



Module 2

Recommended Strategies for Reducing Vulnerability and Exposure



Overview

- FEMA – NFIP
 - Maps – Know the Risk
 - Maps – Limitations
 - Regulations – Minimums aren't enough
 - Reduce Vulnerability
 - Flood Insurance



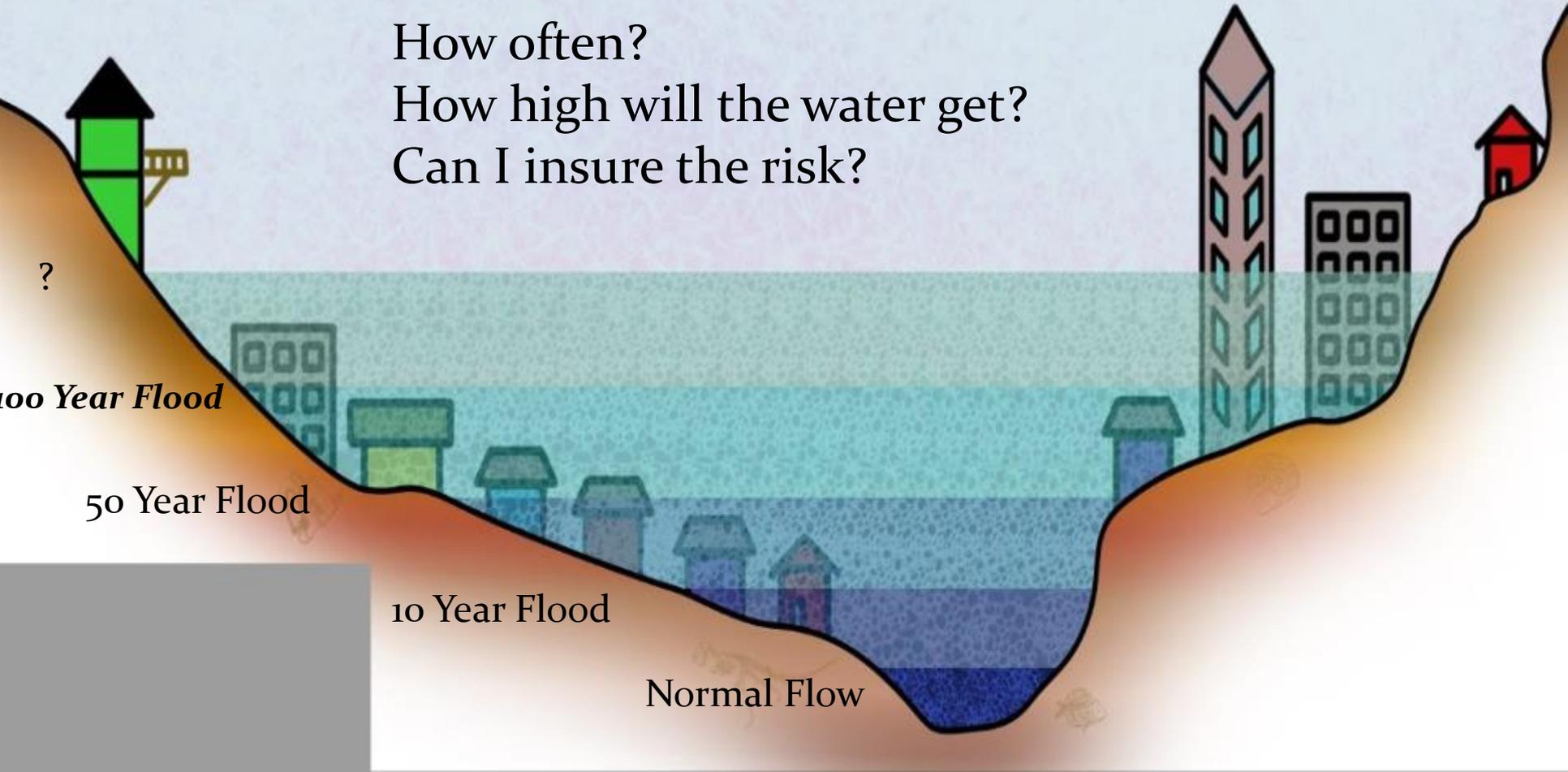
Will this location flood?

How often?

How high will the water get?

Can I insure the risk?

Will this location flood?
How often?
How high will the water get?
Can I insure the risk?



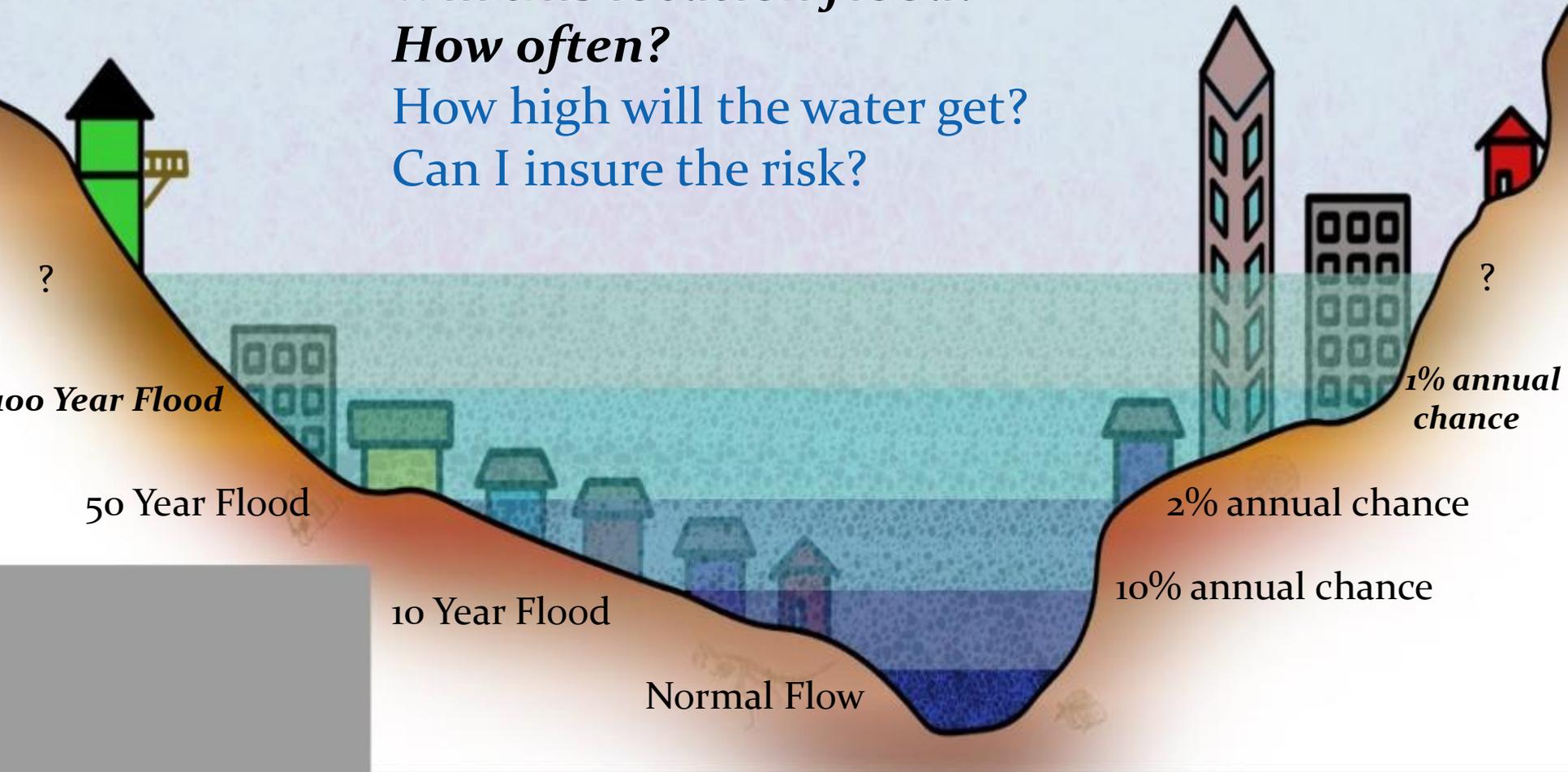
100-Year Flood

Will this location flood?

How often?

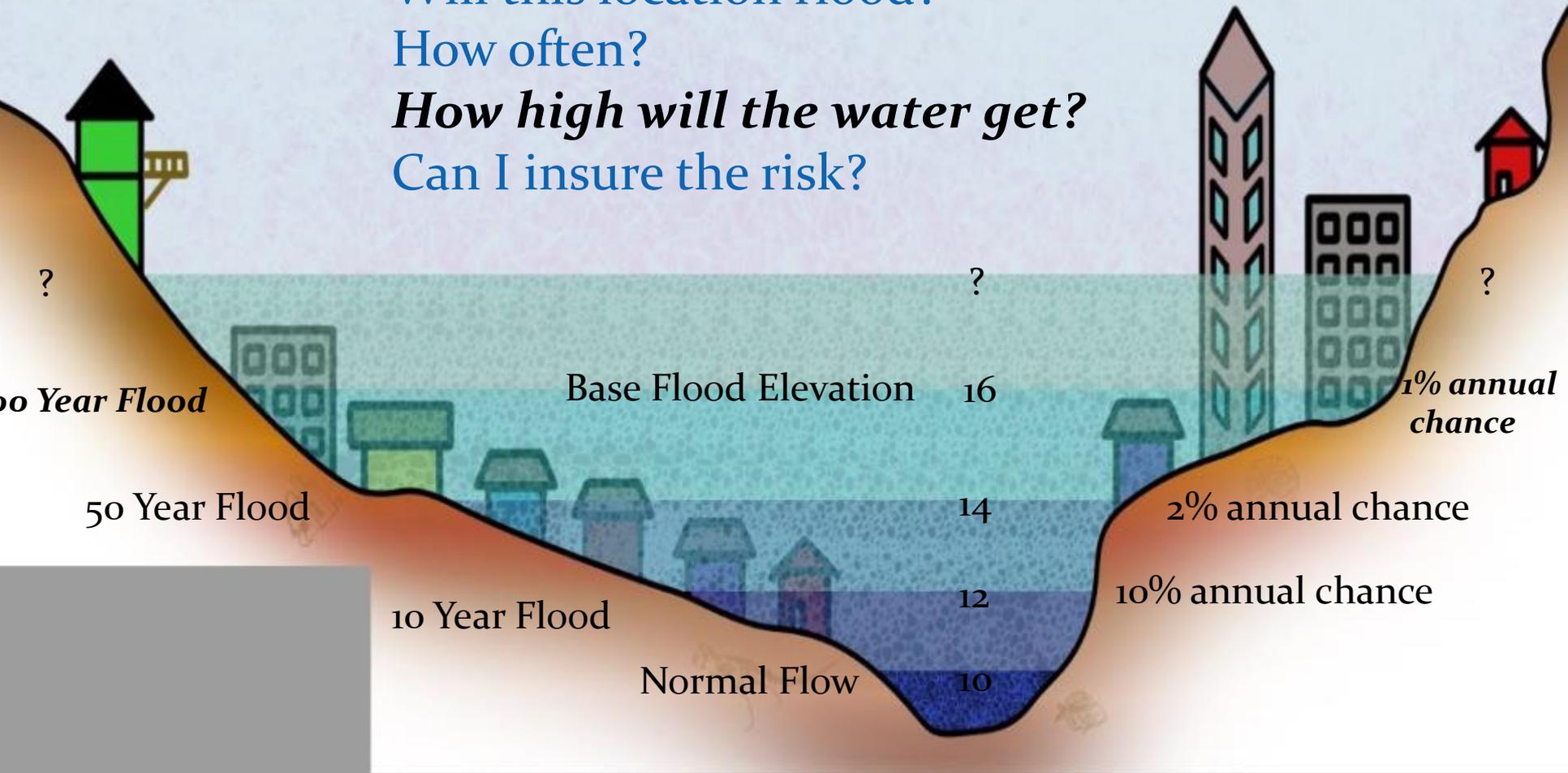
How high will the water get?

