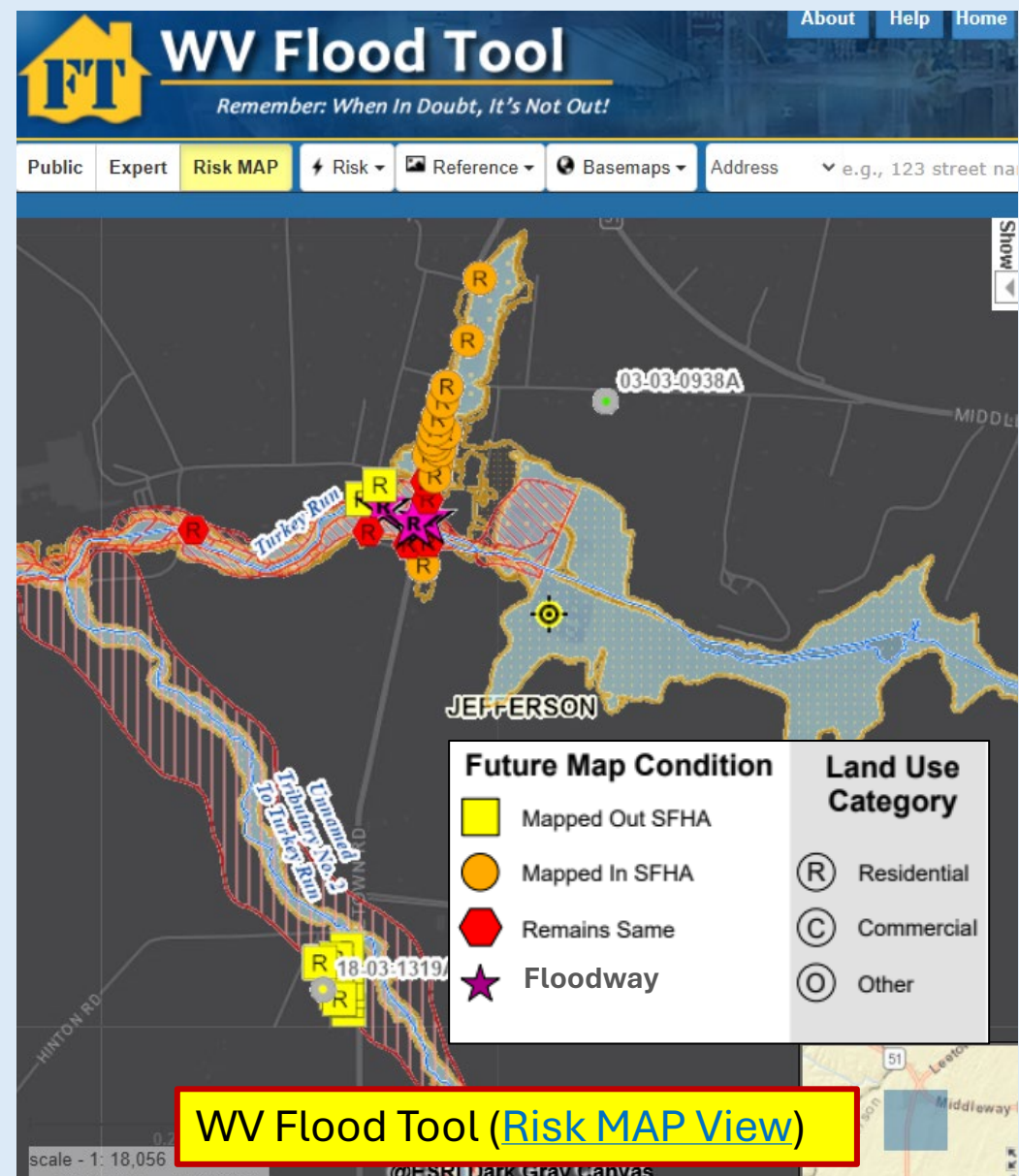
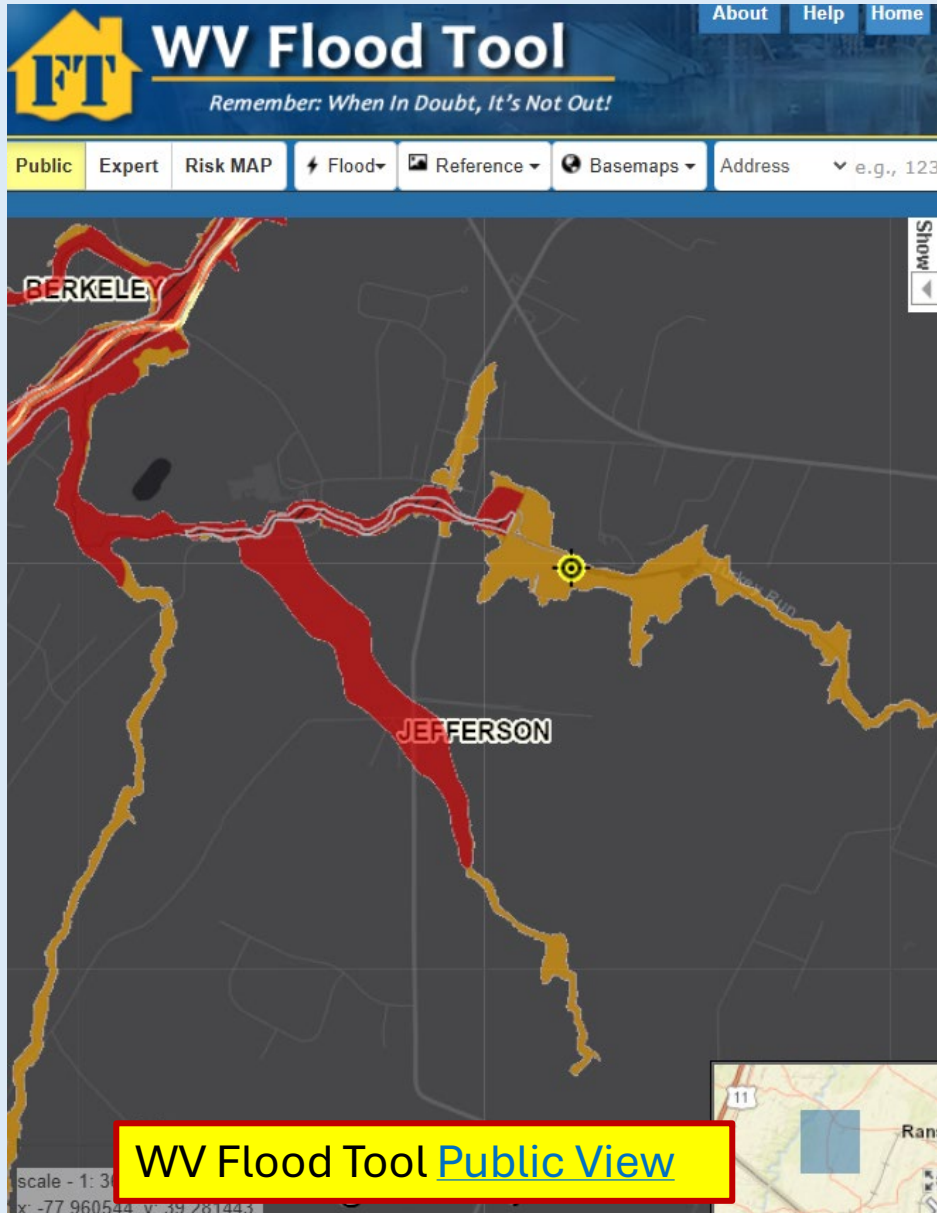
**Flood Risk Information** [Related Resources](#)

**Harpers Ferry: BFE change minus 24 ft.**

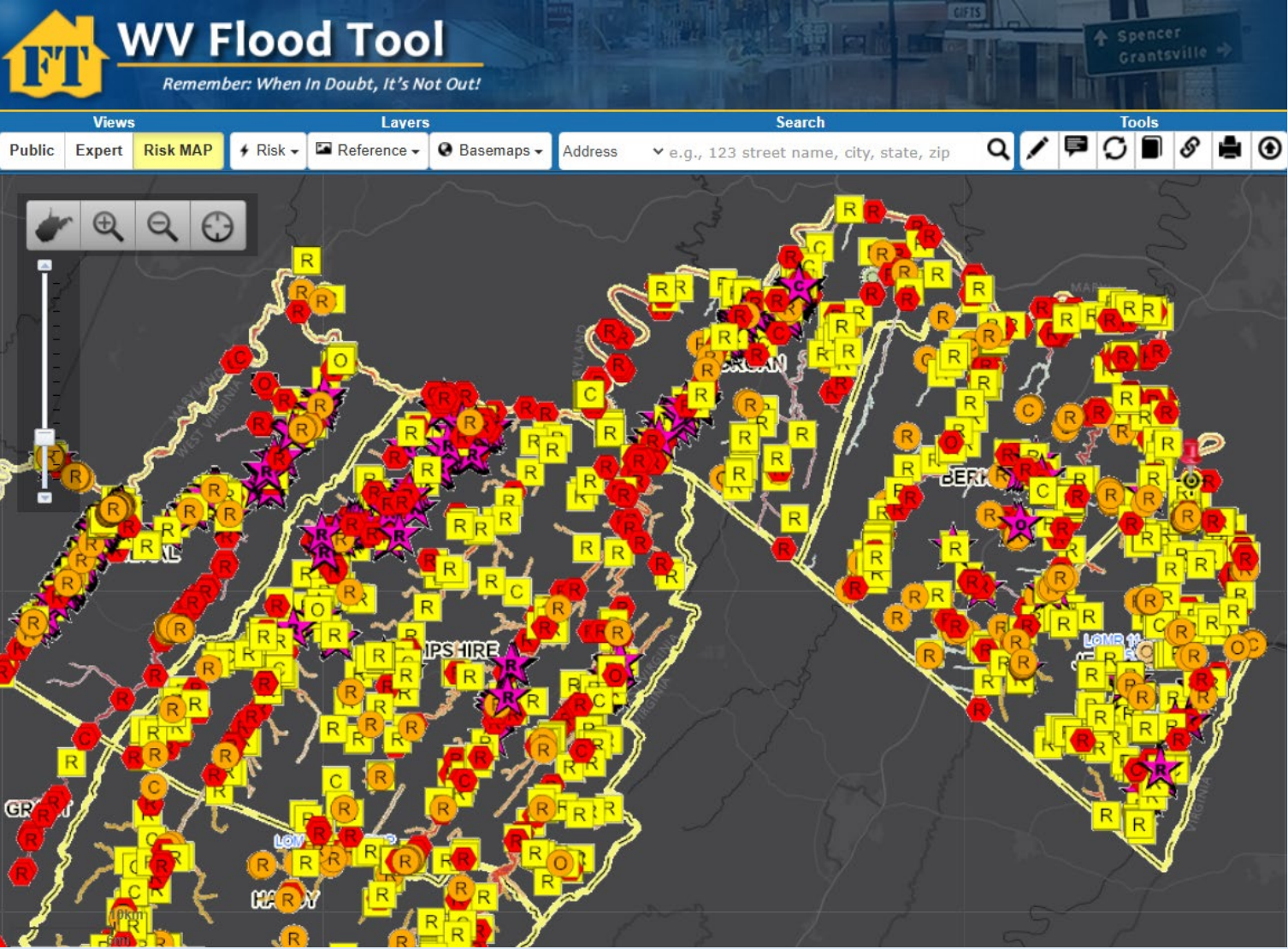
# Map Changes - Shepherdstown










# Map Changes – Jefferson County



# Buildings Mapped-In / Out of Preliminary SFHA



| Future Map Condition  |                 | Land Use Category   |             |
|---|-----------------|---|-------------|
|  | Mapped Out SFHA |  | Residential |
|  | Mapped In SFHA  |  | Commercial  |
|  | Remains Same    |  | Other       |
|  | Floodway        |   |             |

