

Water, Water, Everywhere – what can we do?

*Presented by Dr. Christopher Obropta
from Rutgers University*



Thursday, September 19, 2024

Rutgers Cooperative Extension

Rutgers Cooperative Extension (RCE) helps the diverse population of New Jersey adapt to a rapidly changing society and improves their lives through an educational process that uses science-based knowledge.





Water Resources Program



Our mission is to identify and address water resources issues by engaging and empowering communities to employ practical science-based solutions to help create a more equitable and sustainable New Jersey.

Community Rating System (CRS)

- The Community Rating System (CRS) is a national program developed by the Federal Emergency Management Agency (FEMA).
- The National Flood Insurance Program (NFIP) provides federally backed flood insurance within communities that enact and enforce floodplain regulations.
- Under the Community Rating System (CRS), communities can be rewarded for doing more than simply regulating construction of new buildings to the minimum national standards.

Community Rating System (CRS)

- Under the CRS, the flood insurance premiums of a community's residents and businesses are discounted to reflect that community's work to reduce flood damage to existing buildings, manage development in areas not mapped by the NFIP, protect new buildings beyond the minimum NFIP protection level, preserve and/or restore natural functions of floodplains, help insurance agents obtain flood data, and help people obtain flood insurance.
- The goals of the NFIP are to provide flood insurance to property owners, to encourage flood loss reduction activities by communities, and to save taxpayers' money. As a part of the NFIP, the CRS provides both incentives and tools to further these goals.