Can I insure the risk?



1% ANNUAL CHANCE FLOOD

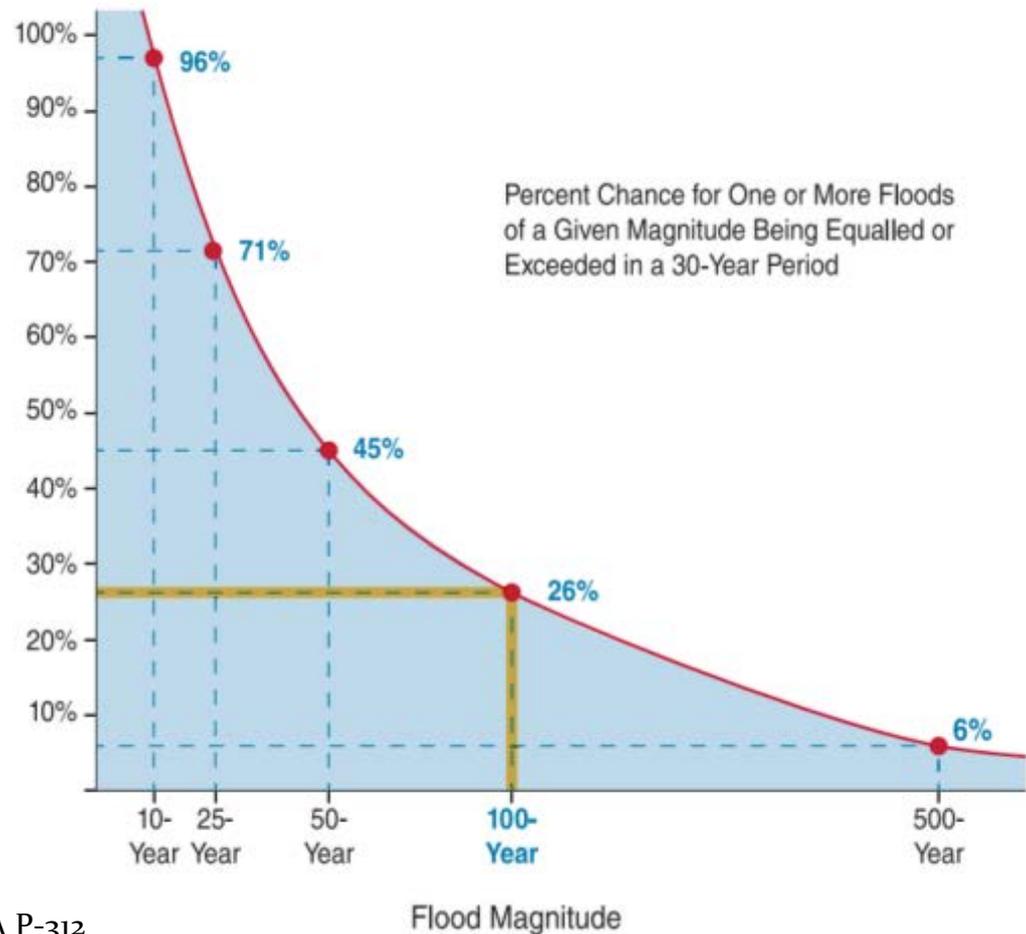
Will this location flood?
How often?
How high will the water get?
Can I insure the risk?



1% ANNUAL CHANCE FLOOD

Probability of Risk

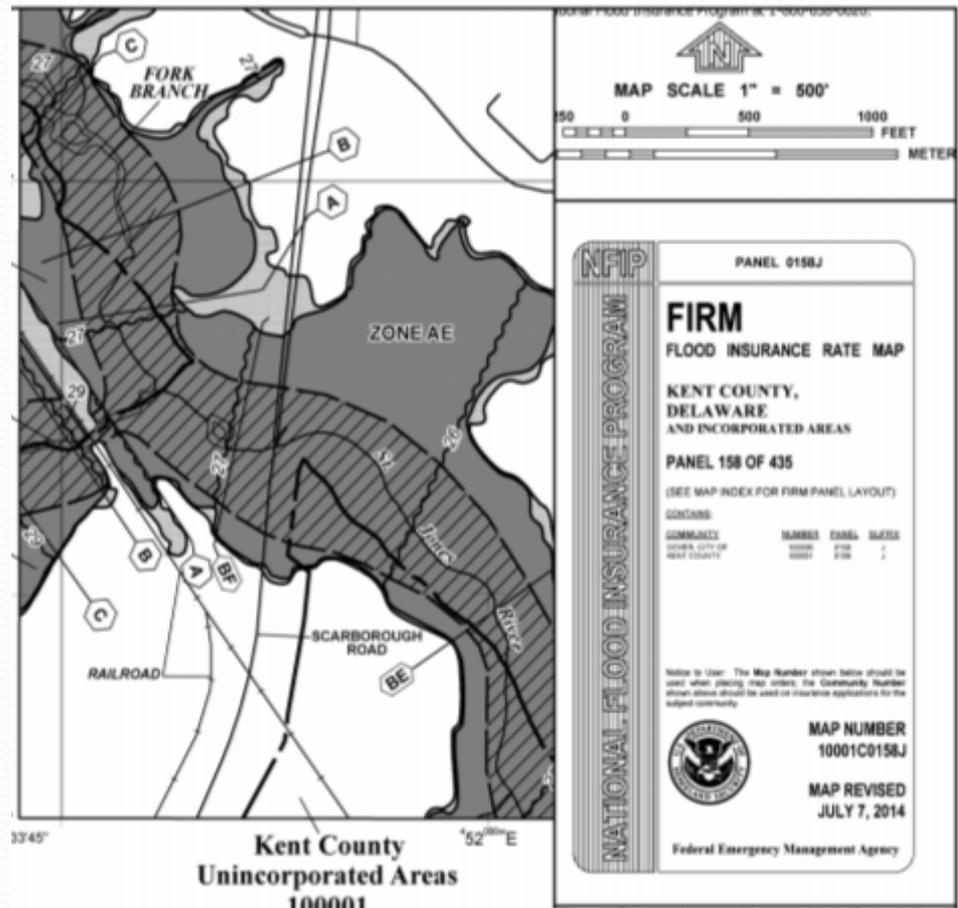
Figure 3-1. This graph shows the relationship between flood recurrence intervals and the probability of an event occurring within a 30-year period.



Homeowners Guide to Retrofitting FEMA P-312

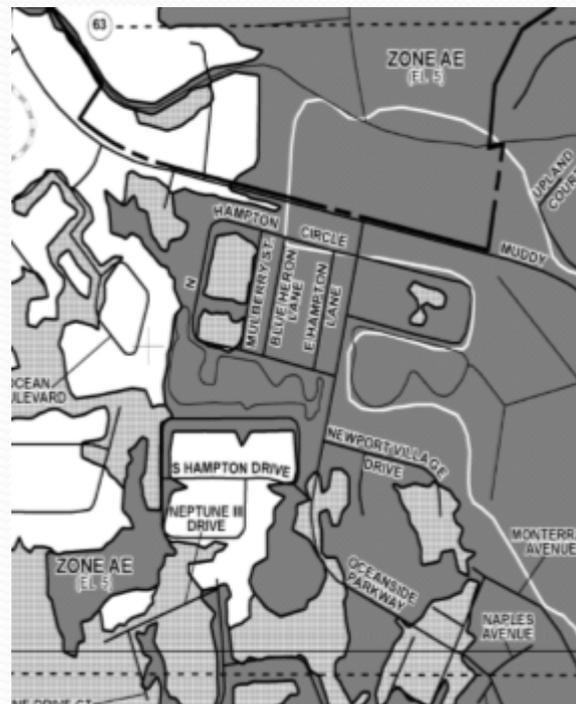
Know Your Flood Risk

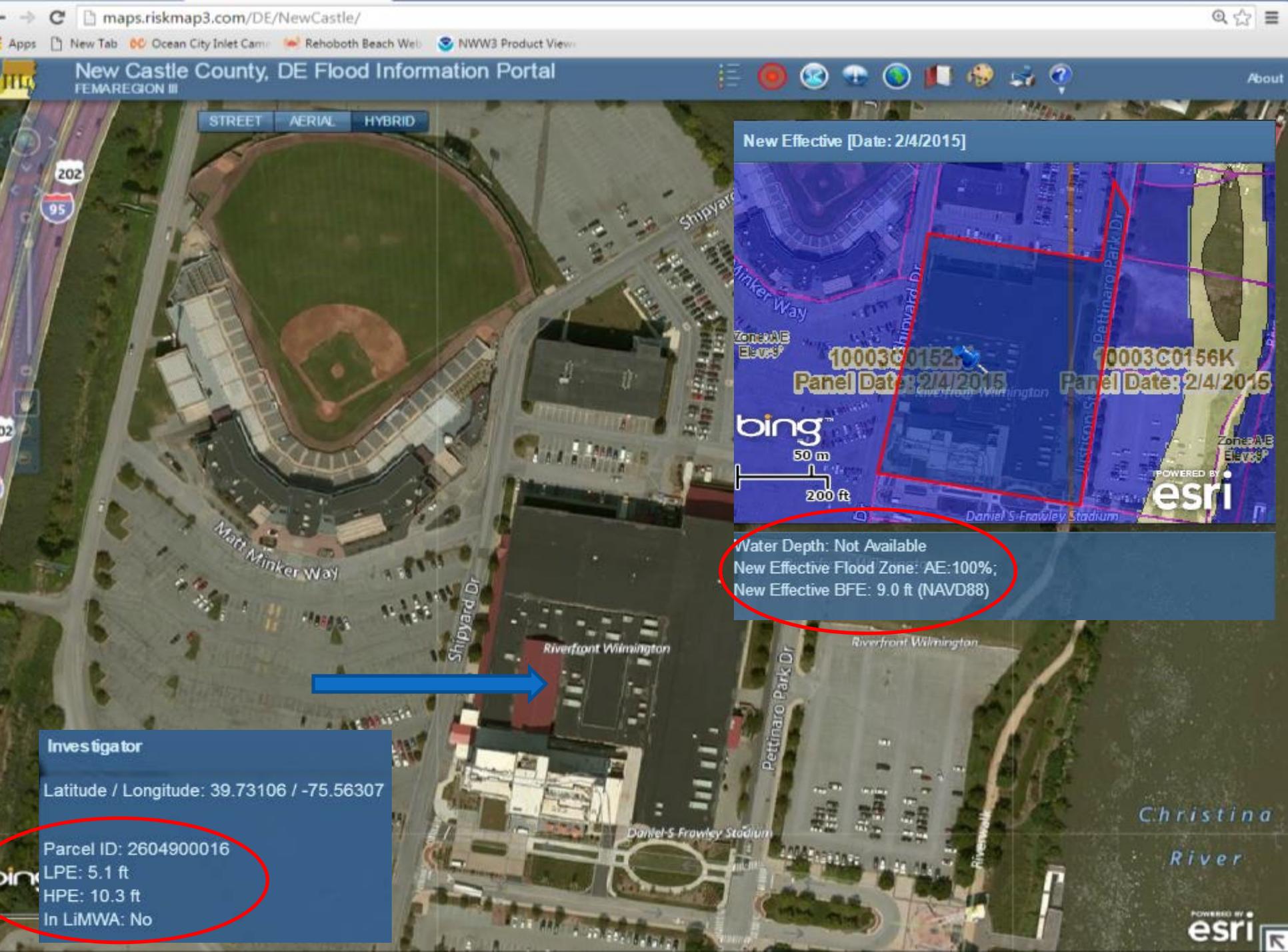
- FEMA Flood Insurance Rate Maps (FIRMs).
- FEMA Flood Insurance Study (FIS)



