Flood Frequency

Frequency: **Probability that a flood of a specific size will be equaled or exceeded in any given year.**

FEMA			
Flood Recurrence Interval and Flood Size	**Annual Probability**	**Cumulative Probability - Flooding at least once over 30 years**	**FEMA Risk Description**
500 yr (1 in 500)	**0.2%**	**6%**	**Moderate Risk**
100 yr (1 in 100) Plus confidence error	1%+		
100 yr (1 in 100)	**1%**	**26%**	**High Risk**
50 yr (1 in 50)	2%	45%	High Risk
25 yr (1 in 25)	4%	71%	High Risk
10 yr (1 in 10)	10%	96%	High Risk

Climate scenarios generated from BFE + 1 ft. or 1%+ Recurrence interval

First Street Foundation (FSF)			
Flood Recurrence Interval and Flood Size (2022, 2037, 2052)*	***Annual Probability (flooding at least 1 cm)***	***Cumulative Probability - Flooding at least once over 30 years***	***First Street Risk Description***
500 yr (1 in 500)	**0.2%**	**>0%**	**Any Risk**
100 yr (1 in 100)	**1%**	**>26%**	**Substantial Risk**
20 yr (1 in 20)	5%	> 85%	
5 yr (1 in 5)	20%	>99%	Almost Certain Risk

Climate scenarios available for 3 flood depth years (2022-today, 2037-15 years, 2052-30 years)

5-, 10-, 20-, 25-, 50-, 100-, and 500-year flood elevations (above sea level) refer to expected water levels of the 20%, 10%, 5%, 4%, 2%, 1%, and 0.2% annual chance flood events.

The Differences between FEMA Flood Maps and Flood Risk Factors by FSF		
Differences	**FEMA**	**(FSF)**
Scale of Flood Risk	Mapping Risk by Zones	Identifying the Risk on Property Level
Future Risk	Maps are not Adjusting based on Climate Change & and its impact on Future Floods	Considering the effect of Sea level Rise & Atmospheric Change in the next 30 years on Flood Risk
Insurance Rates	Maps are Intended to Inform Flood Insurance Rates	Does not Determine Whether the Property Needs Flood Insurance
Development Requirement	Determining Development for the Areas at Risk	Assessing Risk for an Individual Property

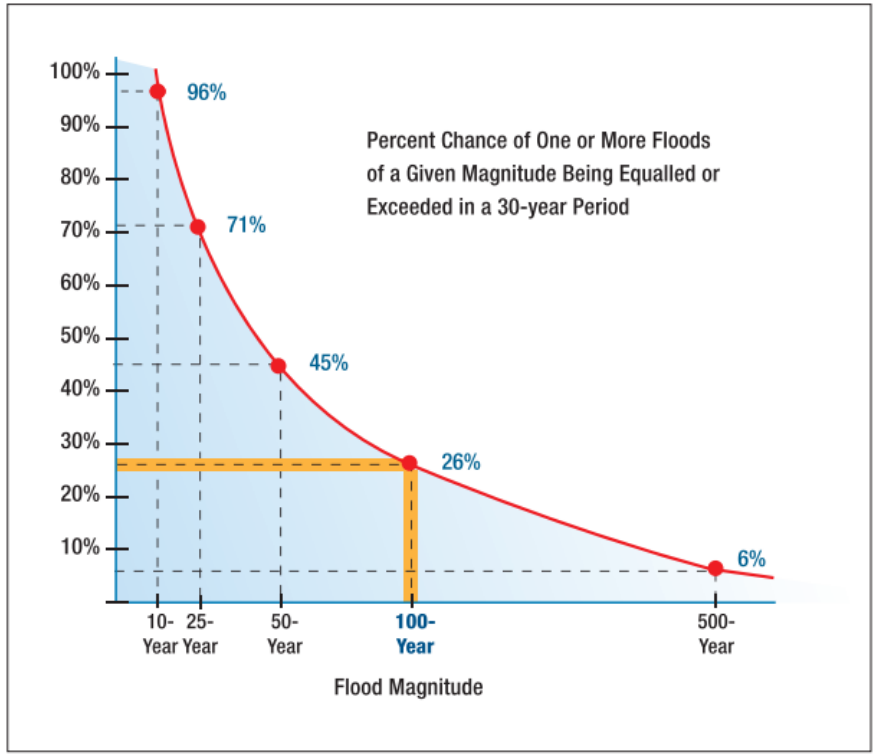
2022 Flood Study Sources: **FEMA** and **First Street Foundation** (FSF)

Flood Characteristics

Flood Characteristics Impacting Community

- ***Frequency:*** **Probability that a flood of a specific size will be equaled or exceeded in any given year**
  - 5-, 10-, 20-, 25-, 50-, 100-, and 500-year flood elevations (above sea level) refer to expected water levels of the 20%, 10%, 5%, 4%, 2%, 1%, and 0.2% annual chance flood events. A 1000-yr flood has a 0.1% chance of happening in any given year.
  - FEMA's 1%+ flood elevations measures how high the 100-year flood could be given the statistical uncertainties in flood modeling. It represents the upper 84-percent confidence limit of the statistical error for calculating the 1-percent annual chance event.
  - The relative frequency of any given flood (e.g., 5-year or 10-year) serves as a useful reference point when selecting a mitigation options and evaluating cost effectiveness.
- ***Depth: Flood depth or water surface elevation above the ground surface***
  - Critical during design considerations, as it is often the primary factor in evaluating the potential for flood damage
  - Flood depth sources include flood models and high water marks which measure the degree of flooding
- ***Velocity: Speed at which the floodwaters are flowing***
  - Flowing water often causes erosion and scour, as well as debris impacts and hydrodynamic forces.
  - FEMA's detailed engineering studies provide river/stream flows
- ***Duration: Measure of how long water remains above normal levels***.
  - Prolonged contact with floodwaters may make some mitigation measures, including dry flood-proofing, inappropriate because of the increased chance of seepage and potential structural failure.
  - Long periods of inundation are more likely to cause greater damage to structural members and finishes than short periods of flooding.
- ***Rate of Floodwater Rise and Fall: Floodwater that rises very quickly with little or now warning***
  - Steep topography and locations with small drainage areas may experience flash flooding in which floodwater can rise very quickly with little or no warning.
  - High-velocity water flows usually accompany flash floods and preclude certain types of flood mitigation measures, especially those requiring human intervention
  - Rapid rates of the rise and fall of floodwater can also lead to unequal hydrostatic pressures on a building. The probability of unequal hydrostatic pressures increases when building exteriors are designed to be watertight
- ***Historical Information: Use past information like the high-water marks of the 2016 Flood as an indication of the nature and severity of effects likely to occur during future events.***

Flood Models and Studies

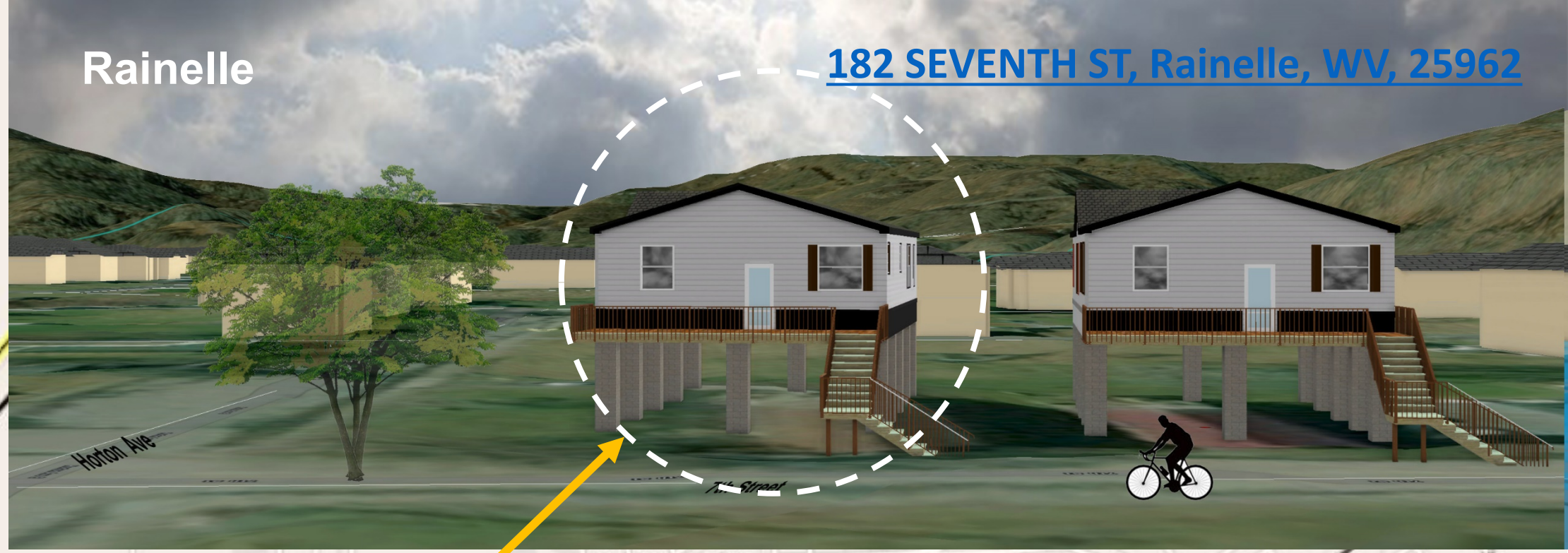


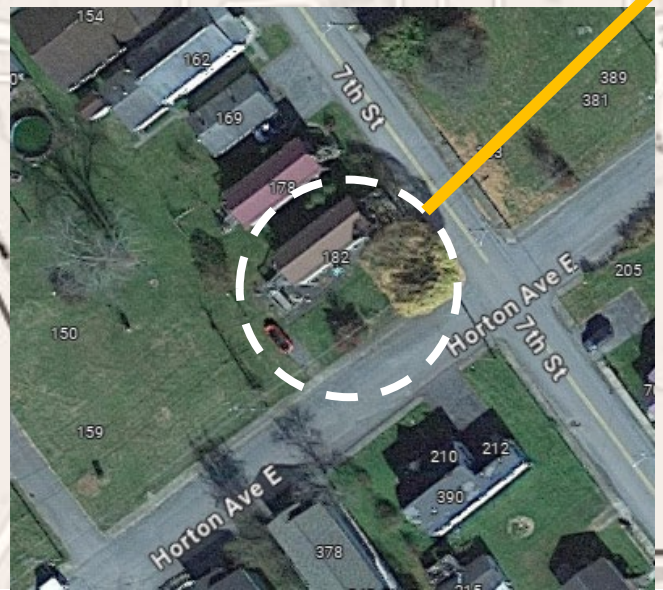
Relationship between flood recurrence intervals and the probability of an event occurring within a given period

Building Flood Profile

Rainelle

182 SEVENTH ST, Rainelle, WV, 25962

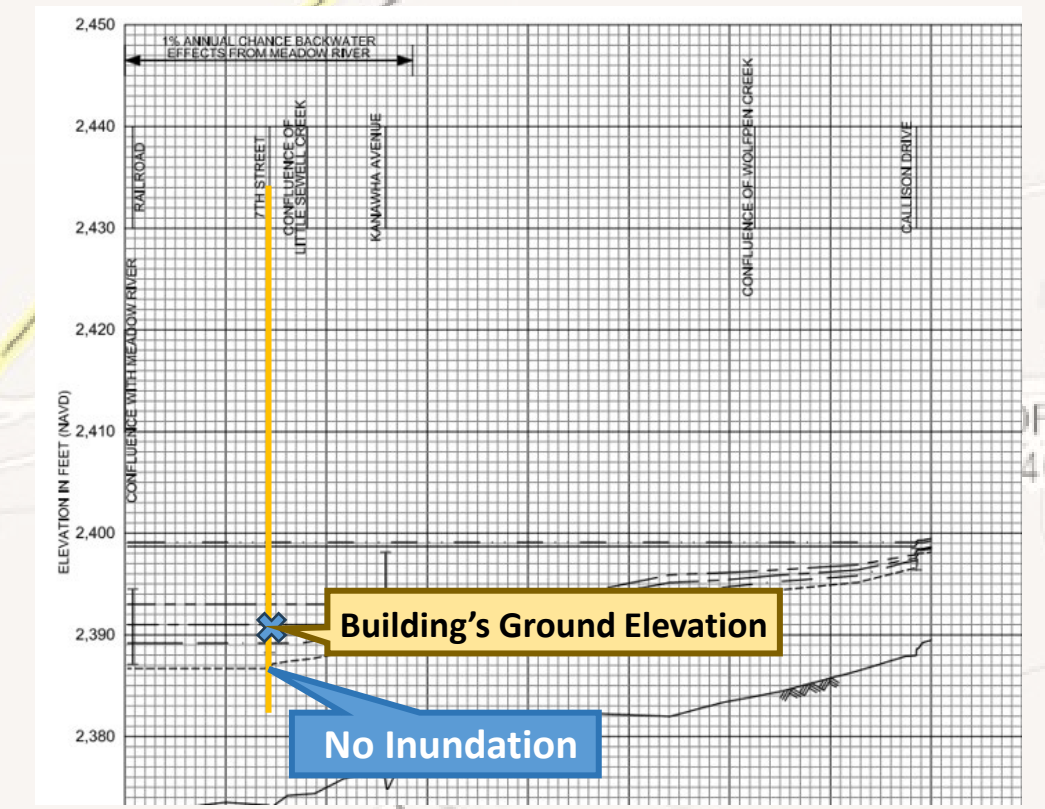


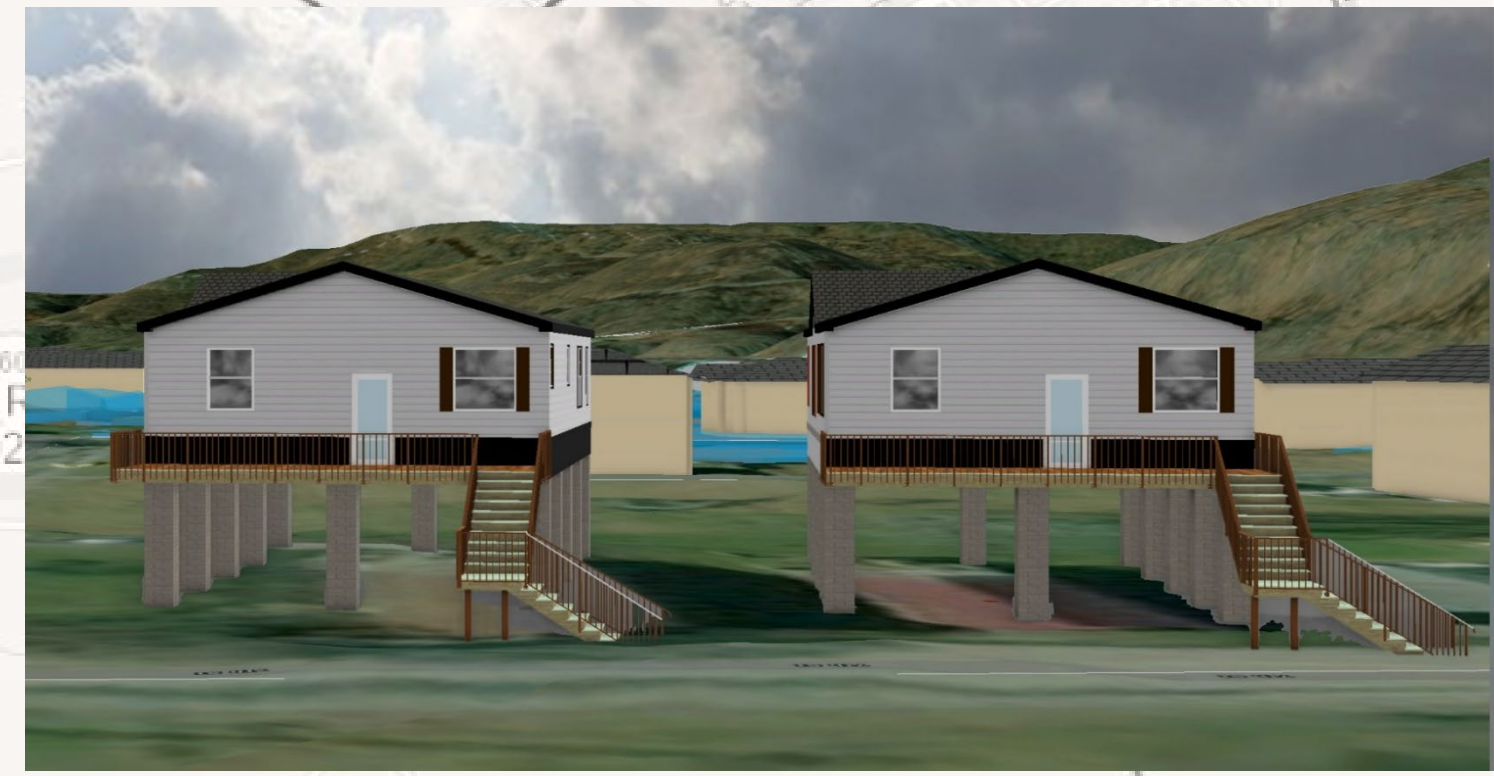


OF RAINELLE
540228

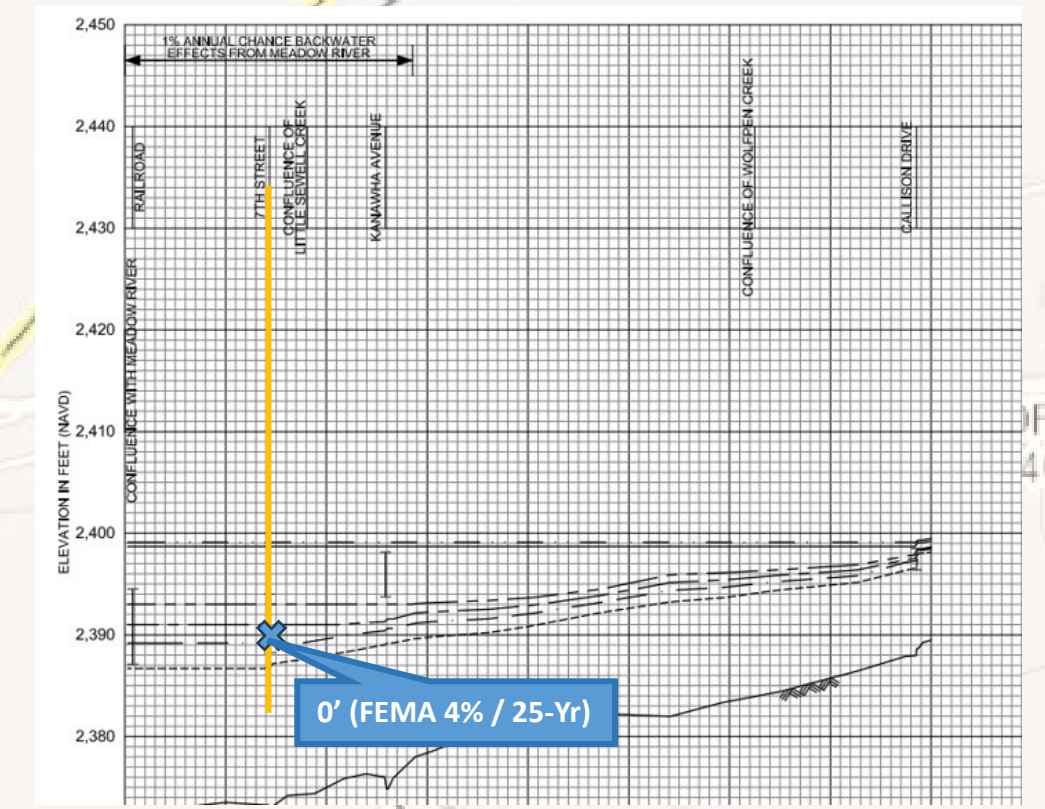
13-13-0001-0054-0000_182

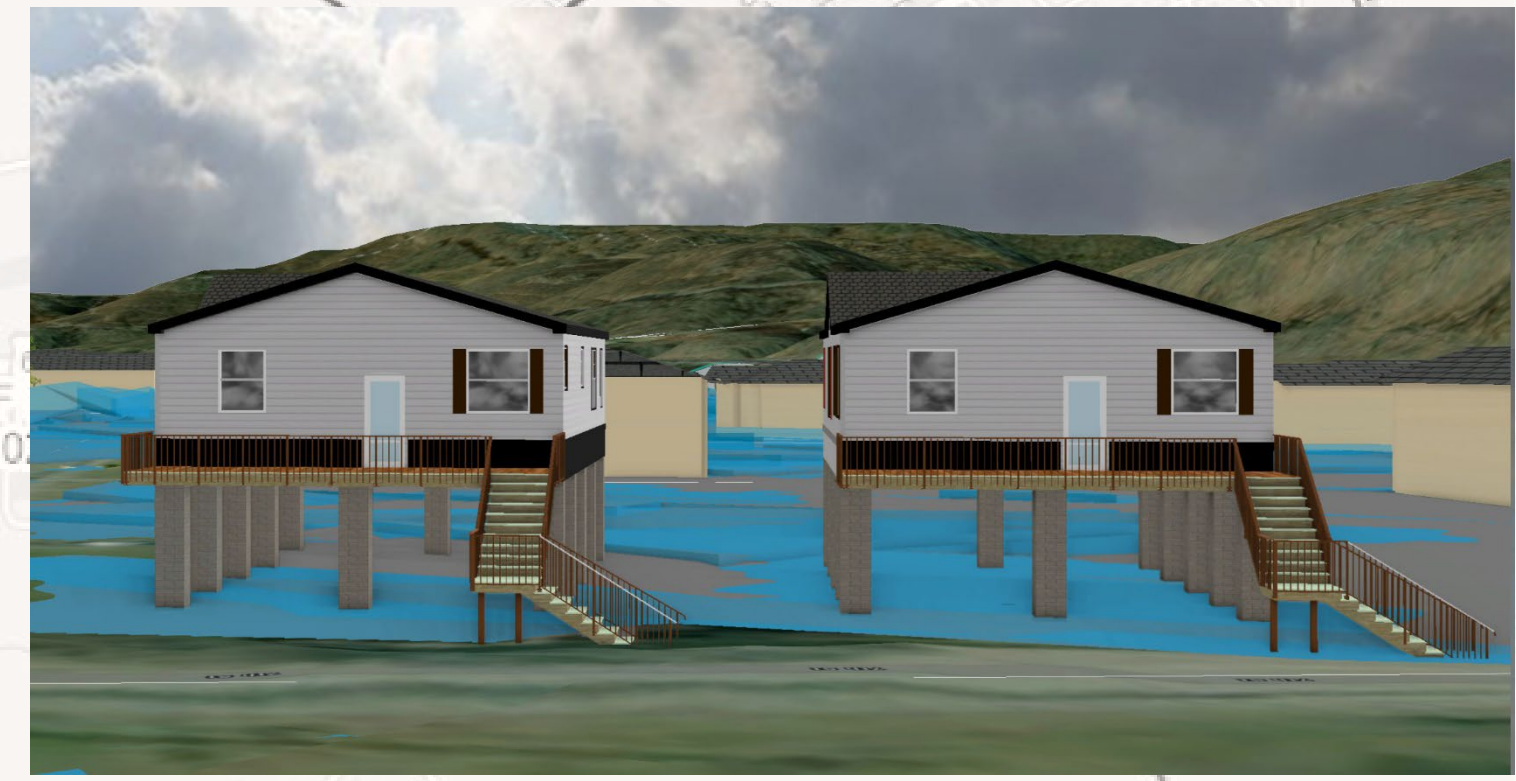
10% Probability of Flood in a year (10-year flood)



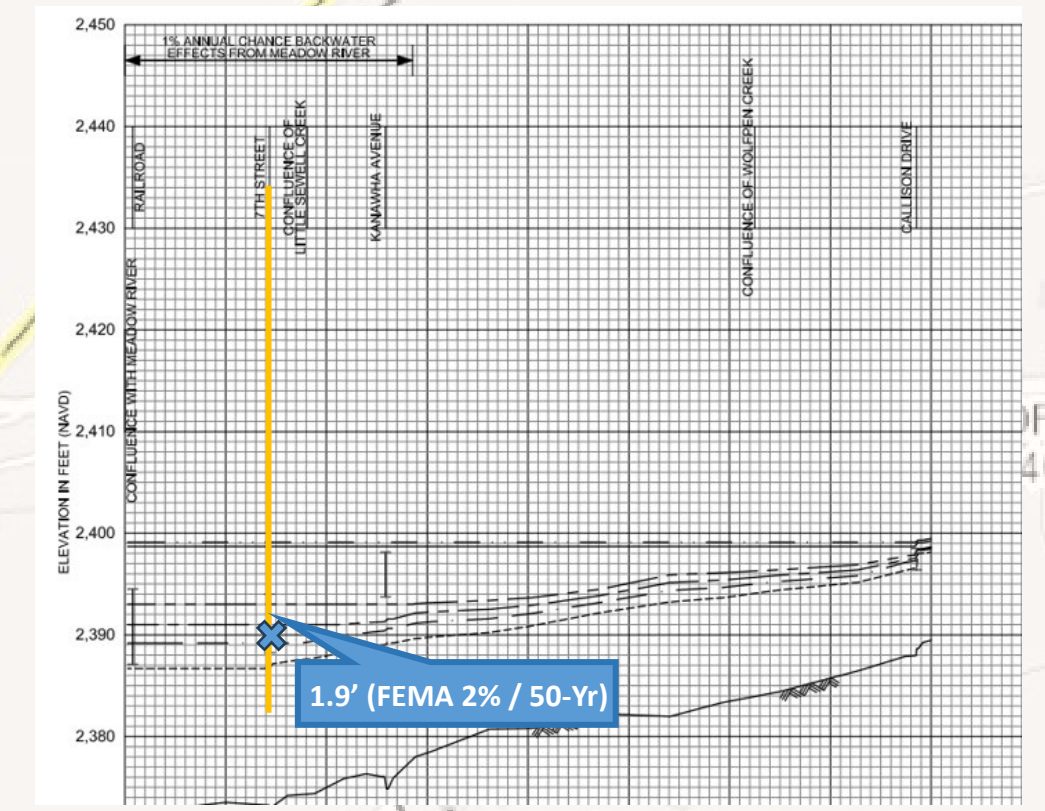


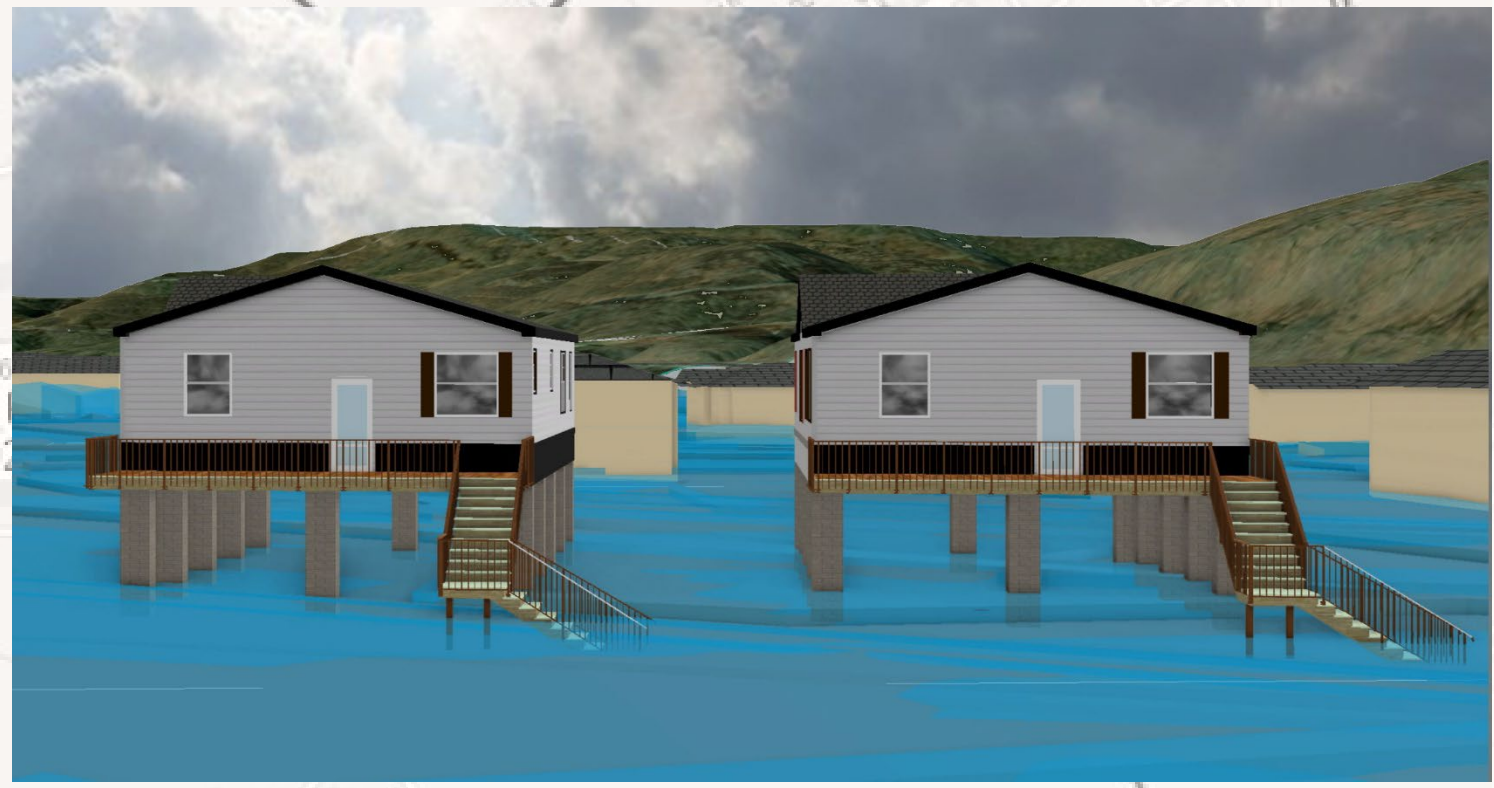
4% Probability of Flood in a year (25-year flood)