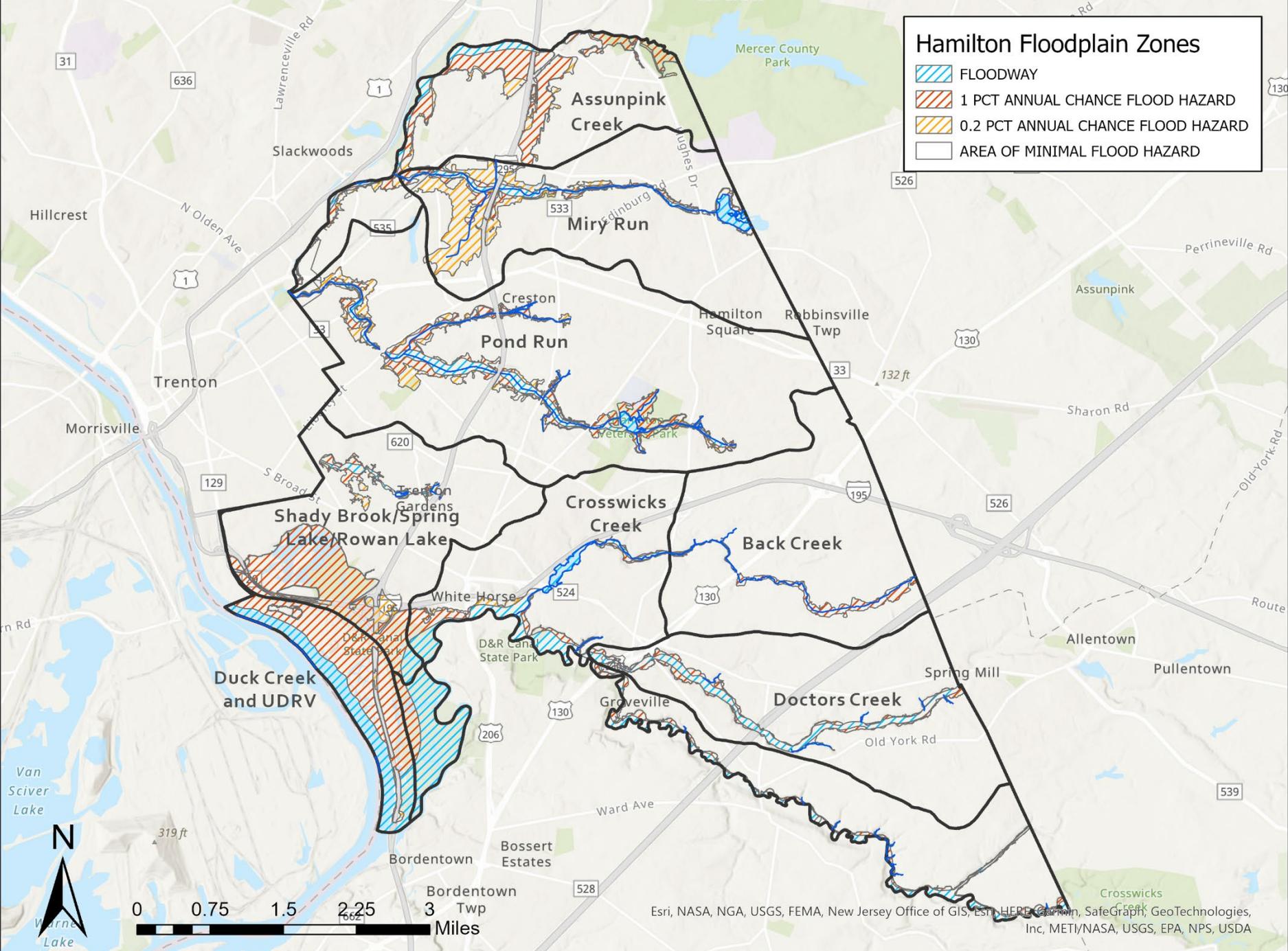
Sweet Briar Ave at Whitehead Road

04.16.2007



Hamilton Floodplain Zones

-  FLOODWAY
-  1 PCT ANNUAL CHANCE FLOOD HAZARD
-  0.2 PCT ANNUAL CHANCE FLOOD HAZARD
-  AREA OF MINIMAL FLOOD HAZARD

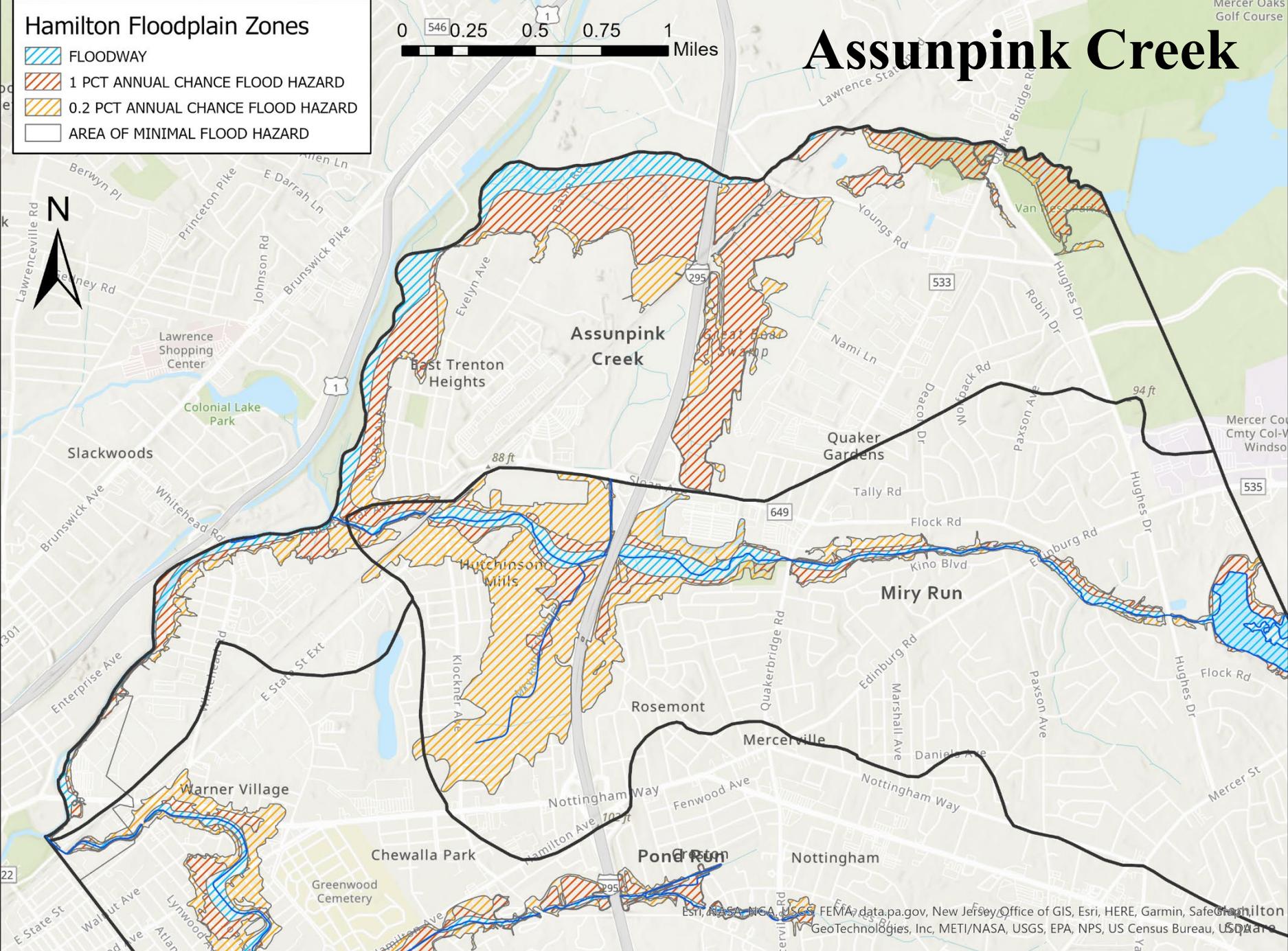


Hamilton Floodplain Zones

-  FLOODWAY
-  1 PCT ANNUAL CHANCE FLOOD HAZARD
-  0.2 PCT ANNUAL CHANCE FLOOD HAZARD
-  AREA OF MINIMAL FLOOD HAZARD

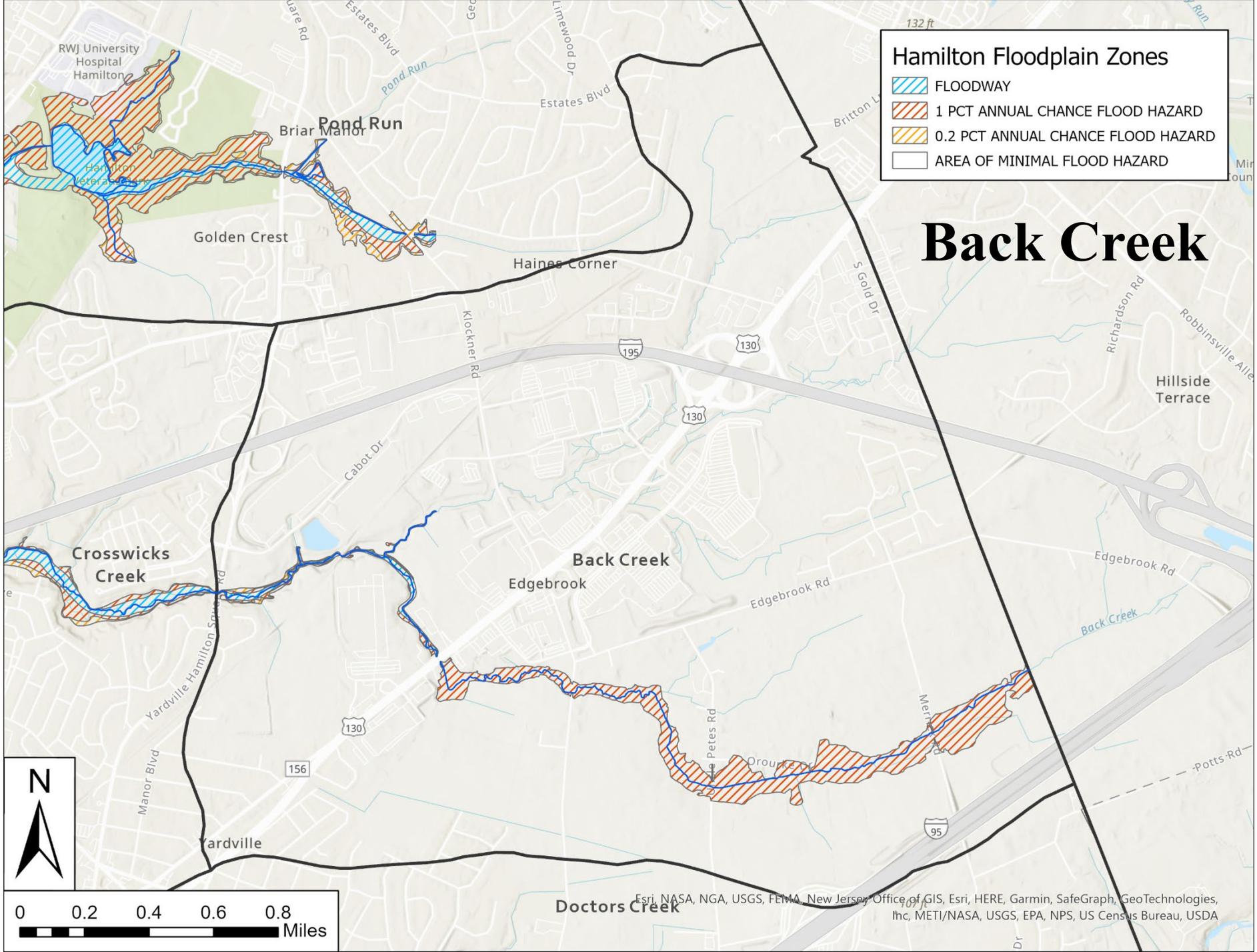


Assunpink Creek



Esri, NASA, NGA, USGS, FEMA, data.pa.gov, New Jersey Office of GIS, Esri, HERE, Garmin, SafePoint, Hamilton GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, US State