New FIRMs in Delaware

- New Castle County
 - February 4, 2015
- Kent County
 - July 7, 2014
- Sussex County
 - March 16, 2015





STREET AERIAL HYBRID

New Effective [Date: 2/4/2015]



Water Depth: Not Available
New Effective Flood Zone: AE:100%;
New Effective BFE: 9.0 ft (NAVD88)

Investigator

Latitude / Longitude: 39.73106 / -75.56307

Parcel ID: 2604900016

LPE: 5.1 ft

HPE: 10.3 ft

In LIMWA: No



Home

Delaware Flood Planning Tool

Overview

The Delaware Department of Natural Resources and Environmental Control (DNREC) Flood Tool is an interactive web map application. This tool is designed to aid you in researching your flood risk in the state of Delaware. It is designed to provide floodplain managers, insurance agents, developers, real estate agents, engineers, surveyors, local planners and citizens with an effective means by which to make informed decisions about the degree of flood risk for a specific area or property. Map features are connected to geospatial databases that may be queried by users in order to obtain pertinent information that may otherwise be difficult to obtain or relate to specific geographic locations, such as the Advisory Flood Height (AFH) for flood Zone A and downloadable HEC-RAS models.

The online tool is for use in administering the National Flood

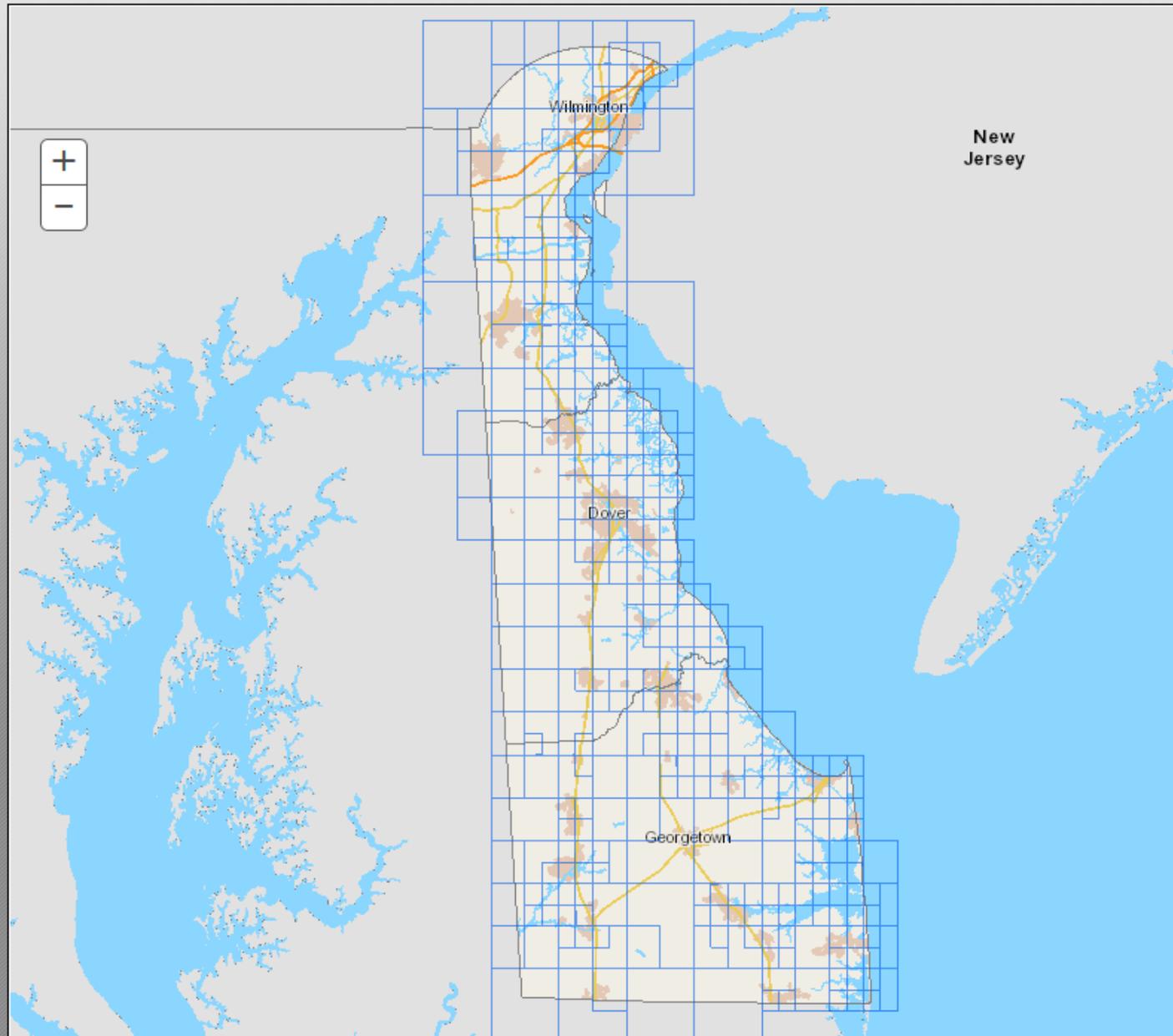
Search

Results

Table of Contents

Print