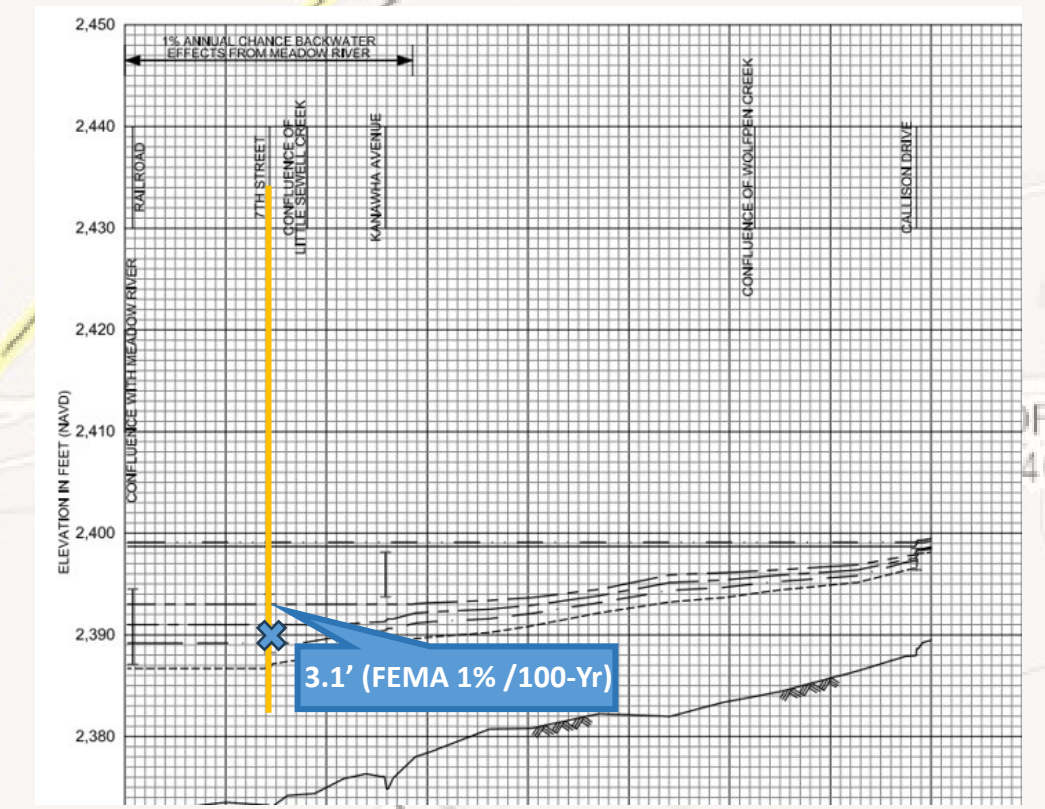


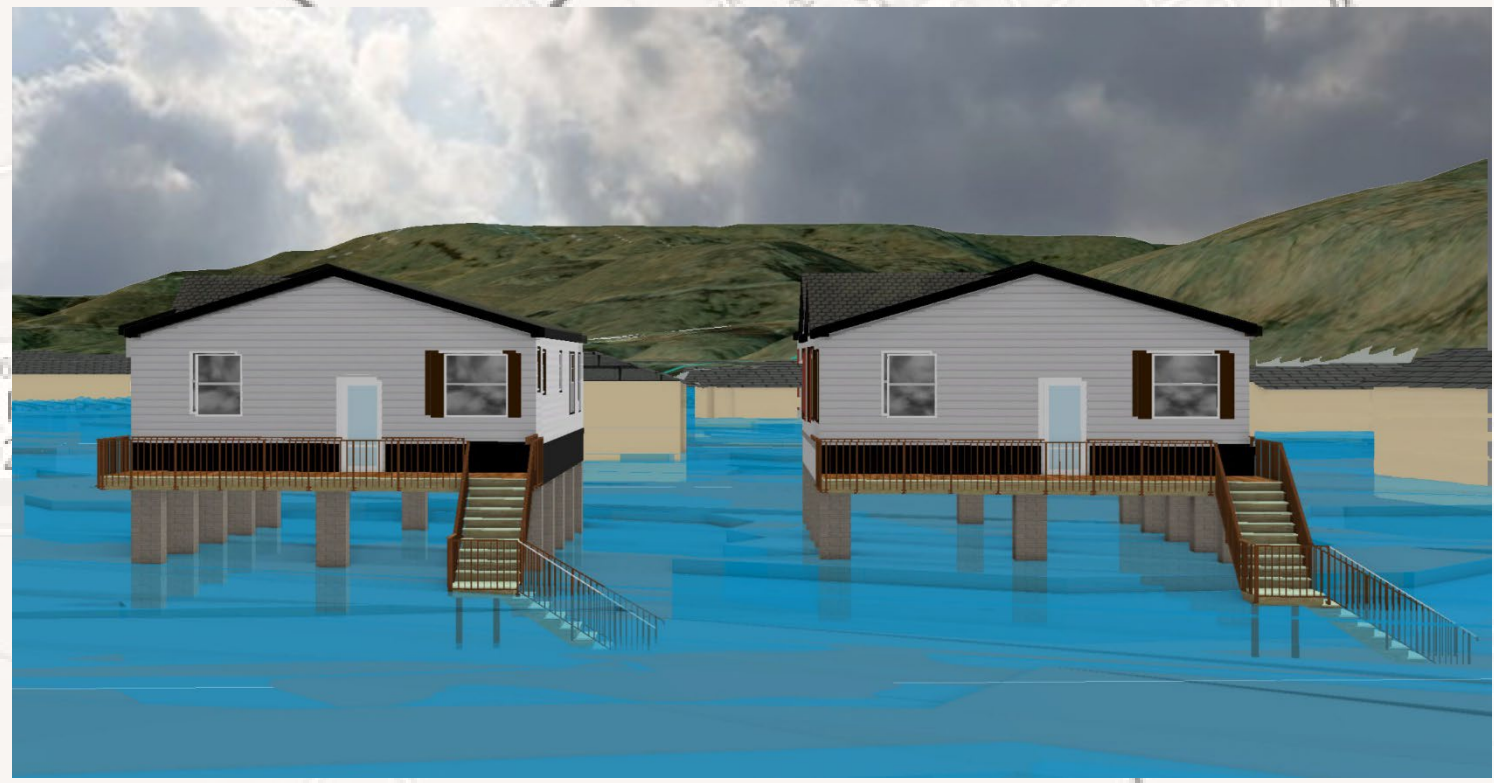
2% Probability of Flood in a year (50-year flood)



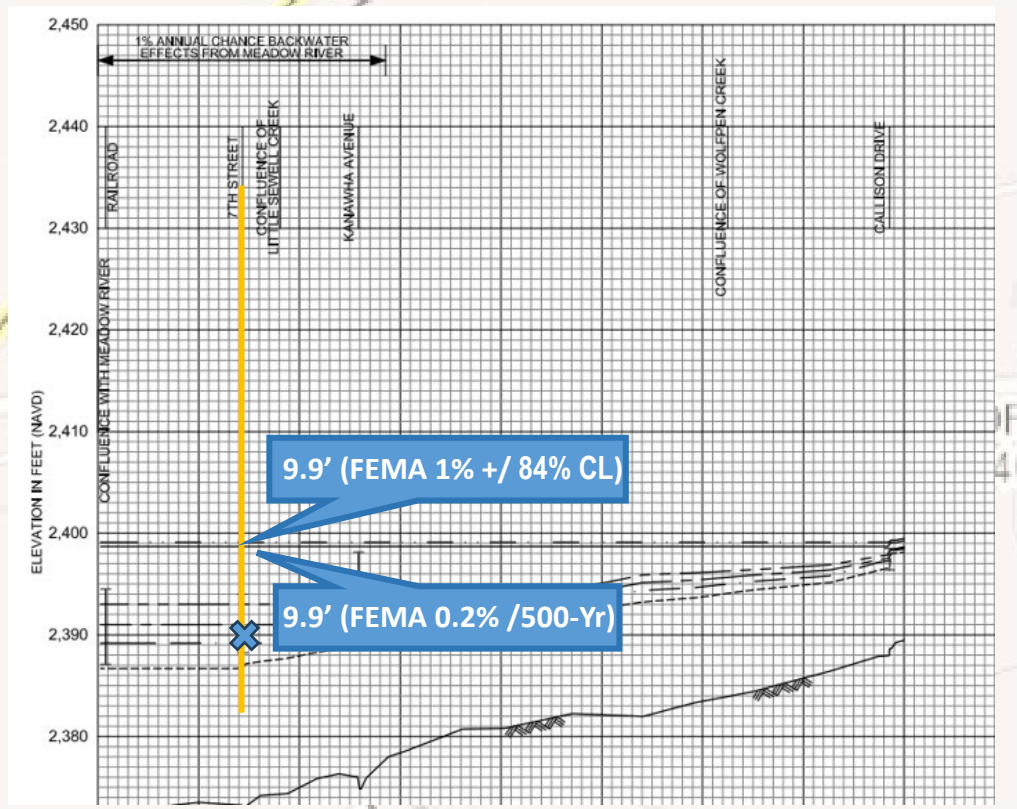


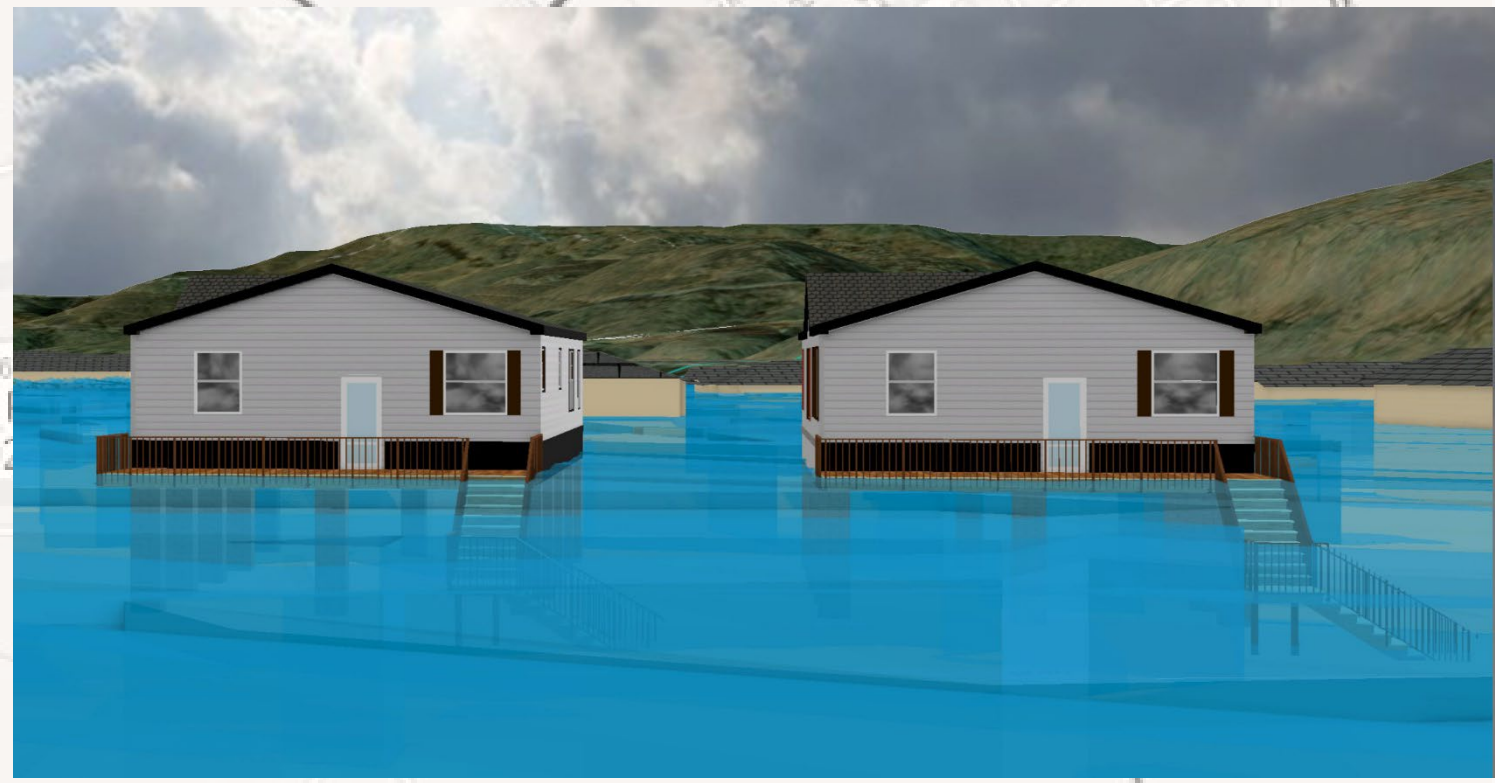
1% Probability of Flood in a year (100-year flood)





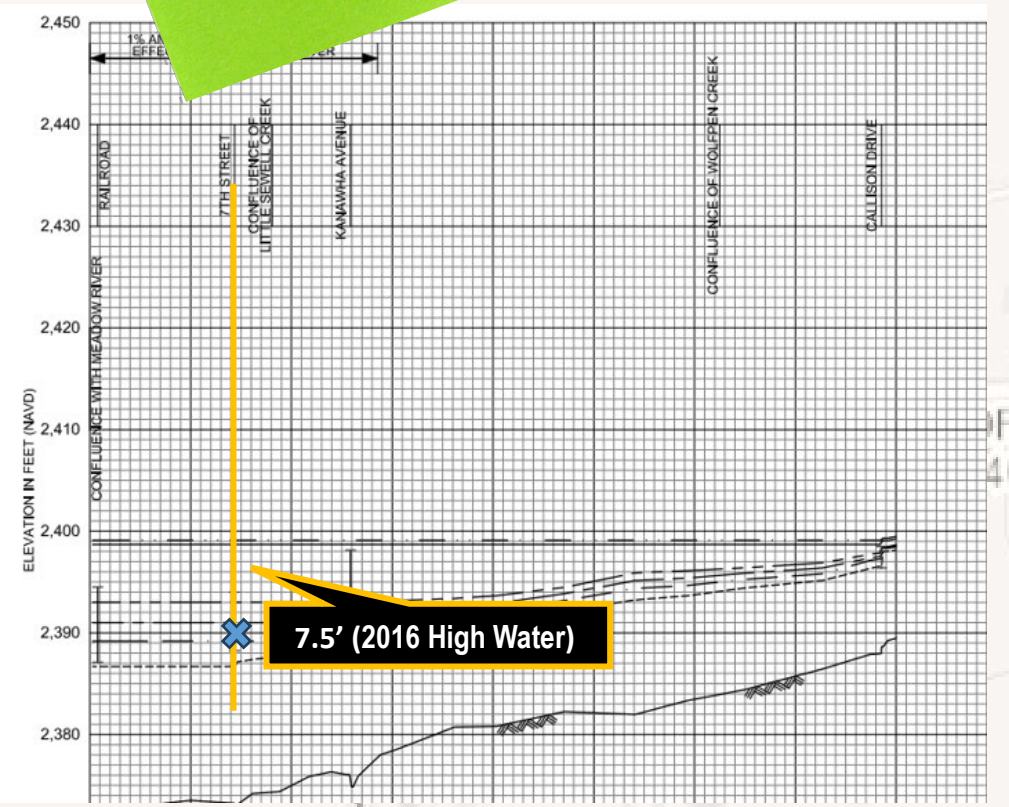
0.2% Probability of Flood in a year (500-year flood)

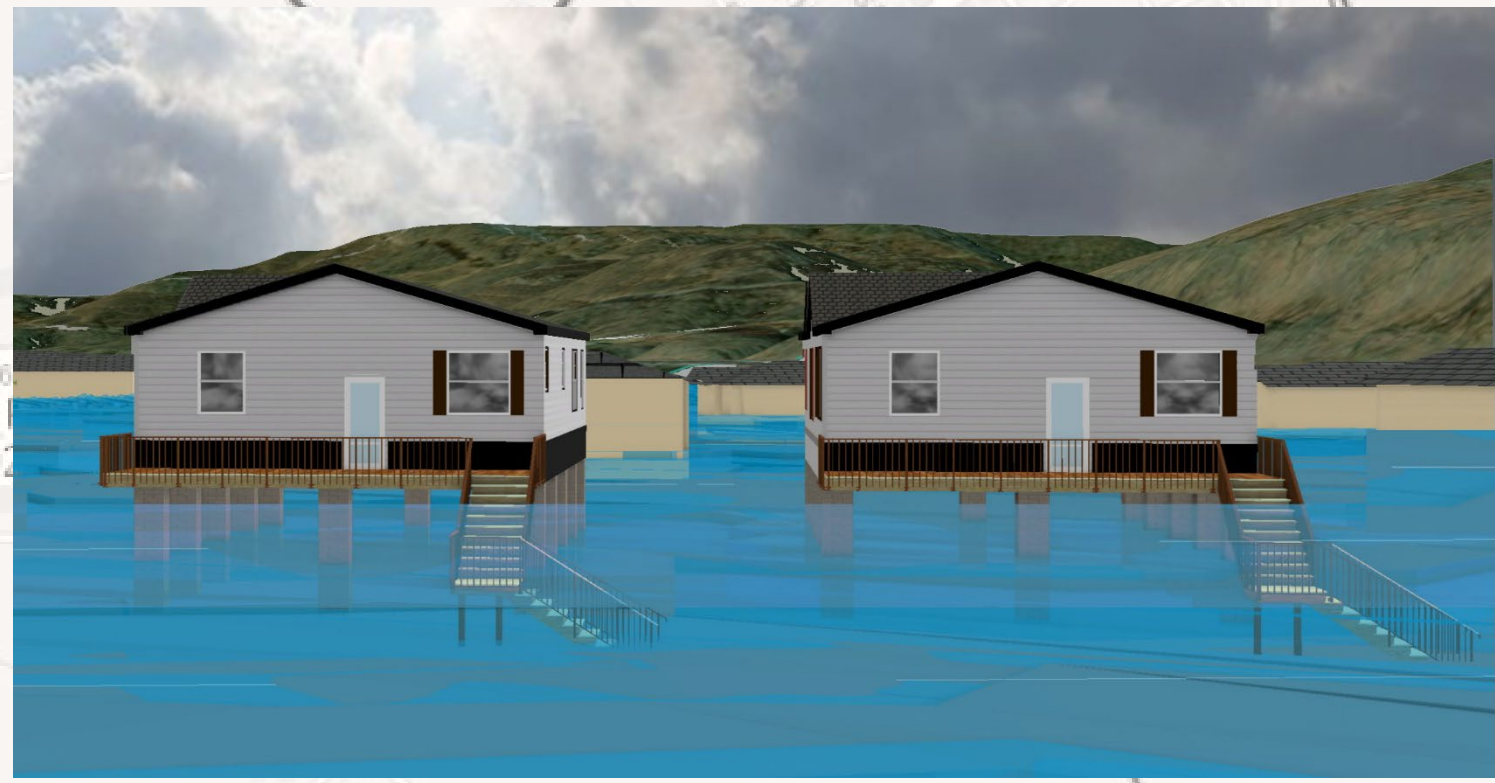




2016 High Watermark

High Watermark





	HEIGHT (ft.)
BUILDING	
First Floor Height	9
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	NA
FEMA 4% (25-Yr)	NA
FEMA 2% (50-Yr)	1.9
2016 Flood HWM	
FEMA 1% (100-Yr)	
FEMA 100-Yr + FBD	
FEMA 1%+ (84% CL)	
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr) Climate	

Building: 13-13-0001-0054-0000_182

182 Seventh Street, Rainelle, WV, 25962

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

	HEIGHT (ft.)
BUILDING	
First Floor Height	9
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	NA
FEMA 4% (25-Yr)	NA
FEMA 2% (50-Yr)	1.9
2016 Flood HWM	
FEMA 1% (100-Yr)	3.1
FEMA 100-Yr + FBD	
FEMA 1%+ (84% CL)	
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr) Climate	

Building: 13-13-0001-0054-0000_182

182 Seventh Street, Rainelle, WV, 25962

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

	HEIGHT (ft.)
BUILDING	
First Floor Height	9
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	NA
FEMA 4% (25-Yr)	NA
FEMA 2% (50-Yr)	1.9
2016 Flood HWM	
FEMA 1% (100-Yr)	3.1
FEMA 100-Yr + FBD	5.1
FEMA 1%+ (84% CL)	9.9
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr) Climate	

FLOOD DEPTHS: **FEMA** **First Street Foundation (FSF)** **USGS 2016 Flood High Water Mark**

	HEIGHT (ft.)
BUILDING	
First Floor Height	9
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	NA
FEMA 4% (25-Yr)	NA
FEMA 2% (50-Yr)	1.9
2016 Flood HWM	7.5
FEMA 1% (100-Yr)	3.1
FEMA 100-Yr + FBD	5.1
FEMA 1%+ (84% CL)	9.9
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr) Climate	

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

	HEIGHT (ft.)
BUILDING	
First Floor Height	9
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	NA
FEMA 4% (25-Yr)	NA
FEMA 2% (50-Yr)	1.9
2016 Flood HWM	7.5
FEMA 1% (100-Yr)	3.1
FEMA 100-Yr + FBD	5.1
FEMA 1%+ (84% CL)	9.9
FEMA 0.2% (500-Yr)	9.9
FSF 0.2% (500-Yr) Climate	

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

	HEIGHT (ft.)
BUILDING	
First Floor Height	9
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	NA
FEMA 4% (25-Yr)	NA
FEMA 2% (50-Yr)	1.9
2016 Flood HWM	7.5
FEMA 1% (100-Yr)	3.1
FEMA 100-Yr + FBD	5.1
FEMA 1%+ (84% CL)	9.9
FEMA 0.2% (500-Yr)	9.9
FSF 0.2% (500-Yr) Climate	12.2

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

Building Flood Profile

White Sulphur Springs

Elevated Structures

Central Ave.

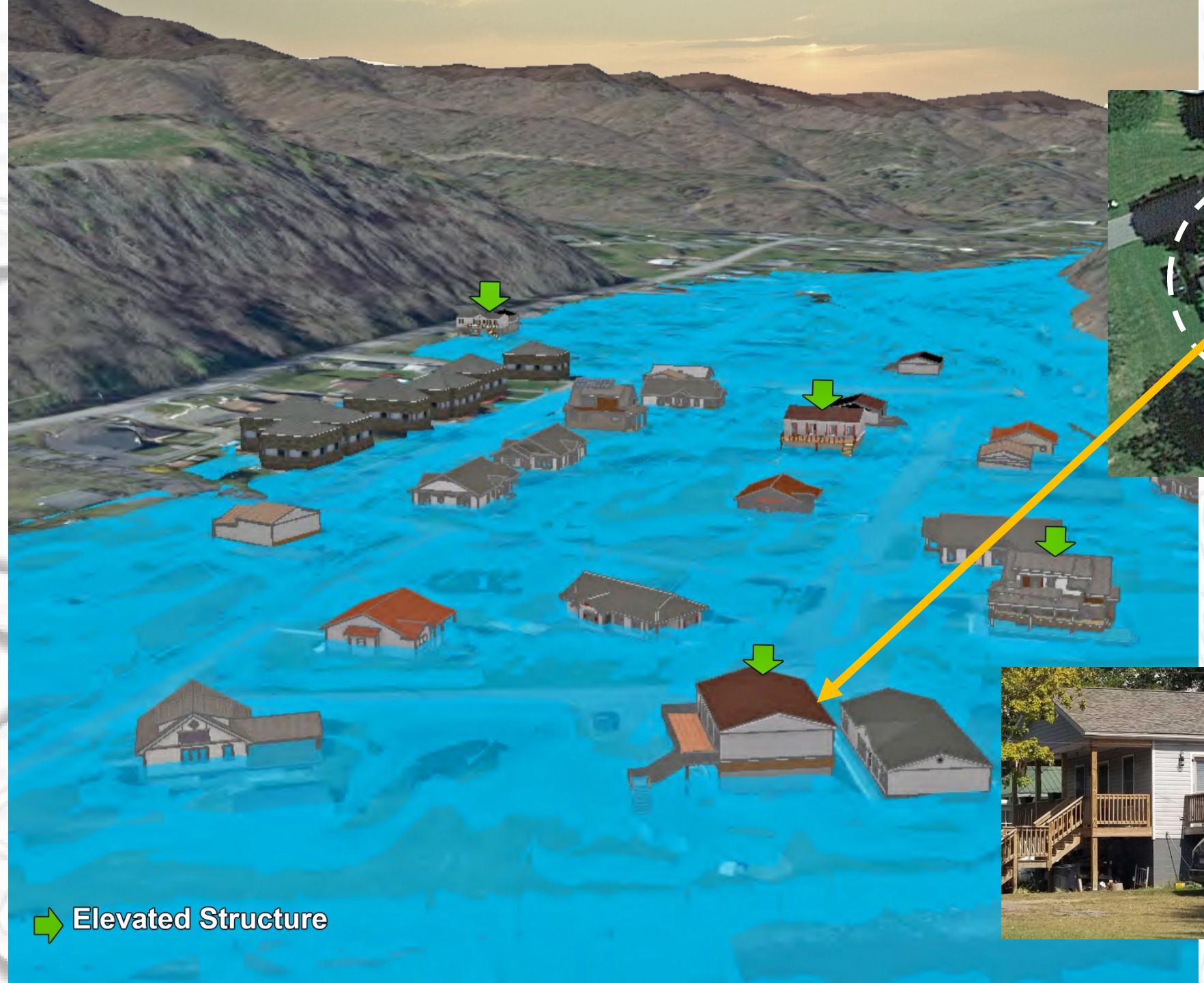
Central Ave.

Garden St.

Maple St.