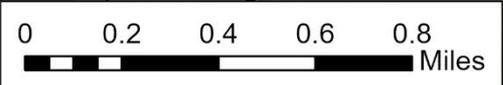
“Don’t enter a flooded building until it’s been cleared by an inspector.”



Hamilton Floodplain Zones

-  FLOODWAY
-  1 PCT ANNUAL CHANCE FLOOD HAZARD
-  0.2 PCT ANNUAL CHANCE FLOOD HAZARD
-  AREA OF MINIMAL FLOOD HAZARD

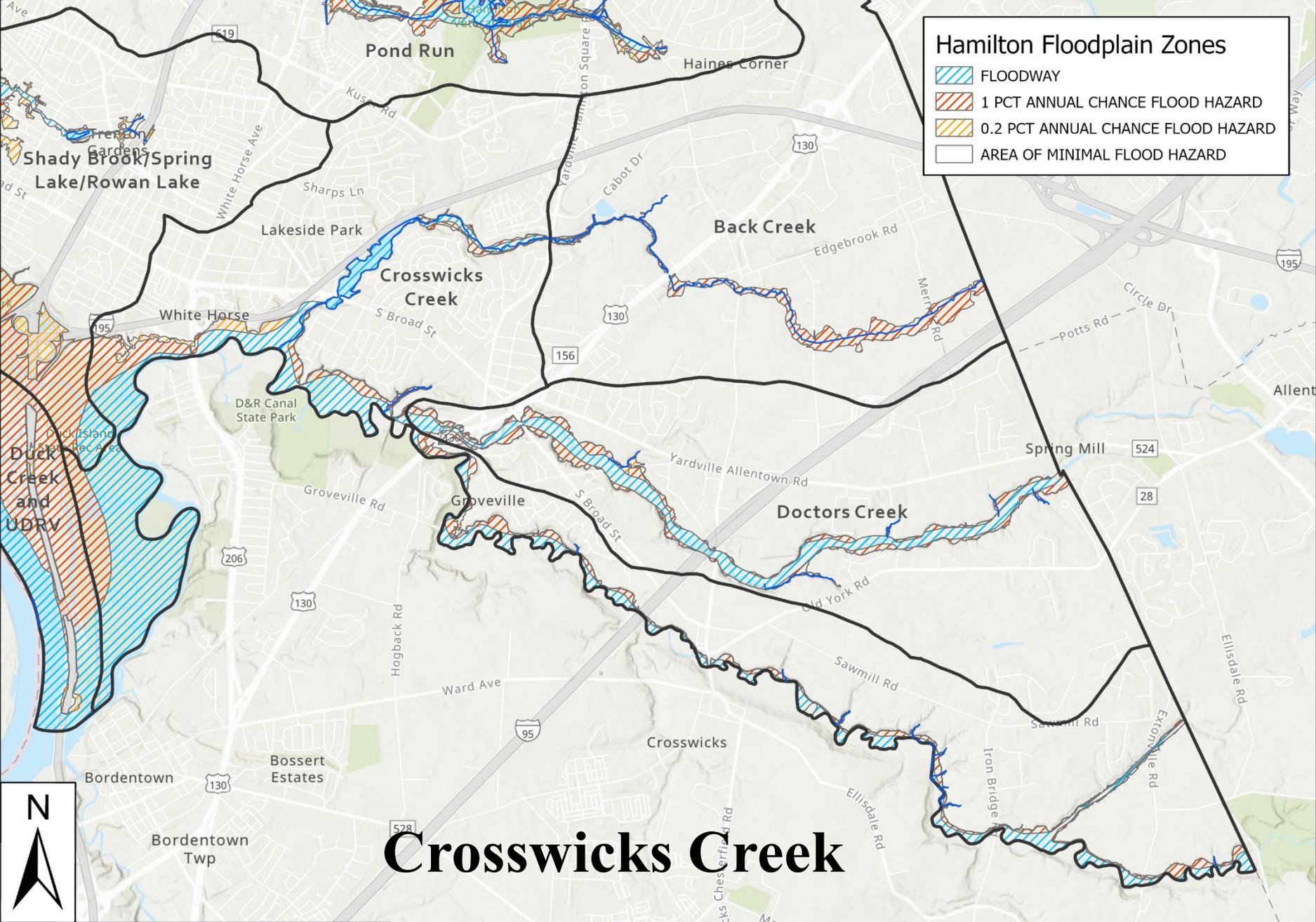
Back Creek



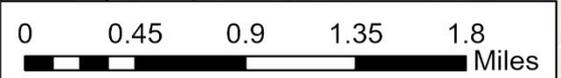
“If your water heater or furnace needs to be replaced, put the new one in a spot above the flood level, so you won’t have to replace it after the next flood.”