Help





Home

Search

Results

Table of Contents

Flood Insurance Rate Map

Base Flood Elevation

FIRM Panel

FEMA Flood Maps

- A
- AE
- AE, FLOODWAY
- VE
- X, 0.2 PCT ANNUAL CHANCE FLOOD HAZARD

Preliminary Flood Insurance Rate Map

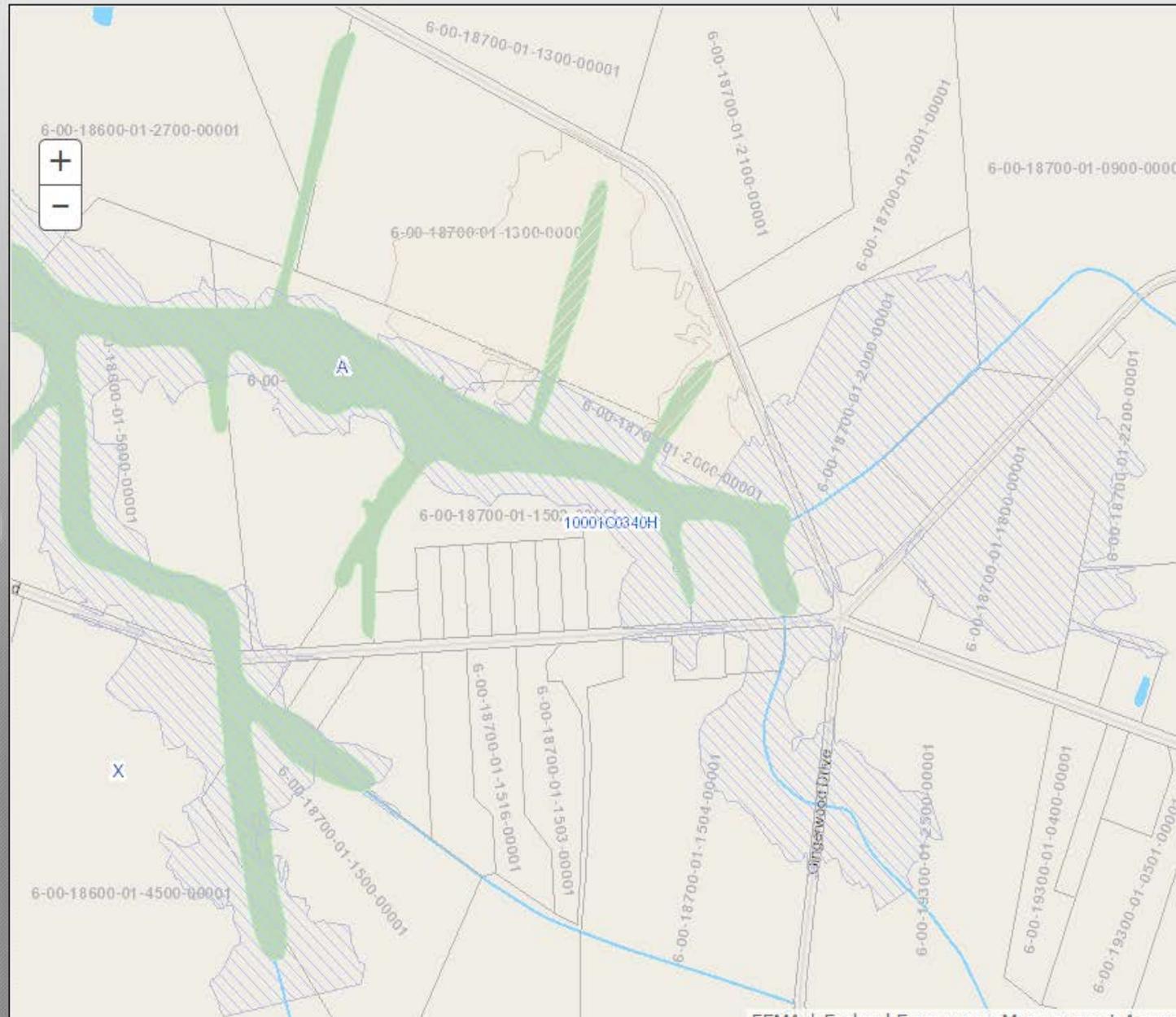
Preliminary Flood Hazard

Areas

- A
- AE
- AE, FLOODWAY
- VE
- 0.2 PCT ANNUAL CHANCE FLOOD HAZARD, <Null>

Print

Help





Home

Search

Results

Table of Contents

Flood Insurance Rate Map

Base Flood Elevation

FIRM Panel

FEMA Flood Maps

A

AE

AE, FLOODWAY

VE

X, 0.2 PCT ANNUAL

CHANCE FLOOD HAZARD

Preliminary Flood Insurance Rate Map

Preliminary Flood Hazard

Areas

A

AE

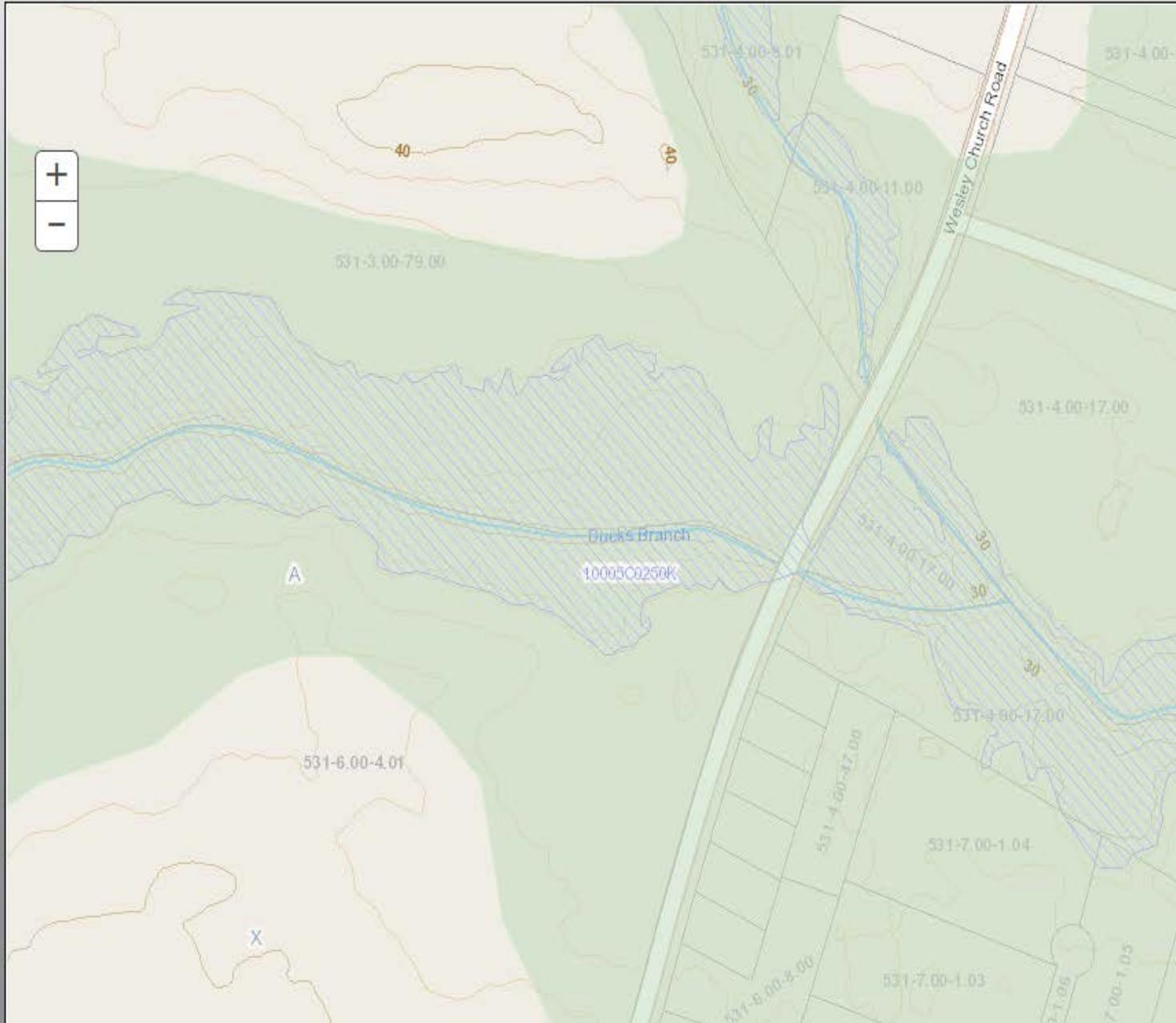
AE, FLOODWAY

VE

0.2 PCT ANNUAL

CHANCE FLOOD HAZARD,

<Null>





Home

Search

Results



Location is **REMOVED** from the FEMA 100-year floodplain in the Preliminary Map

Effective Flood Zone:

A

Preliminary Flood Zone:

X

FEMA Issued Flood Map:

10005C0250K

Effective Map Date:

3/15/2015

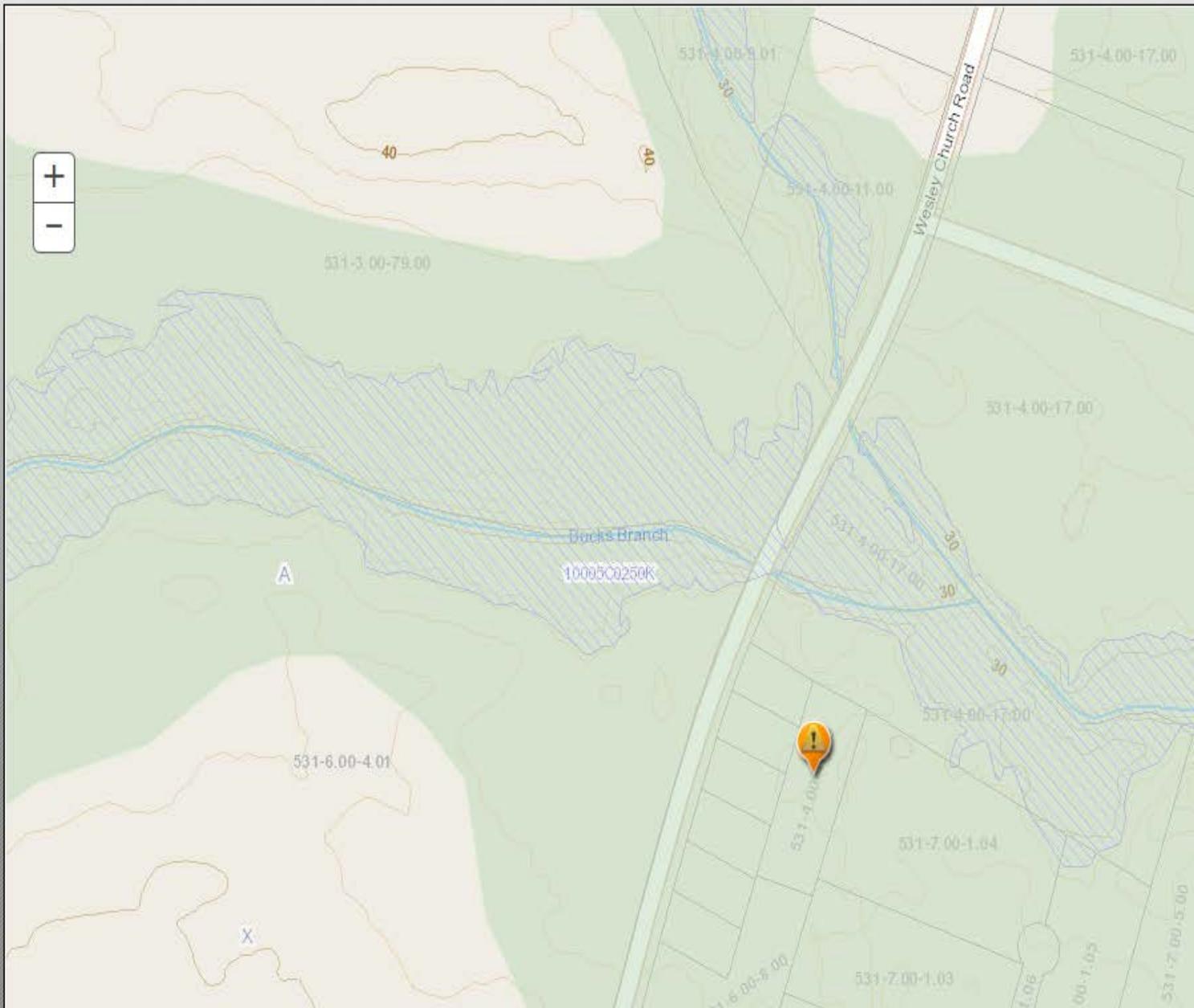
Watershed (HUC12):

Clear Brook-Nanticoke River

Effective Advisory Flood Height:

n/a

Contacts



Home

Search

Address, Stream or Parcel:

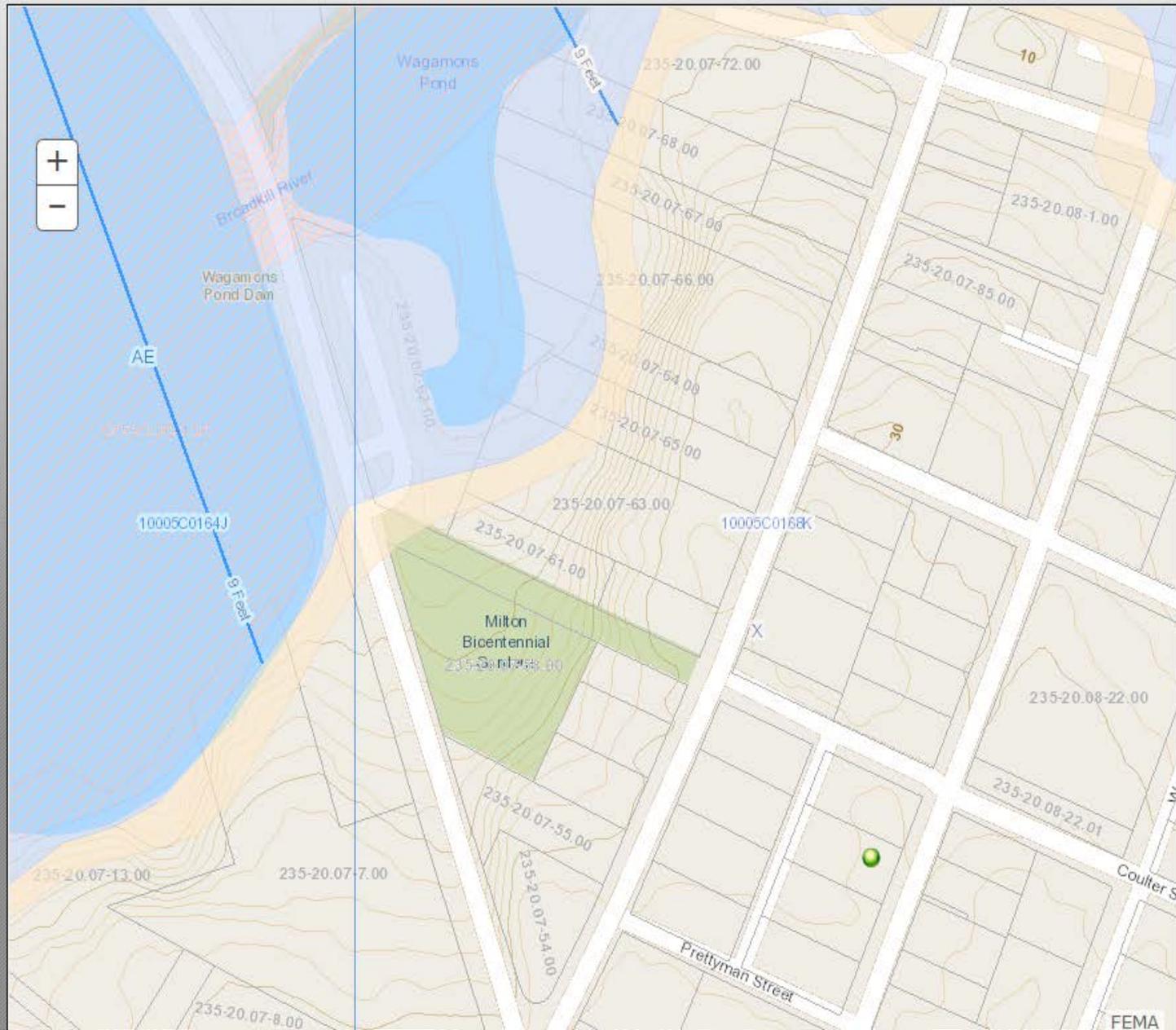
304 Chestnut St 19968

Results

Table of Contents

Print

Help



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- <http://fema.maps.arcgis.com/home/>