Big Draft Rd.

Building Flood Profile

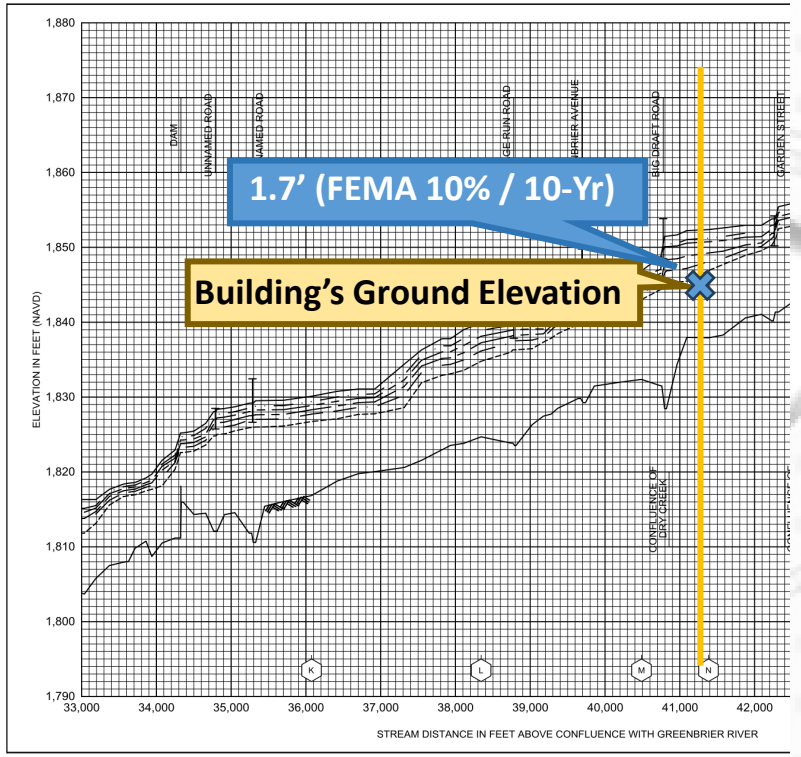


Building Flood Profile

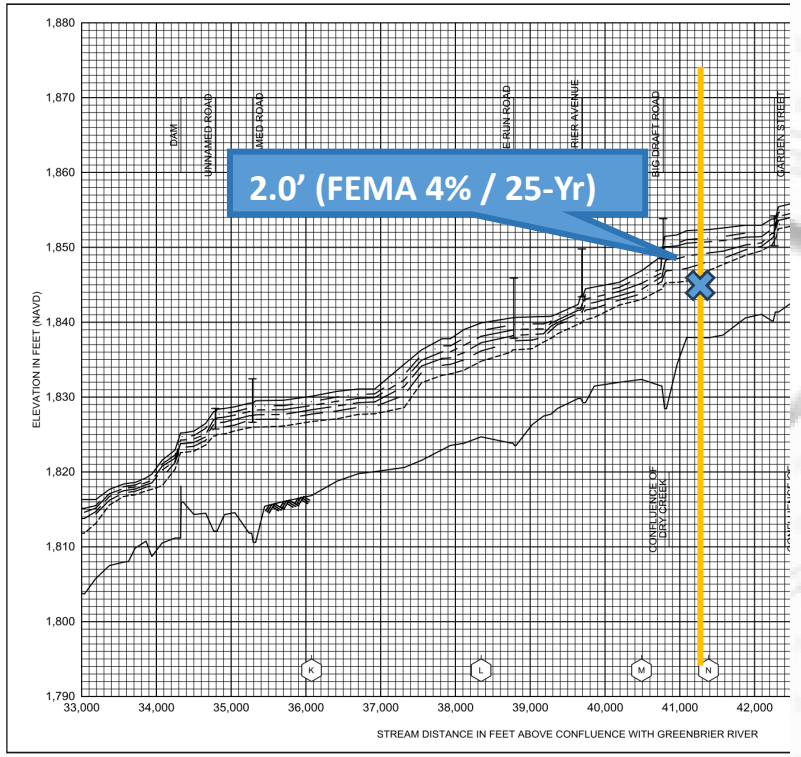
138 Mill Street, White Sulphur Springs, WV, 24986

13-17-0009-0026-0000_138

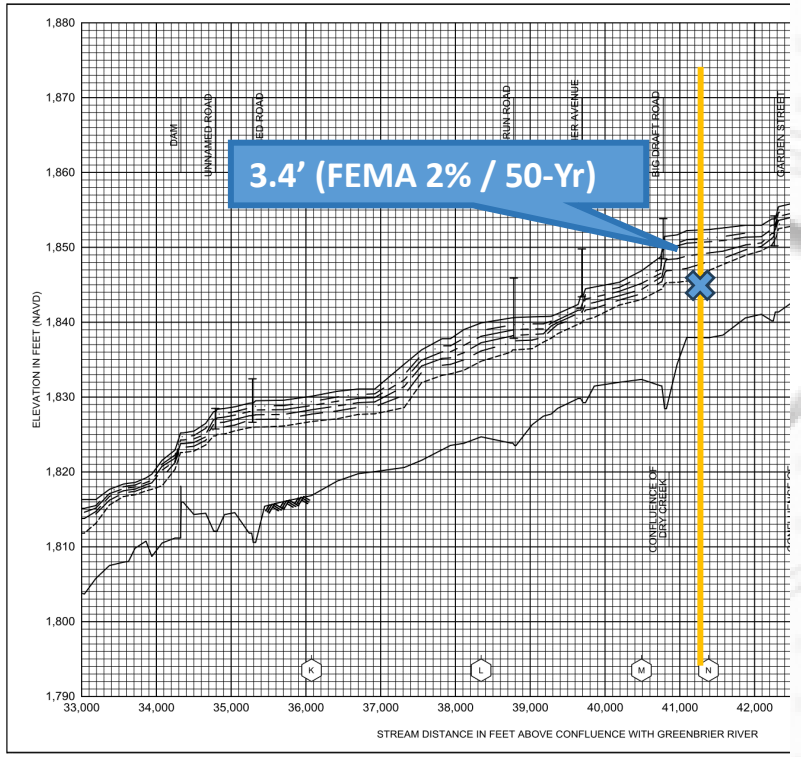
10% Probability of Flood in a year (10-year flood)



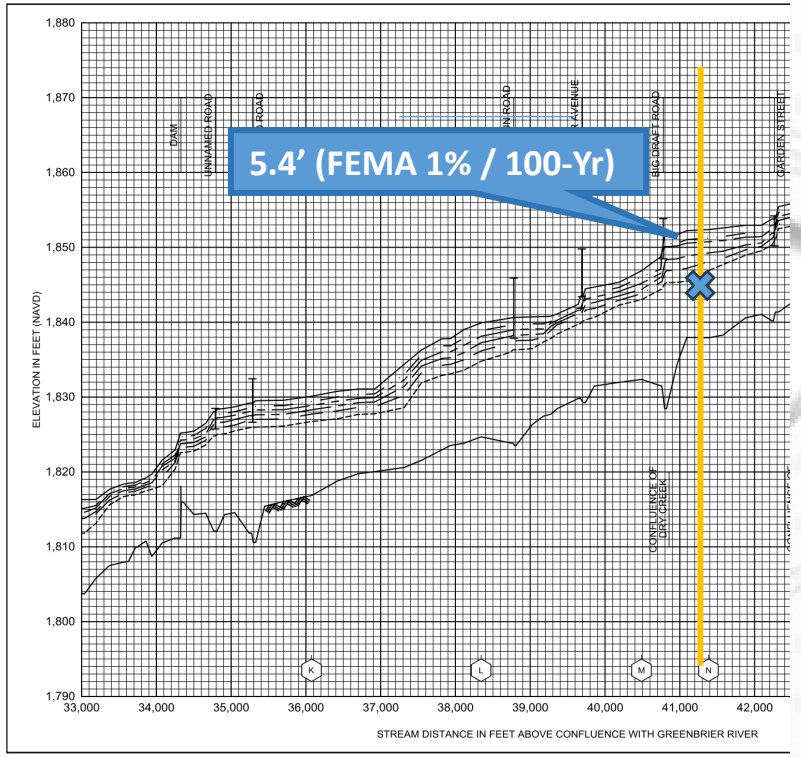
4% Probability of Flood in a year (25-year flood)

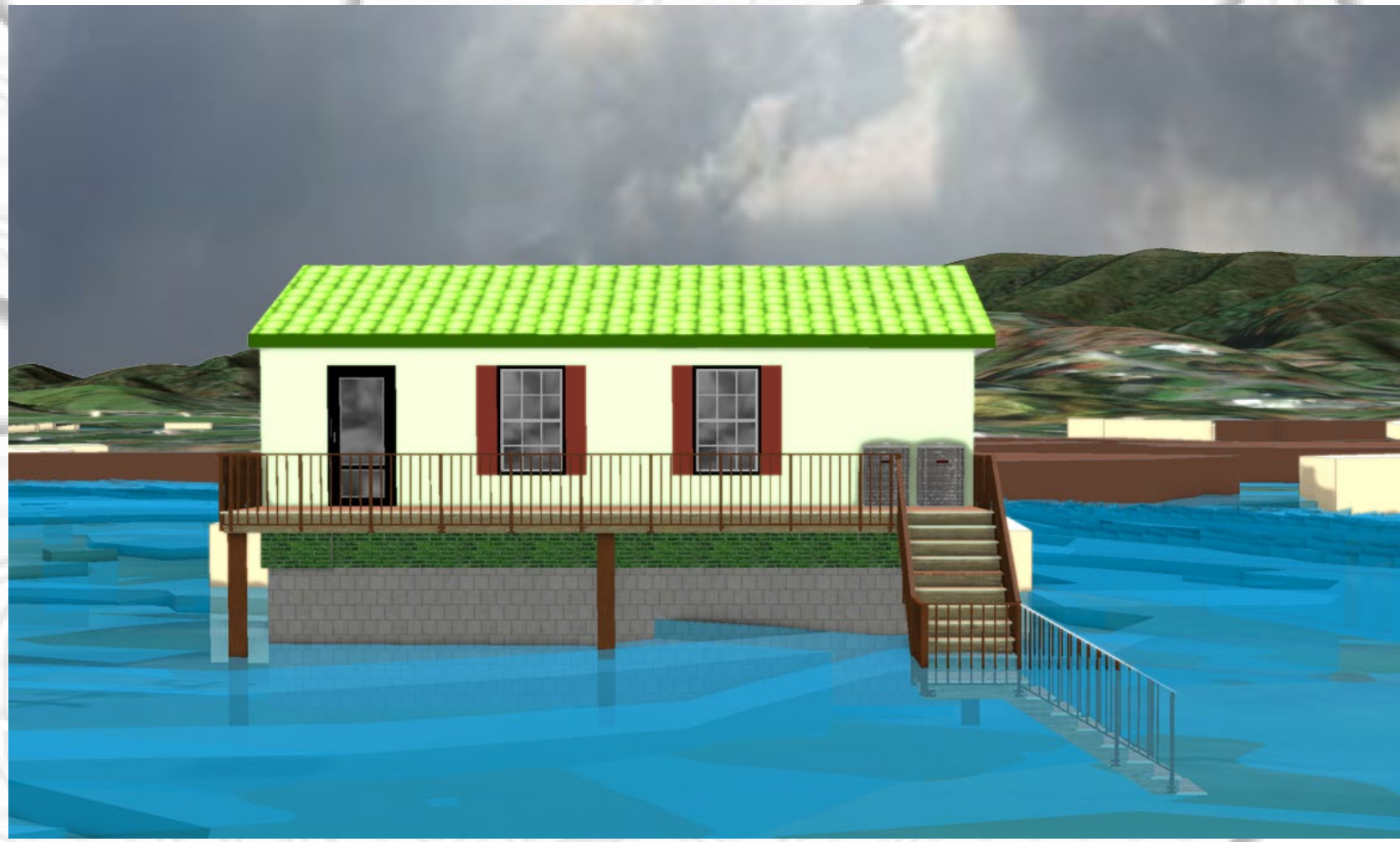


2% Probability of Flood in a year (50-year flood)

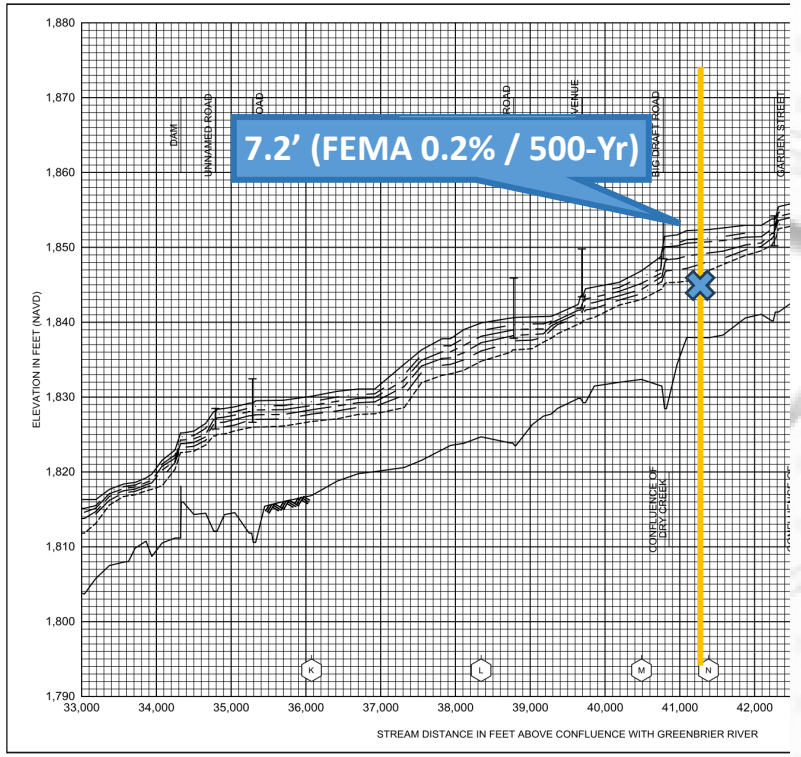


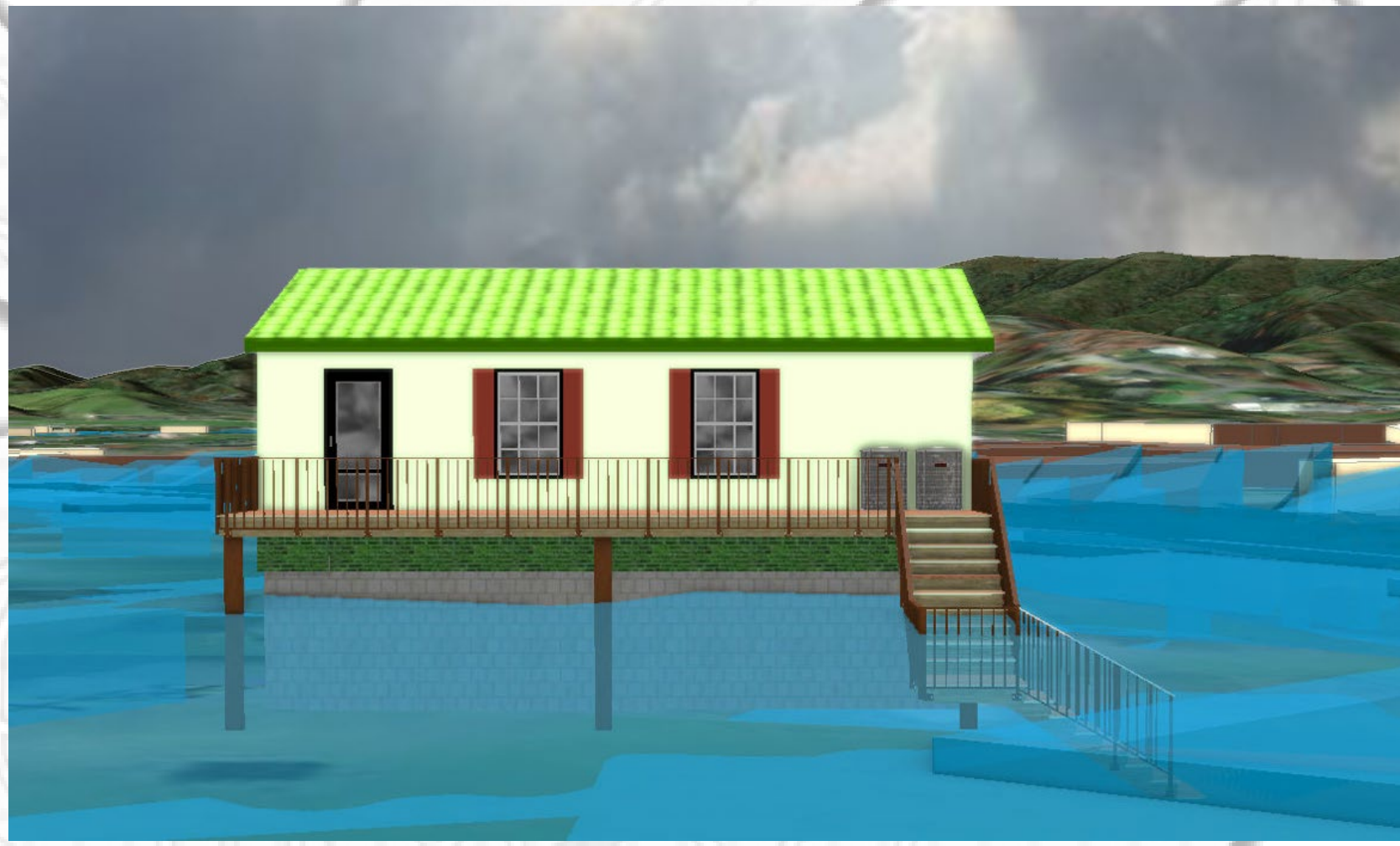
1% Probability of Flood in a year (100-year flood)





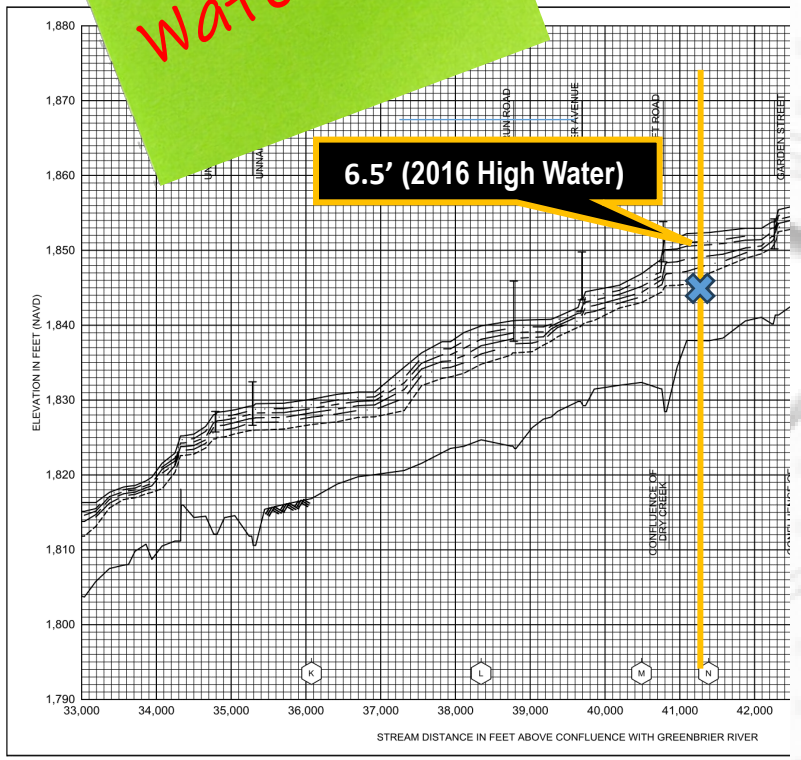
0.2% Probability of Flood in a year (500-year flood)

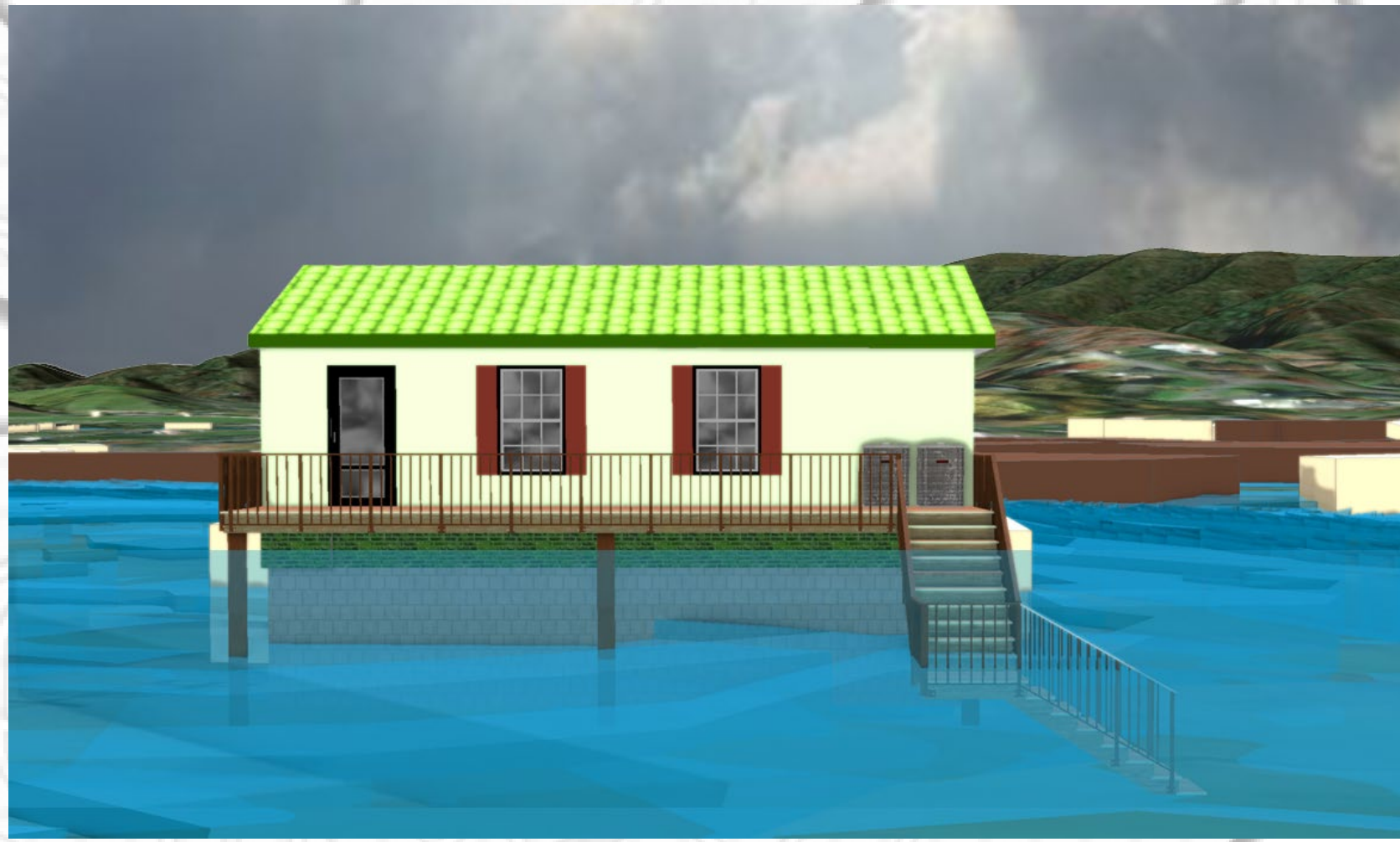




2016 High Watermark

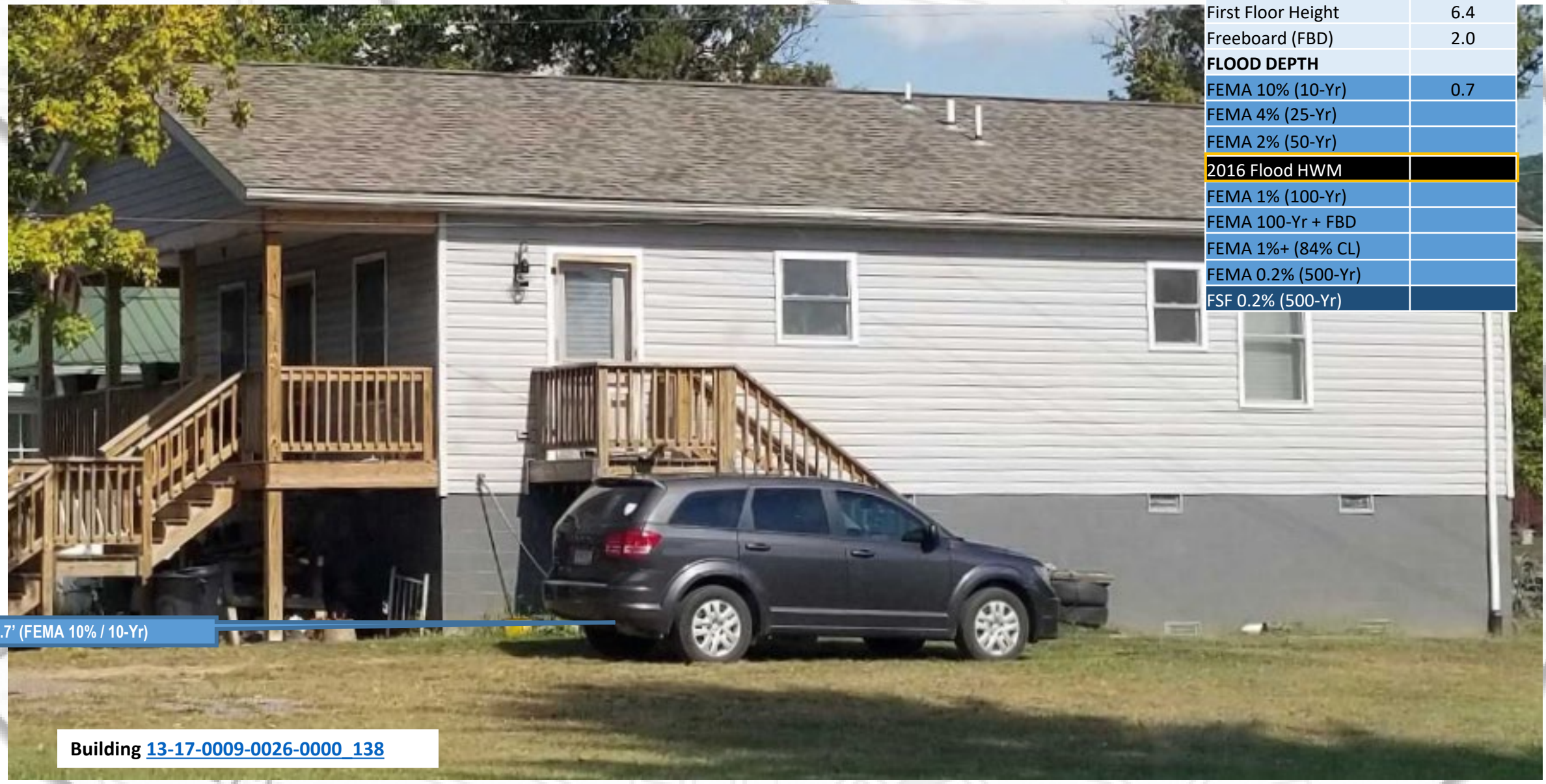
High Watermark





The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

	HEIGHT (ft.)
BUILDING	
First Floor Height	6.4
Freeboard (FBD)	2.0
FLOOD DEPTH	
FEMA 10% (10-Yr)	0.7
FEMA 4% (25-Yr)	
FEMA 2% (50-Yr)	
2016 Flood HWM	
FEMA 1% (100-Yr)	
FEMA 100-Yr + FBD	
FEMA 1%+ (84% CL)	
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