Hamilton Floodplain Zones

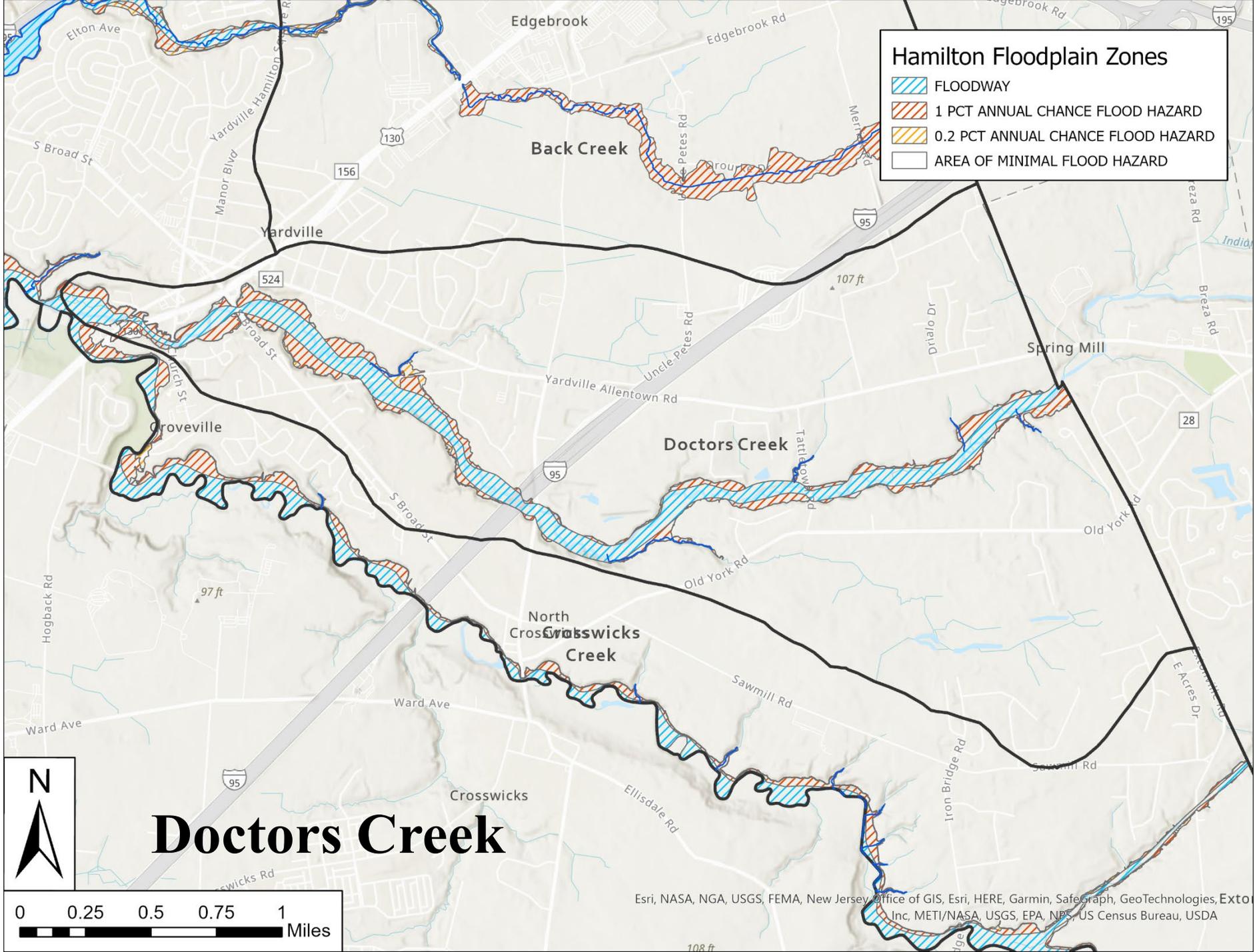
-  FLOODWAY
-  1 PCT ANNUAL CHANCE FLOOD HAZARD
-  0.2 PCT ANNUAL CHANCE FLOOD HAZARD
-  AREA OF MINIMAL FLOOD HAZARD



Crosswicks Creek



**“Get a building permit before
you start your repairs.”**

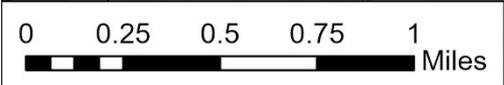
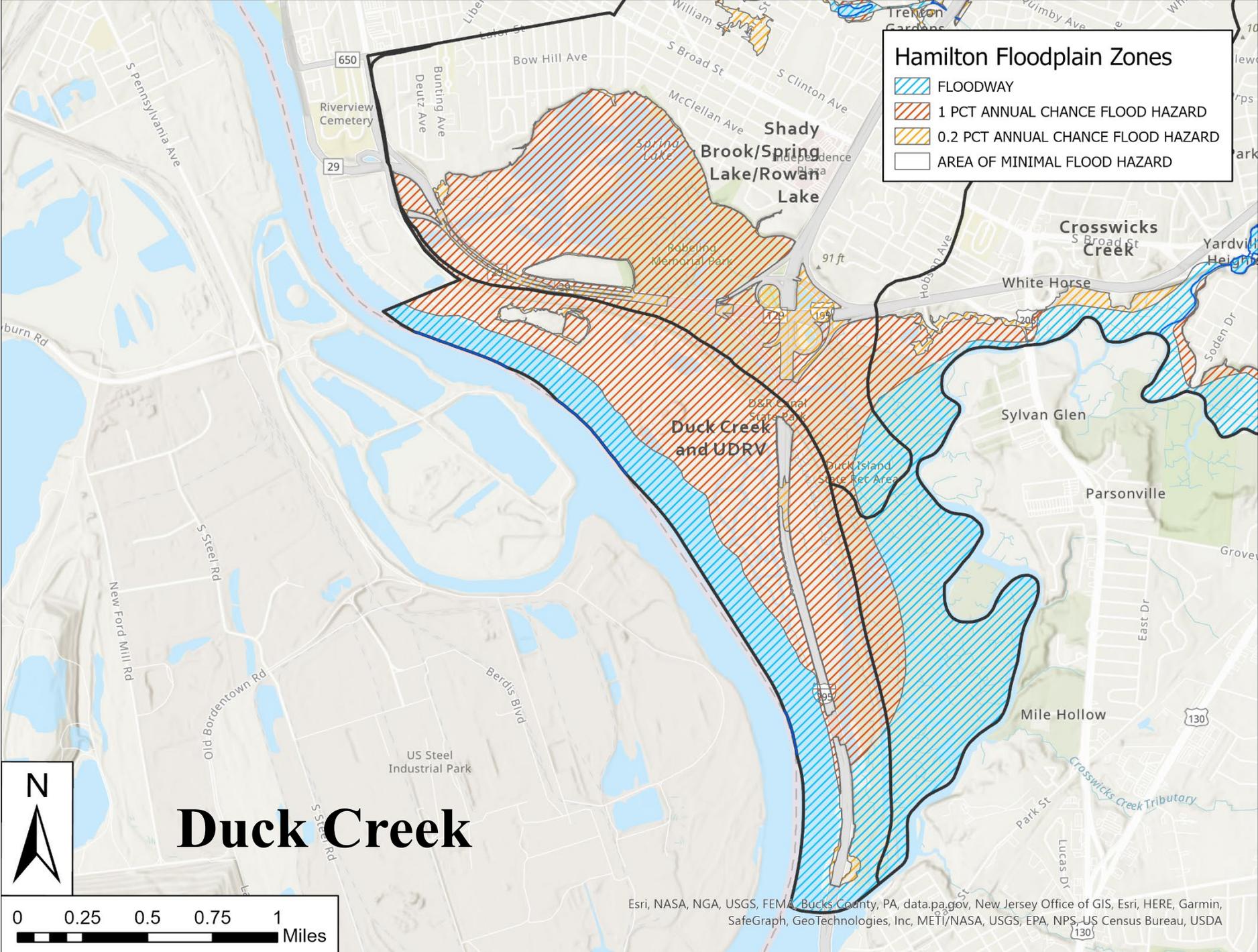