FEMA

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FEMA GeoPlatform

Providing geospatial data and analytics in support of emergency management

Hurricanes and Typhoons **Tornadoes** **Earthquakes** **Flooding**

FEMA USNG Viewer

FEMA's GeoPlatform Journal on work being done in response to the April, 2016 **Houston Area Flooding**
FEMA's GeoPlatform Journal on work being done in response to the March, 2016 **Texas and Louisiana Flooding**

FEMA is a partner of the FGDC's National Geospatial Platform Visit: www.geoplatform.gov

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Click on FEMA's NFHL

Flooding

The public facing group of FEMA gathered data relating to flooding. This grouping of data is curated by the Mapping and Analysis Center of FEMA.

Search maps

FEMA's National Flood Hazard Layer (Official)
Web Map by SMcAfee_FEMA. Last Modified Apr 21, 2016.
Data from Flood Insurance Rate Maps (FIRMs) where available nationally. Try <http://bit.ly/1bPpUjq> (Unofficial) if this map is down
★★★★☆ (6 ratings, 5 comments, 2,693,841 views) [🔗](#)

March 2016 Southern Flooding
Web Mapping Application by dante.terango_FEMA. Last Modified Mar 21, 2016.
★★★★☆ (1 rating, 397 views) [🔗](#)

FEMA's Hazus Average Annualized Loss Viewer
Web Map by casey.zuzak_FEMA. Last Modified Feb 1, 2016.
FEMA's Hazus Average Annualized Loss Viewer - Click on Counties to access Hazus Loss Estimation data
★★★★☆ (1 rating, 8,098 views) [🔗](#)

Central U.S. Flooding Geoframework Journal

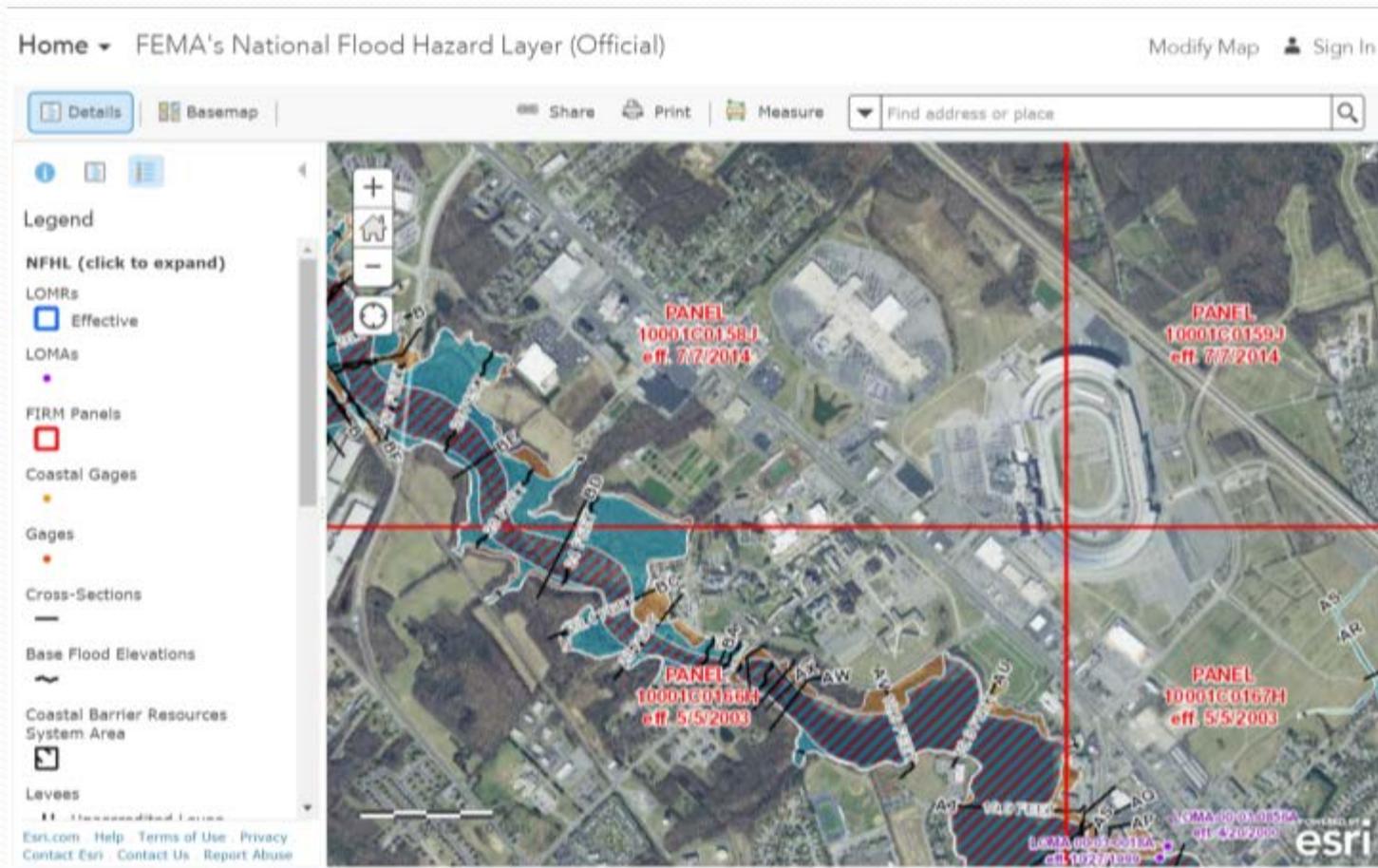
Show

- All Results
- Maps
- Layers
- Applications
- Tools
- Files

The public facing group of FEMA gathered data relating to flooding. This grouping of data is curated by the Mapping and Analysis Center of FEMA.

Thumbnail photo from Lous-Deluca of The Dallas Morning News via Associated Press on the Boston Globe's Big Picture Texas Flooding website.

View FEMA's ArcGIS Online



Details | Basemap | Share | Print | Measure |

Legend

NFHL (click to expand)

LOMRs

Effective

LOMAs

FIRM Panels

Coastal Gages

Gages

Cross-Sections

Base Flood Elevations

Coastal Barrier Resources System Area

Levees

Unaccredited Levees

The map displays an aerial view of a residential and commercial area. A large area on the left is shaded with red and blue diagonal lines, labeled "FLOODWAY Zone AF". Two adjacent areas are labeled "PANEL 10001C0166H eff. 5/5/2003" and "PANEL 10001C0167H eff. 5/5/2003". A large area on the right is labeled "AREA OF MINIMAL FLOOD HAZARD Zone X". A red vertical line is drawn across the map. A scale bar at the bottom left shows 0, 50, and 100 feet. The Esri logo is in the bottom right corner of the map area.

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Where to view floodplain maps

- <http://msc.fema.gov/portal>



FEMA Flood Map Service Center : Welcome!

Navigation

Search

Languages

MSC Home

MSC Search by Address

MSC Search All Products

MSC Products and Tools

Hazus

LOMC Batch Files

Product Availability

MSC Frequently Asked Questions (FAQs)

MSC Email Subscriptions

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Looking for a Flood Map?

Enter an address, a place, or longitude/latitude coordinates:

Enter an address, a place, or longitude/lat

Search



Looking for more than just a current flood map?

Visit [Search All Products](#) to access the full range of flood risk products for your community.

About Flood Map Service Center

The FEMA Flood Map Service Center (MSC) is the official public source for flood hazard information produced in support of the National Flood Insurance Program (NFIP). Use the MSC to find your official flood map, access a range of other flood hazard products, and take advantage of tools for better understanding flood risk.

View Historic, Effective, or Preliminary



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Navigation

Search

Languages

MSC Home

MSC Search by Address

MSC Search All Products

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LOMC Batch Files

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Choose one of the three search options below and optionally enter a posting date range.

Jurisdiction

State

DELAWARE ▼

County

SUSSEX COUNTY ▼

Community

LAUREL, TOWN OF ▼

Jurisdiction Name

Jurisdiction Name or FEMA ID

(Ex. Fairfax County-wide or 51059C)

Product ID

Product ID

(Ex. Panel Number, LOMC Case Number)

> [Filter By Posting Date Range \(Optional\)](#)

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Search Results for LAUREL, TOWN OF

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 Preliminary Products (41) 

▶ Preliminary FIRM Panels (35)

 DL ALL

▶ Preliminary FIS Reports (4)

 DL ALL

▶ Preliminary FIRM Database (2)

 Pending Product (0) 

 Historic Products (16) 

 Flood Risk Products (8) 