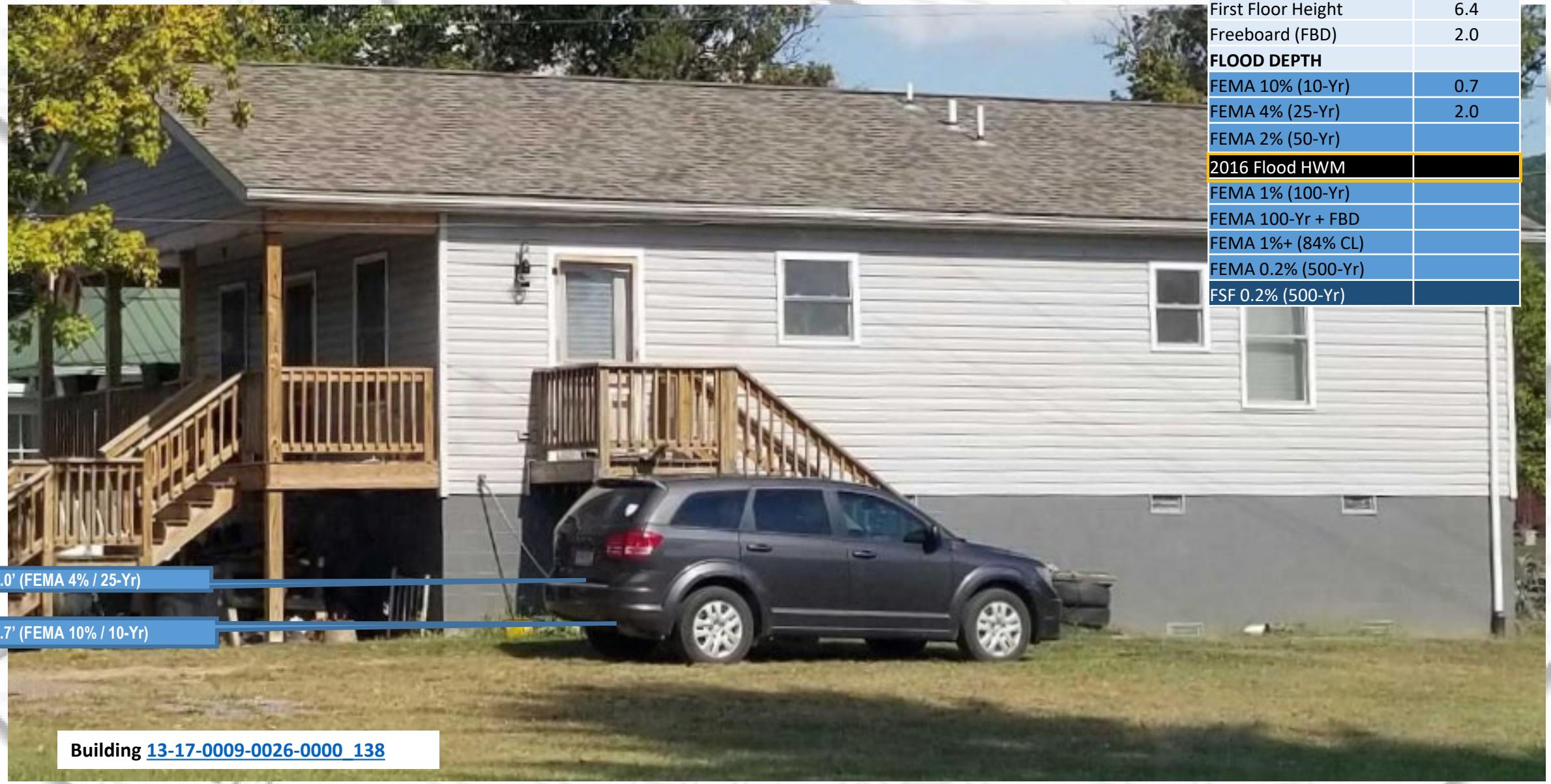


Building 13-17-0009-0026-0000_138

FLOOD DEPTHS: FEMA First Street Foundation (FSF) USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

	HEIGHT (ft.)
BUILDING	
First Floor Height	6.4
Freeboard (FBD)	2.0
FLOOD DEPTH	
FEMA 10% (10-Yr)	0.7
FEMA 4% (25-Yr)	2.0
FEMA 2% (50-Yr)	
2016 Flood HWM	
FEMA 1% (100-Yr)	
FEMA 100-Yr + FBD	
FEMA 1%+ (84% CL)	
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

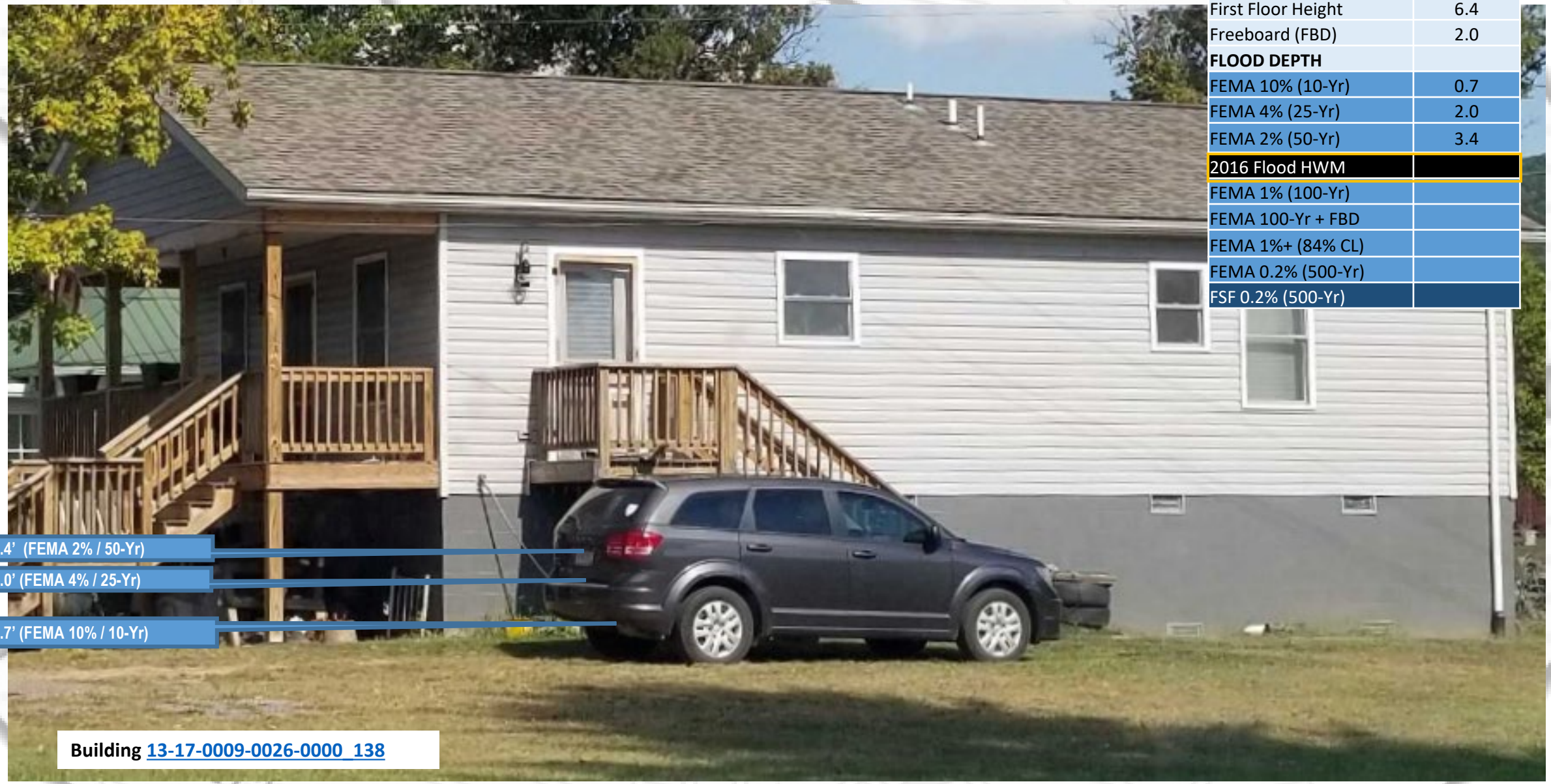


Building 13-17-0009-0026-0000_138

FLOOD DEPTHS: FEMA First Street Foundation (FSF) USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

	HEIGHT (ft.)
BUILDING	
First Floor Height	6.4
Freeboard (FBD)	2.0
FLOOD DEPTH	
FEMA 10% (10-Yr)	0.7
FEMA 4% (25-Yr)	2.0
FEMA 2% (50-Yr)	3.4
2016 Flood HWM	
FEMA 1% (100-Yr)	
FEMA 100-Yr + FBD	
FEMA 1%+ (84% CL)	
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	



Building 13-17-0009-0026-0000_138

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

	HEIGHT (ft.)
BUILDING	
First Floor Height	6.4
Freeboard (FBD)	2.0
FLOOD DEPTH	
FEMA 10% (10-Yr)	0.7
FEMA 4% (25-Yr)	2.0
FEMA 2% (50-Yr)	3.4
2016 Flood HWM	
FEMA 1% (100-Yr)	5.4
FEMA 100-Yr + FBD	7.4
FEMA 1%+ (84% CL)	6.4
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

Building 13-17-0009-0026-0000_138

FLOOD DEPTHS: FEMA First Street Foundation (FSF) USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

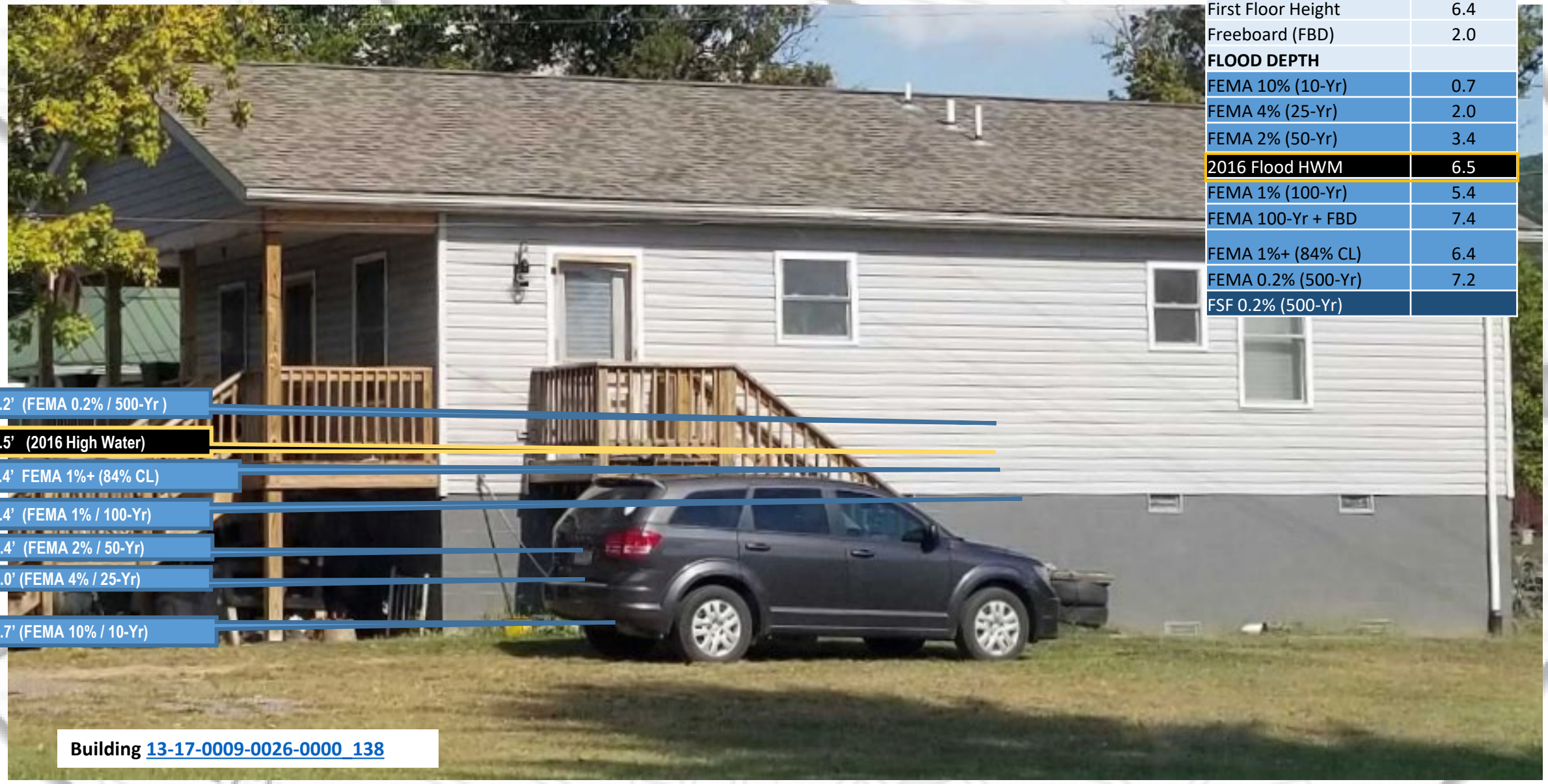
	HEIGHT (ft.)
BUILDING	
First Floor Height	6.4
Freeboard (FBD)	2.0
FLOOD DEPTH	
FEMA 10% (10-Yr)	0.7
FEMA 4% (25-Yr)	2.0
FEMA 2% (50-Yr)	3.4
2016 Flood HWM	6.5
FEMA 1% (100-Yr)	5.4
FEMA 100-Yr + FBD	7.4
FEMA 1%+ (84% CL)	6.4
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

Building 13-17-0009-0026-0000_138

FLOOD DEPTHS: FEMA First Street Foundation (FSF) USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

	HEIGHT (ft.)
BUILDING	
First Floor Height	6.4
Freeboard (FBD)	2.0
FLOOD DEPTH	
FEMA 10% (10-Yr)	0.7
FEMA 4% (25-Yr)	2.0
FEMA 2% (50-Yr)	3.4
2016 Flood HWM	6.5
FEMA 1% (100-Yr)	5.4
FEMA 100-Yr + FBD	7.4
FEMA 1%+ (84% CL)	6.4
FEMA 0.2% (500-Yr)	7.2
FSF 0.2% (500-Yr)	

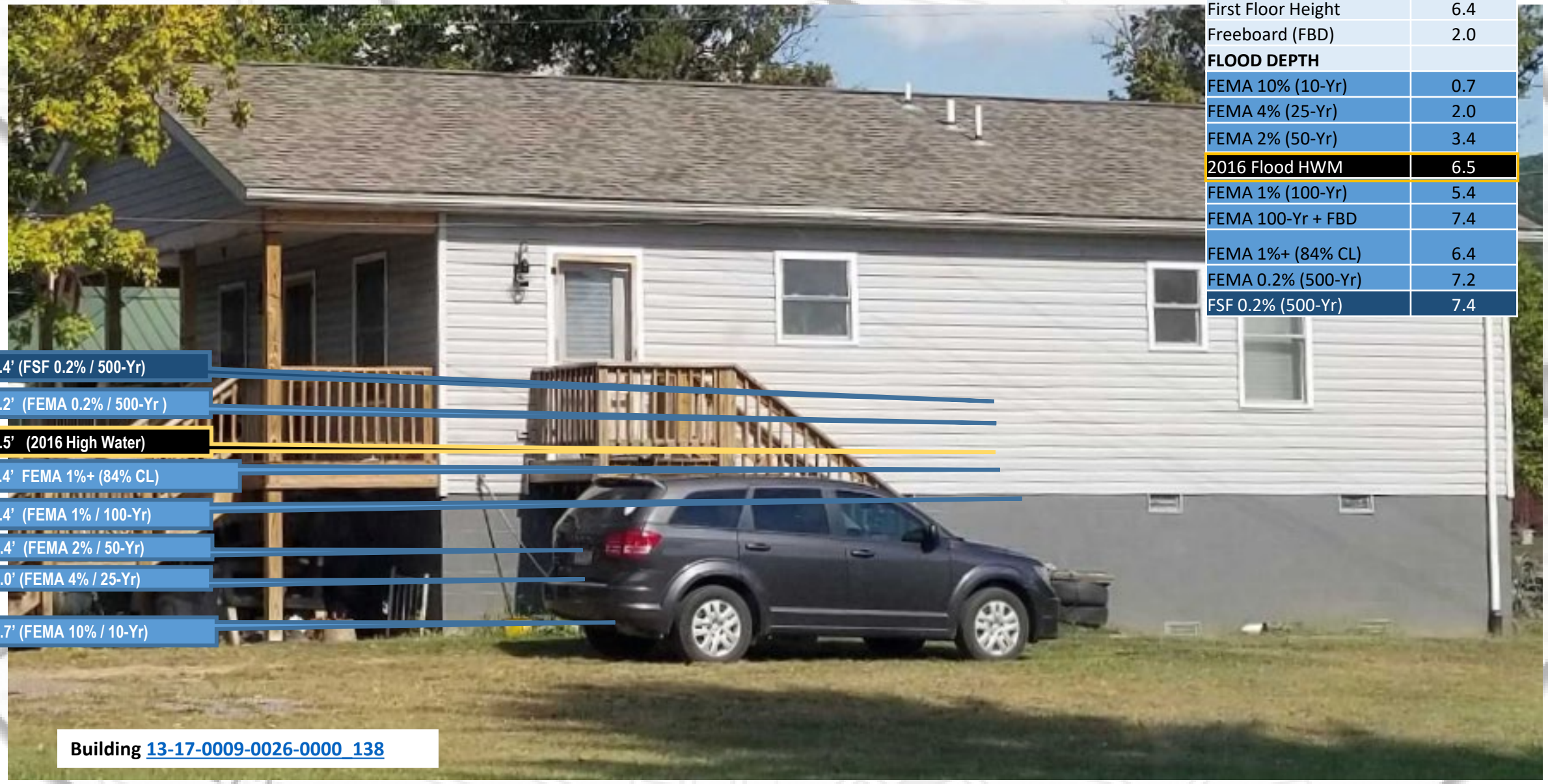


Building 13-17-0009-0026-0000_138

FLOOD DEPTHS: FEMA First Street Foundation (FSF) USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

	HEIGHT (ft.)
BUILDING	
First Floor Height	6.4
Freeboard (FBD)	2.0
FLOOD DEPTH	
FEMA 10% (10-Yr)	0.7
FEMA 4% (25-Yr)	2.0
FEMA 2% (50-Yr)	3.4
2016 Flood HWM	6.5
FEMA 1% (100-Yr)	5.4
FEMA 100-Yr + FBD	7.4
FEMA 1%+ (84% CL)	6.4
FEMA 0.2% (500-Yr)	7.2
FSF 0.2% (500-Yr)	7.4



Building 13-17-0009-0026-0000_138

FLOOD DEPTHS: FEMA First Street Foundation (FSF) USGS 2016 Flood High Water Mark

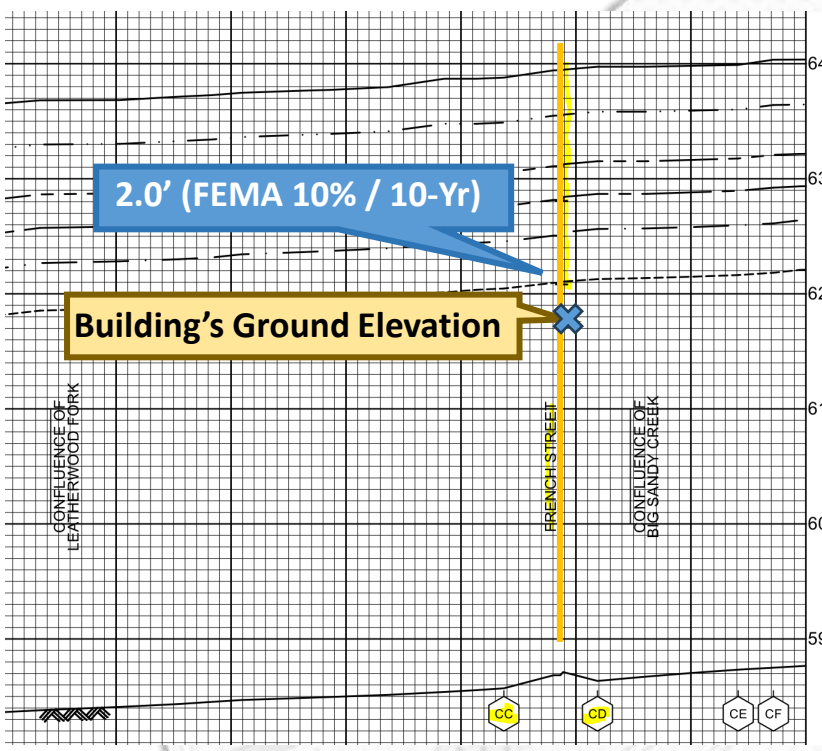
Building Flood Profile

Clendenin

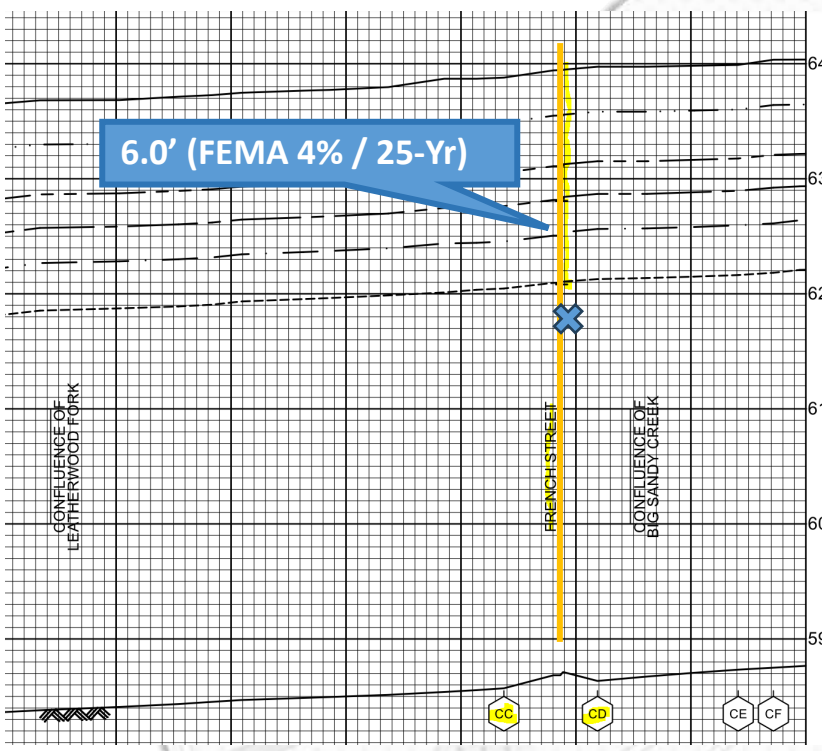
20-02-0006-0044-0000_306

306 Maywood Ave., Clendenin, WV, 25045

10% Probability of Flood in a year (10-year flood)

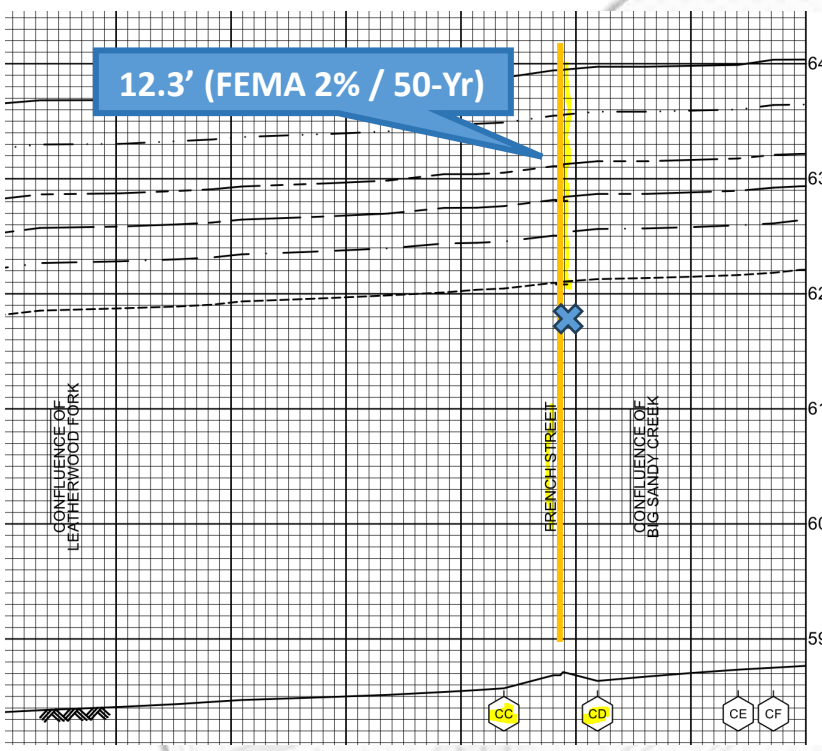


4% Probability of Flood in a year (25-year flood)

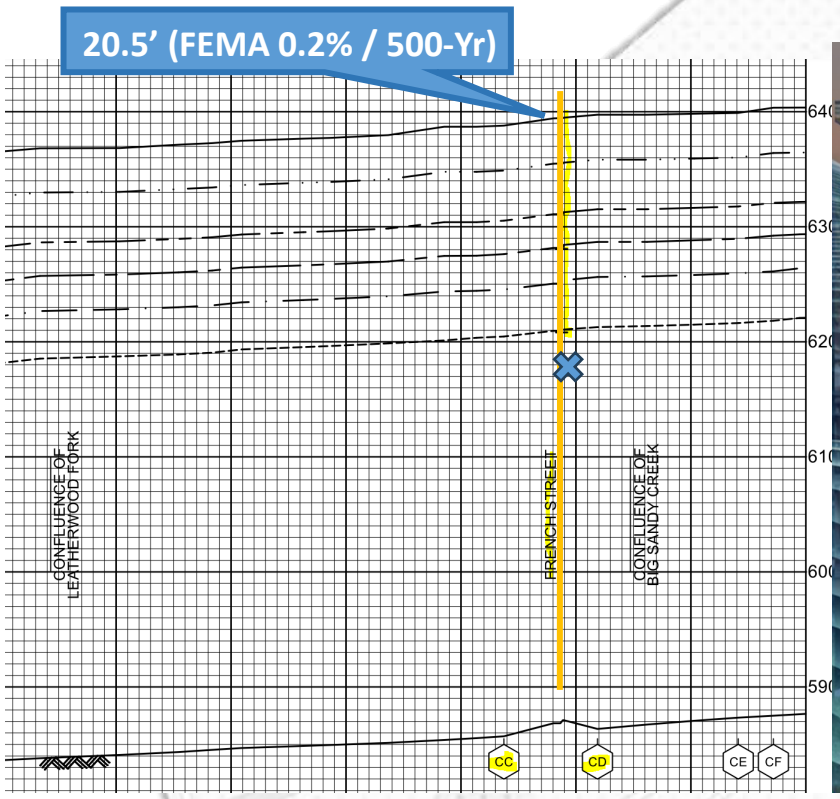


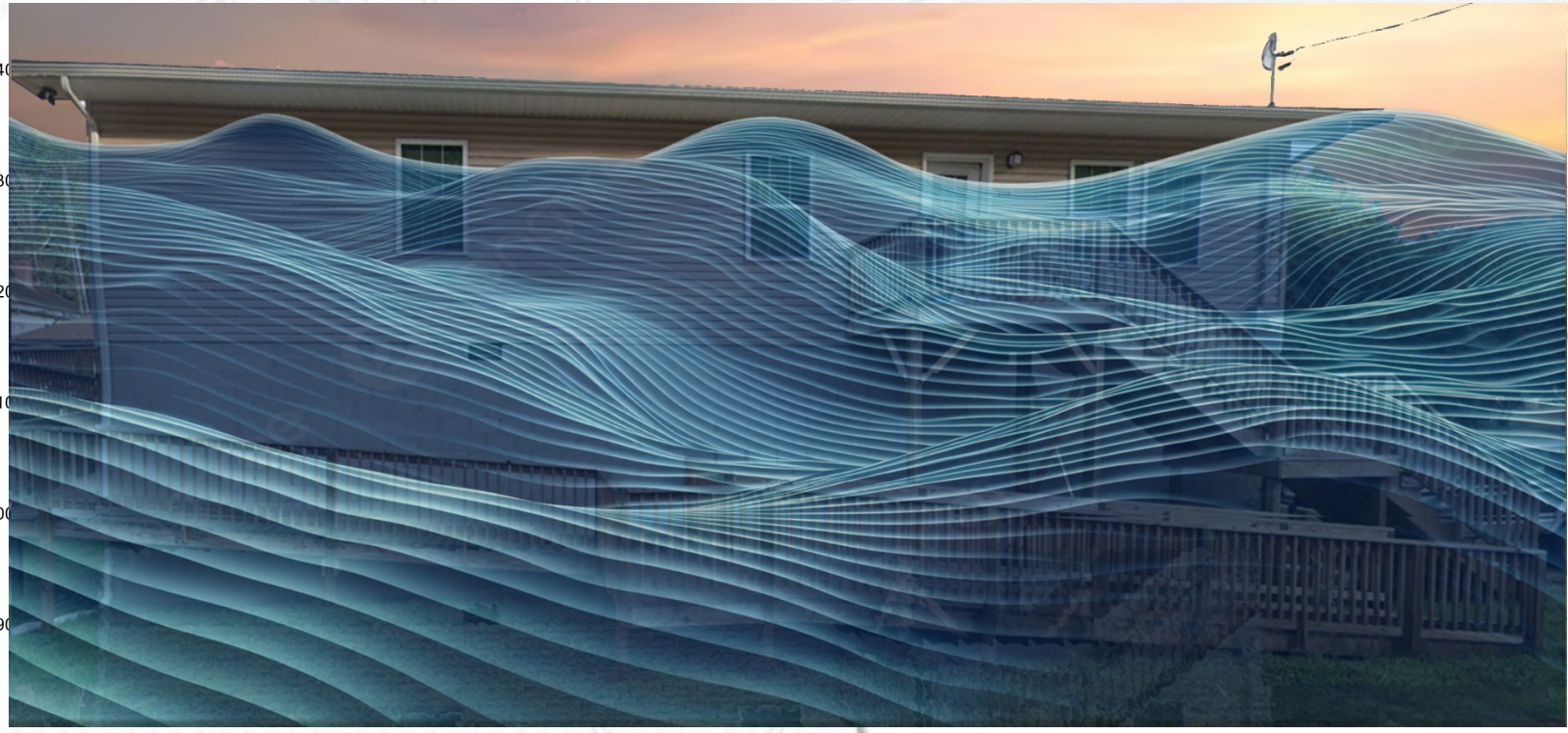
2% Probability of Flood in a year (50-year flood)