Difference between FEMA's 2009 and 2024 flood studies

# SFHA Building Changes: Mapped-In/Out

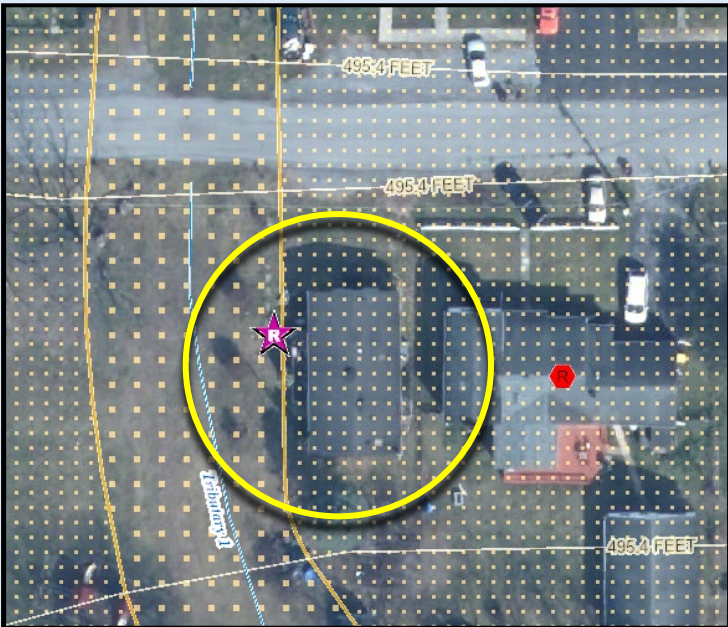
| COMMUNITY IDENTIFICATION |                | Estimated structures in the Community | Estimated structures in the preliminary flood high hazard area | Estimated structures newly mapped in | Estimated structures newly mapped out |
|--------------------------|----------------|---------------------------------------|--|--------------------------------------|---------------------------------------|
| Community Name           | Community Type |                                       |  |                                      |                                       |
| Jefferson County*        | Unincorporated | 20,397                                | 317  | 55                                   | 220                                   |
| Bolivar                  | Incorporated   | 616                                   | 4  | 4                                    | 0                                     |
| Charles Town             | Incorporated   | 3,670                                 | 21   | 4                                    | 8                                     |
| Harpers Ferry            | Incorporated   | 276                                   | 31   | 30                                   | 0                                     |
| Ranson                   | Incorporated   | 2,918                                 | 50   | 1                                    | 28                                    |
| Shepherdstown            | Incorporated   | 735                                   | 76   | 29                                   | 20                                    |
| <b>JEFFERSON</b>         | <b>County</b>  | <b>28,612</b>                         | <b>499</b>   | <b>123</b>                           | <b>276</b>                            |

\* Unincorporated Area

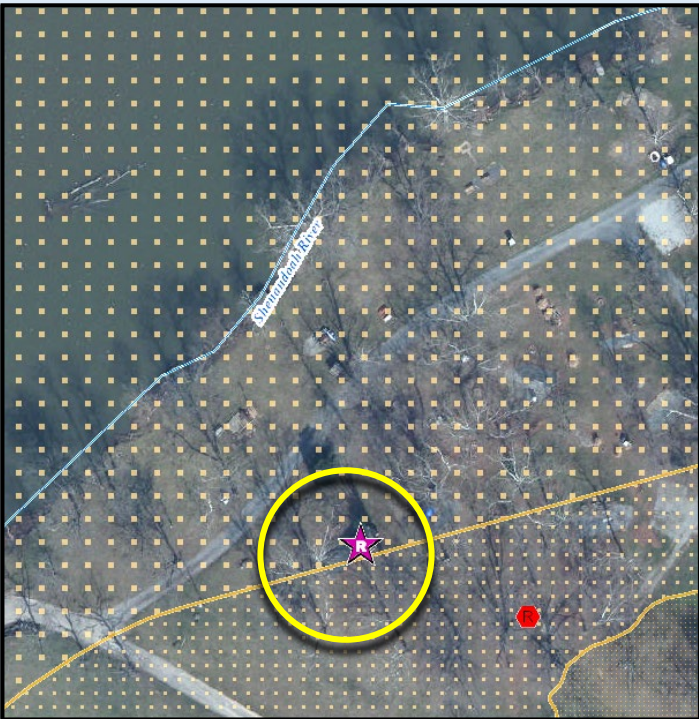
**County Net Change in structures: - 153**

**County Net Change in floodway structures: - 14**

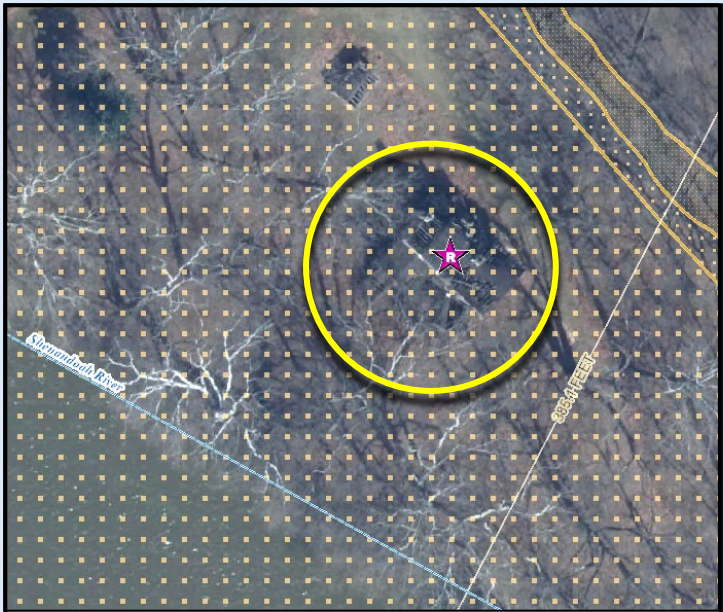
# Buildings Mapped into Floodway



Double-wide Mobile Home in Ranson (FD: 2.2 ft)  
 \$33K; Year Built: 1993 (Post-FIRM)  
 (Building ID: [19-08-0006-0019-0001\\_407](#))




Single-wide Mobile Home in Jefferson County\* (FD: 7.0 ft)  
 \$25K; **Minus Rated: 3.5 ft**; Year Built: Unknown  
 (Building ID: [19-02-0020-0031-0000\\_30](#))



Single Family Dwelling in Jefferson County\* (FD: 14.0 ft)  
 \$8K; **Minus Rated: 10.3 ft**; Year Built: 1979 (Pre-FIRM)  
 (Building ID: [19-06-008F-0007-0000\\_457](#))

*Structures mapped from  
 Floodplain Fringe into Floodway*

-  FLOOD FRINGE TO FLOODWAY-Res.
-  FLOOD FRINGE TO FLOODWAY-Com.
-  FLOOD FRINGE TO FLOODWAY-Other

# Risk Communications: SFHA Map Change Letters

Incorporate 1% Floodplain Building Risk Assessment Inventory into **Mitigation** and **NFIP/CRS Management** Activities



FEMA Region 3 Toolkit for New Flood Studies

## City of White Sulphur Springs

Date: 10/14/2021

Dear SMITH JOHN:

This letter is a test to show the use of mail merge and the data we can retrieve for it. I copied the first two paragraphs from the Local Officials Toolkit template and added the last two paragraphs for demonstration purposes.

A multi-year project to re-examine City of White Sulphur Springs's flood zones and develop detailed digital flood hazard maps has been completed. The new maps, also known as Flood Insurance Rate Maps (FIRMs), were just released for public view. The new maps reflect current flood risk based on the latest data and a more accurate understanding of our area's topography. As a result, you and other property owners throughout GREENBRIER COUNTY will have up-to-date, Internet-accessible information about flood risk to your property.

### How will these changes affect you?

Based on the new maps, your property is being mapped into a higher risk flood zone, known as the Special Flood Hazard Area (SFHA). If you have a mortgage from a federally regulated lender and your property is in the SFHA, you are required by Federal law to carry flood insurance when these flood maps are put into effect. We recommend that you use this time to contact your insurance agent to get the most favorable rate and learn about options offered by the National Flood Insurance Program (NFIP) for properties being mapped into higher risk areas for the first time.

You can find your property on the WV Flood tool in one of two ways: first, you can go to the following link in a web browser: <https://mapwv.gov/flood/map/?wkid=102100&x=-8939196.678447664&y=4550352.316266677&l=13&v=2>. Or, you can go to <https://mapwv.gov/> map and enter your address, 177 PATTERSON ST, WHITE SULPHUR SPRINGS, WV, 24986, in the search bar.

Your property is within the Howard Creek flood zone and has a flood depth of 1.0 feet. Its FIRM status is Pre-FIRM.