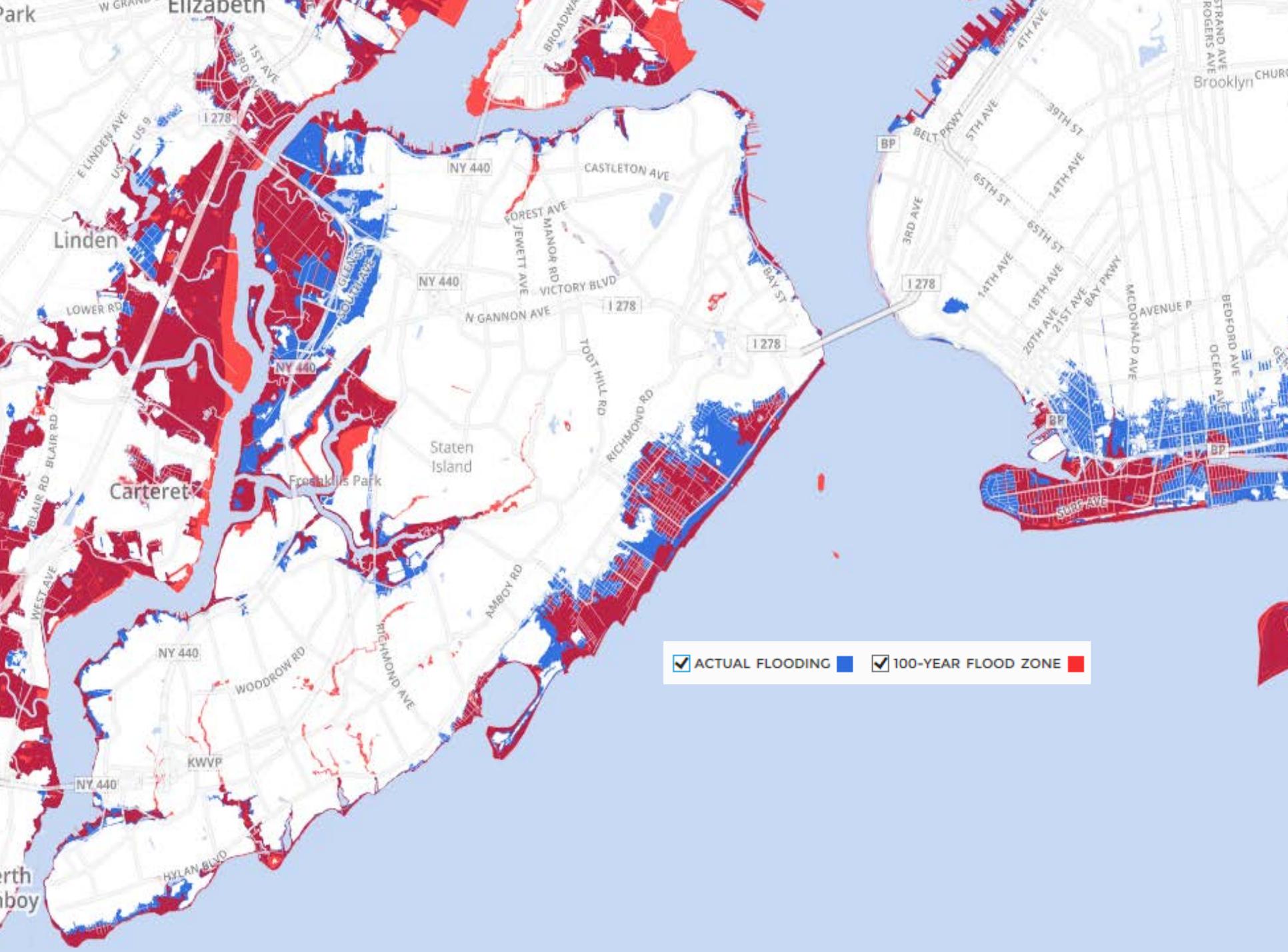
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 Official website of the Department of Homeland Security

Using FEMA flood maps as your sole source of flood risk information is like driving forward using only your rearview mirrors.





ACTUAL FLOODING 100-YEAR FLOOD ZONE

FEMA Flood Insurance Rate Maps limitations

- FIRM's show an analysis of flood scenario based on past events and data.
- Indicate areas of high, moderate, low risk.
- Future conditions are not taken into account.
- Margin of error in calculations.
- Mother nature is unpredictable.
- Conditions continuously change – one map will not suffice.

FIRMs do not account for the following:

- Shoreline erosion, wetland loss, subsidence, and relative sea level rise.
- Upland development or topographic changes.
- Degradation or settlement of levees and floodwalls.
- Changes in storm climatology (frequency and severity).
- The effects of multiple storm events.

Other considerations



- Few if any standards existing for development immediately adjacent to the floodplain or outside mapped floodplains.
- ~25% of flood damages nationally occur to structures which are outside a FEMA-mapped floodplain.



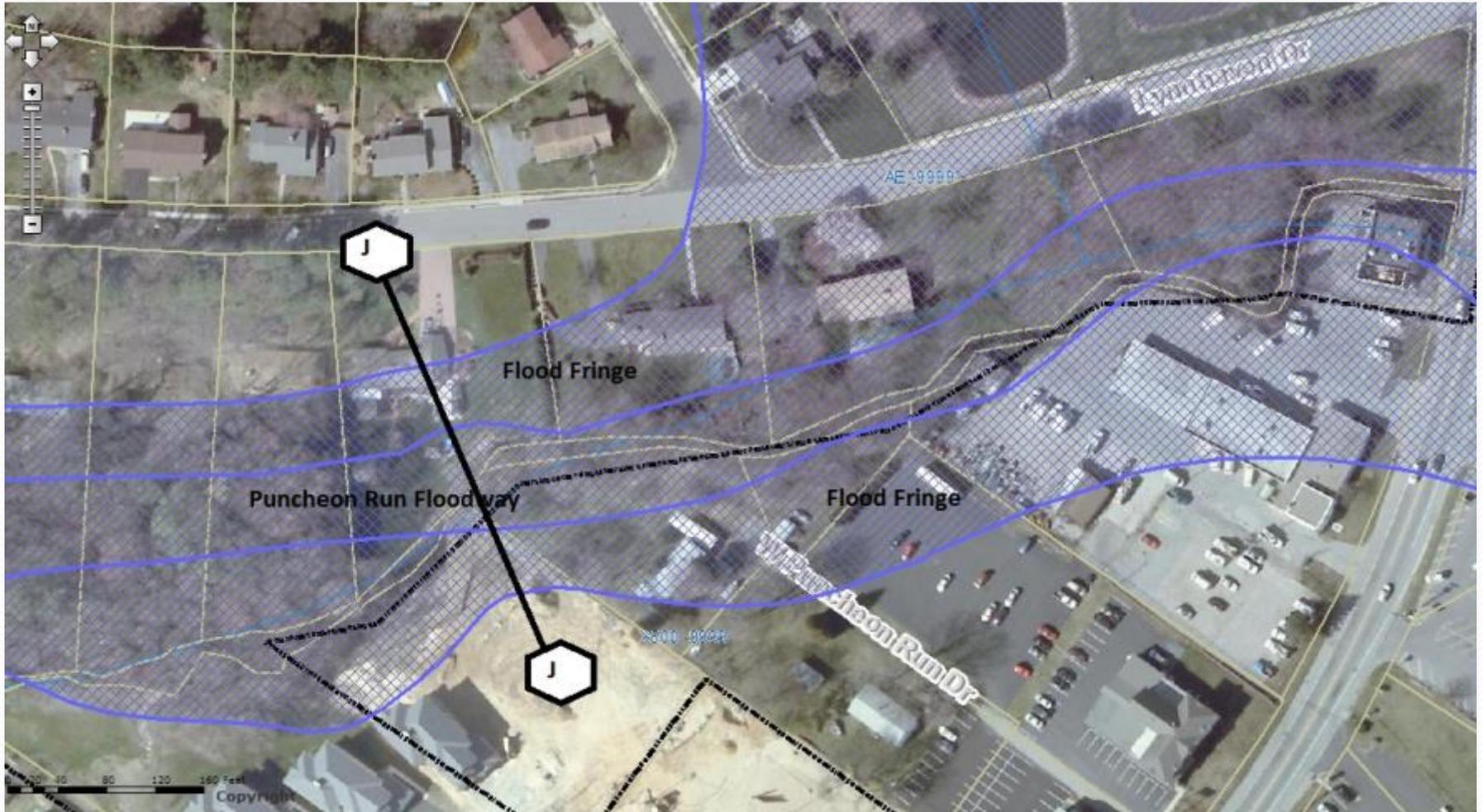
House with proposed basement under construction just outside the floodplain filled with groundwater.

Debris



Photo by G. Williams - Seaford 6/26/06

Encroachment



Puncheon Run

Floodway data table from FIS

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Brandywine Creek (Lower Reach)								
A	1.62 ¹	447	6,132	4.3	13.6	13.6	14.6	1.0
B	2.31 ¹	168	2,689	9.7	15.5	15.5	16.5	1.0
C	2.94 ¹	230	3,292	8.0	27.1	27.1	27.3	0.2
D	3.40 ¹	142	2,122	12.3	38.3	38.3	39.3	1.0
Chestnut Run								
A	665 ²	190	661	3.0	76.8	76.8	77.6	0.8
B	1,865 ²	162	299	6.7	82.7	82.7	82.7	0.0
C	3,020 ²	121	548	3.6	89.4	89.4	90.4	1.0
D	4,550 ²	81	291	6.9	96.6	96.6	96.7	0.1
Christina River								
A	14,855 ³	616	6,636	4.0	8.8	8.3 ⁴	8.3	0.0
B	18,970 ³	345	3,999	6.7	9.6	9.6	9.6	0.0
C	33,490 ³	1,299	12,579	0.8	12.9	12.9	13.9	1.0
D	39,545 ³	1,275	11,743	0.9	13.3	13.3	14.2	0.9
E	43,300 ³	685	7,482	1.3	13.5	13.5	14.5	1.0
F	45,710 ³	825	9,460	1.0	13.8	13.8	14.7	0.9
G	48,870 ³	700	7,542	1.3	14.1	14.1	15.0	0.9
H	52,165 ³	775	9,248	1.0	14.5	14.5	15.4	0.9
I	56,750 ³	587	6,787	1.4	15.6	15.6	16.4	0.8
J	58,500 ³	753	9,130	1.0	15.7	15.7	16.4	0.7
K	61,700 ³	672	5,291	1.7	16.6	16.6	17.1	0.5
L	63,850 ³	868	5,714	1.6	17.0	17.0	17.5	0.5
M	66,990 ³	700	5,665	1.6	17.8	17.8	18.2	0.4

¹Miles above confluence with Christina River

²Feet above confluence with Little Mill Creek

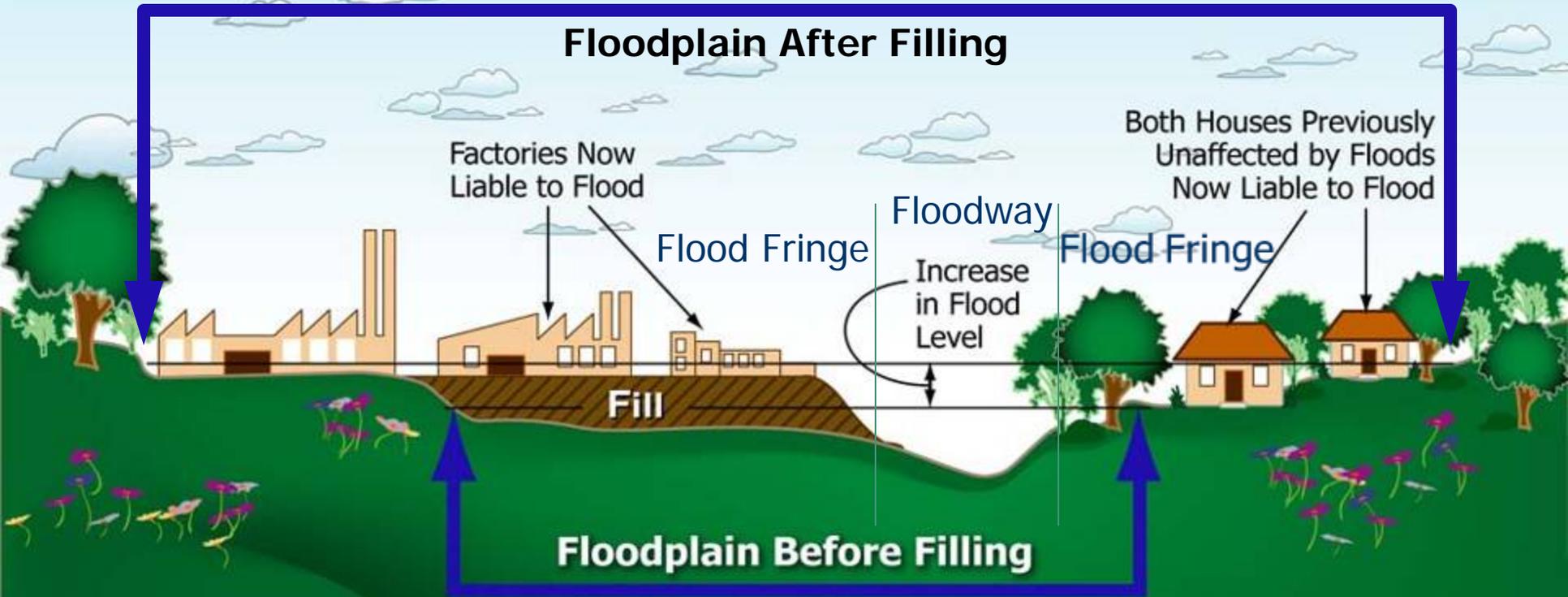
³Feet above the City of Wilmington corporate limits