Hamilton Floodplain Zones

-  FLOODWAY
-  1 PCT ANNUAL CHANCE FLOOD HAZARD
-  0.2 PCT ANNUAL CHANCE FLOOD HAZARD
-  AREA OF MINIMAL FLOOD HAZARD

Doctors Creek

**“If the street is under water,
turn Around Don’t Drown.”**



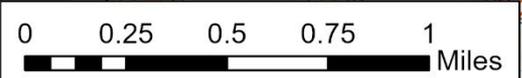
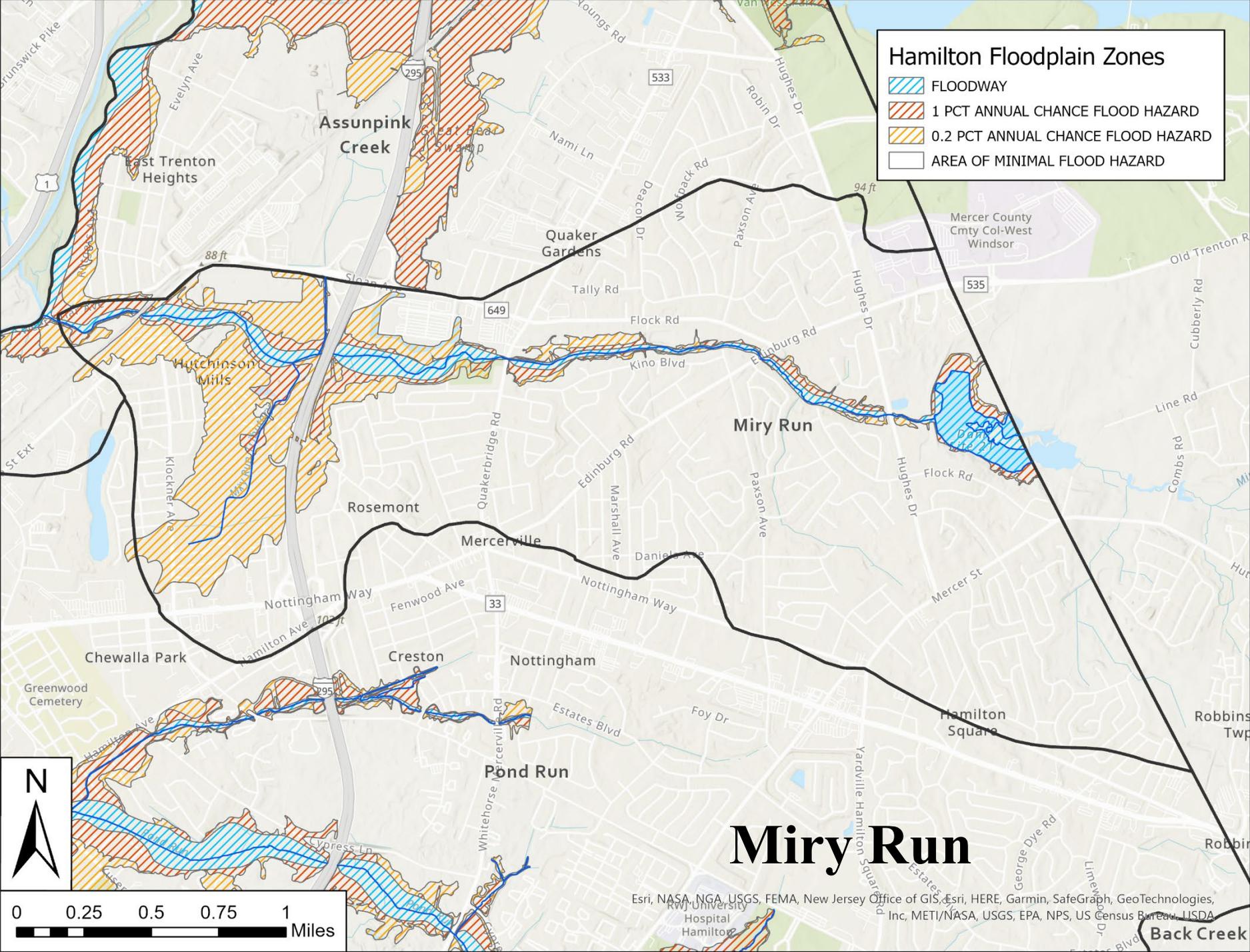
Duck Creek

Esri, NASA, NGA, USGS, FEMA, Bucks County, PA, data.pa.gov, New Jersey Office of GIS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