Mail Merge Template for SFHA Mapped-in Structures

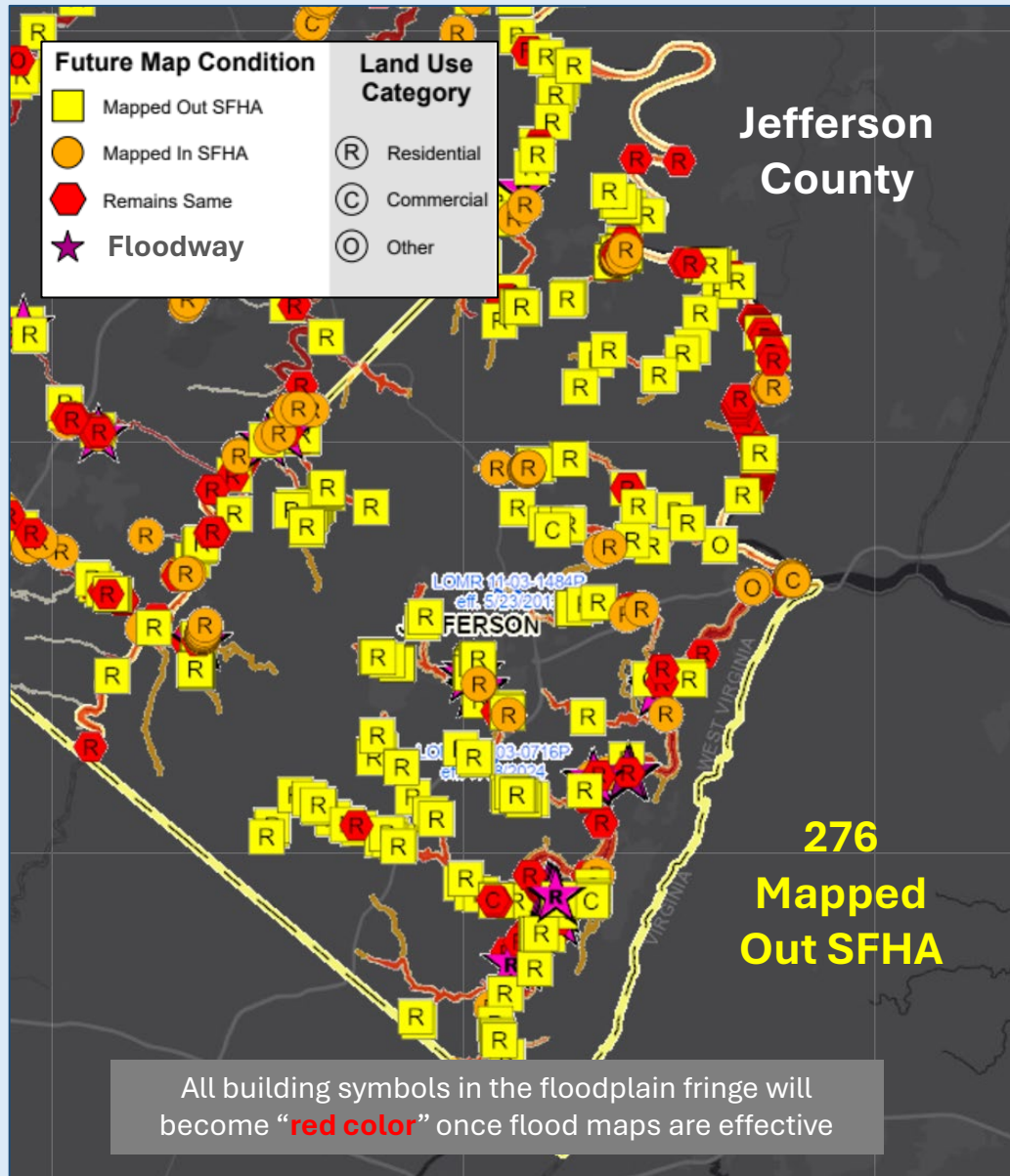
Counties which recently sent outreach letters to homeowners:

- Hardy County Risk MAP
- Kanawha County - Elk River PMR
- Greenbrier County Risk MAP

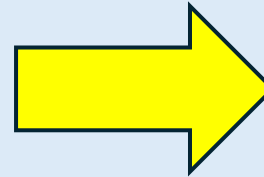
**Jefferson County and Shepherdstown** have 55 and 29 buildings, respectfully, mapped into the SFHA



# SFHA Buildings Changes: LOMAs for Mapped Out



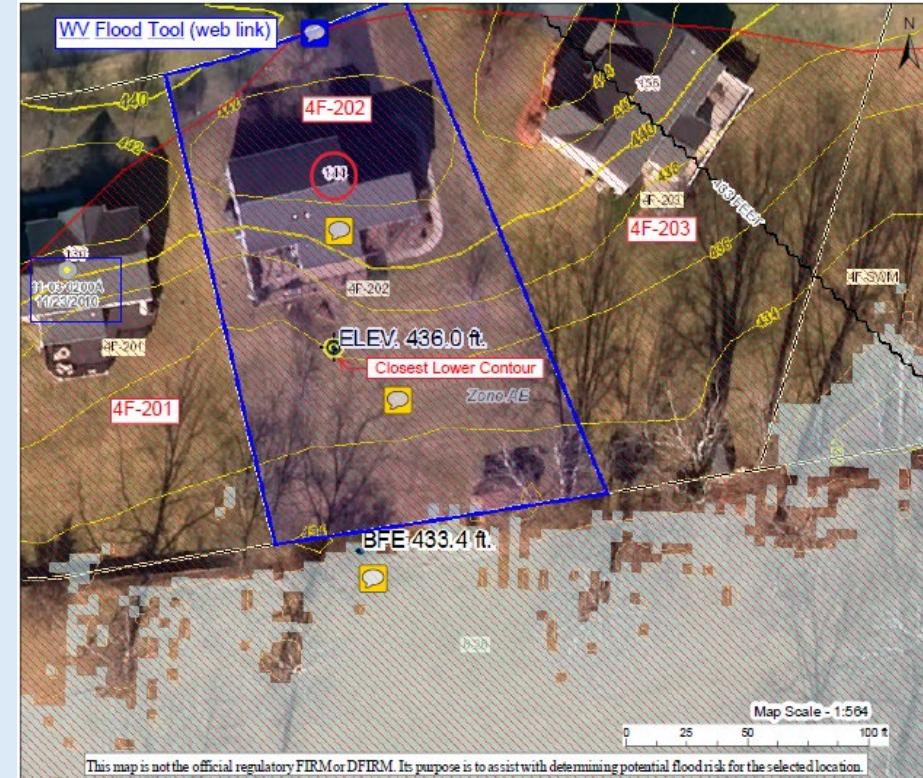
Mapped-out structures of the SFHA may qualify for LOMAs



WV Flood Tool  
LiDAR LOMA:

[Instructions](#) | [Guide](#)

## LOMA Map: 144 APPALOOSA WAY, Charles Town, WV



|  |          |   |   |  |
|--|----------|---|---|--|
| H<br>I<br>G<br>H<br>S<br>K   | Zone AE  | 1-Percent-Annual-Chance Flood Hazard Area With Base Flood Elevation (BFE)               | Map created by Kurt Donaldson, WVU on 11/9/2020   | Flood Info Location                        |
|  | Floodway | Regulatory Floodway in AE Zone  |   |  |
|  | Zone A   | 1-Percent-Annual-Chance Flood Hazard Area Without BFE (may have Advisory Flood Heights) | User Closest Lowest Contour 436 ft. - 1 ft. = 435.0 ft. (LAG). The LAG Notes 435.0 ft. => BFE 433.4 ft. |  |
|  | Advisory | 1-Percent-Annual-Chance High Risk Advisory  | Flood Hazard Area Location is WITHIN the FEMA 100-year floodplain.                                      |  |
| Download the Full Legend for all Flood tool symbols<br><a href="https://www.mapwv.gov/flood/map/docs/wv_flood_tool_legend.pdf">https://www.mapwv.gov/flood/map/docs/wv_flood_tool_legend.pdf</a> |          |   | Flood Zone  | AE   |
| <b>WEB LINKS:</b>  |          |   | Stream  | Flowing Springs Run                        |
| <a href="#">WV Flood Tool</a>  |          |   | Watershed (HUC8)  | Shenandoah (2070007)                       |
| <a href="#">Assessment Record 4F-202</a>   |          |   | Flood Height  | 433.4 ft. (Source: User Defined) (NAVD88)  |
| <a href="#">LiDAR Metadata</a>   |          |   | Water Depth   |  |
| <a href="#">Building Sketch</a>  |          |   | Elevation   | 436.1 ft. (Source: FEMA 2012) (NAVD88)     |
|  |          |   | Community & ID  | Jefferson County (ID: 540065)              |
|  |          |   | FEMA Map & Date   | 54037C0130E; Effective Date: 12/18/2009    |
|  |          |   | Location (lat, long)  | (39.313144, -77.824168) (WGS84)            |
|  |          |   | Parcel ID   | 19-02-004F-0202-0000                       |
|  |          |   | E-911 Address   | 144 APPALOOSA WAY, Charles Town, WV, 25414 |

# River/Stream Building Risk Assessment



MEDIAN BUILDING VALUE: **Town Run** and **Shenandoah River** rank first and fourth, respectively, of 156 major rivers/streams in the state with the highest median value of structures in high-risk flood areas.

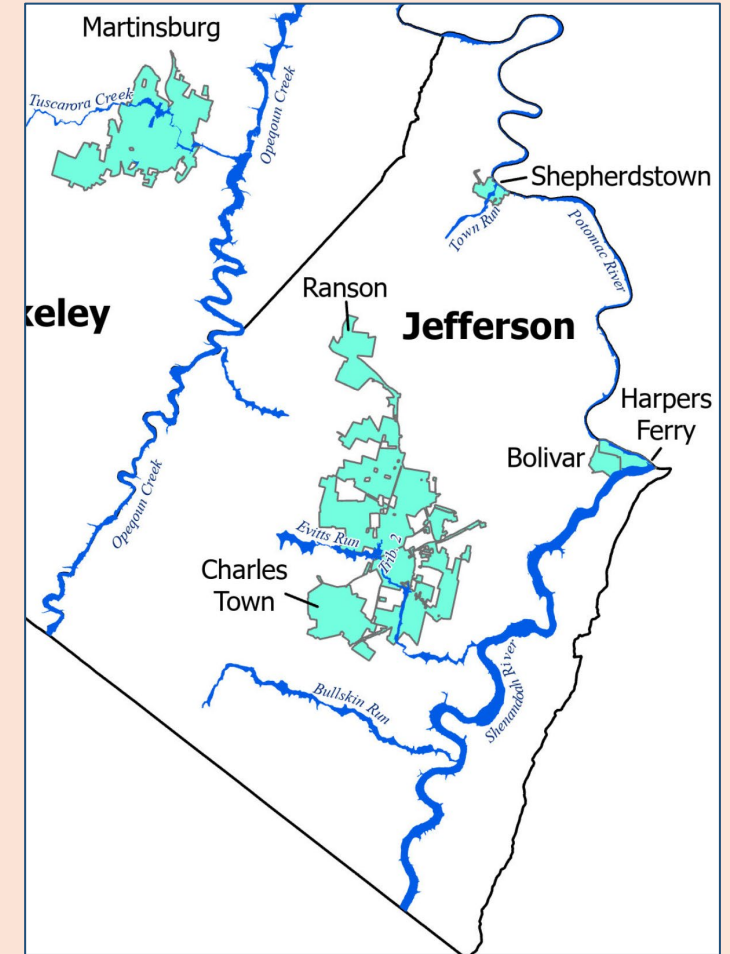
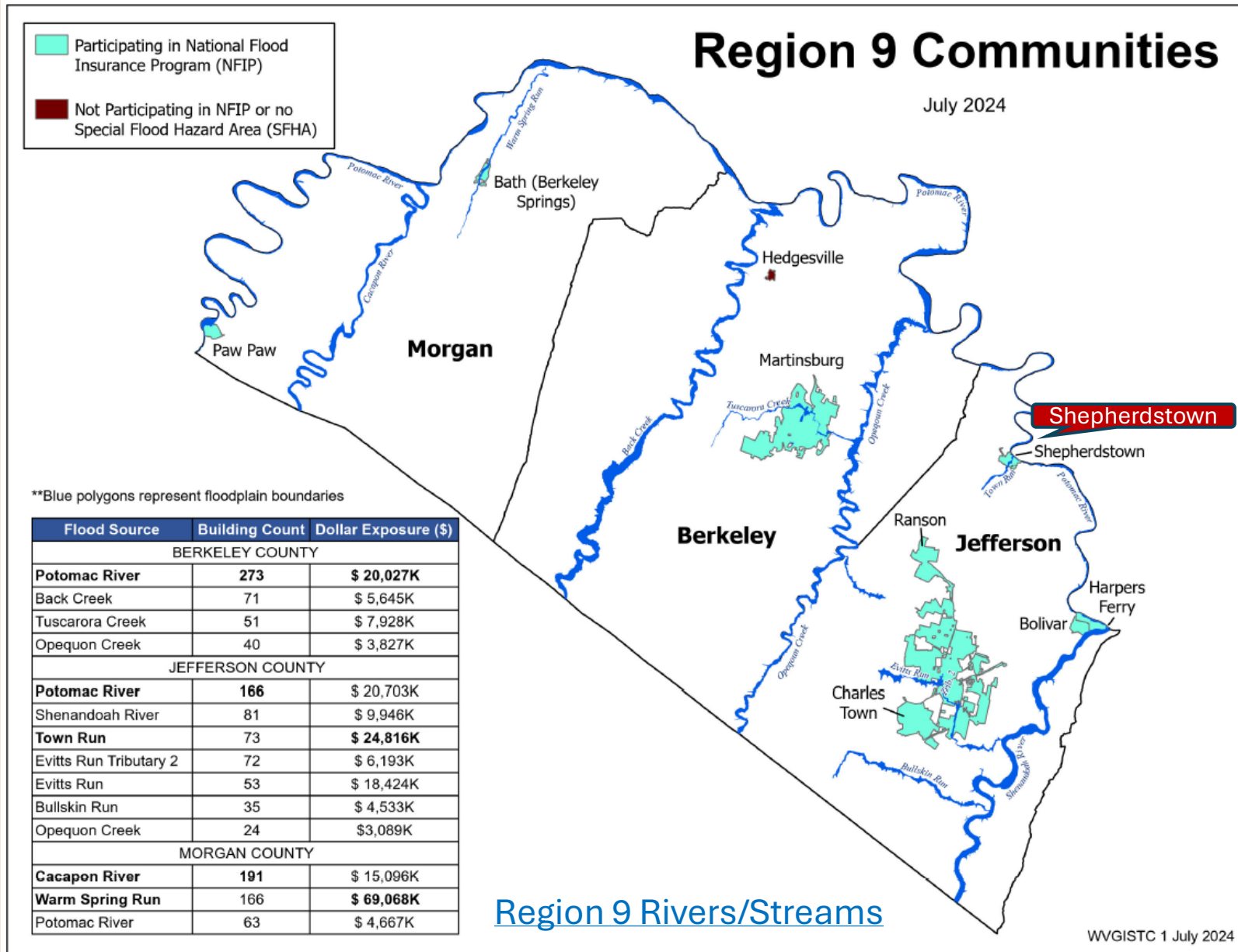
| # | STATE<br>CATEGORY<br>RANK | River/Stream Floodplain          | Building Characteristics |  | CATEGORY<br>SCORE |
|---|---------------------------|----------------------------------|--------------------------|--|-------------------|
|   |                           |                                  | Building Median Value    |  |                   |
| 1 | 1                         | <a href="#">Town Run</a>         | \$247,700                |  | 100.0%            |
| 2 | 4                         | <a href="#">Shenandoah River</a> | \$95,100                 |  | 98.0%             |
| 3 | 24                        | <a href="#">Potomac River</a>    | \$57,300                 |  | 85.1%             |