1% Probability of Flood in a year (100-year flood)



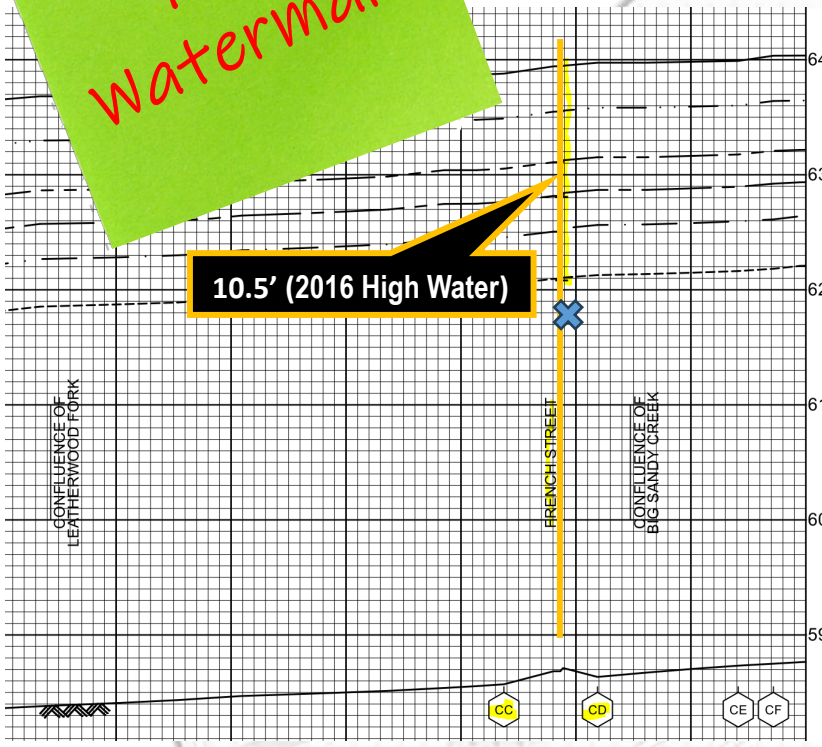
0.2% Probability of Flood in a year (500-year flood)





2016 High Watermark

High Watermark



The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

306 Maywood Ave., Clendenin, WV, 25045

	HEIGHT (ft.)
BUILDING	
First Floor Height	12.0
Freeboard (FBD)	2.0
FLOOD DEPTH	
FEMA 10% (10-Yr)	2.0
FEMA 4% (25-Yr)	
FEMA 2% (50-Yr)	
2016 Flood HWM	
FEMA 1% (100-Yr)	
FEMA 100-Yr + FBD	
FEMA 1%+ (84% CL)	
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

Building 20-02-0006-0044-0000_306

FLOOD DEPTHS: FEMA First Street Foundation (FSF) USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

306 Maywood Ave., Clendenin, WV, 25045

	HEIGHT (ft.)
BUILDING	
First Floor Height	12.0
Freeboard (FBD)	2.0
FLOOD DEPTH	
FEMA 10% (10-Yr)	2.0
FEMA 4% (25-Yr)	6.0
FEMA 2% (50-Yr)	
2016 Flood HWM	
FEMA 1% (100-Yr)	
FEMA 100-Yr + FBD	
FEMA 1%+ (84% CL)	
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

Building 20-02-0006-0044-0000_306

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

306 Maywood Ave., Clendenin, WV, 25045

	HEIGHT (ft.)
BUILDING	
First Floor Height	12.0
Freeboard (FBD)	2.0
FLOOD DEPTH	
FEMA 10% (10-Yr)	2.0
FEMA 4% (25-Yr)	6.0
FEMA 2% (50-Yr)	9.5
2016 Flood HWM	
FEMA 1% (100-Yr)	
FEMA 100-Yr + FBD	
FEMA 1%+ (84% CL)	
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

Building 20-02-0006-0044-0000_306

FLOOD DEPTHS: FEMA First Street Foundation (FSF) USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

306 Maywood Ave., Clendenin, WV, 25045

	HEIGHT (ft.)
BUILDING	
First Floor Height	12.0
Freeboard (FBD)	2.0
FLOOD DEPTH	
FEMA 10% (10-Yr)	2.0
FEMA 4% (25-Yr)	6.0
FEMA 2% (50-Yr)	9.5
2016 Flood HWM	10.5
FEMA 1% (100-Yr)	
FEMA 100-Yr + FBD	
FEMA 1%+ (84% CL)	
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

Building 20-02-0006-0044-0000_306

FLOOD DEPTHS: FEMA First Street Foundation (FSF) USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

306 Maywood Ave., Clendenin, WV, 25045

	HEIGHT (ft.)
BUILDING	
First Floor Height	12.0
Freeboard (FBD)	2.0
FLOOD DEPTH	
FEMA 10% (10-Yr)	2.0
FEMA 4% (25-Yr)	6.0
FEMA 2% (50-Yr)	9.5
2016 Flood HWM	10.5
FEMA 1% (100-Yr)	12.3
FEMA 100-Yr + FBD	14.3
FEMA 1%+ (84% CL)	16.5
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

Building 20-02-0006-0044-0000_306

FLOOD DEPTHS: FEMA First Street Foundation (FSF) USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

306 Maywood Ave., Clendenin, WV, 25045

	HEIGHT (ft.)
BUILDING	
First Floor Height	12.0
Freeboard (FBD)	2.0
FLOOD DEPTH	
FEMA 10% (10-Yr)	2.0
FEMA 4% (25-Yr)	6.0
FEMA 2% (50-Yr)	9.5
2016 Flood HWM	10.5
FEMA 1% (100-Yr)	12.3
FEMA 100-Yr + FBD	14.3
FEMA 1%+ (84% CL)	16.5
FEMA 0.2% (500-Yr)	20.5
FSF 0.2% (500-Yr)	

Building 20-02-0006-0044-0000_306

FLOOD DEPTHS: FEMA First Street Foundation (FSF) USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

306 Maywood Ave., Clendenin, WV, 25045

	HEIGHT (ft.)
BUILDING	
First Floor Height	12.0
Freeboard (FBD)	2.0
FLOOD DEPTH	
FEMA 10% (10-Yr)	2.0
FEMA 4% (25-Yr)	6.0
FEMA 2% (50-Yr)	9.5
2016 Flood HWM	10.5
FEMA 1% (100-Yr)	12.3
FEMA 100-Yr + FBD	14.3
FEMA 1%+ (84% CL)	16.5
FEMA 0.2% (500-Yr)	20.5
FSF 0.2% (500-Yr)	24.6

Building 20-02-0006-0044-0000_306

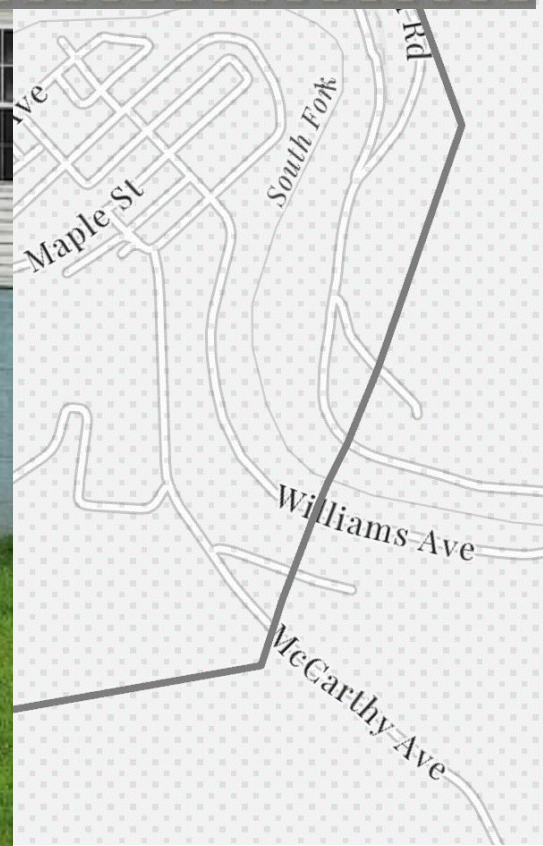
FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

Building Flood Profile

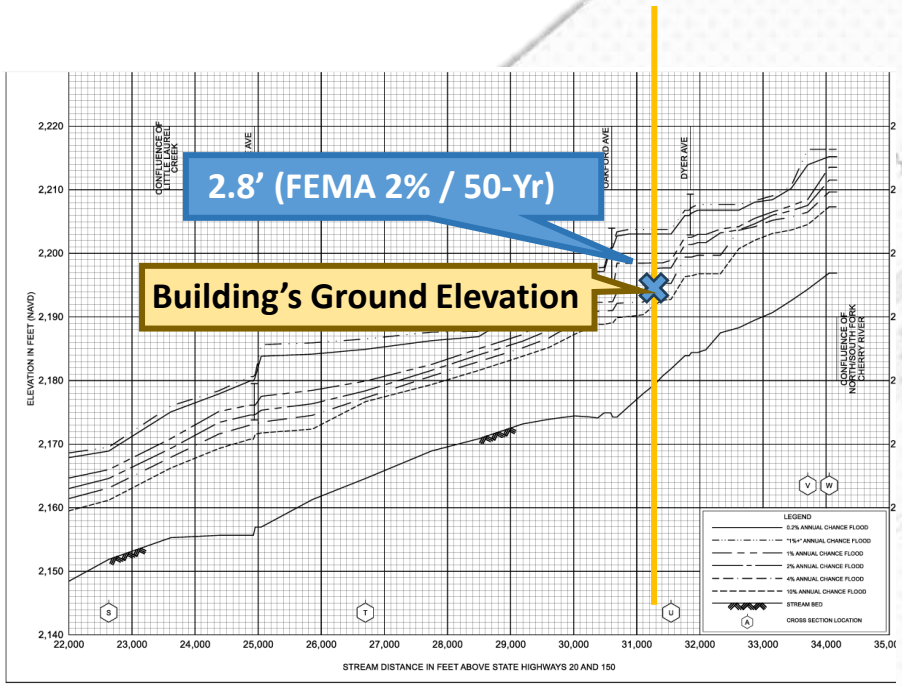
Richwood

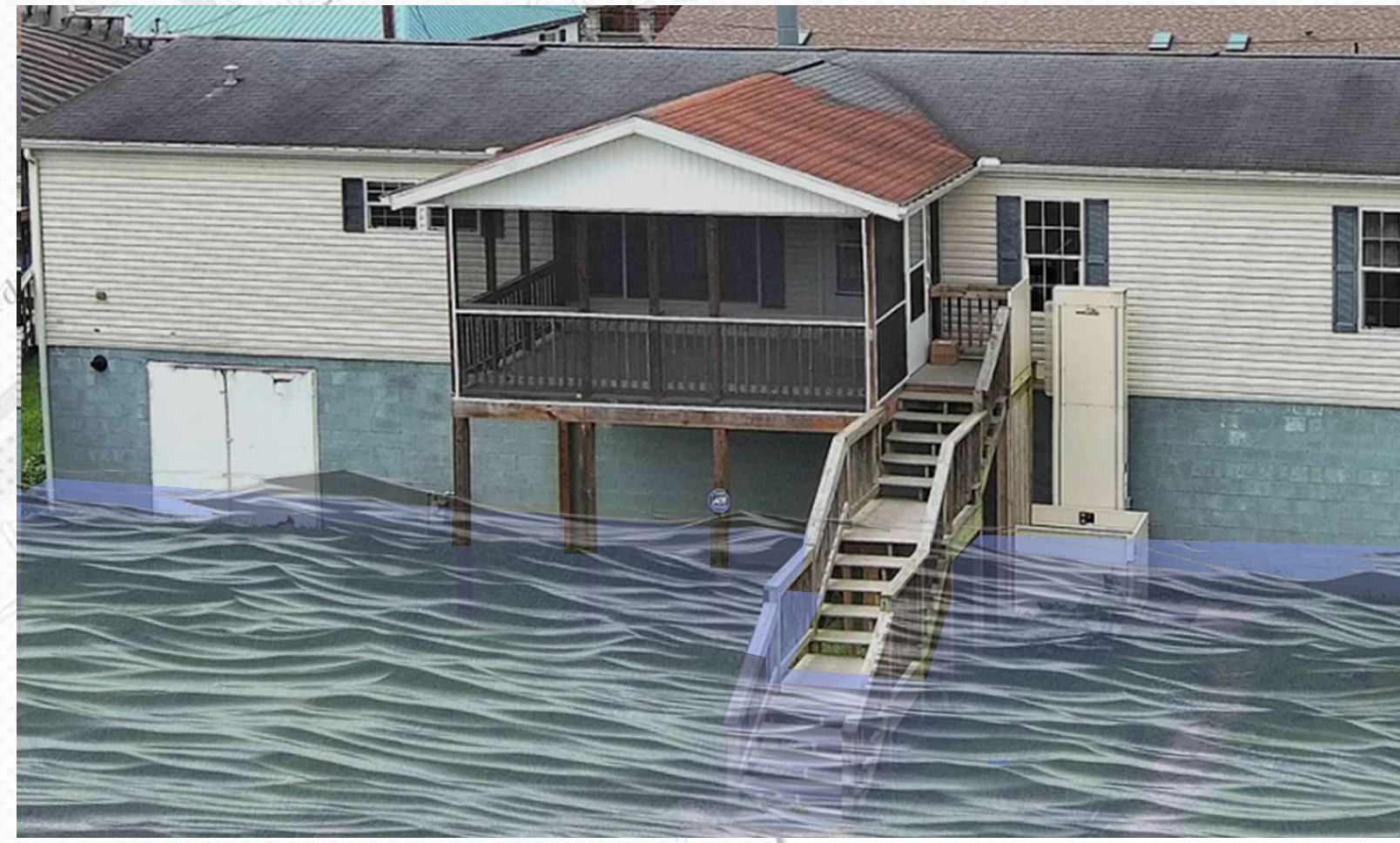
34-06-0011-0090-0000 113

113 Valley Ave, Richwood, WV

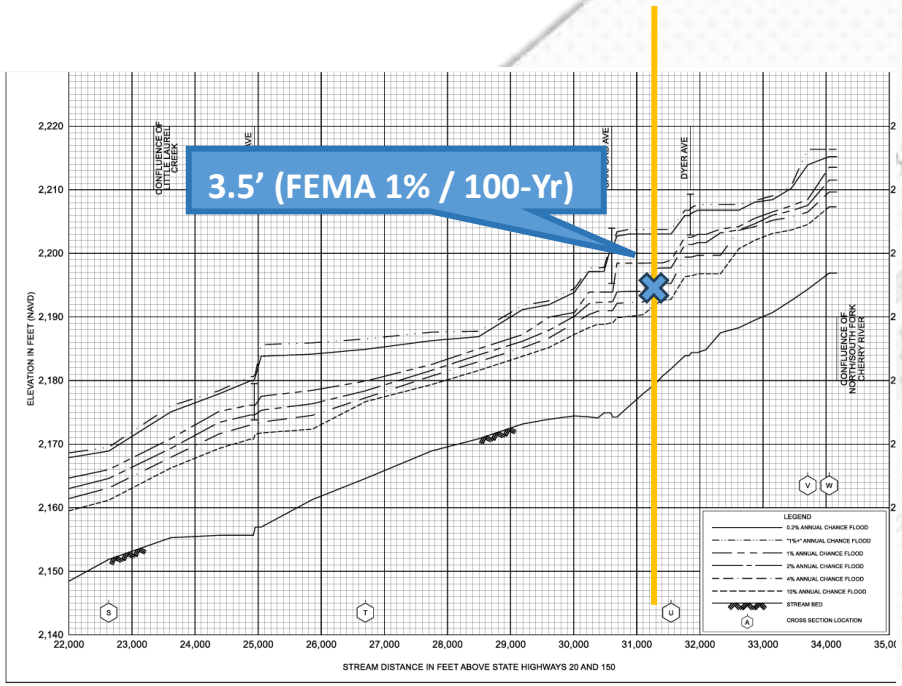


2% Probability of Flood in a year (50-year flood)

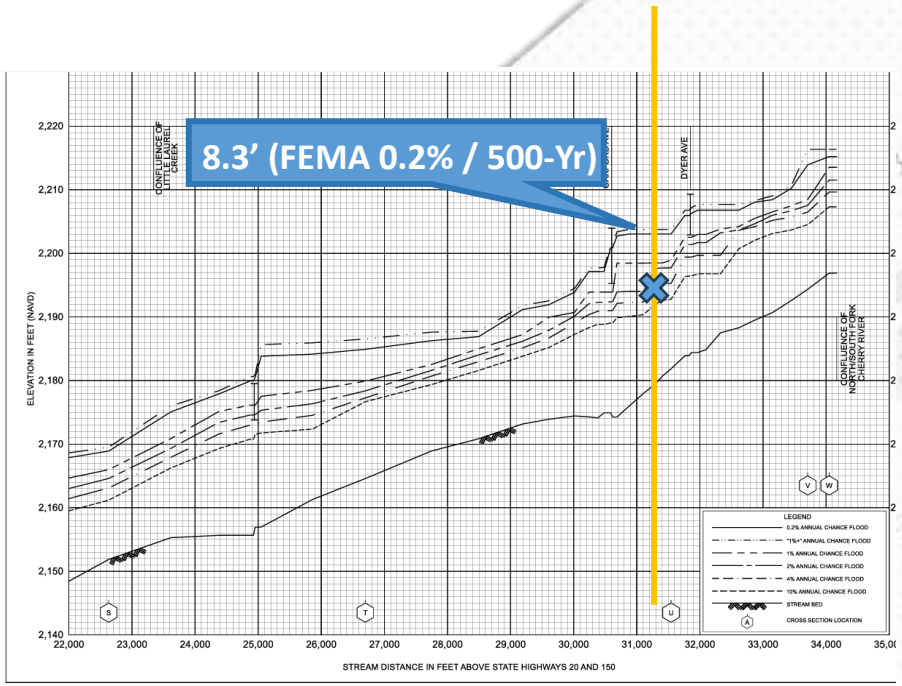




1% Probability of Flood in a year (100-year flood)

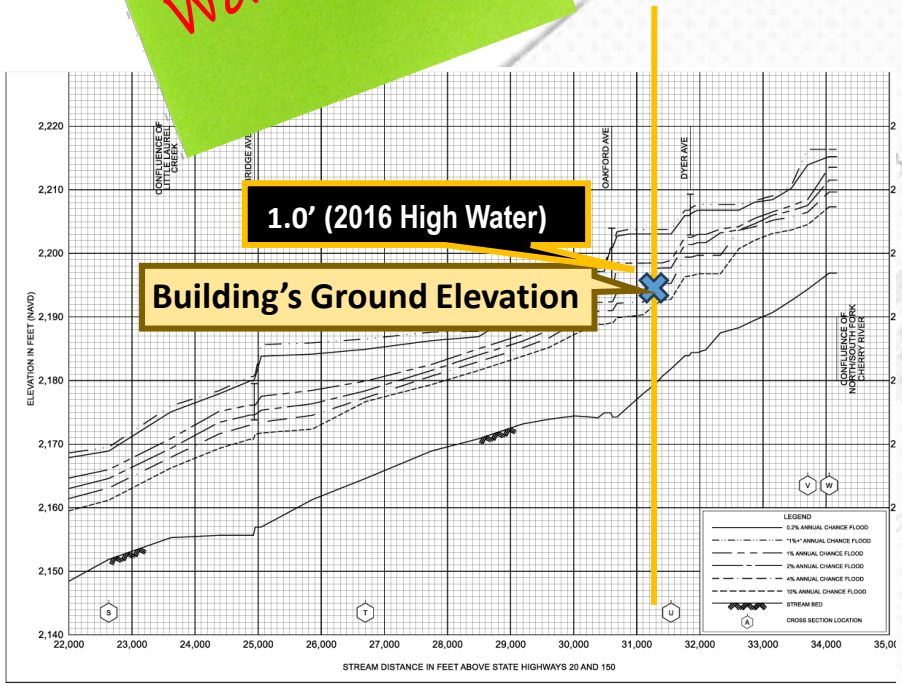


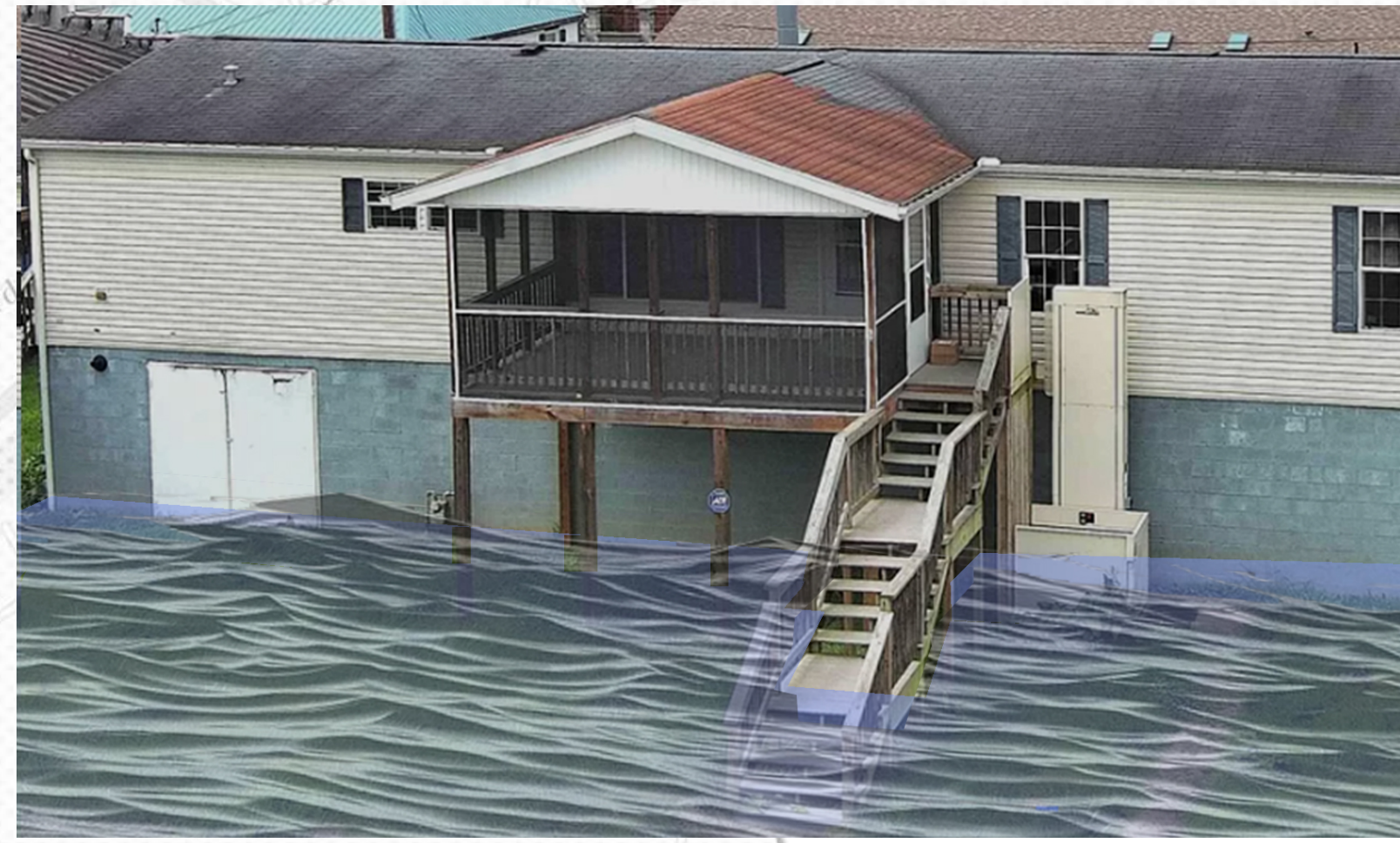
0.2% Probability of Flood in a year (500-year flood)



2016 High Watermark

High Watermark





The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

113 Valley Ave, Richwood, WV

	HEIGHT (ft.)
BUILDING	
First Floor Height	8
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	NA
FEMA 4% (25-Yr)	NA
FEMA 2% (50-Yr)	
2016 Flood HWM	1.0
FEMA 1% (100-Yr)	
FEMA 100-Yr + FBD	
FEMA 1%+ (84% CL)	
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

113 Valley Ave, Richwood, WV

	HEIGHT (ft.)
BUILDING	
First Floor Height	8
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	NA
FEMA 4% (25-Yr)	NA
FEMA 2% (50-Yr)	2.8
2016 Flood HWM	1.0
FEMA 1% (100-Yr)	
FEMA 100-Yr + FBD	
FEMA 1%+ (84% CL)	
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

113 Valley Ave, Richwood, WV

	HEIGHT (ft.)
BUILDING	
First Floor Height	8
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	NA
FEMA 4% (25-Yr)	NA
FEMA 2% (50-Yr)	2.8
2016 Flood HWM	1.0
FEMA 1% (100-Yr)	3.5
FEMA 100-Yr + FBD	5.5
FEMA 1%+ (84% CL)	9.0
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

113 Valley Ave, Richwood, WV

	HEIGHT (ft.)
BUILDING	
First Floor Height	8
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	NA
FEMA 4% (25-Yr)	NA
FEMA 2% (50-Yr)	2.8
2016 Flood HWM	1.0
FEMA 1% (100-Yr)	3.5
FEMA 100-Yr + FBD	5.5
FEMA 1%+ (84% CL)	9.0
FEMA 0.2% (500-Yr)	8.3
FSF 0.2% (500-Yr)	

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

The Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 2016 flood plus freeboard.