**“Know your evacuation
route”**

Hamilton Floodplain Zones

-  FLOODWAY
-  1 PCT ANNUAL CHANCE FLOOD HAZARD
-  0.2 PCT ANNUAL CHANCE FLOOD HAZARD
-  AREA OF MINIMAL FLOOD HAZARD

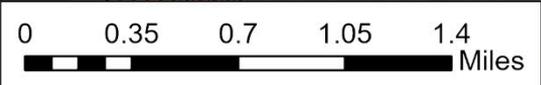
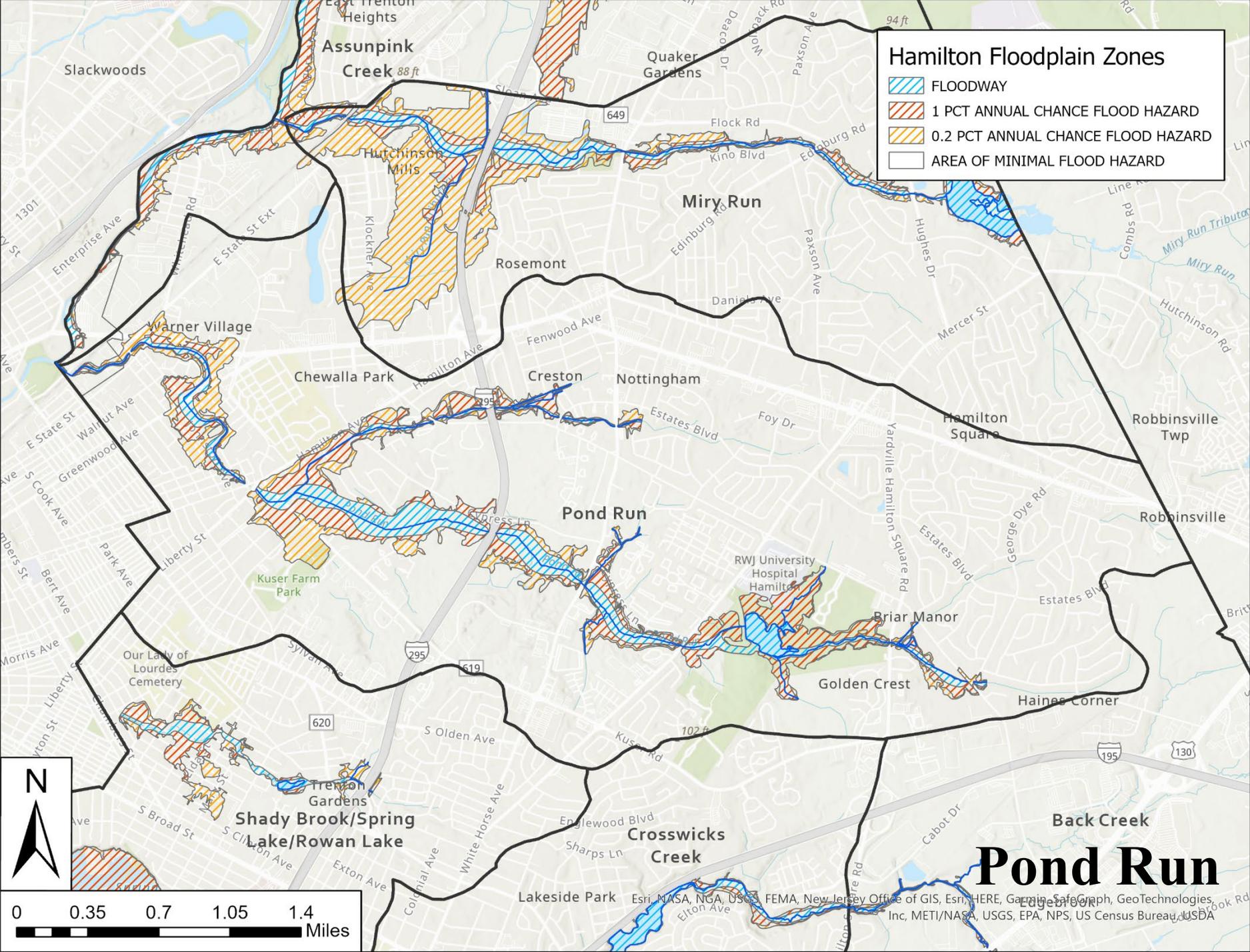


Miry Run

**“Know where the evacuation
shelters are”**

Hamilton Floodplain Zones

-  FLOODWAY
-  1 PCT ANNUAL CHANCE FLOOD HAZARD
-  0.2 PCT ANNUAL CHANCE FLOOD HAZARD
-  AREA OF MINIMAL FLOOD HAZARD



Pond Run

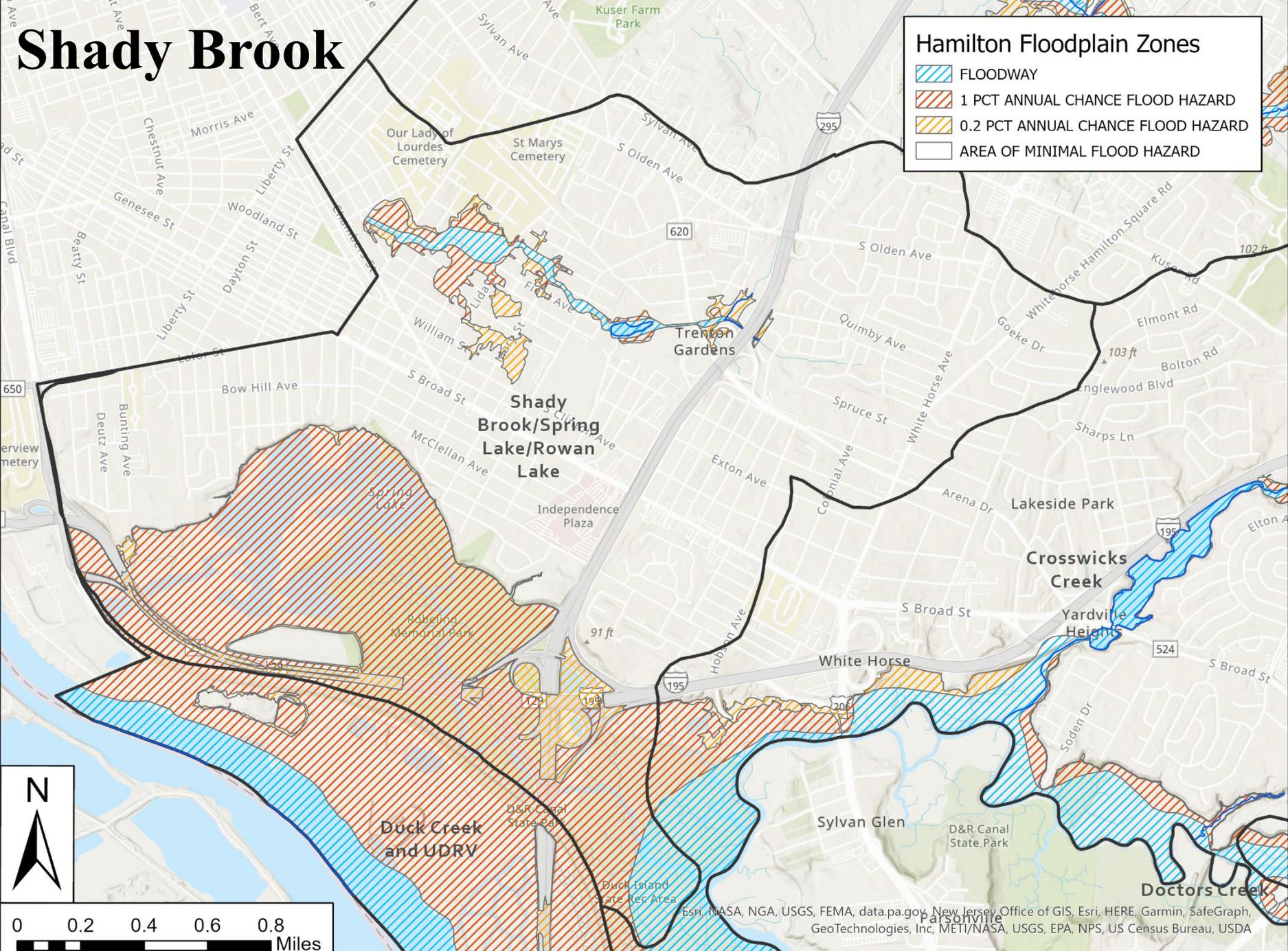
Esri, NASA, NGA, USGS, FEMA, New Jersey Office of GIS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