FLOOD DEPTH MEDIAN: Floodplain structures along the **Shenandoah River** have high flood depths compared to 156 other major rivers/streams in the state.

| # | STATE<br>CATEGORY<br>RANK | River/Stream Floodplain          | Floodplain Characteristics |                    | CATEGORY<br>SCORE |
|---|---------------------------|----------------------------------|----------------------------|--------------------|-------------------|
|   |                           |                                  | Floodplain Length          | Flood Depth Median |                   |
| 1 | 12                        | <a href="#">Shenandoah River</a> | 30.2 Miles                 | 7.4 Ft             | 92.9%             |
| 2 | 2                         | <a href="#">Potomac River</a>    | 143.8 Miles                | 4.5 Ft             | 99.3%             |
| 3 | 147                       | <a href="#">Town Run</a>         | 2.1 Miles                  | 0.2 Ft             | 5.8%              |

# River/Stream Building Risk Assessment



Top rivers with high building counts in SFHA are **Potomac River** (166), **Shenandoah River** (81) and **Town Run** (73). Town Run has highest building dollar exposure.

# Jefferson County Risk Assessment



Statewide Rank  
among the Top 5

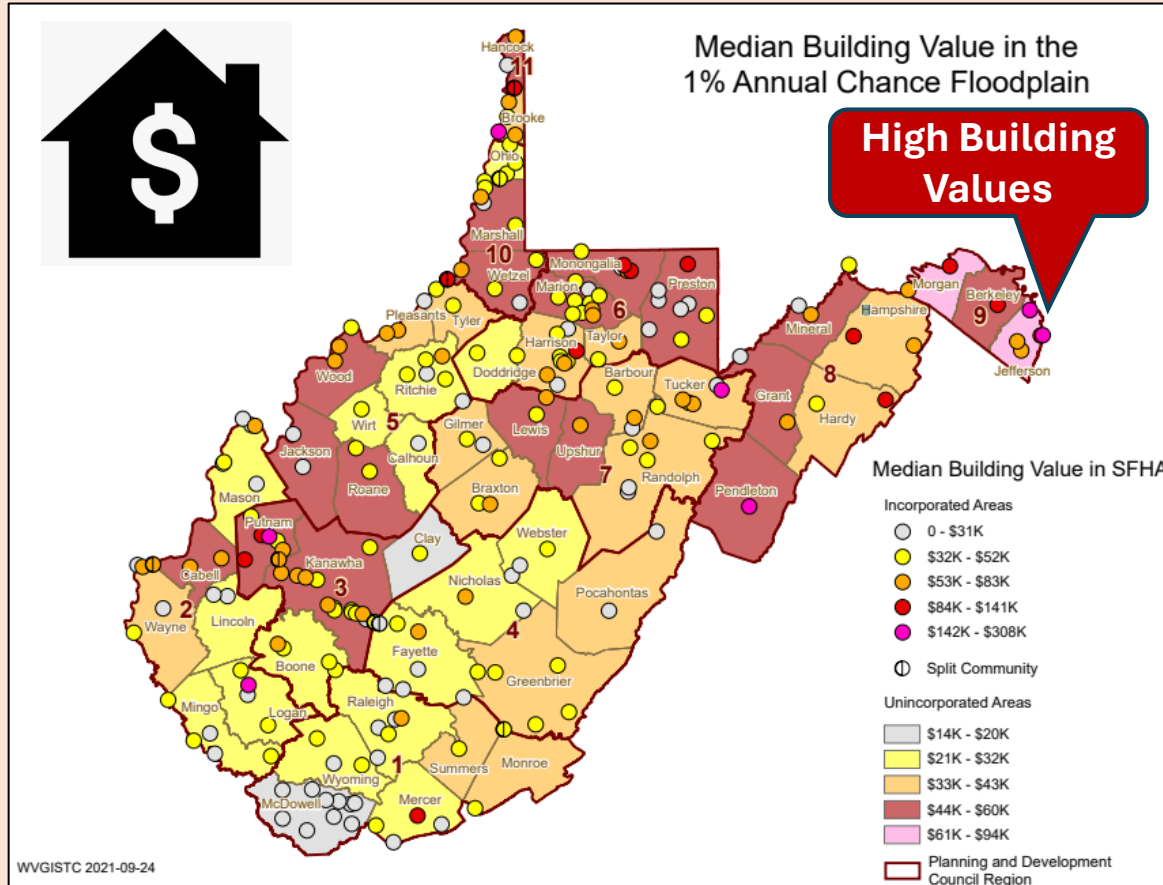
**JEFFERSON COUNTY** ranks “very high” or in the **top 20%** of all 55 counties in the state for the five risk indicators below. View [Top 20% Risk Indicators Report](#) for county. Click on Risk Factor links for rationales/recommendations.

| Category                 | Flood Risk Indicator                                   |          | Value for Jefferson        | Indicator Score<br>(0 - 100%) | Indicator Rating |
|--------------------------|--|----------|----------------------------|-------------------------------|------------------|
| Building Characteristics | <a href="#">Building Median Value</a>                  | <b>1</b> | \$97,450 (Median \$42,200) | 100.0%                        | VERY HIGH        |
|                          | <a href="#">Bldg. Subgrade Basements Ratio</a>         | <b>4</b> | 49.5%                      | 94.4%                         | VERY HIGH        |
|                          | <a href="#">Bldg. Year Minus Rated Post-FIRM Ratio</a> |          | 9.4%                       | 81.4%                         | Very High        |
| Community Assets         | <a href="#">Community Assets Historical</a>            | <b>4</b> | 120                        | 94.4%                         | VERY HIGH        |
| Building Damage Loss     | <a href="#">Bldg. Substantial Damage Ratio</a>         |          | 24.0%                      | 90.7%                         | VERY HIGH        |

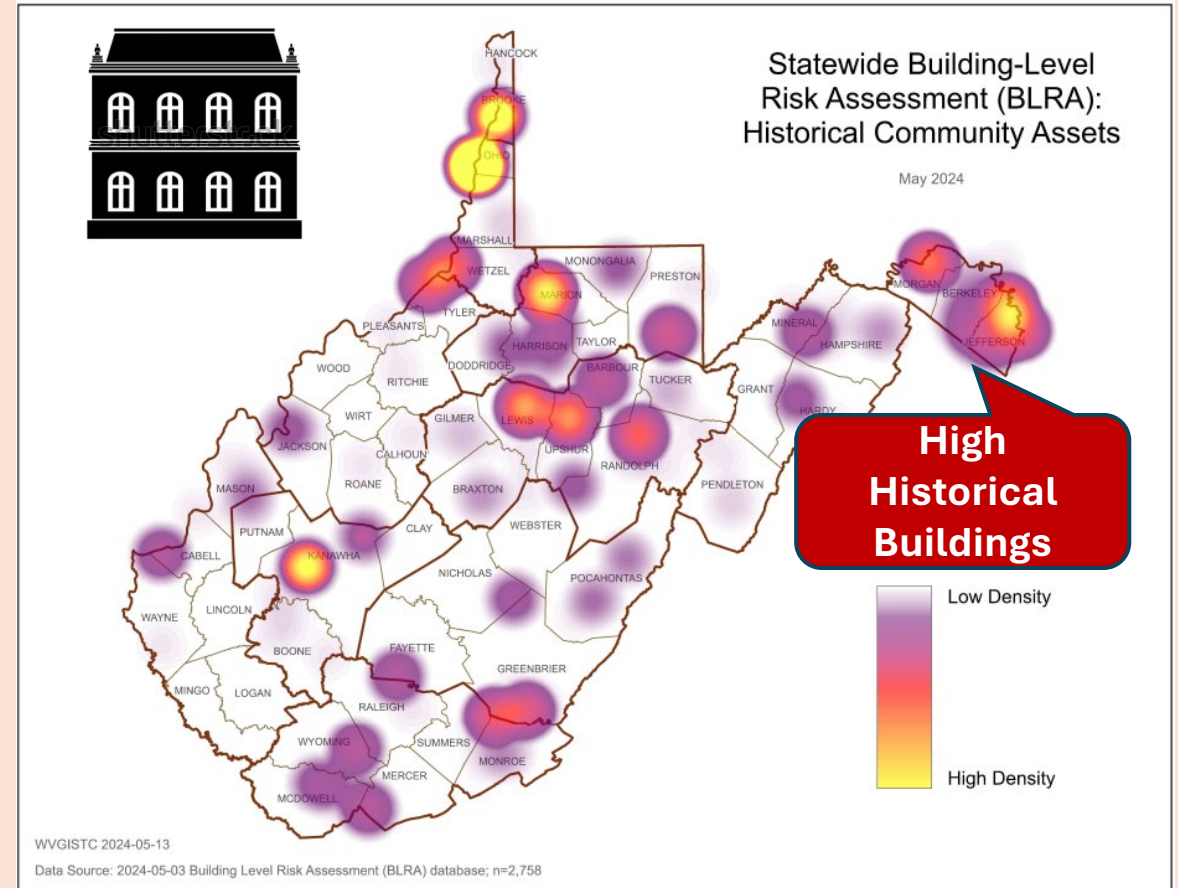
**JEFFERSON COUNTY UNINCORPORATED\*** ranks “very high” or in the **top 20%** of all 55 unincorporated areas in the state for the six risk indicators below. View [Top 20% Risk Indicators Report](#) for incorporated area.