113 Valley Ave, Richwood, WV

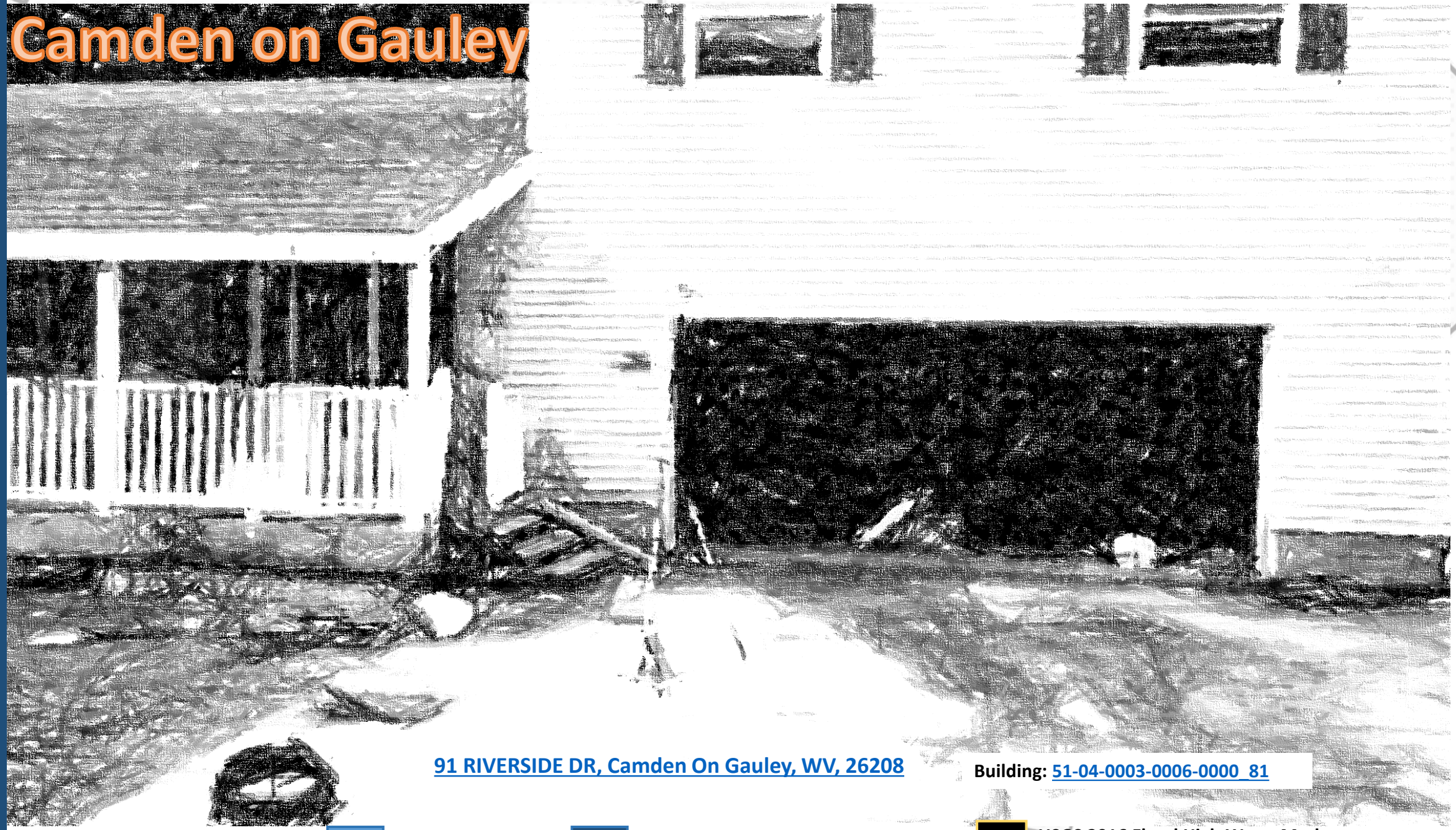
	HEIGHT (ft.)
BUILDING	
First Floor Height	8
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	NA
FEMA 4% (25-Yr)	NA
FEMA 2% (50-Yr)	2.8
2016 Flood HWM	1.0
FEMA 1% (100-Yr)	3.5
FEMA 100-Yr + FBD	5.5
FEMA 1%+ (84% CL)	9.0
FEMA 0.2% (500-Yr)	8.3
FSF 0.2% (500-Yr)	6.7

Building 34-06-0011-0090-0000_113

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

Building Flood Profile

Camden on Gauley



91 RIVERSIDE DR, Camden On Gauley, WV, 26208

Building: 51-04-0003-0006-0000_81

FLOOD DEPTHS:

FEMA

First Street Foundation (FSF)

USGS 2016 Flood High Water Mark

	HEIGHT (ft.)
BUILDING	
First Floor Height	4
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	1.9
FEMA 4% (25-Yr)	
FEMA 2% (50-Yr)	
2016 Flood HWM	
FEMA 1% (100-Yr)	
FEMA 100-Yr + FBD	
FEMA 1%+ (84% CL)	
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

Building: 51-04-0003-0006-0000_81

FLOOD DEPTHS: **FEMA** **First Street Foundation (FSF)** **2016**

	HEIGHT (ft.)
BUILDING	
First Floor Height	4
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	1.9
FEMA 4% (25-Yr)	4.4
FEMA 2% (50-Yr)	
2016 Flood HWM	
FEMA 1% (100-Yr)	
FEMA 100-Yr + FBD	
FEMA 1%+ (84% CL)	
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

Building: 51-04-0003-0006-0000_81

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

	HEIGHT (ft.)
BUILDING	
First Floor Height	4
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	1.9
FEMA 4% (25-Yr)	4.4
FEMA 2% (50-Yr)	6.7
2016 Flood HWM	
FEMA 1% (100-Yr)	
FEMA 100-Yr + FBD	
FEMA 1%+ (84% CL)	
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

Building: 51-04-0003-0006-0000_81

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

	HEIGHT (ft.)
BUILDING	
First Floor Height	4
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	1.9
FEMA 4% (25-Yr)	4.4
FEMA 2% (50-Yr)	6.7
2016 Flood HWM	
FEMA 1% (100-Yr)	8.3
FEMA 100-Yr + FBD	10.3
FEMA 1%+ (84% CL)	
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

Building: 51-04-0003-0006-0000_81

FLOOD DEPTHS: **FEMA** **First Street Foundation (FSF)** **USGS 2016 Flood High Water Mark**

	HEIGHT (ft.)
BUILDING	
First Floor Height	4
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	1.9
FEMA 4% (25-Yr)	4.4
FEMA 2% (50-Yr)	6.7
2016 Flood HWM	
FEMA 1% (100-Yr)	8.3
FEMA 100-Yr + FBD	10.3
FEMA 1%+ (84% CL)	10.7
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

Building: 51-04-0003-0006-0000_81

FLOOD DEPTHS: **FEMA** **First Street Foundation (FSF)** **USGS 2016 Flood High Water Mark**

	HEIGHT (ft.)
BUILDING	
First Floor Height	4
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	1.9
FEMA 4% (25-Yr)	4.4
FEMA 2% (50-Yr)	6.7
2016 Flood HWM	9.1
FEMA 1% (100-Yr)	8.3
FEMA 100-Yr + FBD	10.3
FEMA 1%+ (84% CL)	10.7
FEMA 0.2% (500-Yr)	
FSF 0.2% (500-Yr)	

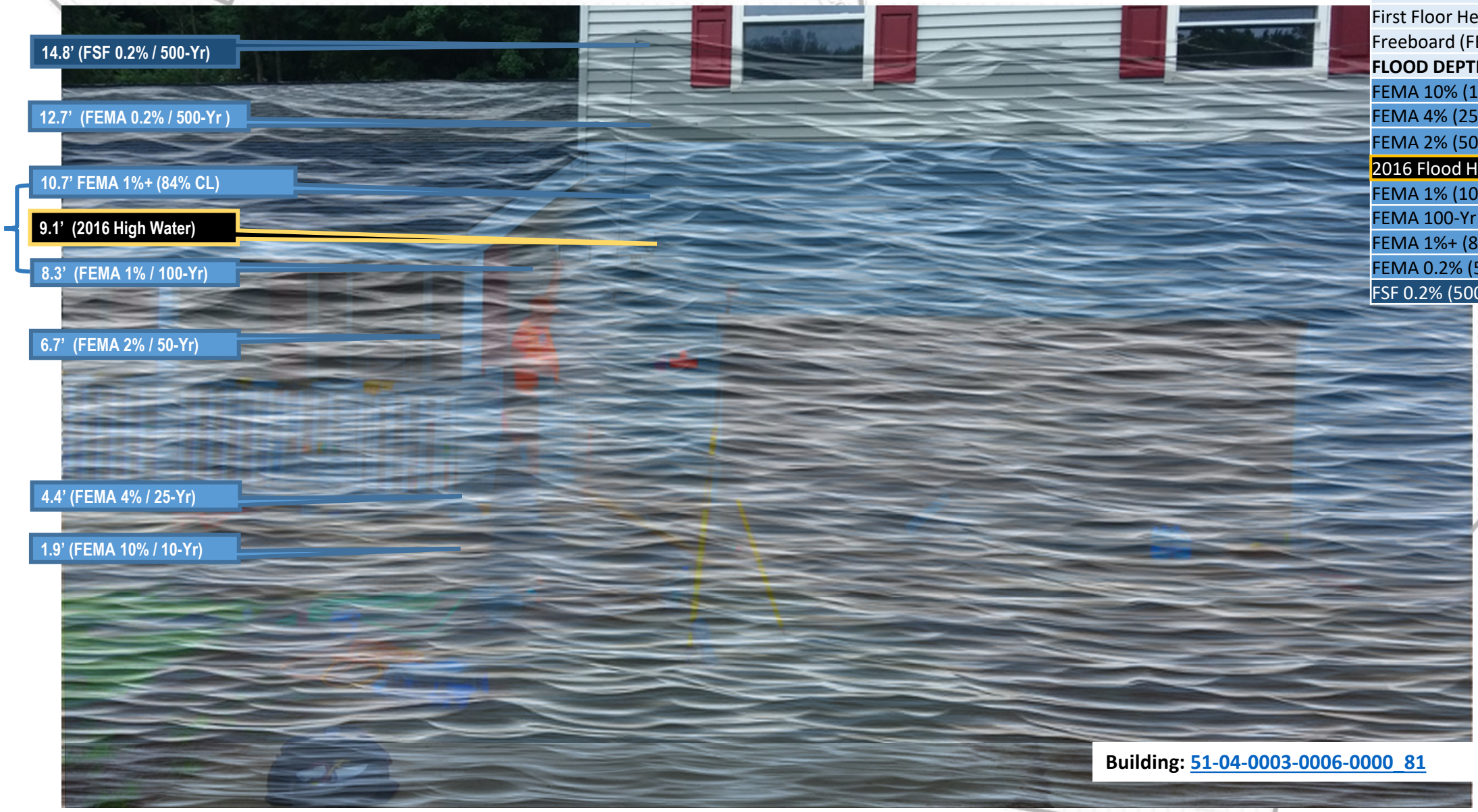
Building: 51-04-0003-0006-0000_81

FLOOD DEPTHS: **FEMA** **First Street Foundation (FSF)** **USGS 2016 Flood High Water Mark**

	HEIGHT (ft.)
BUILDING	
First Floor Height	4
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	1.9
FEMA 4% (25-Yr)	4.4
FEMA 2% (50-Yr)	6.7
2016 Flood HWM	9.1
FEMA 1% (100-Yr)	8.3
FEMA 100-Yr + FBD	10.3
FEMA 1%+ (84% CL)	10.7
FEMA 0.2% (500-Yr)	12.7
FSF 0.2% (500-Yr)	

Building: 51-04-0003-0006-0000_81

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark



	HEIGHT (ft.)
BUILDING	
First Floor Height	4
Freeboard (FBD)	2
FLOOD DEPTH	
FEMA 10% (10-Yr)	1.9
FEMA 4% (25-Yr)	4.4
FEMA 2% (50-Yr)	6.7
2016 Flood HWM	9.1
FEMA 1% (100-Yr)	8.3
FEMA 100-Yr + FBD	10.3
FEMA 1%+ (84% CL)	10.7
FEMA 0.2% (500-Yr)	12.7
FSF 0.2% (500-Yr)	14.8

Building: 51-04-0003-0006-0000_81

FLOOD DEPTHS: FEMA | First Street Foundation (FSF) | USGS 2016 Flood High Water Mark

Marlinton

Building: 38-08-0003-0023-0000

1900 Commercial Structure

309 8th St, Marlinton, WV, 24954

9.4' (FSF 0.2% / 500-Yr)

8.8' (FEMA DRAFT NFHL 0.2% / 500-Yr)

7' (1985 High Water Mark)

4.8' (FEMA DRAFT NFHL 1% / 100-Yr)

3.6' (FEMA 1% / 100-Yr)

2.7' (FEMA 2% / 50-Yr)

0.4' (FEMA 10% / 10-Yr)

Ideally, the Design Flood Elevation (DFE) should be the BFE plus 2 feet of freeboard. The DFE should also be above the high-water marks of the 1985 flood plus freeboard.

Flood Intervals	Height (ft.)	Source
FEMA 10% / 10-Yr	0.4	Flood Profile (Effective 2010)
FEMA 2% / 50-yr	2.7	Flood Profile (Effective 2010)
FEMA 1% / 100-yr	3.6	Flood Profile (Effective 2010)
FEMA 100-yr + 2.0 Ft. Freeboard (DFE)	5.6	Design flood elevation (DFE)
High Water Mark (1985 Flood)	7.0	Picture
FEMA Draft NFHL 100-yr	4.8	WV Flood Tool (Draft 2023)
FEMA 500-yr	8.8	WV Flood Tool (Draft 2023)
FSF 500-yr	9.4	FSF Flood Depth (2022)

1985 Flood High Water Mark

FLOOD DEPTHS: FEMA Effective (2010) | FEMA Draft NFHL (2023) | First Street Foundation (FSF) | 1985 Flood High Water Mark

Community Flood Profile

Assessing the Percentage of Inundated Area in Different Flood Intervals

FEMA 10% Annual Chance (10-year)

White Sulphur Springs, WV

13% of White Sulphur Springs is in the 10% Annual Flood Chance

96% probability of flooding at least once over 30 years

FEMA 4% Annual Chance (25-year)

White Sulphur Springs, WV

17% of White Sulphur Springs is in the 4% Annual Flood Chance

71% probability of flooding at least once over 30 years

FEMA 2% Annual Chance (50-year)

White Sulphur Springs, WV

20% of White Sulphur Springs is in the 2% Annual Flood Chance

45% probability of flooding at least once over 30 years

FEMA 1% Annual Chance (100-year)

White Sulphur Springs, WV

22% of White Sulphur Springs is in the 1% Annual Flood Chance

26% probability of flooding at least once over 30 years

FEMA 1% +Annual Chance (100-year)

White Sulphur Springs, WV

Climate Change

25% of White Sulphur Springs is in the 1% +Annual Flood Chance

26% probability of flooding at least once over 30 years

FEMA 0.2% Annual Chance (500-year) White Sulphur Springs, WV

18% of White Sulphur Springs is in the 0.2% Annual Flood Chance

6% probability of flooding at least once over 30 years

Rainelle

FEMA 10% Annual Chance (10-year)

Rainelle, WV

96% probability of flooding at least once over 30 years

13% Rainelle is in the 10% Annual Flood Chance

FEMA 4% Annual Chance (25-year)

Rainelle, WV

71% probability of flooding at least once over 30 years

20% Rainelle is in the 4% Annual Flood Chance

FEMA 2% Annual Chance (50-year)

Rainelle, WV

45% probability of flooding at least once over 30 years

26% Rainelle is in the 2% Annual Flood Chance

FEMA 1% Annual Chance (100-year)

Rainelle, WV

26% probability of flooding at least once over 30 years

31% Rainelle is in the 1% Annual Flood Chance

FEMA 1%+ Annual Chance (100-year)

Rainelle, WV

FEMA 0.2% Annual Chance (100-year)

Rainelle, WV

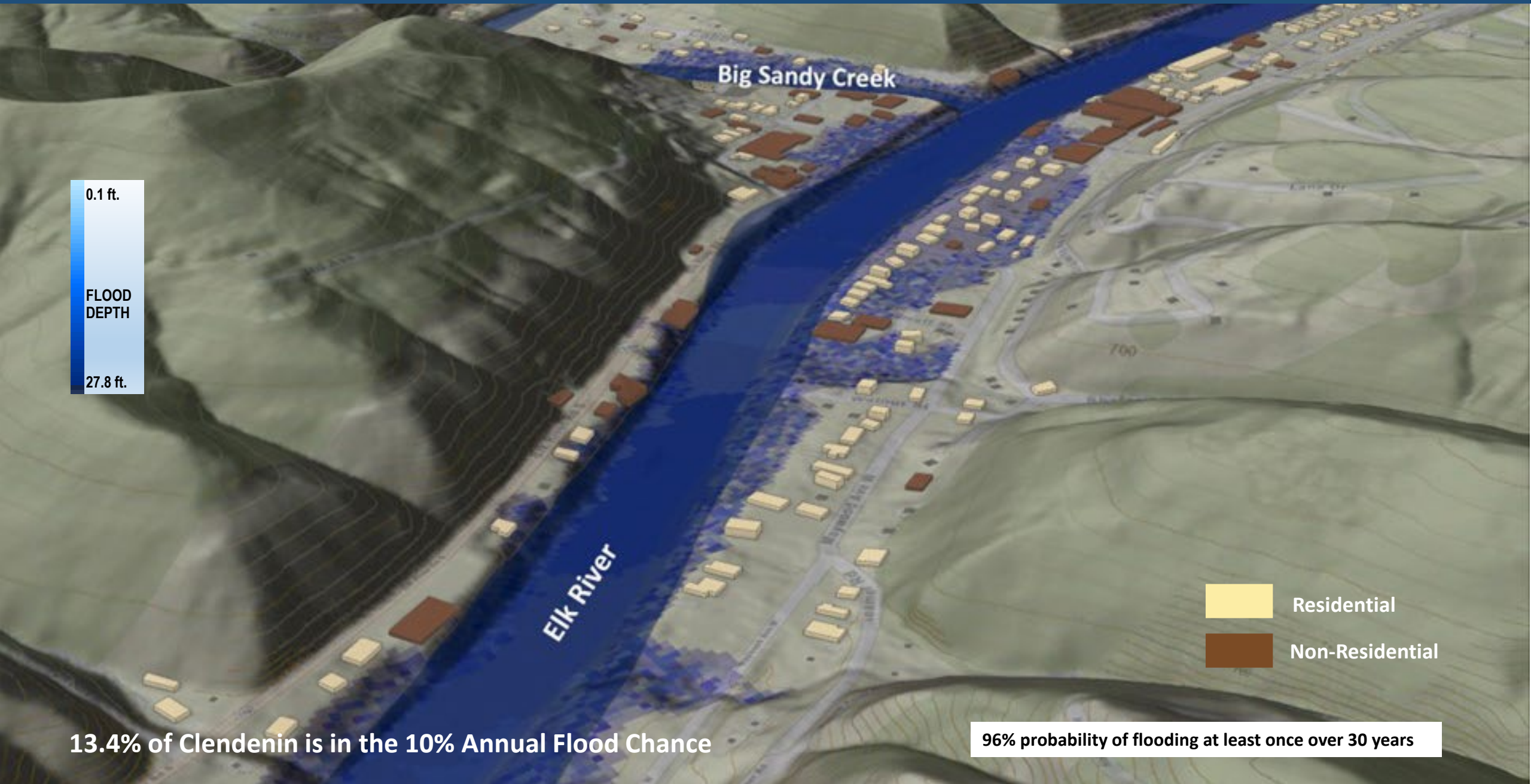
6% probability of flooding at least once over 30 years

37% Rainelle is in the 0.2% Annual Flood Chance

Clendenin

FEMA 10% Annual Chance (10-year)

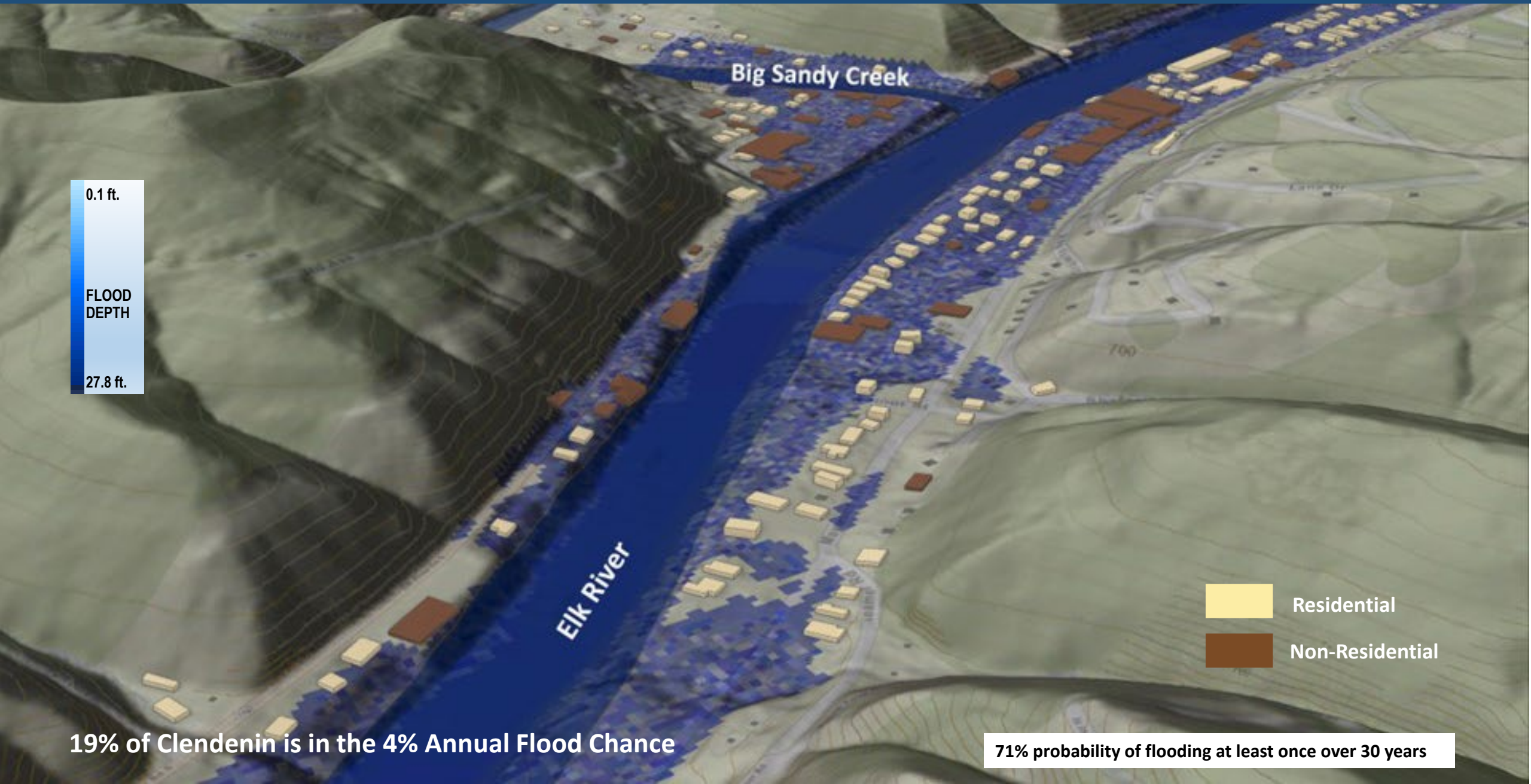
Clendenin, WV



13.4% of Clendenin is in the 10% Annual Flood Chance

96% probability of flooding at least once over 30 years

FEMA 4% Annual Chance (25-year) Clendenin, WV

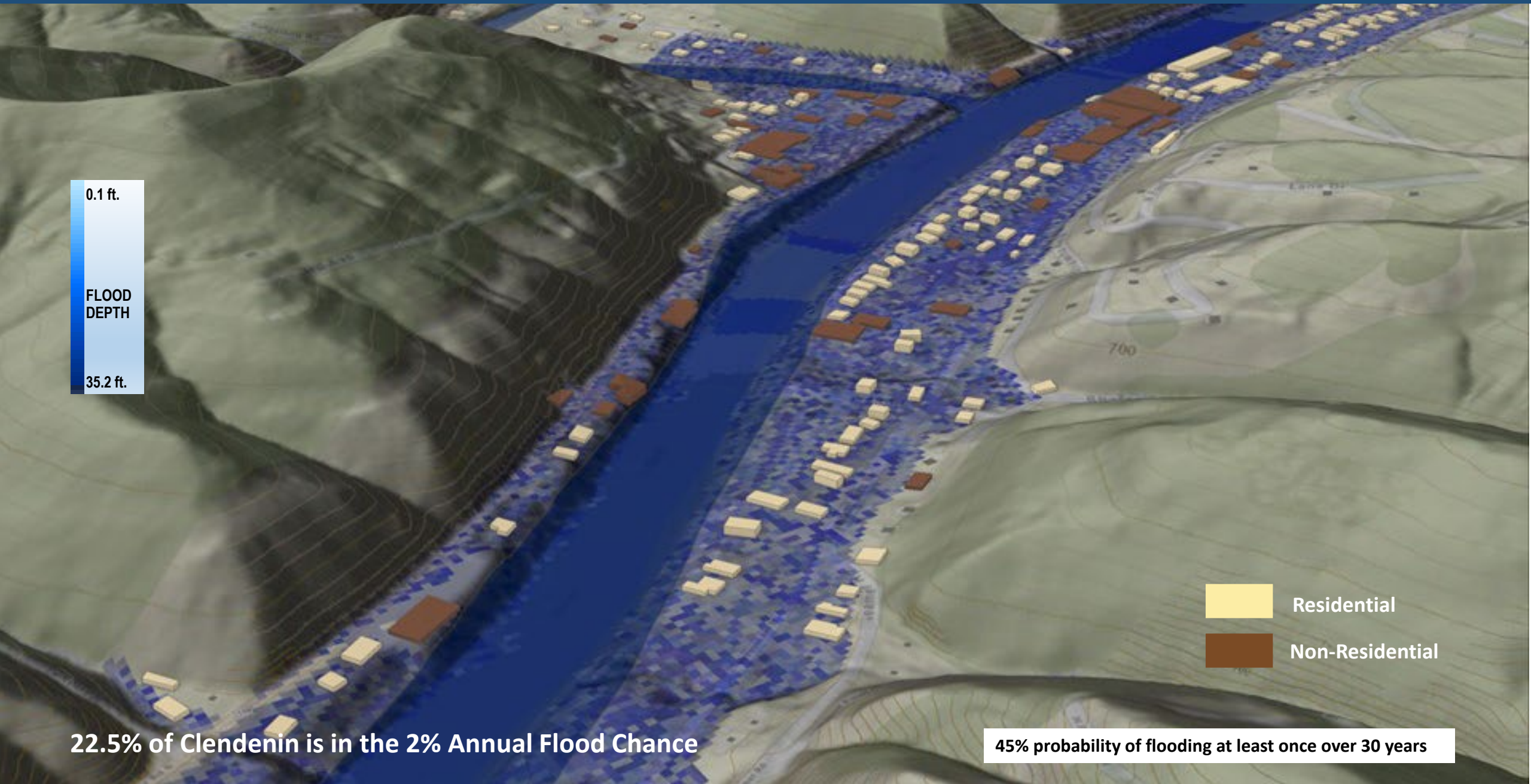


19% of Clendenin is in the 4% Annual Flood Chance

71% probability of flooding at least once over 30 years

FEMA 2% Annual Chance (50-year)