**“DON’T operate a generator
indoors or in a closed
space.”**

Shady Brook

Hamilton Floodplain Zones

-  FLOODWAY
-  1 PCT ANNUAL CHANCE FLOOD HAZARD
-  0.2 PCT ANNUAL CHANCE FLOOD HAZARD
-  AREA OF MINIMAL FLOOD HAZARD



**“DON’T operate a generator
near doors, windows, fans,
or vents.”**

Basement Flooding



Don't go down into the water

- Flood water is mixed in with storm water, could be sanitary sewer mixture, could be oils from the street.
- There's so many contaminants in the runoff water that you wouldn't want anyone touching it unless they're wearing the proper protective gear to protect themselves.

Electric Panel

- If the main circuit panel is under water the next step is to not touch anything in the house and to get out of the house and call 911 or a reputable contractor to assess the situation.

Be Prepared

- Get a sump pumps and shop vac
- Install a French drain to help capture and divert water to sump pumps
- Consider a backup generator
- Know the location of your electric panel and what breakers control basement outlets
- Know the location of your gas meter.
- Unplug any powered items that may become submerged
- After the event contact your insurance company, take lots of pictures and document everything.

Drainage Problems from Smaller Storms

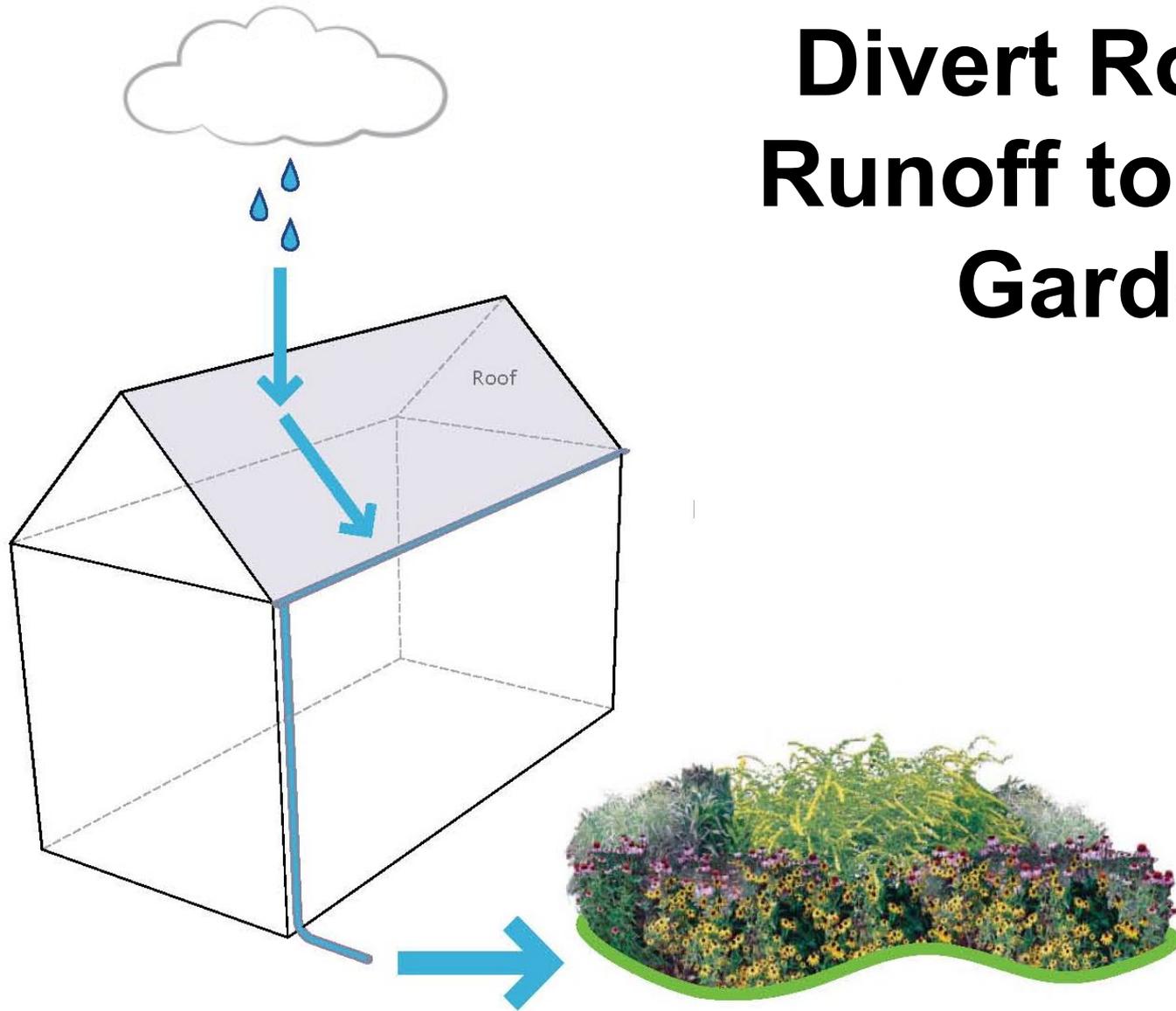
- Direct rainwater away from the house
- Keep inlets clean
- Divert rooftop runoff to a rain garden
- Install a rain barrel to harvest the rainwater
- Consider a permeable driveway



**Keep
inlets
clean**



Divert Rooftop Runoff to a Rain Garden



Rain Gardens

A rain garden is a landscaped, shallow depression that is designed to capture, treat, and infiltrate stormwater at the source before it becomes runoff.