| Category                   | Flood Risk Indicator                                   |          | Value for Jefferson County* -<br>Unincorporated | Indicator Score<br>(0 - 100%) | Indicator Rating |
|----------------------------|--|----------|---|-------------------------------|------------------|
| Floodplain Characteristics | <a href="#">Flood Depth Median</a>                     | <b>4</b> | 4.7 Ft  | 94.4%                         | VERY HIGH        |
| Building Characteristics   | <a href="#">Building Median Value</a>                  | <b>1</b> | \$93,150 (Median \$37,350)                      | 100.0%                        | VERY HIGH        |
|                            | <a href="#">Bldg. Subgrade Basements Ratio</a>         | <b>2</b> | 48.9%   | 98.1%                         | VERY HIGH        |
|                            | <a href="#">Bldg. Year Minus Rated Post-FIRM Ratio</a> |          | 14.5%   | 90.7%                         | VERY HIGH        |
| Community Assets           | <a href="#">Community Assets Historical</a>            | <b>1</b> | 26  | 100.0%                        | VERY HIGH        |
| Building Damage Loss       | <a href="#">Bldg. Substantial Damage Ratio</a>         |          | 29.7%   | 90.7%                         | VERY HIGH        |

# Jefferson County Building Risk Assessment



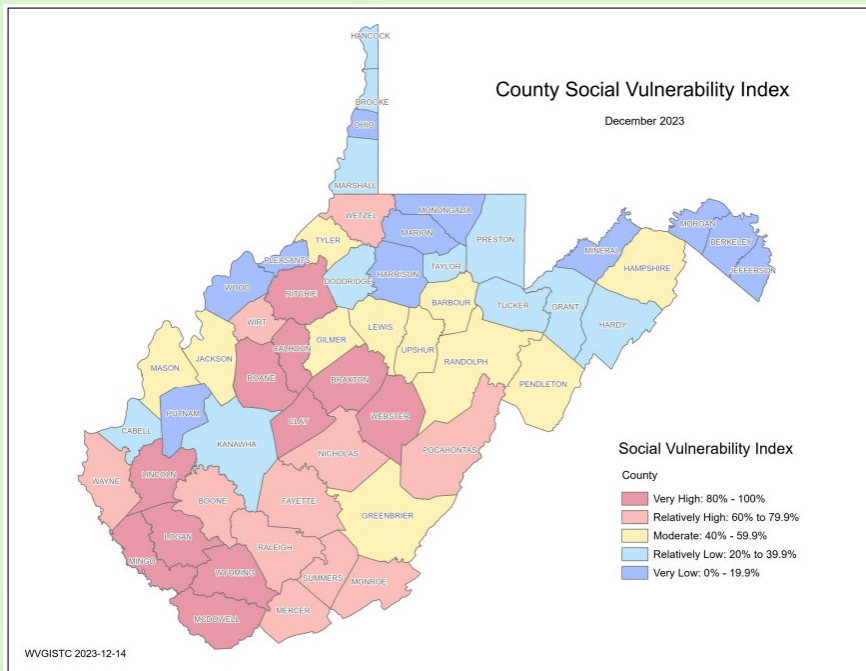
Jefferson County has very high [Building Values](#), or more than double the statewide median value.



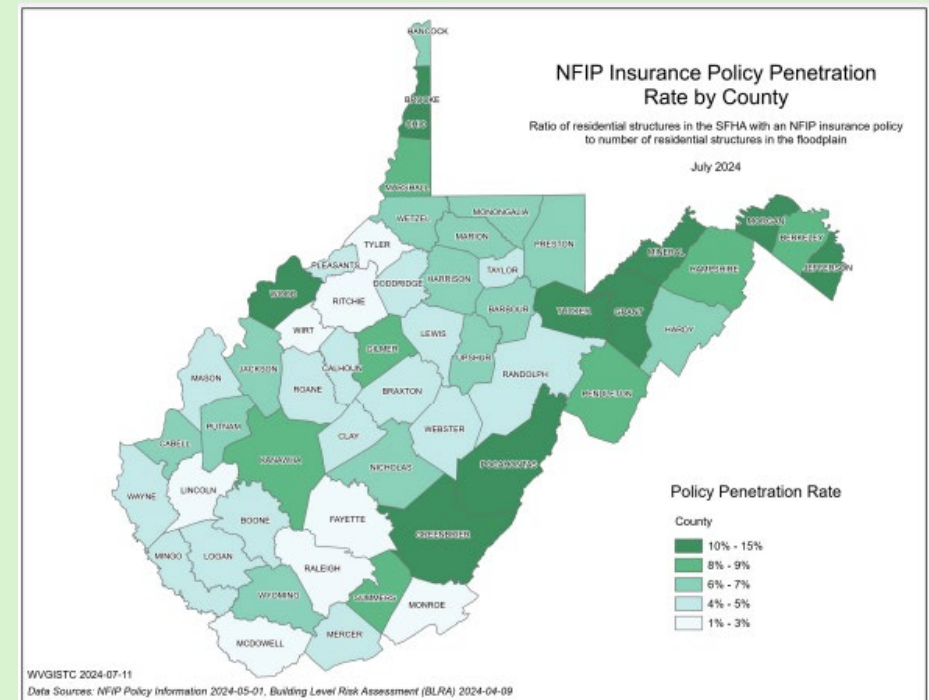
Jefferson County has a high number of [Historical Community Assets](#) on the National Register.

# Jefferson County Resiliency

(1) Jefferson County has no [Essential Facilities](#) in the high or moderate risk floodplains