Clendenin, WV

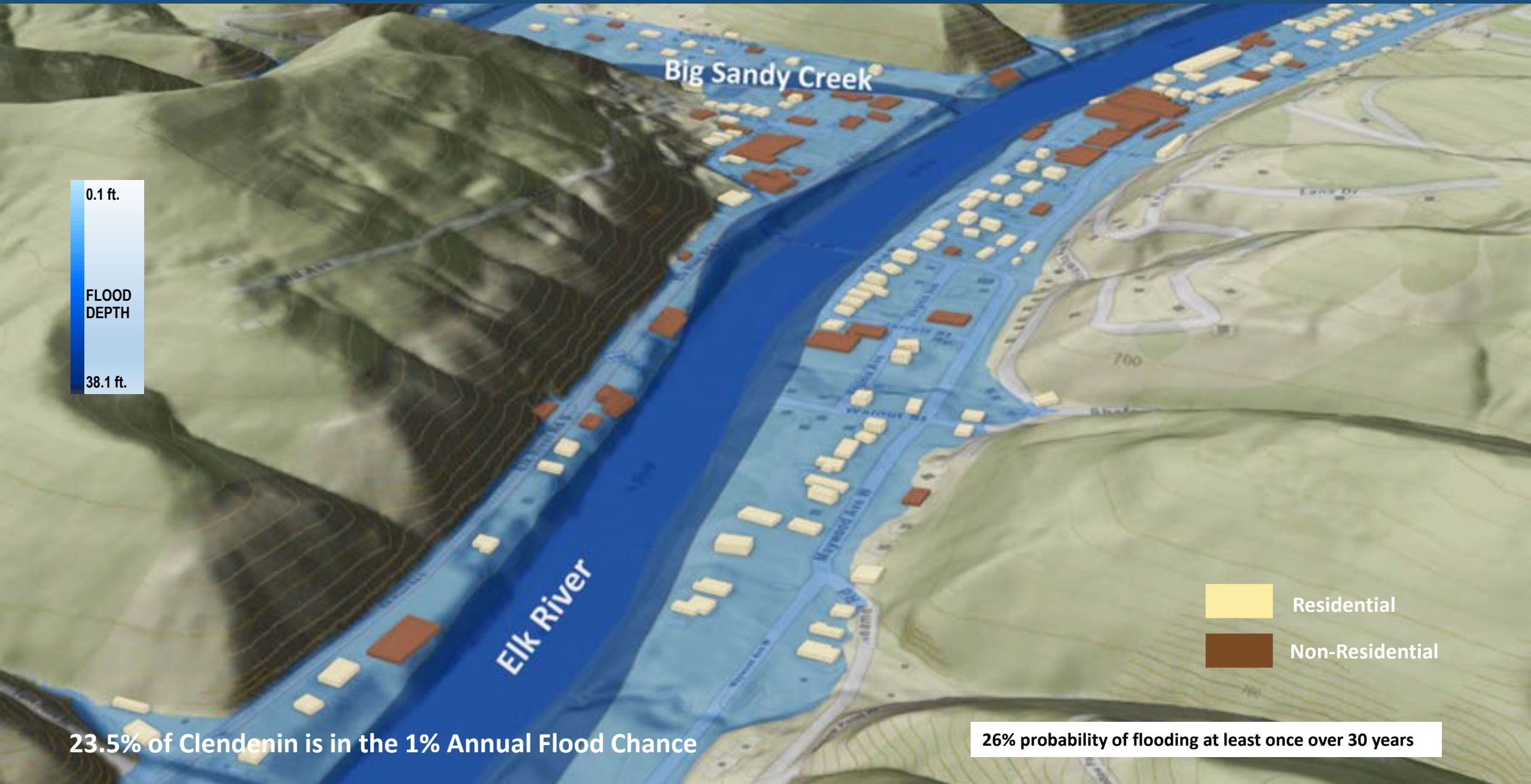


22.5% of Clendenin is in the 2% Annual Flood Chance

45% probability of flooding at least once over 30 years

FEMA 1% Annual Chance (100-year)

Clendenin, WV

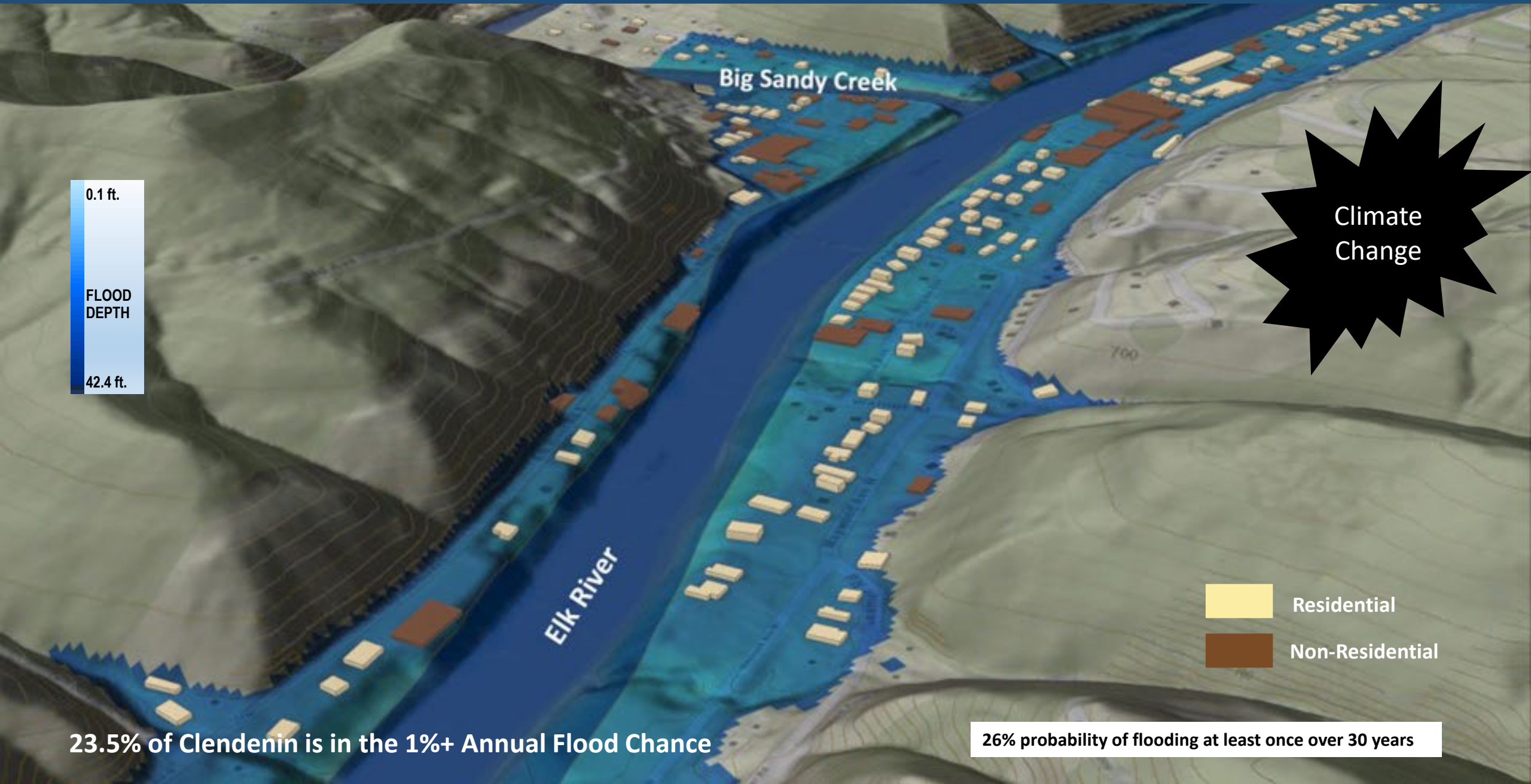


23.5% of Clendenin is in the 1% Annual Flood Chance

26% probability of flooding at least once over 30 years

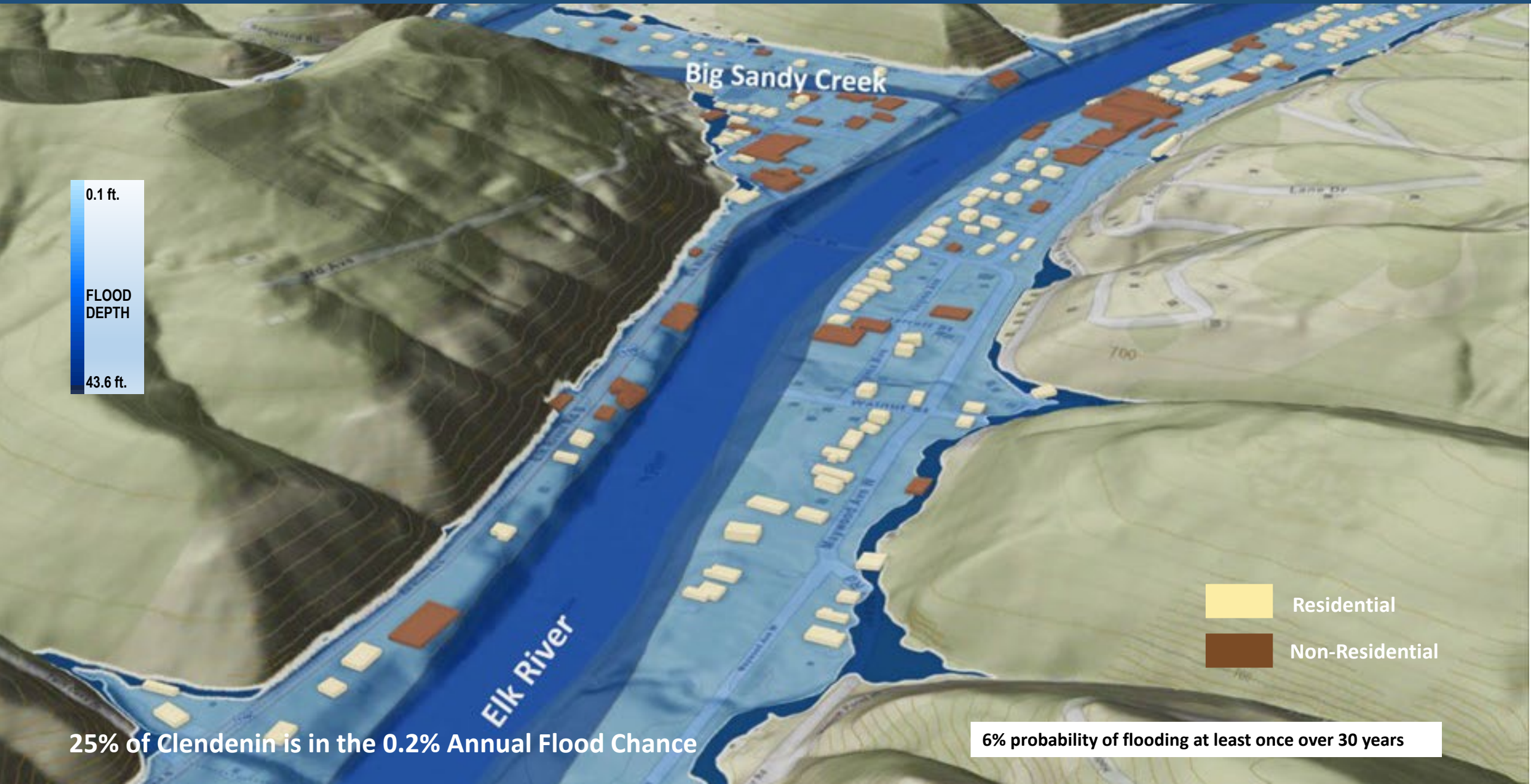
FEMA 1%+ Annual Chance (100-year)

Clendenin, WV



FEMA 0.2% Annual Chance (500-year)

Clendenin, WV

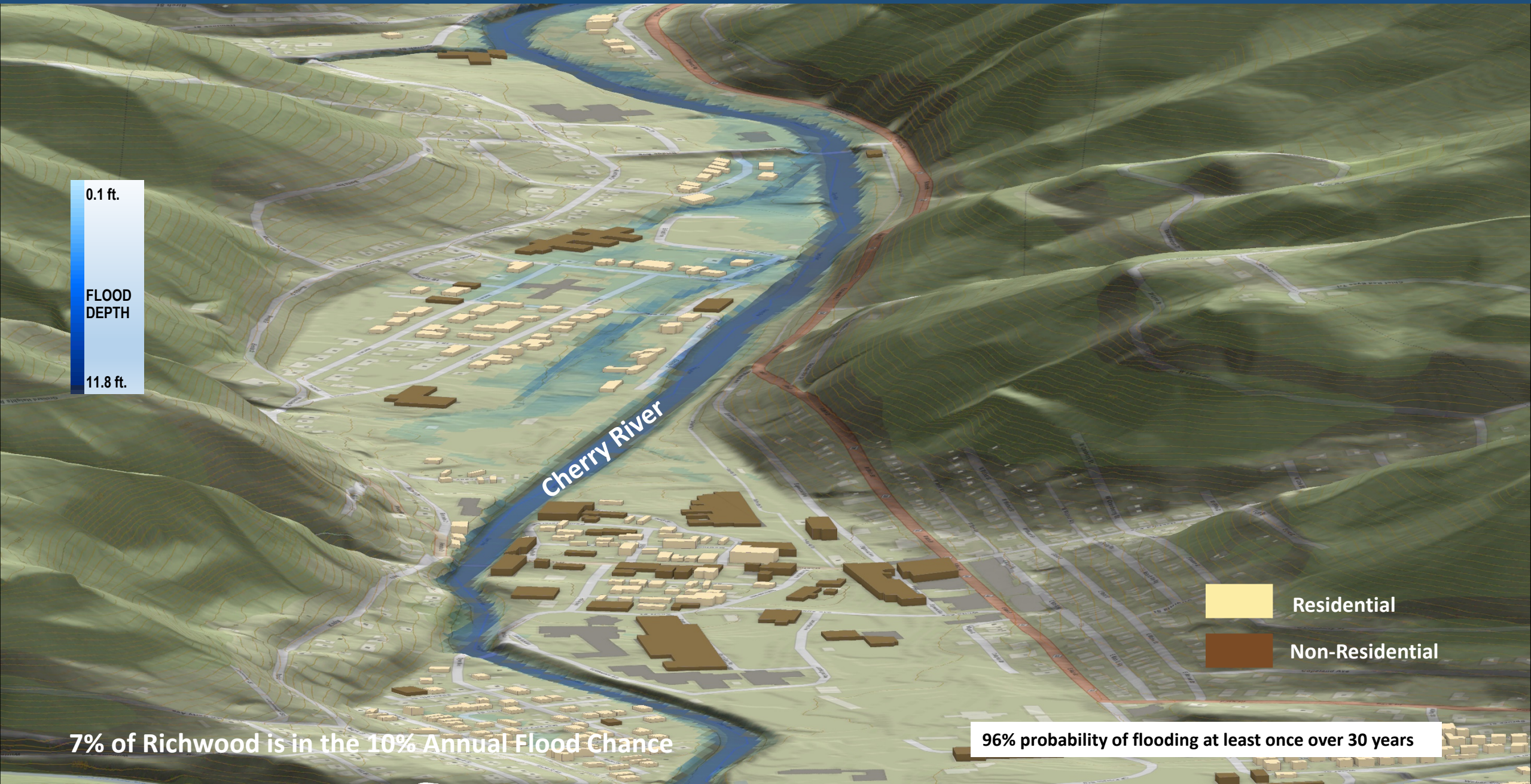


25% of Clendenin is in the 0.2% Annual Flood Chance

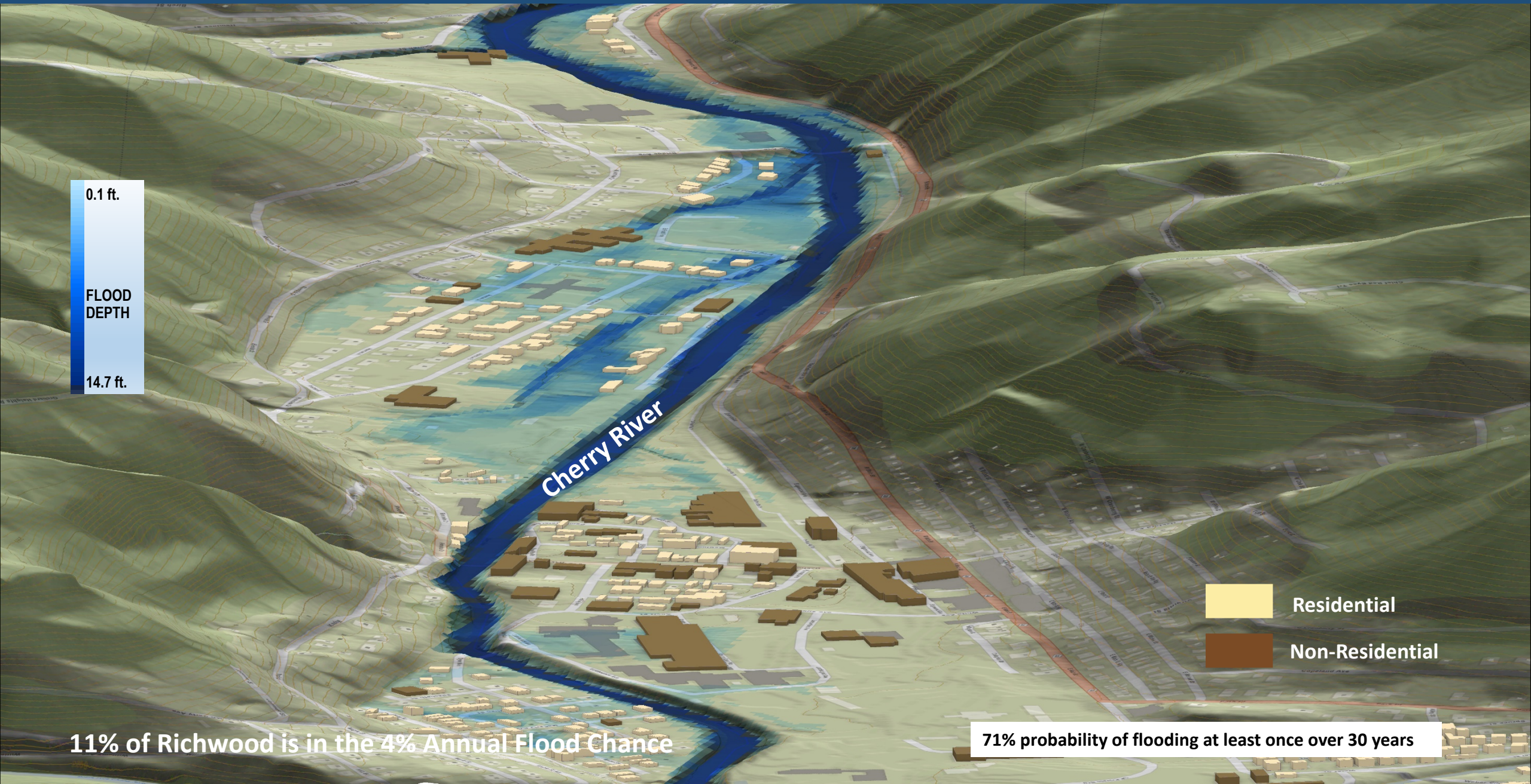
6% probability of flooding at least once over 30 years

Richwood

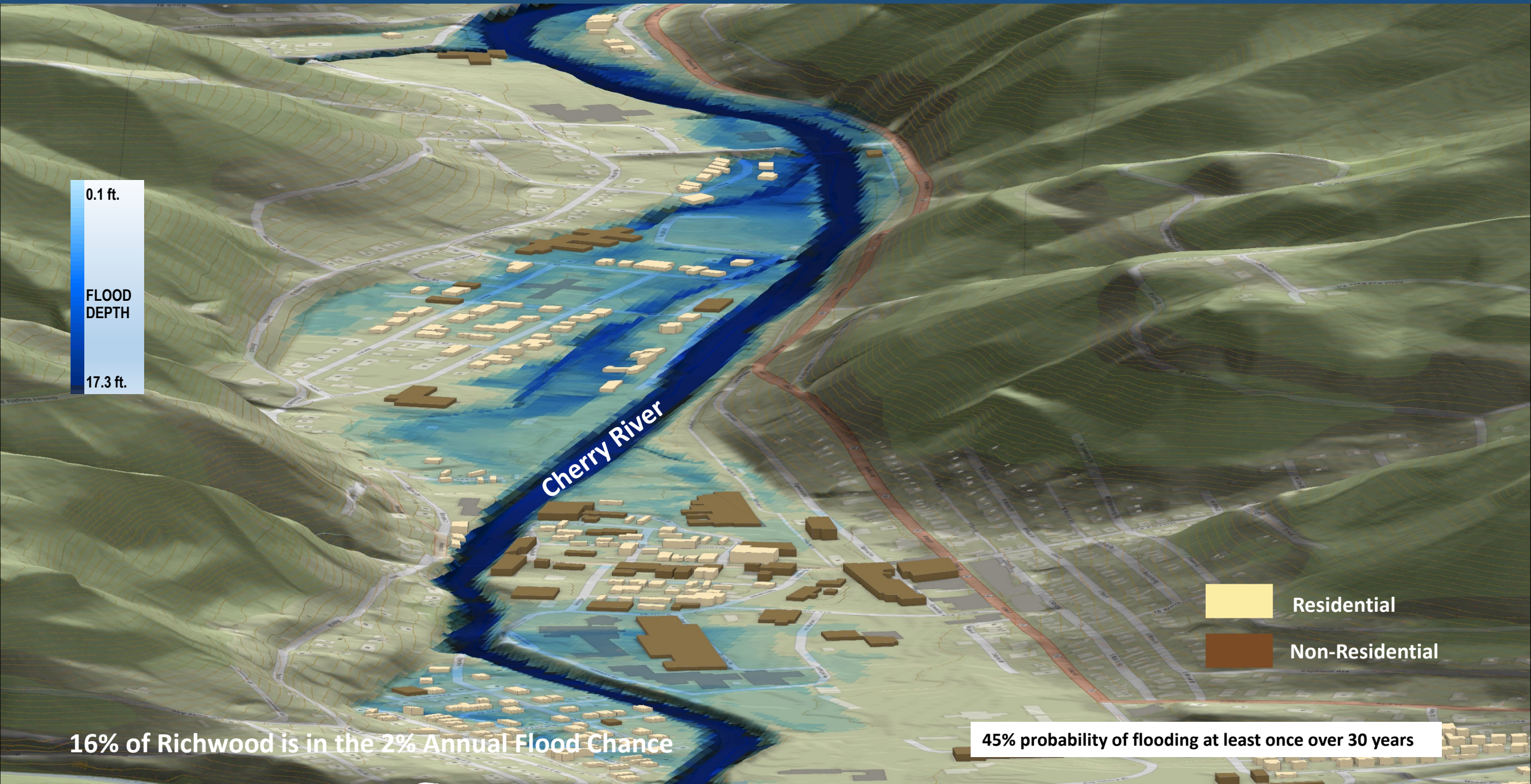
FEMA 10% Annual Chance (10-year) Richwood, WV



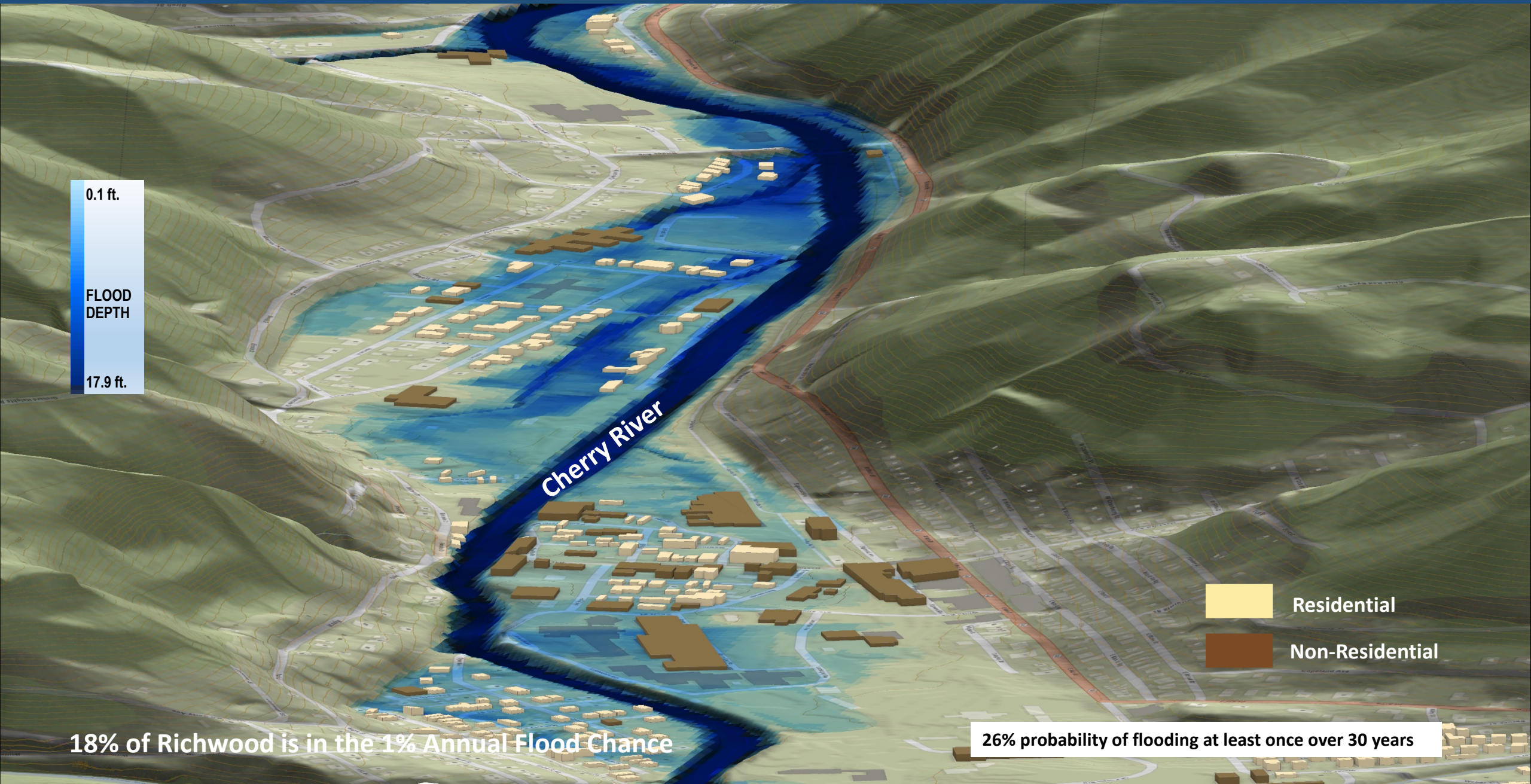
FEMA 4% Annual Chance (25-year) Richwood, WV