⁴Elevation computed without consideration of backwater effects from Delaware River

**BASE FLOOD
WATER SURFACE ELEVATION
(FEET NAVD)**

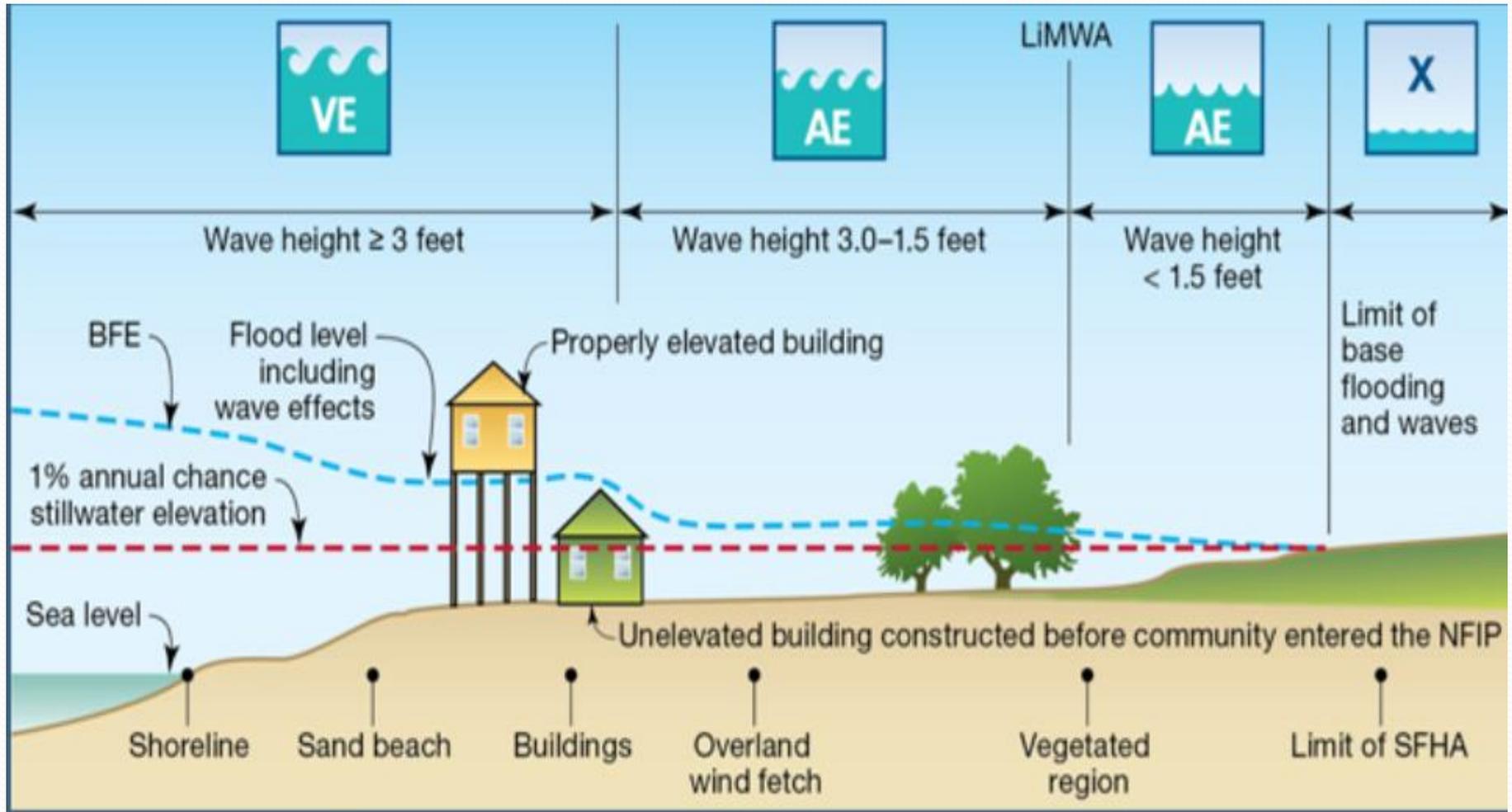
REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
13.6	13.6	14.6	1.0
15.5	15.5	16.5	1.0
27.1	27.1	27.3	0.2
38.3	38.3	39.3	1.0
76.8	76.8	77.6	0.8
82.7	82.7	82.7	0.0
89.4	89.4	90.4	1.0
96.6	96.6	96.7	0.1

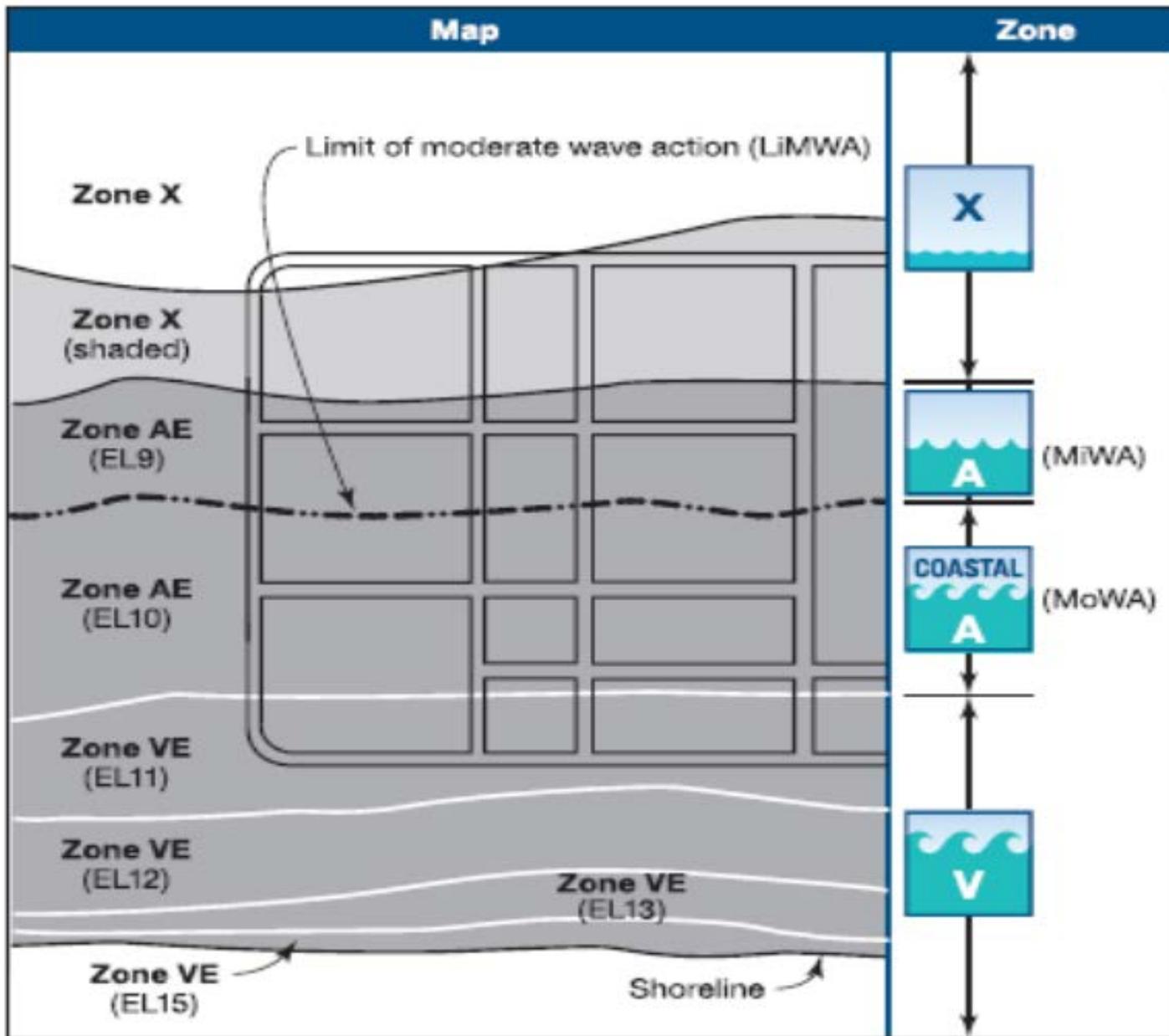
Today's Floodplain Is Not Necessarily Tomorrow's Floodplain



If large areas of the floodplain are filled, then there will be an increase in the land area needed to store flood waters. This means your home or business may be impacted.

Changing coast





Coastal Const.
Manual

Erosion



Broadkill Beach 10/31/12

Multiple events



Photo by T. Pratt 11/8/12

Oceanfront dune providing protection prior to winter storms.



Loss of oceanfront dune protection following winter storms.



FEMA Federal Regulations

- 44 CFR 59 & 60 - minimums
- Participation in the NFIP requires adoption of at least minimum floodplain management regulations.
 - Community has ability to adopt higher standards.
 - CRS program rewards adoption of higher standards.

Reducing Risk - Higher standards

- 40 of 46 communities chose to adopt some level of freeboard in their new floodplain ordinances.