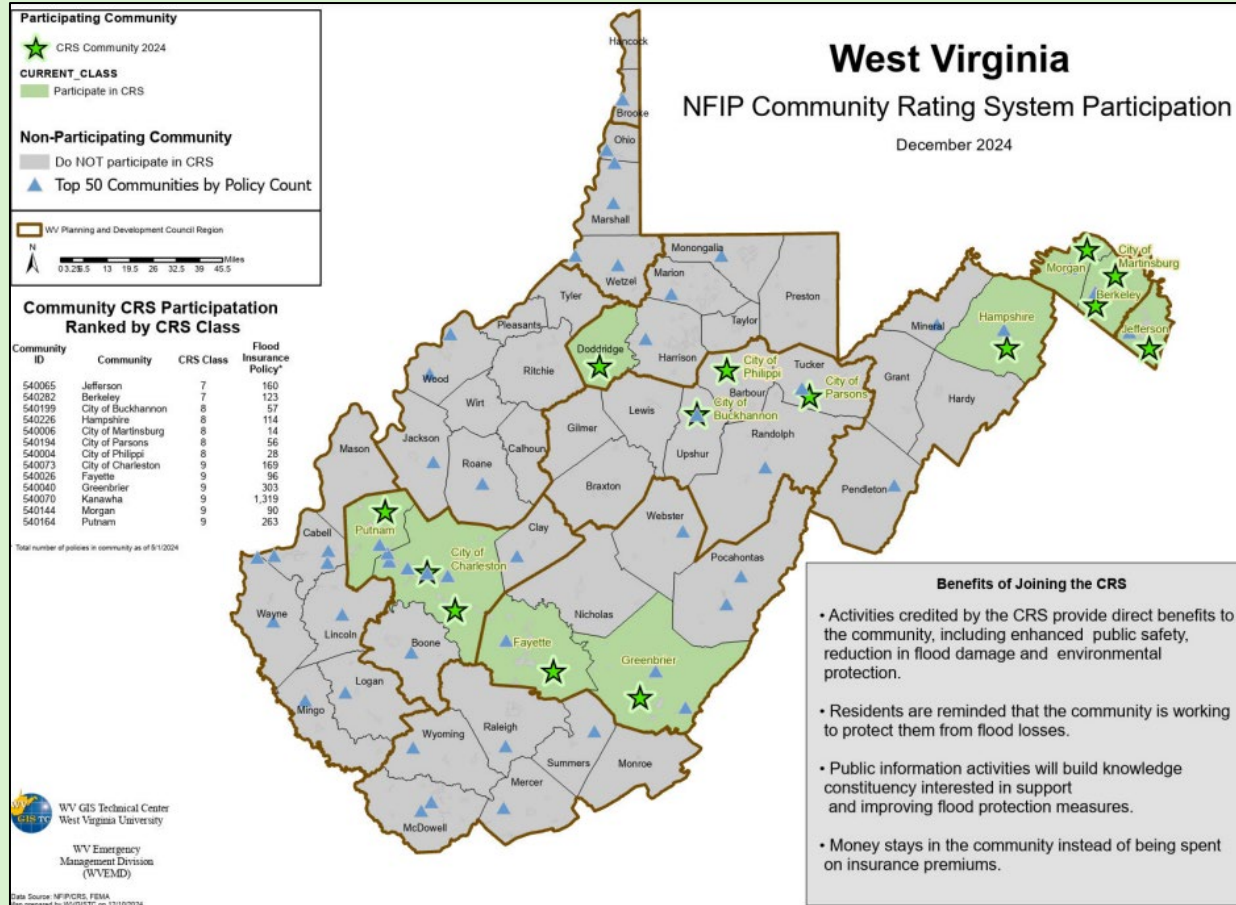


(2) Jefferson County has the lowest [Social Vulnerability Index](#) in the State

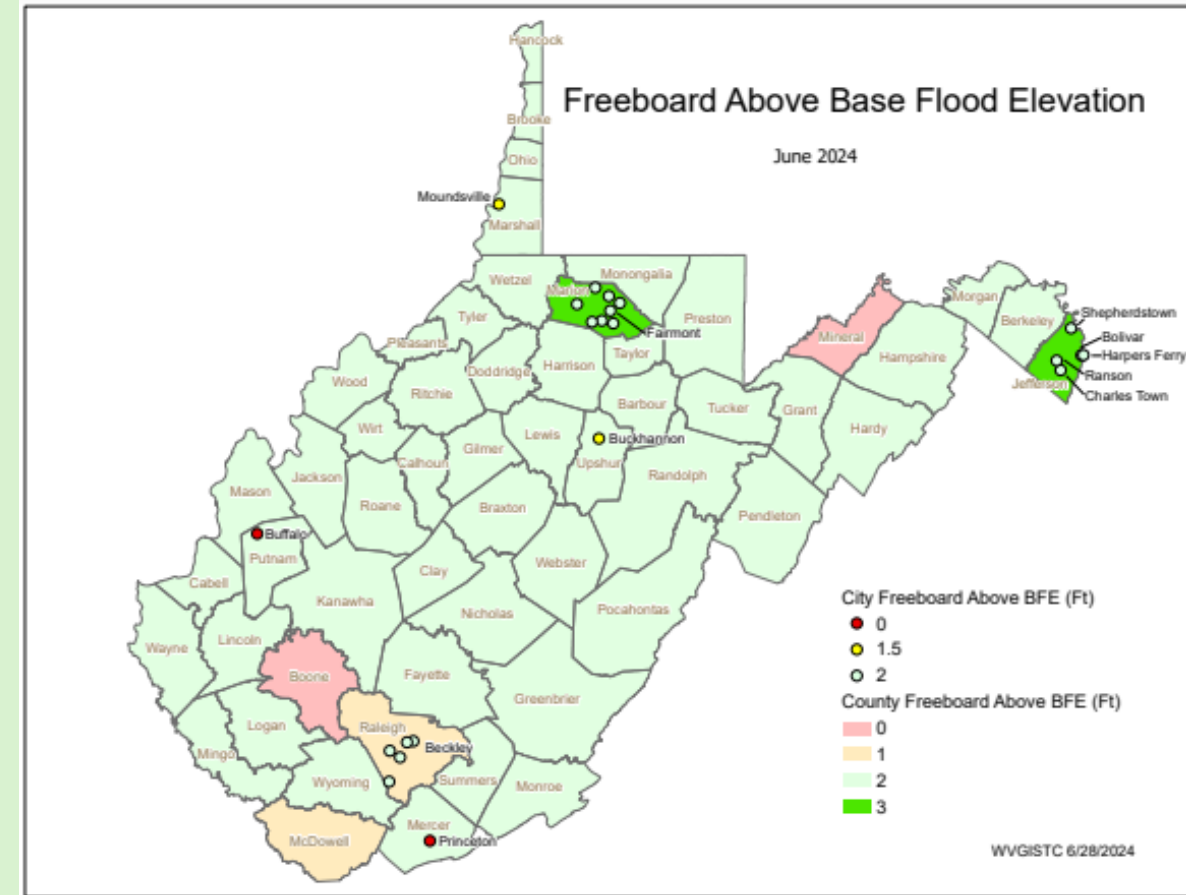


(3) Jefferson County has higher [NFIP Insurance Penetration Rate](#) than other counties

# Jefferson County Unincorporated\* Resiliency

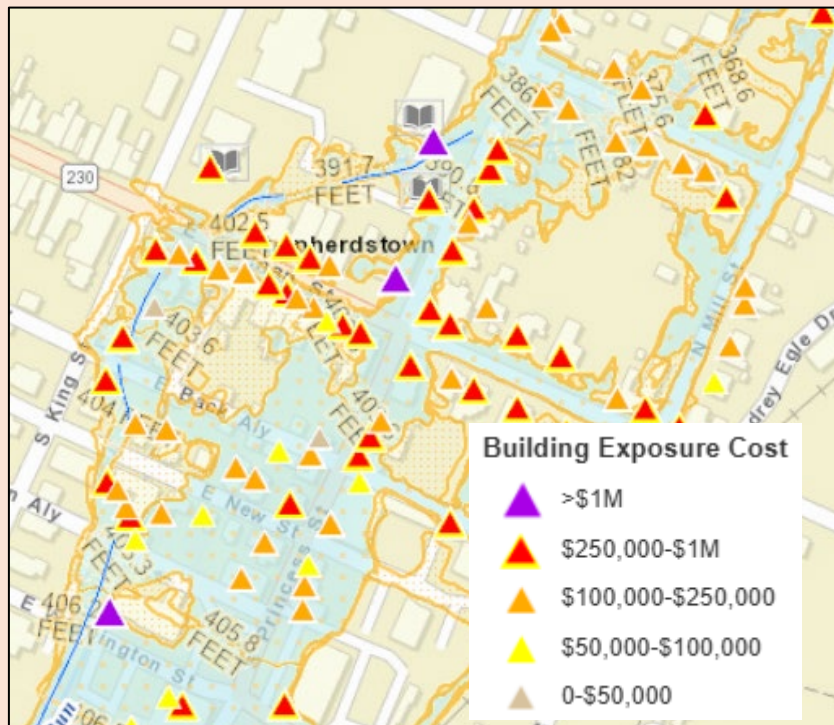


Jefferson County Unincorporated has a high [CRS](#) Rating of Class 7



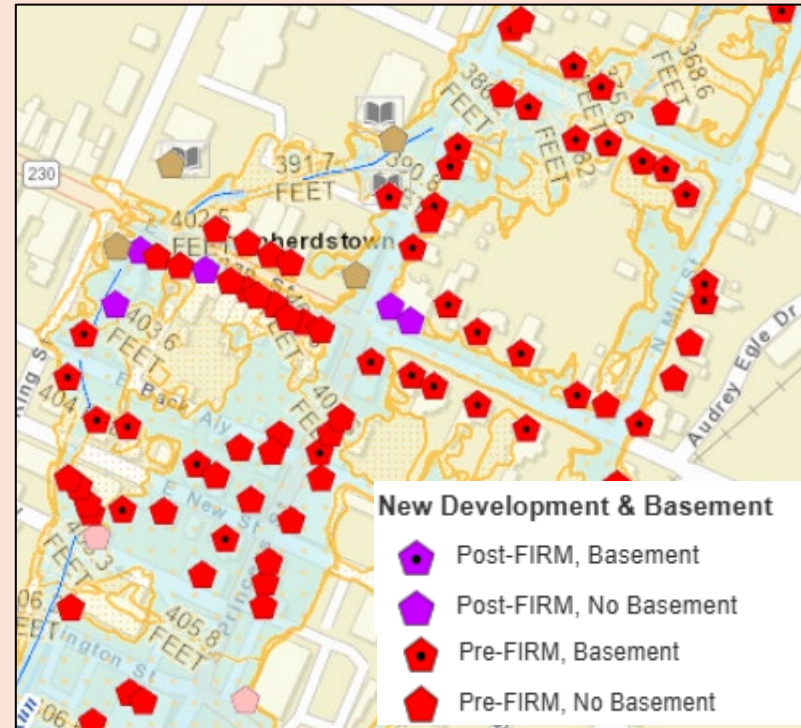
Jefferson County Unincorporated has a high [Freeboard](#) safety factor of 3 feet

# Shepherdstown Risk Assessment



## Building Value and Density.

Median Building Value ranks first of 229 incorporated places in the state. High density of buildings in small area.



## Pre-FIRM and Basements.

Nearly 90% of structures are Pre-FIRM and nearly half have basements.



## Historical Buildings.

Most building are in the National Historic District.

Refer to online [All Risk Indicators Report](#)

Sources: [WV Flood Tool's Risk Map View](#) & Statewide Building-Level Risk Assessment





# Shepherdstown 3D Flood Movie

Media Player

0:01:07

3DMovie\_Shepherdstown\_2024

0:01:00

Within the 1% annual chance floodplain, four non-residential buildings, including large university buildings and the Shepherdstown Water Works have an estimated value exceeding \$1 million.

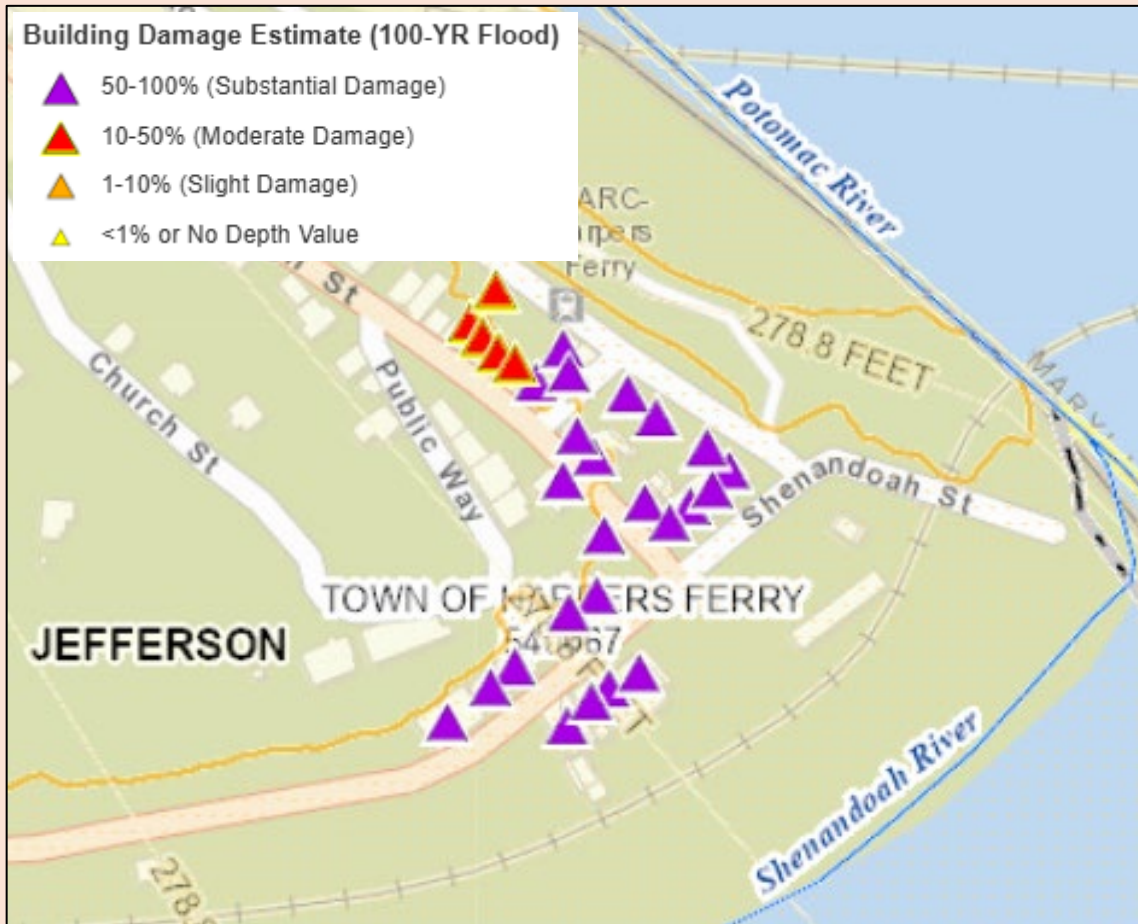
Click [here](#) to view 3D Flood Movie of Shepherdstown

# Example Urban Flooding



View [Videos](#) of 2021 Morgantown Flooding along *Popenoe Run* on Pattleson Drive near WVU stadium that may occur similarly on *Town Run* in Shepherdstown

# Harpers Ferry Risk Assessment



**Building Substantial Damage Ratio** highest of all 229 incorporated places in the state



**Pre-FIRM Building Ratio** highest of all 229 incorporated places in the state

Refer to online [All Risk Indicators Report](#)

Sources: [WV Flood Tool's Risk Map View](#) & Statewide Building-Level Risk Assessment