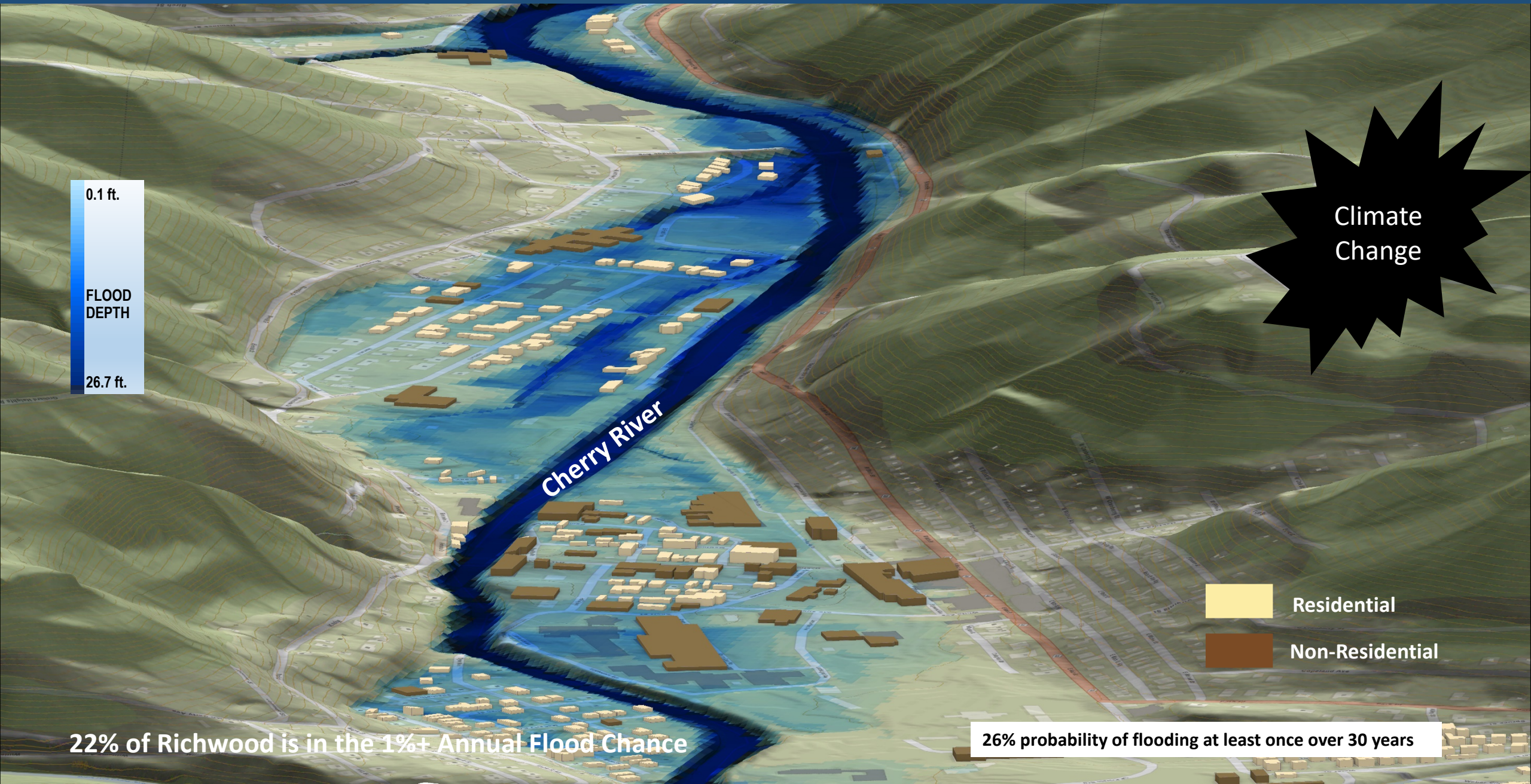
FEMA 2% Annual Chance (50-year) Richwood, WV



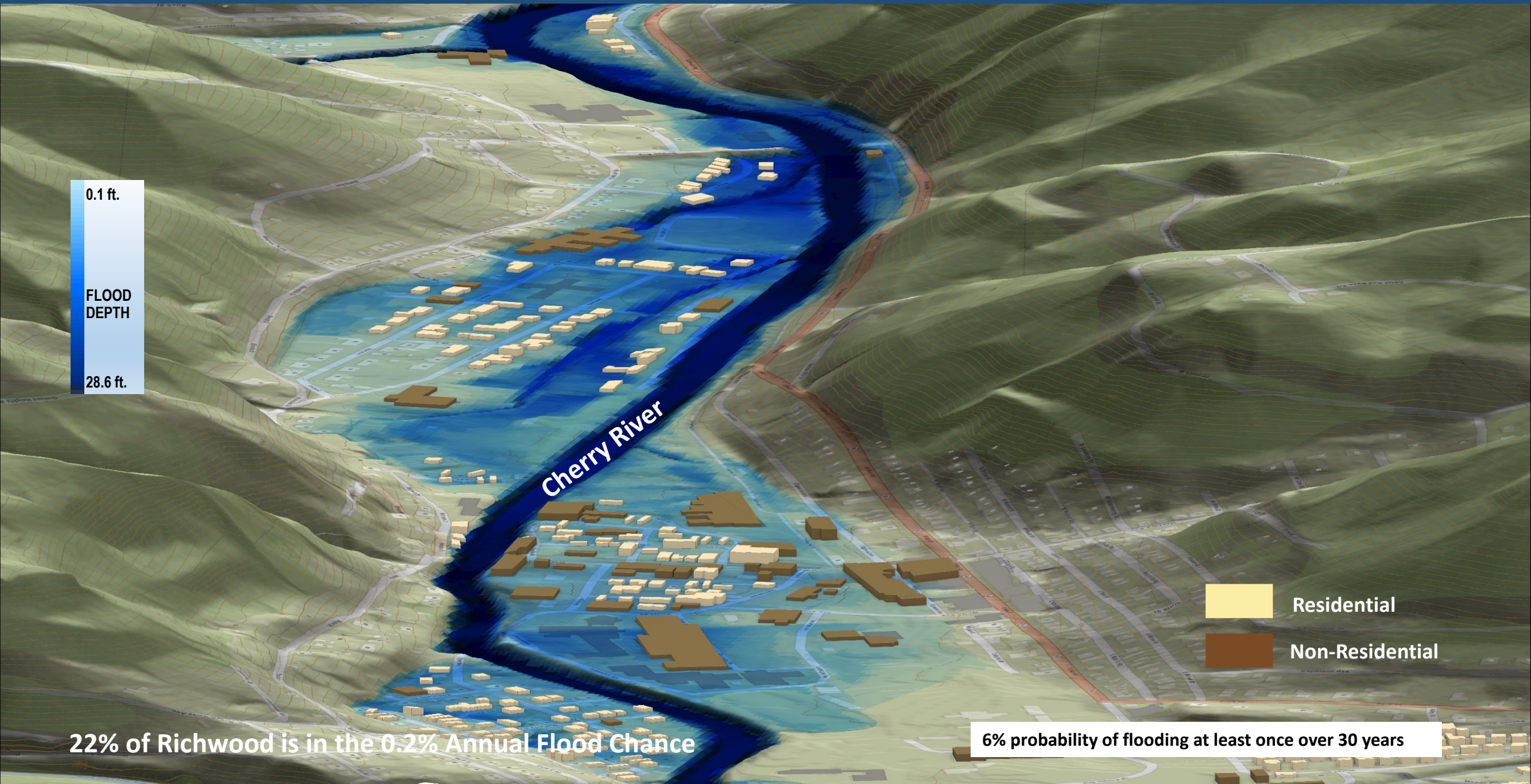
FEMA 1% Annual Chance (100-year) Richwood, WV



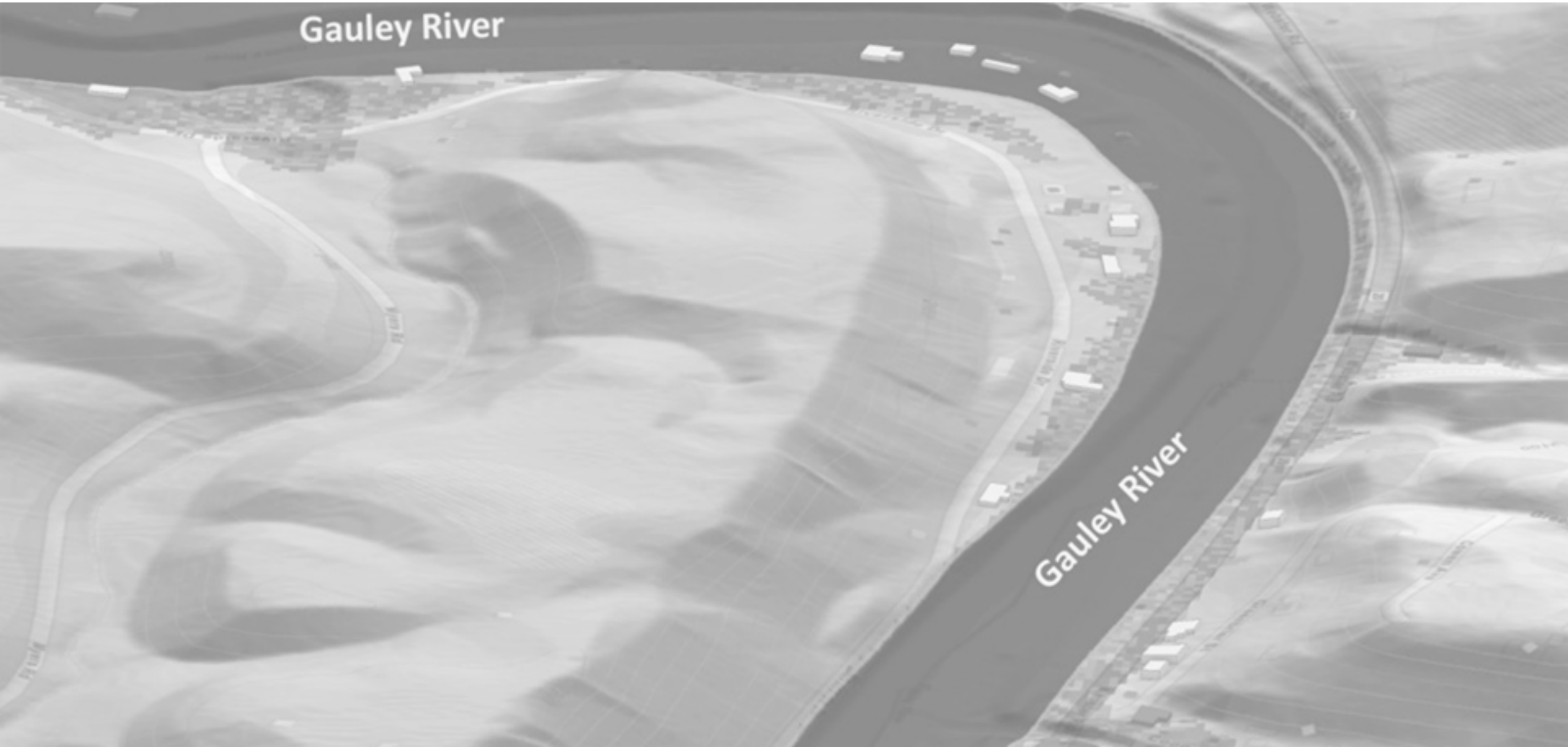
FEMA 1%+ Annual Chance (100-year) Richwood, WV



FEMA 0.2% Annual Chance (500-year) Richwood, WV



Camden-on-Gauley



FEMA 10% Annual Chance (10-year)

Camden-on-Gauley, WV

FEMA 4% Annual Chance (25-year)

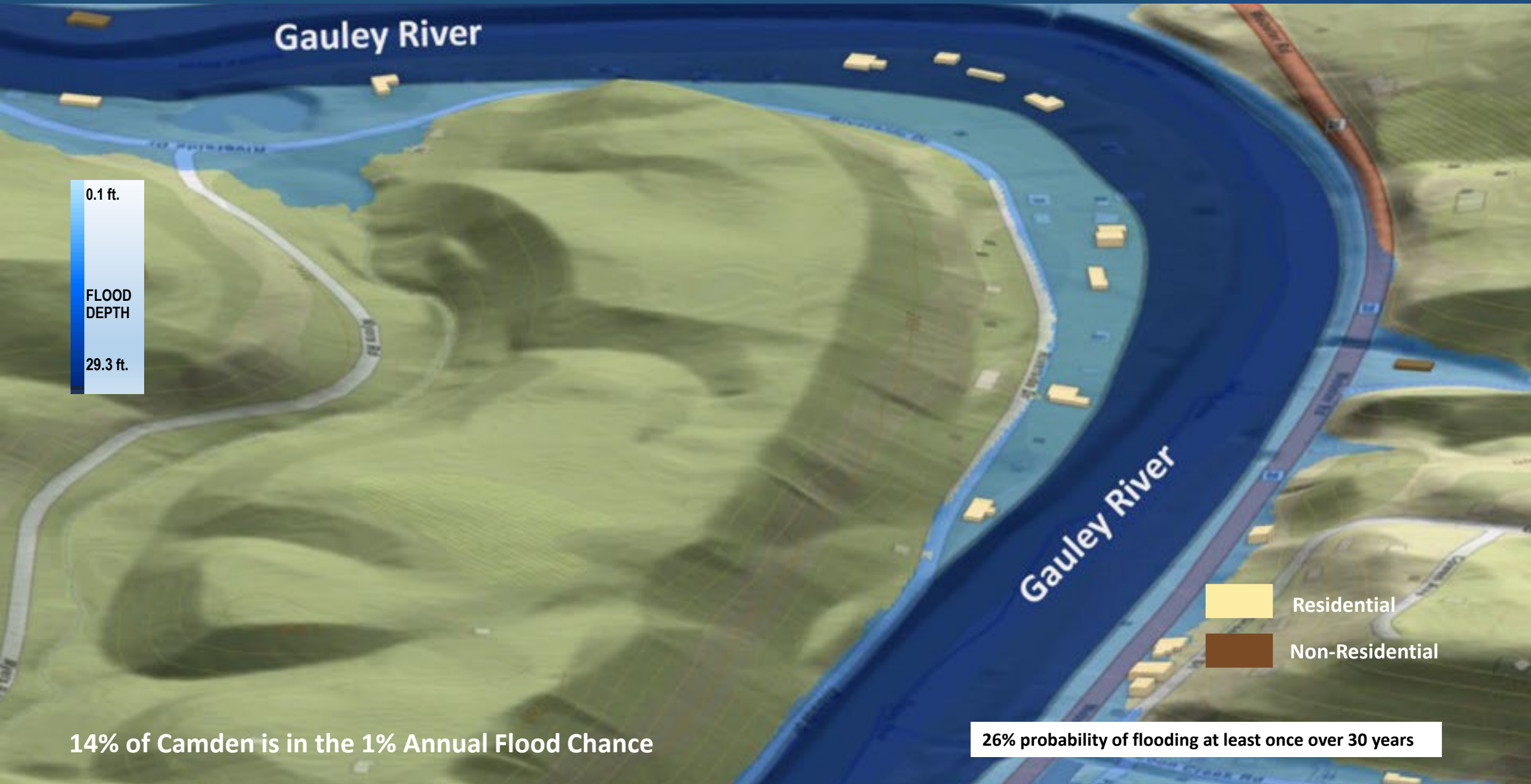
Camden-on-Gauley, WV

FEMA 2% Annual Chance (50-year)

Camden-on-Gauley, WV

FEMA 1% Annual Chance (100-year)

Camden-on-Gauley, WV

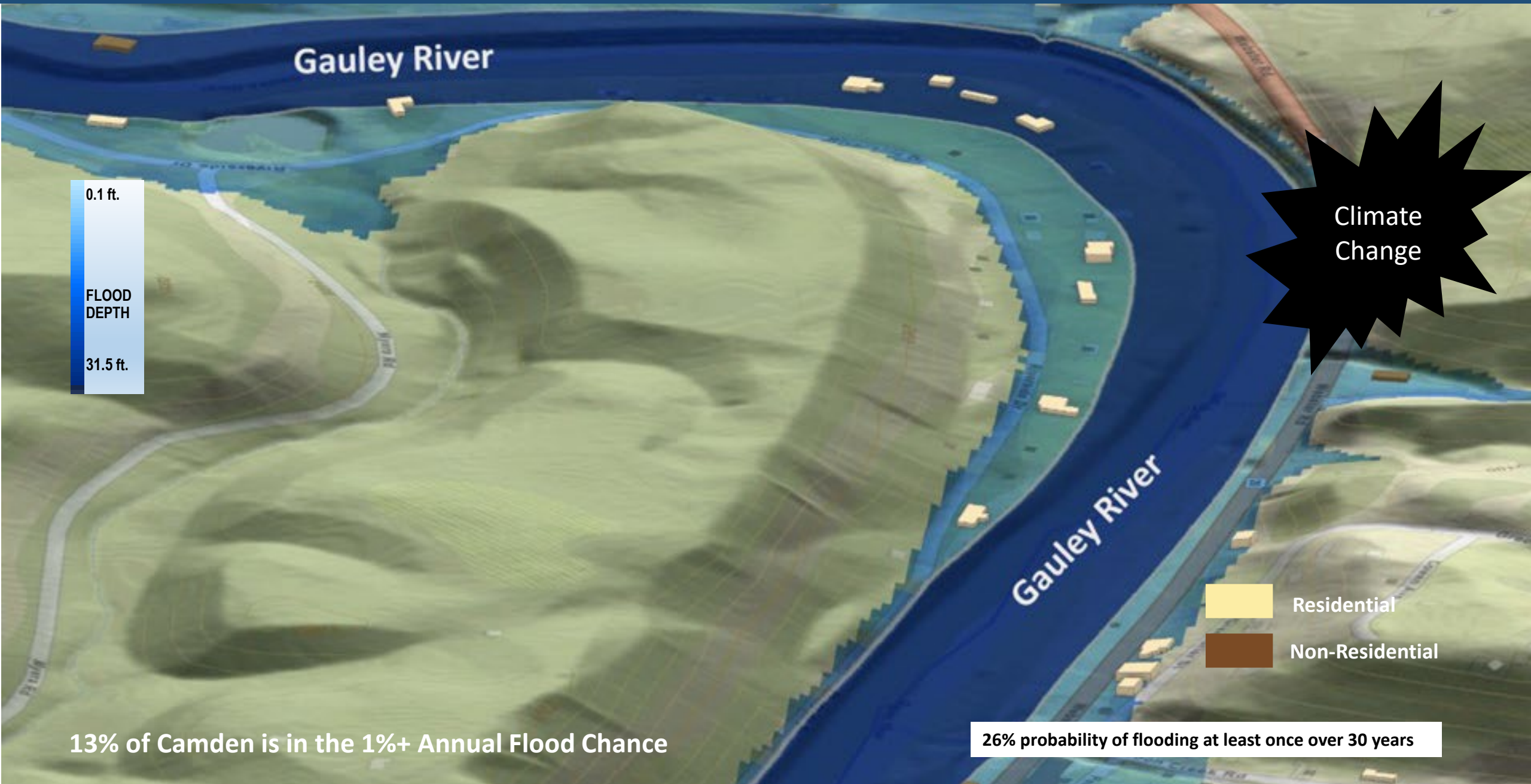


14% of Camden is in the 1% Annual Flood Chance

26% probability of flooding at least once over 30 years

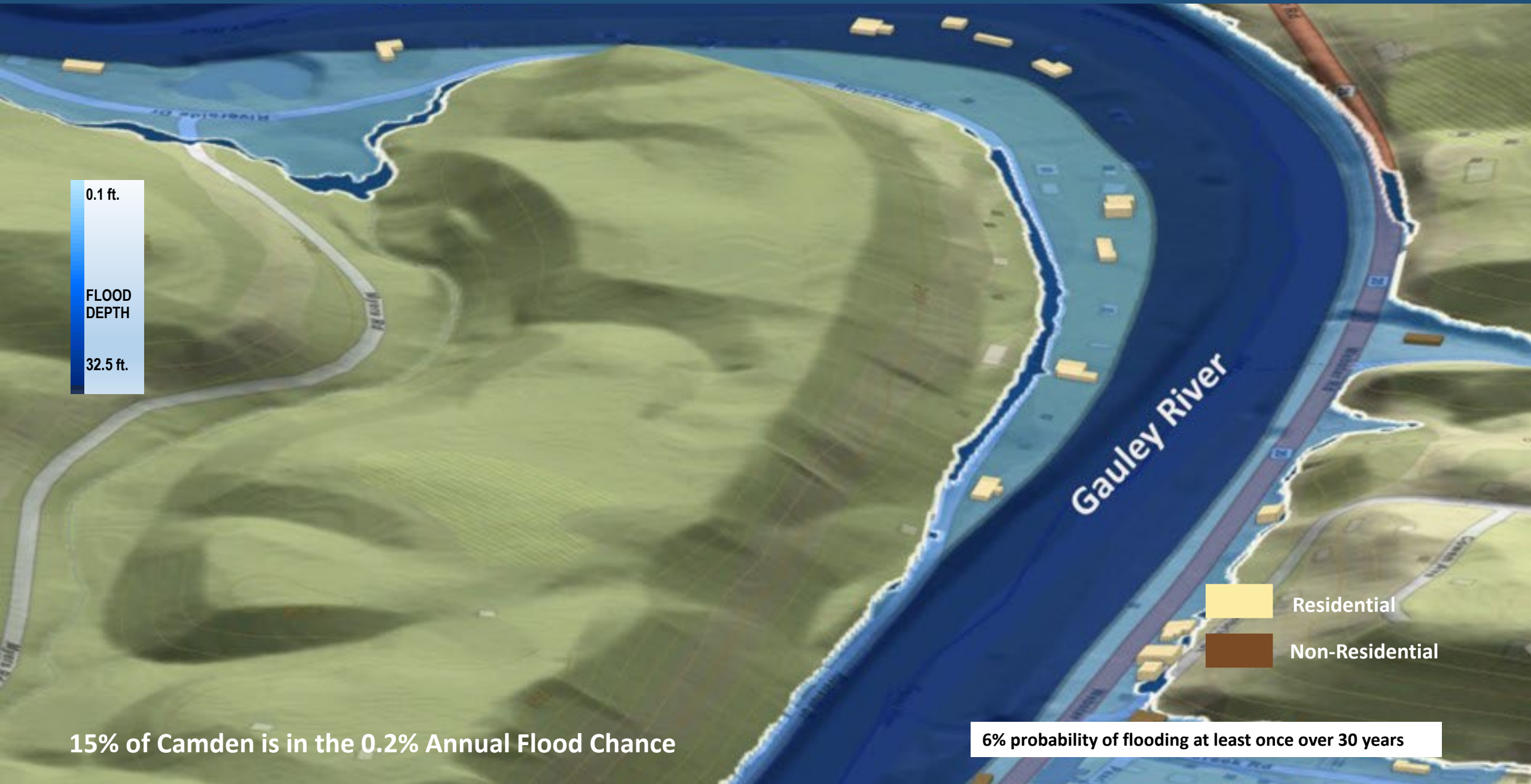
FEMA 1+% Annual Chance (100-year)

Camden-on-Gauley, WV



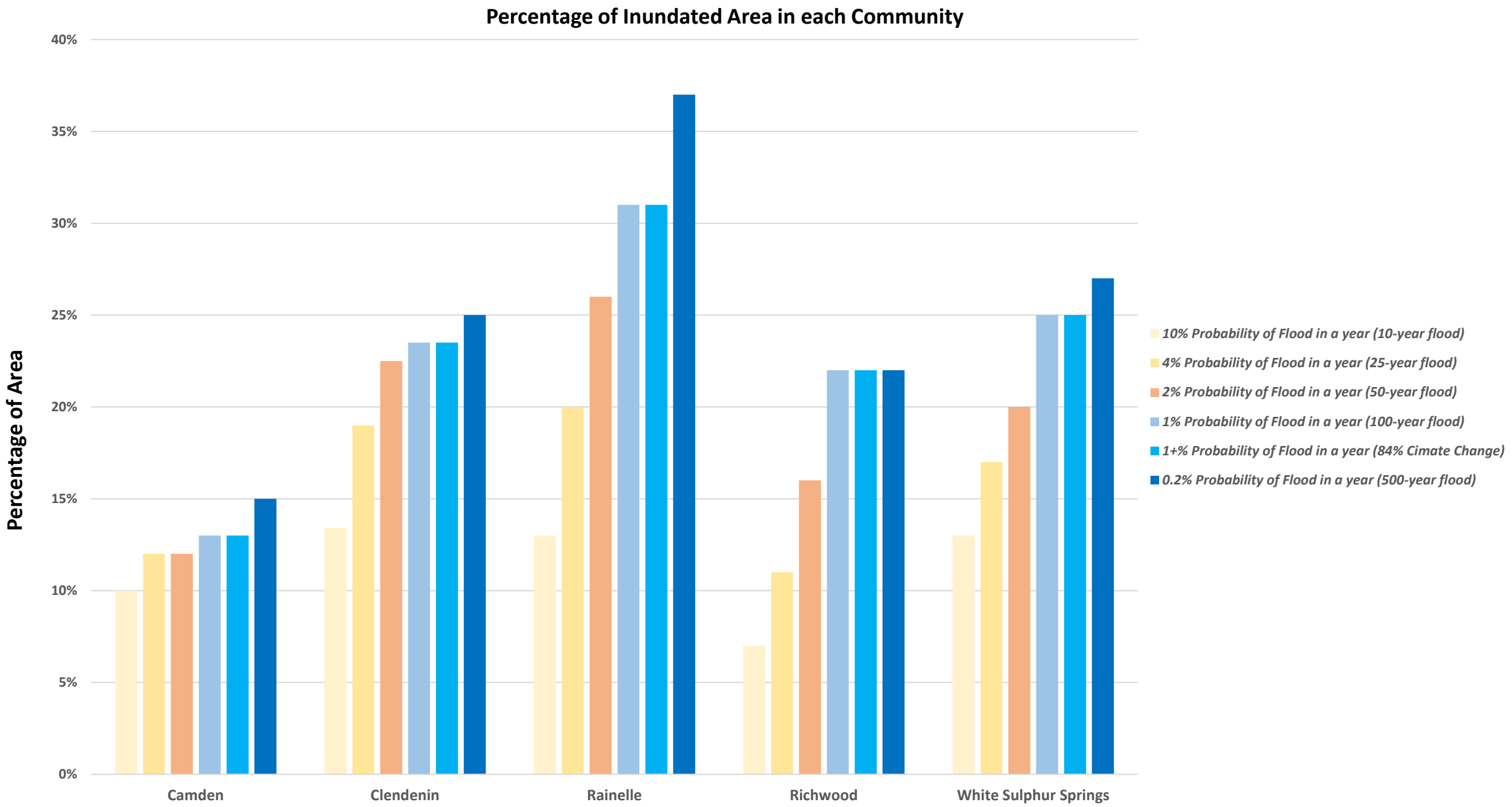
FEMA 0.2% Annual Chance (500-year)

Camden-on-Gauley, WV



15% of Camden is in the 0.2% Annual Flood Chance

6% probability of flooding at least once over 30 years


Percentage of Inundated Area in each Community
Percentage of Area
40%
35%
30%
25%
20%
15%
10%
5%
0%
Camden
Clendenin
Rainelle
Richwood
White Sulphur Springs
10% Probability of Flood in a year (10-year flood)
4% Probability of Flood in a year (25-year flood)
2% Probability of Flood in a year (50-year flood)
1% Probability of Flood in a year (100-year flood)
1+% Probability of Flood in a year (84% Cimate Change)
0.2% Probability of Flood in a year (500-year flood)

Flood Intervals	Percentage of Inundated Area in each Community				
	Camden	Clendenin	Rainelle	Richwood	White Sulphur Springs
10% Probability of Flood in a year (10-year flood)	10%	13.4%	13%	7%	13%
4% Probability of Flood in a year (25-year flood)	12%	19%	20%	11%	17%
2% Probability of Flood in a year (50-year flood)	12%	22.5%	26%	16%	20%
1% Probability of Flood in a year (100-year flood)	14%	23.5%	31%	18%	22%
*1+% Probability of Flood in a year (84% Climate Change)	13%	23.5%	31%	22%	25%
0.2% Probability of Flood in a year (500-year flood)	15%	25%	37%	22%	27%

**** The 1-percent-plus flood elevation is defined as a flood elevation derived by using discharges that are at the upper 84-percent confidence limit as calculated in the gage analysis for the 1- percent-annual-chance event for the Flood Risk Project (FEMA, 2019)***