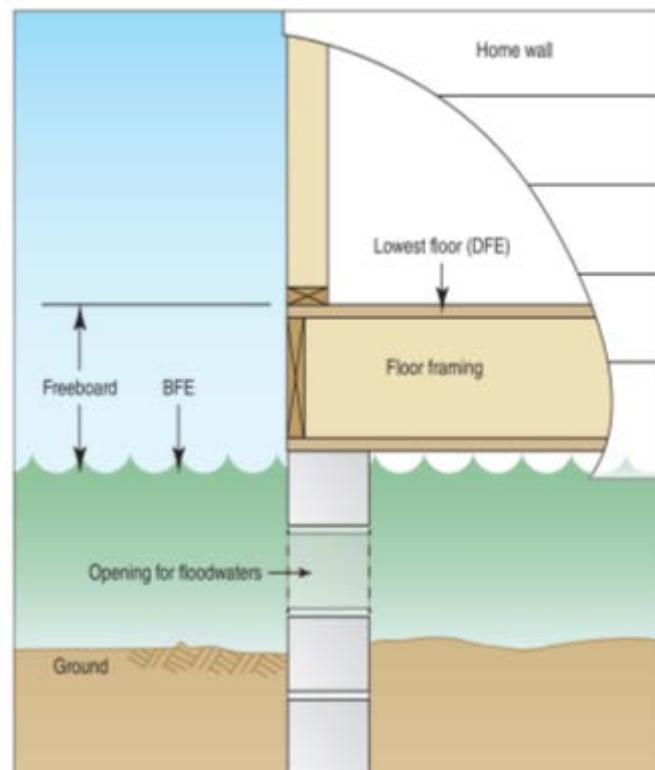


Figure 5-1. As shown in the cutaway view, the lowest floor is above the flood level. When at least 1 foot of freeboard is provided, only the foundation is exposed to flooding.

Homeowners Guide to Retrofitting FEMA P-312



Lowest floor
several feet below
BFE - damaged
beyond repair



Lowest floor
several feet above
BFE - no damage



Floodplain issues

- Development in Areas Without Sufficient Floodplain Mapping and Flood Data
- Inadequate Building Standards
- Inconsistent and / or Minimum Code Provisions
- Lack of Enforcement of Existing Standards
- Real Estate Disclosure form

Improved Floodplain Regulations and Enforcement



Benefits:

- Lowers the cost of flood insurance.
- Avoiding NFIP probation ensures continued insurance availability.
- Reduce flood damage and expensive drainage solutions.

Flood Insurance issues

- Biggert-Waters Flood Insurance Reform Act of 2012
- Homeowner Flood Insurance Affordability Act of 2014
- NFIP reauthorized until September 2017.

www.Floodsmart.gov



Call toll free: 1-888-379-9531 or have us call you

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FLOODING & FLOOD RISKS

ABOUT THE NATIONAL FLOOD INSURANCE PROGRAM

RESIDENTIAL COVERAGE

COMMERCIAL COVERAGE

POLICYHOLDER RESOURCES

PREPARATION & RECOVERY

RESOURCES

- > Agent Site
- > Agent Locator
- > Community Rating System
- > Community Resources
- > File Your Claim
- > Frequently Asked Questions
- > Glossary
- > Flood Facts
- > Media Resources
- > Toolkits
- > Email Updates

LATEST NEWS

Learn what to do **during** and **after** a flood and how to **file a flood insurance claim**.

When does your state focus on flood safety? Find out **here**.

Hurricane Season Has Started. Are You Ready?

LEARN MORE



Texas Flooding Hurricane Season Protect What Matters Recent Changes New Flood Maps



GET COVERAGE WITH A LOW-COST POLICY



WHAT COULD FLOODING COST ME?

One-Step Flood Risk Profile

HOW CAN I GET COVERED?

- Rate your risk
- Estimate your premiums
- Find an agent

Address:

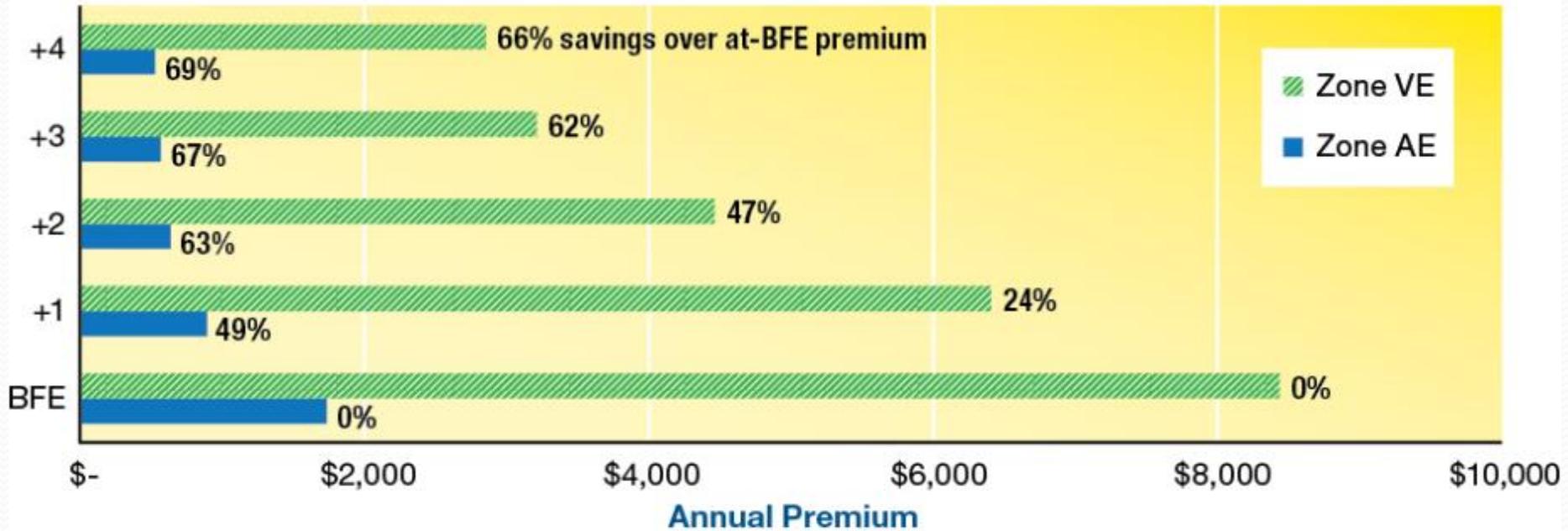
City:

State: State/Territory ▼

Zip code:



Lowest Floor Elevation Relative to BFE



Note: Annual premiums calculated using the *NFIP Flood Insurance Manual*, October 3, 2013, for a one-story single-family home with no basement, no enclosure, and full replacement coverage. Premiums are based on the maximum available coverage of building coverage of \$250,000 for building and \$100,000 for contents coverage. Zone V building is assumed to be free of obstructions.

If your property is in a floodplain, how you build has a huge effect on the cost of flood insurance

**PREMIUM AT 4 FEET BELOW
BASE FLOOD ELEVATION**

\$9,500/year
\$95,000/10 years



**PREMIUM AT
BASE FLOOD ELEVATION**

\$1,410/year
\$14,100/10 years



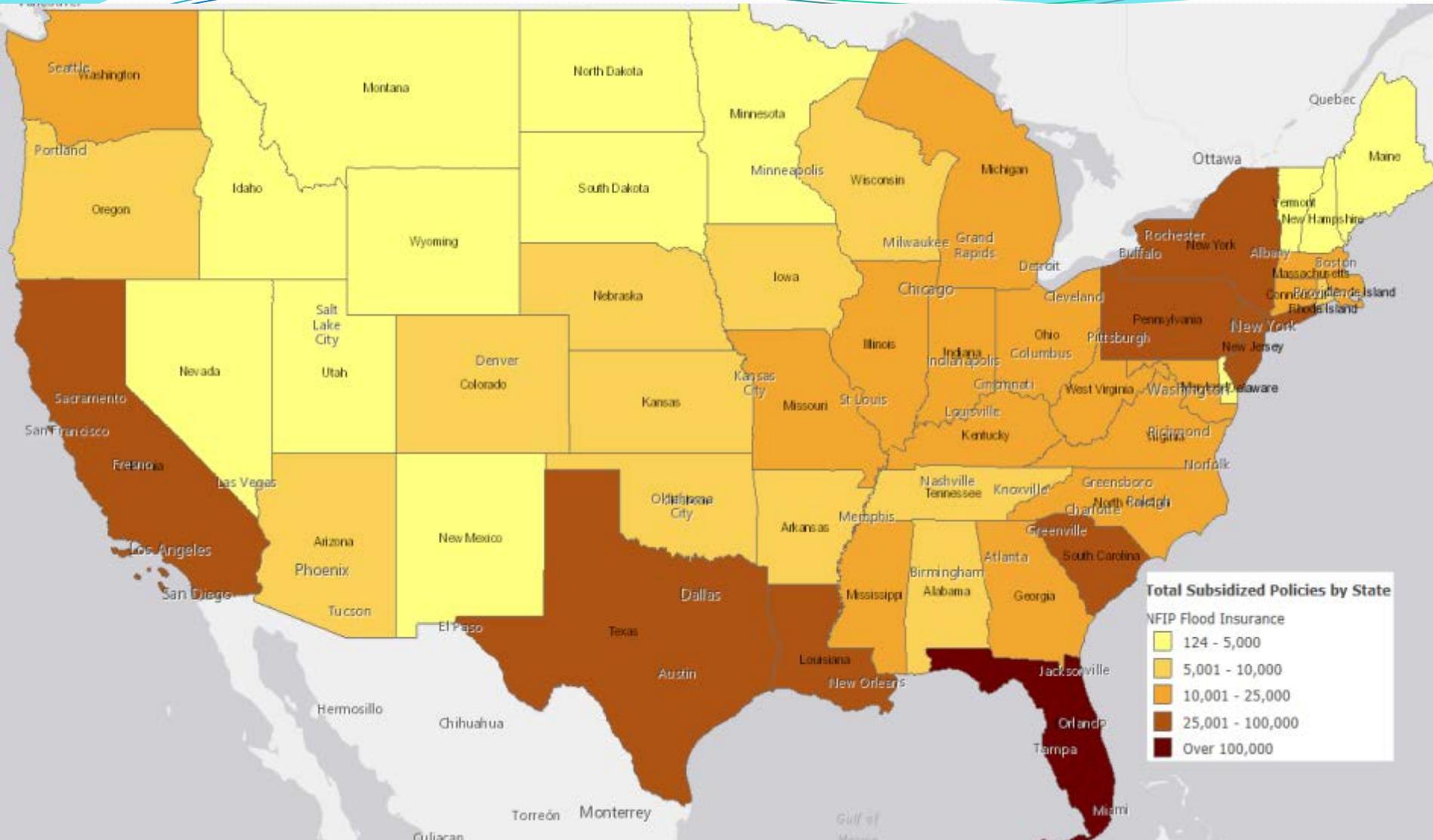
**PREMIUM AT 3 FEET ABOVE
BASE FLOOD ELEVATION**

\$427/year
\$4,270/10 years



The National Flood Insurance Program is not currently financially solvent

They do not charge enough to pay expected claims in major events



Avoid practices that benefit one property at the expense of another





Severe Floods in
2008 and 2009











Welcome to
**MAIN STREET
PARK**

HISTORIC
HOWARD BEACH
EST.

**“Floods are an act of God,
but flood losses are largely
an act of man.”**

-Gilbert F. White

Summary

- Educate residents on their risk.
- Flood insurance alone is not the solution.
- Buildings with floors 18 inches above the base flood elevation are far less likely to be damaged.
- Discourage fill in the flood fringe, prohibit in floodway.
- Locate critical facilities outside of high risk areas.
- Generally discourage development in the floodplain.

Questions?

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Greg Williams, CFM

Gregory.Williams@state.de.us

302-739-9921