# Harpers Ferry Risk Assessment

744 Shenandoah St, Harpers Ferry, WV, 25425

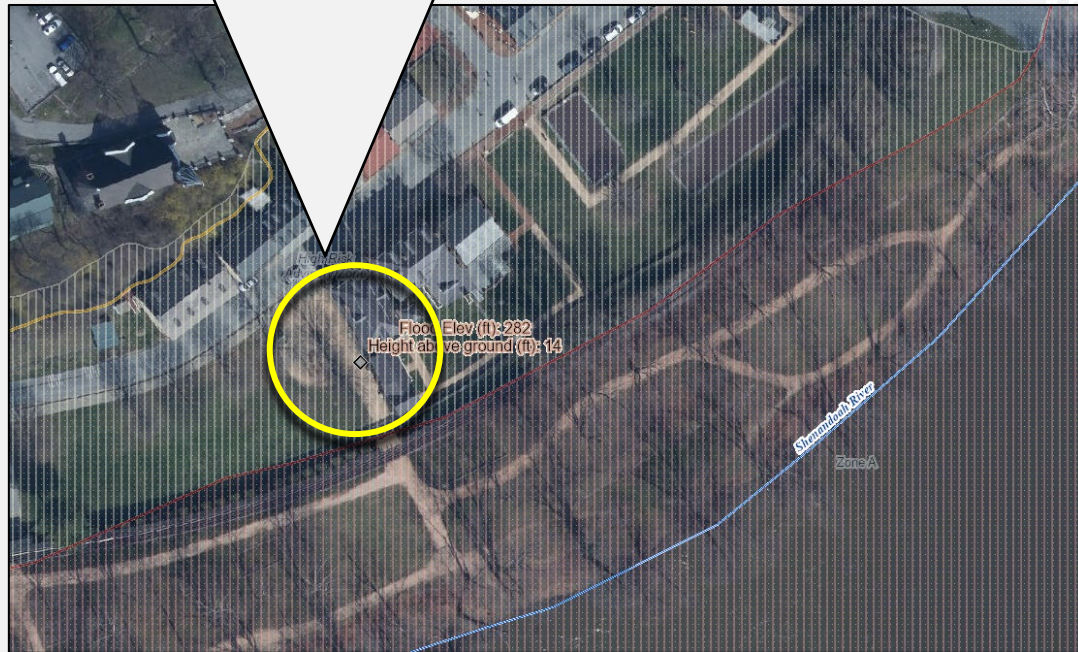
Building ID: [19-05-0004-0025-0000 801A](#)

Historical structure built in 1845

14' (1936 High Water Mark)

8' (1996 High Water Mark)

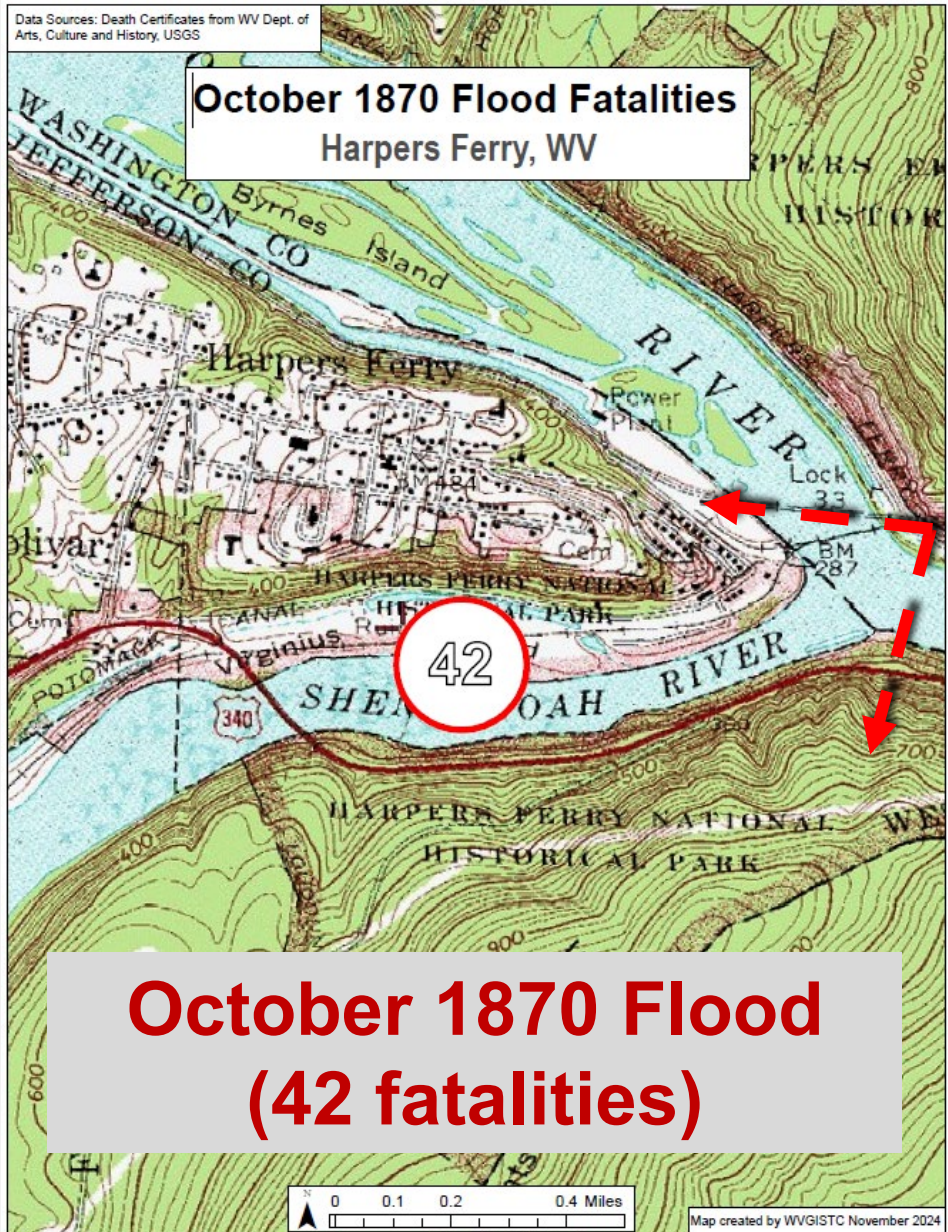
1936 Flood of Record



High Water Mark



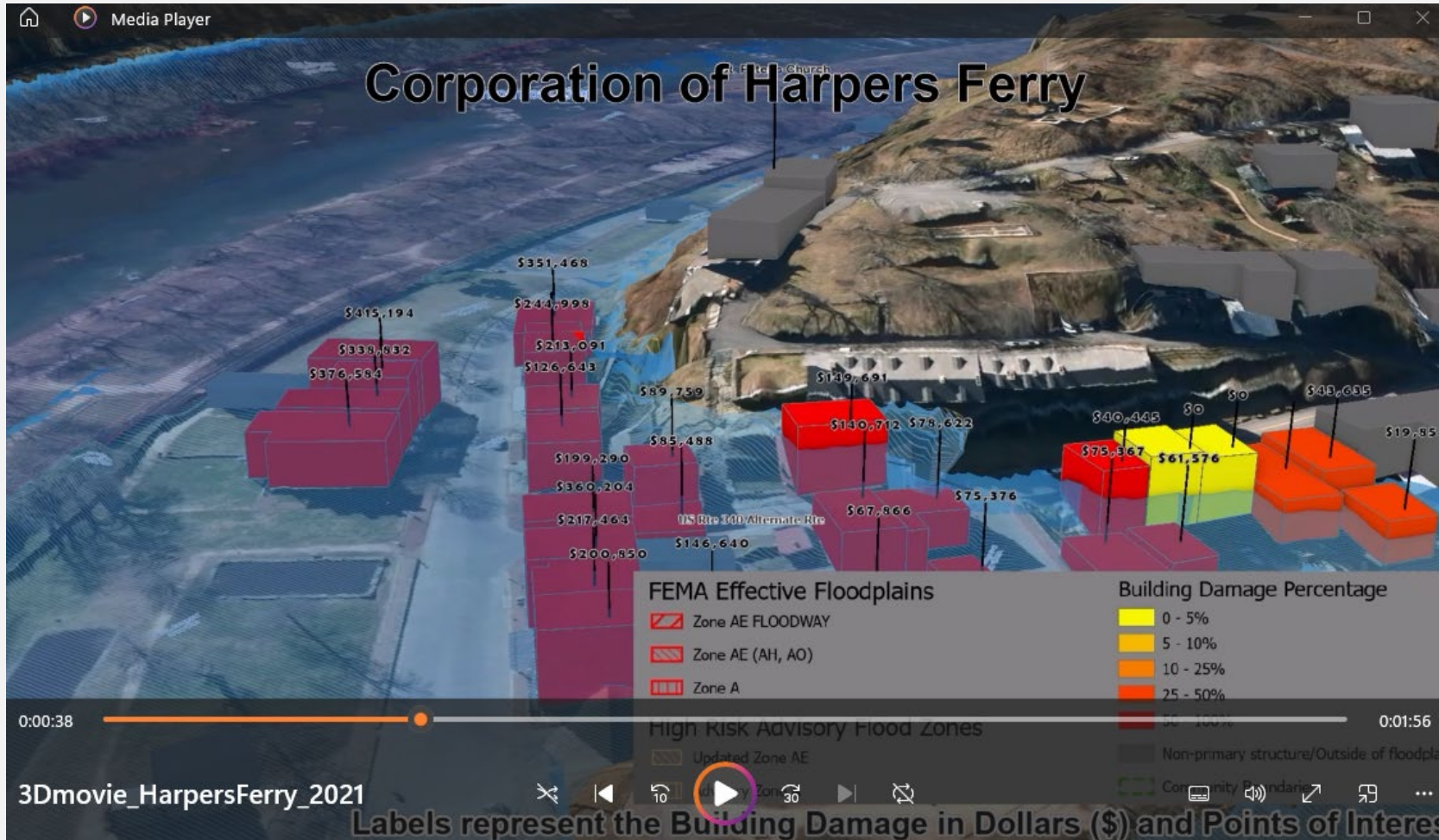
# Historical Flood Research (Harpers Ferry, WV)



Link to [WV Flood Fatality Dashboard](#)

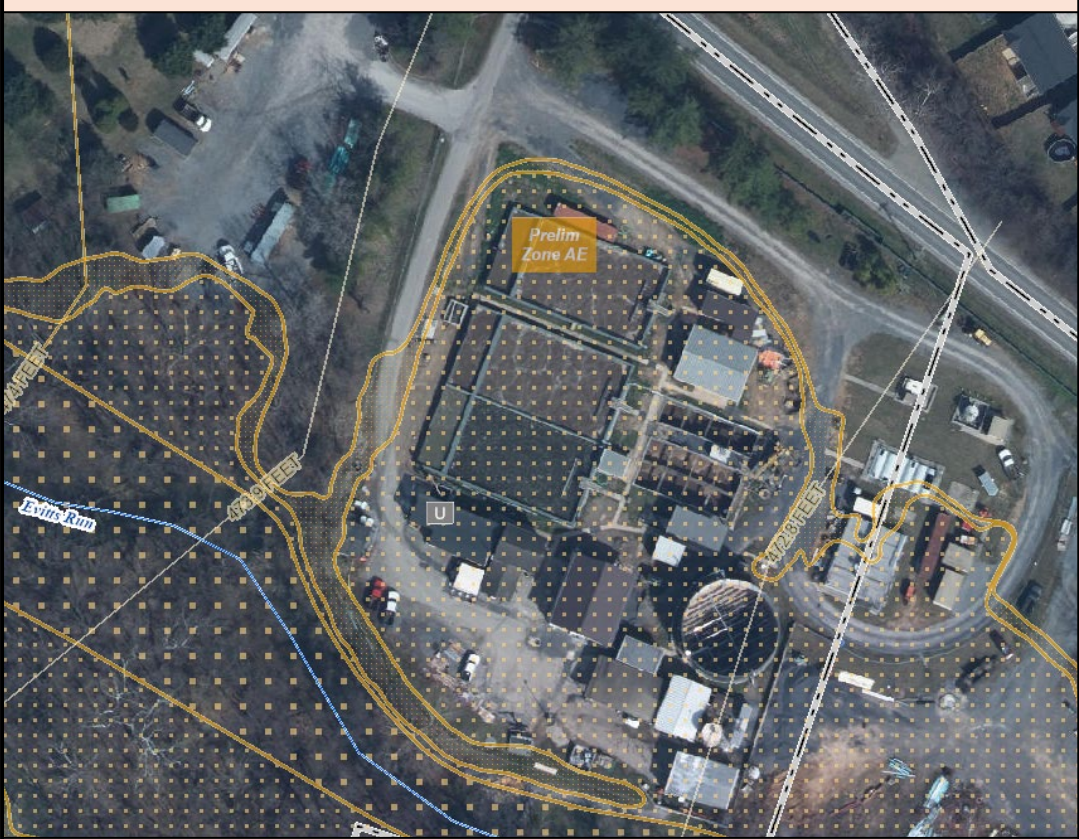


# Harpers Ferry 3D Flood Movie



Click [here](#) to view 3D Flood Movie of Harpers Ferry

# Utilities in Floodplain (High \$ Exposure)



City of Charles Town Wastewater Treatment Plant (FD: 1 ft)  
 Highest CA Value (\$6.8M) in Jefferson County  
 (Building ID: [19-03-0008-0001-0000\\_842](#))  
[Value source](#) inflation adjusted to 2021



Shepherdstown Water Works Water Treatment Plant (FD: ? ft)  
 (Building ID: [19-10-0001-0052-0000\\_309](#)) (\$3.1M)  
[Value source](#) inflation adjusted to 2021

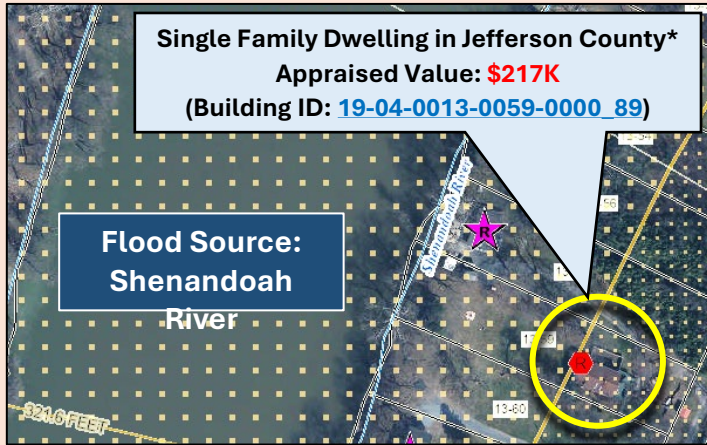


Harpers Ferry Bolivar PSD Wastewater Treatment Plant (FD: 1 ft)  
 (Building ID: [19-05-0004-0025-0000\\_192](#)) (\$462K)  
[Value source](#) inflation adjusted to 2021





# Building Flood Profile - Unmitigated

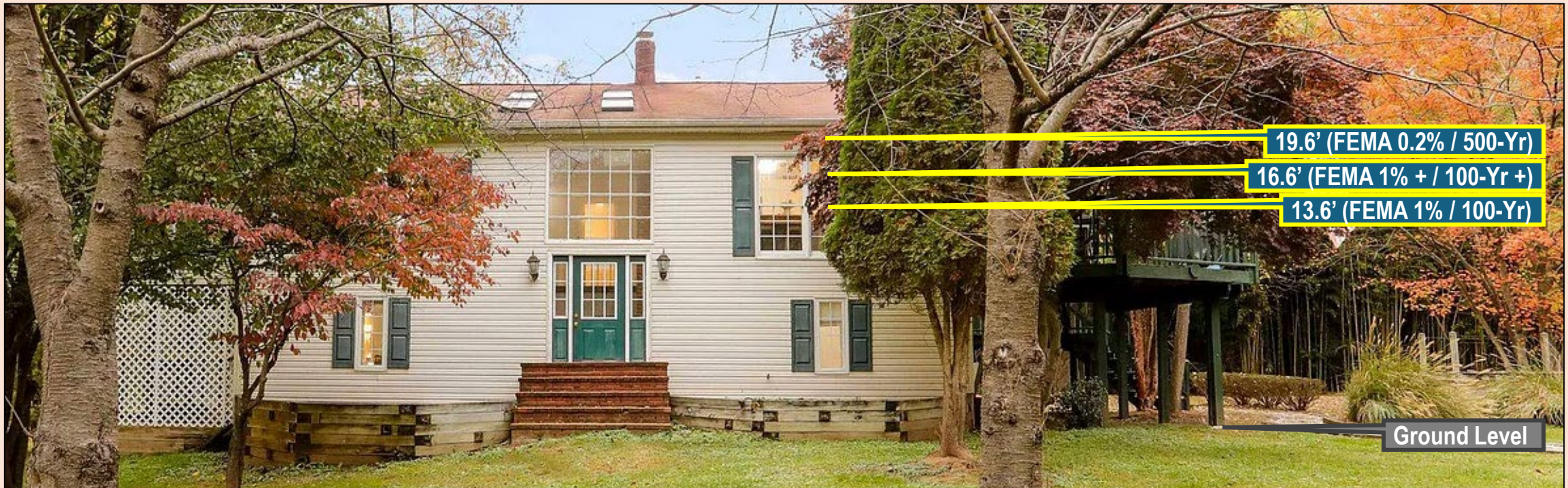


## Rivermist Lane, Harpers Ferry

*Repetitive Loss Area / Area of Mitigation Interest*

| BUILDING INFORMATION |                            |
|----------------------|----------------------------|
| Property Class Type  | R - Residential            |
| Land Use             | 101 - Residential 1 Family |
| Year Built           | 1985 <b>Post-FIRM</b>      |

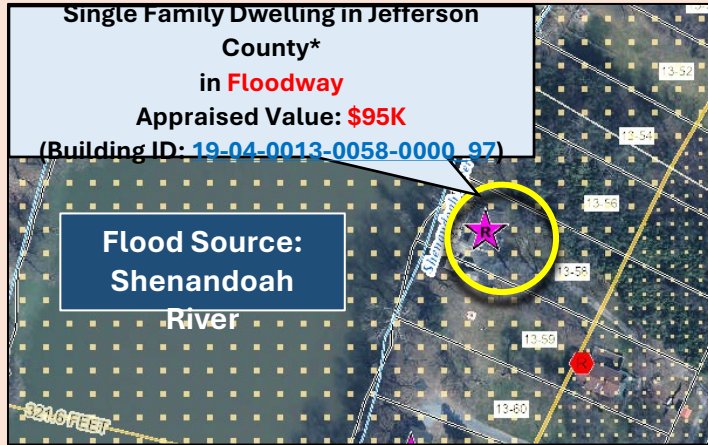
|                    | HEIGHT (ft.) |
|--------------------|--------------|
| <b>BUILDING</b>    |              |
| Freeboard (FBD)    | 3            |
| <b>FLOOD DEPTH</b> |              |
| FEMA 1% (100-Yr)   | 13.6         |
| FEMA 100-Yr + FBD  | 16.6         |
| FEMA 0.2% (500-Yr) | 19.6         |







# Building Flood Profile - Unmitigated



## Rivermist Lane, Harpers Ferry

*Repetitive Loss Area / Area of Mitigation Interest*

| BUILDING INFORMATION |                            |
|----------------------|----------------------------|
| Property Class Type  | R - Residential            |
| Land Use             | 101 - Residential 1 Family |
| Year Built           | 1971 <b>Pre-FIRM</b>       |

|                    | HEIGHT (ft.) |
|--------------------|--------------|
| <b>BUILDING</b>    |              |
| Freeboard (FBD)    | 3            |
| <b>FLOOD DEPTH</b> |              |
| FEMA 1% (100-Yr)   | 13.7         |
| FEMA 100-Yr + FBD  | 16.7         |
| FEMA 0.2% (500-Yr) | 19.7         |

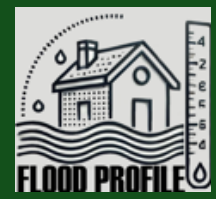


19.7' (FEMA 0.2% / 500-Yr)

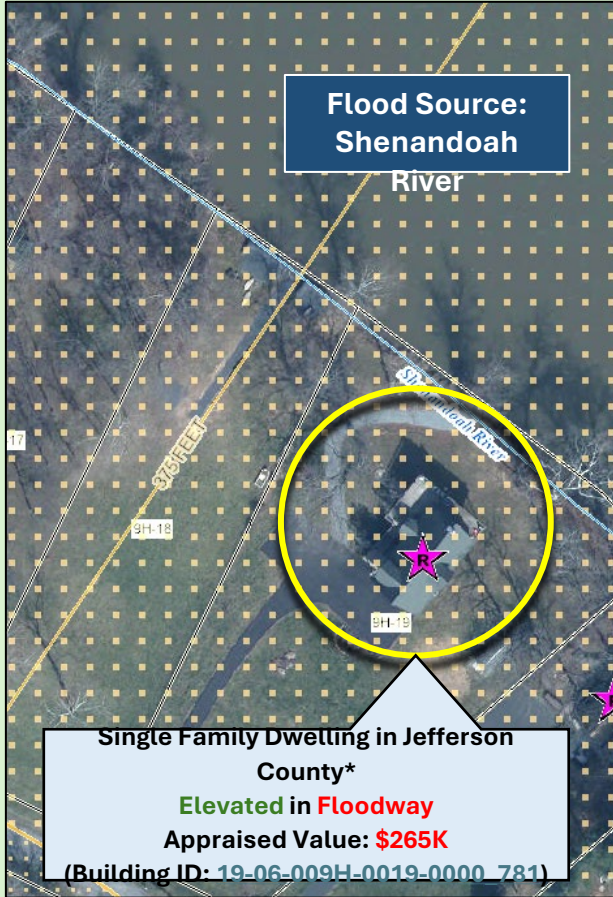
16.7' (FEMA 1% + / 100-Yr +)

13.7' (FEMA 1% / 100-Yr)

Ground Level



# Building Flood Profile – Mitigated to DFE



| BUILDING INFORMATION |                            |
|----------------------|----------------------------|
| Property Class Type  | R - Residential            |
| Land Use             | 101 - Residential 1 Family |
| Year Built           | 2011 <b>Post-FIRM</b>      |

|                    | HEIGHT (ft.) |
|--------------------|--------------|
| <b>BUILDING</b>    |              |
| Freeboard (FBD)    | 3            |
| <b>FLOOD DEPTH</b> |              |
| FEMA 1% (100-Yr)   | 9.9          |
| FEMA 100-Yr + FBD  | 12.9         |
| FEMA 0.2% (500-Yr) | 18.9         |