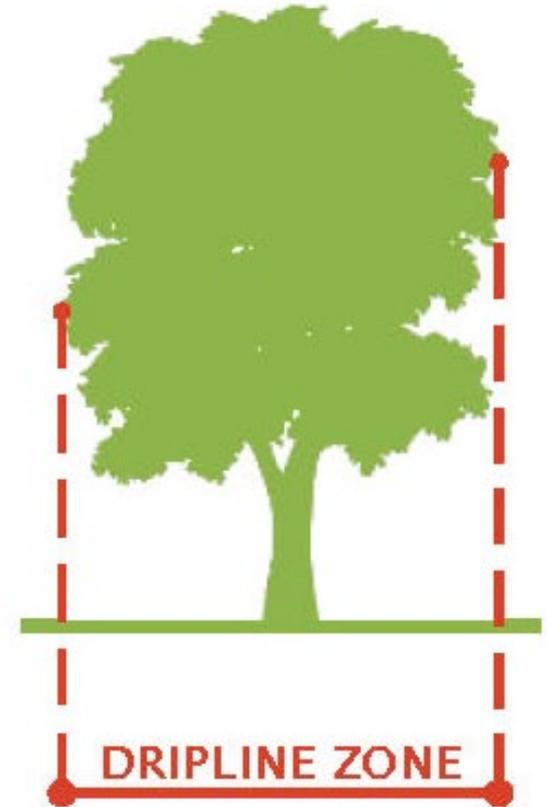
Rain Gardens

- Landscaped areas that treat stormwater runoff
- Designed to merge two important goals: aesthetics and water quality
- Can be blended into the landscape and made to look natural
- Water is directed into them by pipes, swales, or curb openings

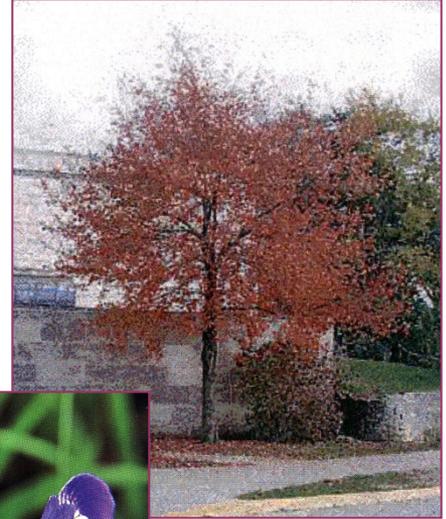
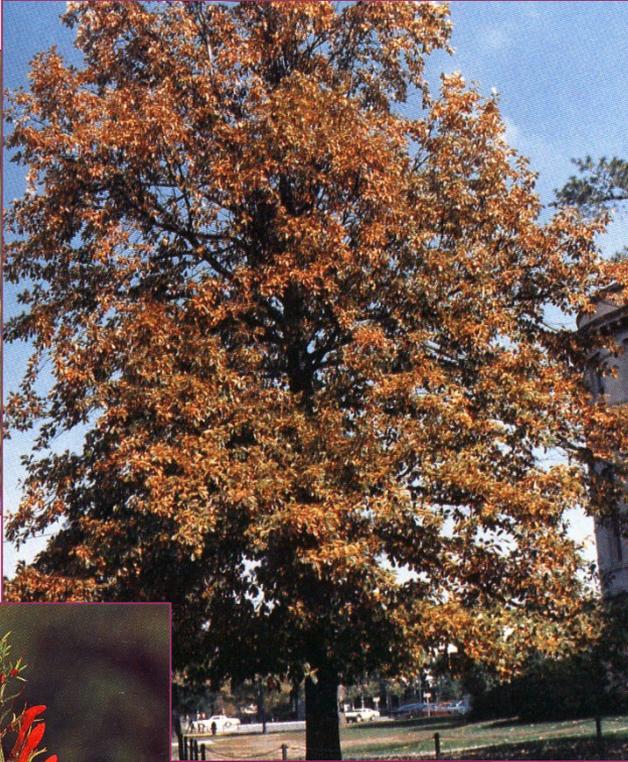


Site Selection

1. Next to a building with a basement, rain garden should be located at a minimum of 10' from building; no basement, 2' from building
2. Do not place rain garden within 25' of a septic system
3. Do not situate rain garden in soggy places where water already ponds
4. Avoid seasonably-high water tables within 2' of rain garden depth
5. Consider flat areas first – easier digging
6. Avoid placing rain garden within dripline of trees



Native Vegetation





8 2 2004



8 2 2004







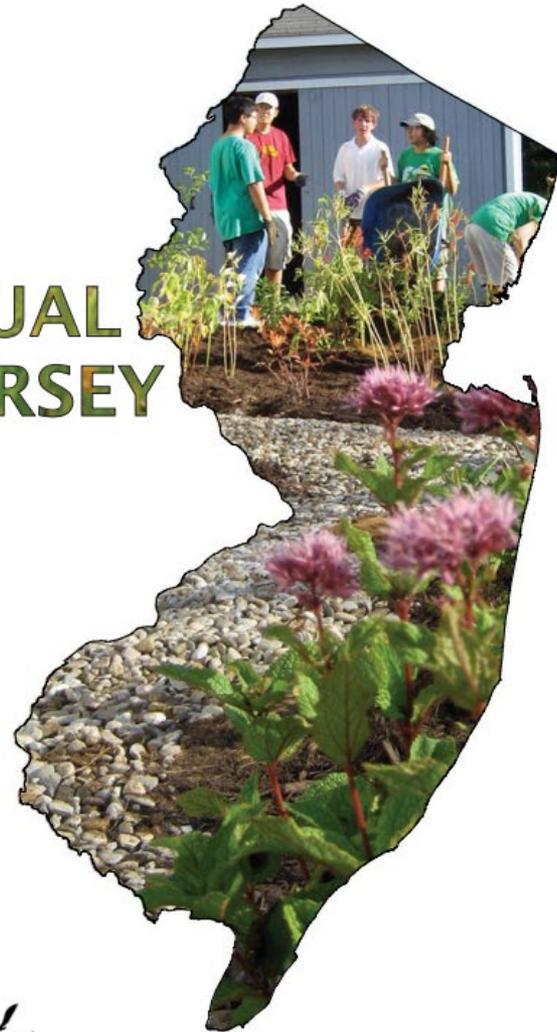








RAIN GARDEN MANUAL OF NEW JERSEY



RUTGERS
New Jersey Agricultural
Experiment Station



Here is the website for the rain garden manual:

http://www.water.rutgers.edu/Rain_Gardens/RGWebsite/RainGardenManualofNJ.html



Rain Garden App

A Mobile App for designing, installing, and maintaining a Rain Garden

Download the Rain Garden App first. "Rain Garden" is a **FREE app** designed to help you properly install a rain garden at your home, office, or job site. Through video tutorials, diagrams, text, and tools, the App guides you through determining the size and placement of your garden, selecting plants, digging and planting your garden, and maintaining your garden. It also includes tools for determining your soil type, measuring the size of the area that will drain to your garden, and managing multiple rain garden projects.



Help Promote the App! [Click here](#) to request App promo cards to display in your town hall or business.

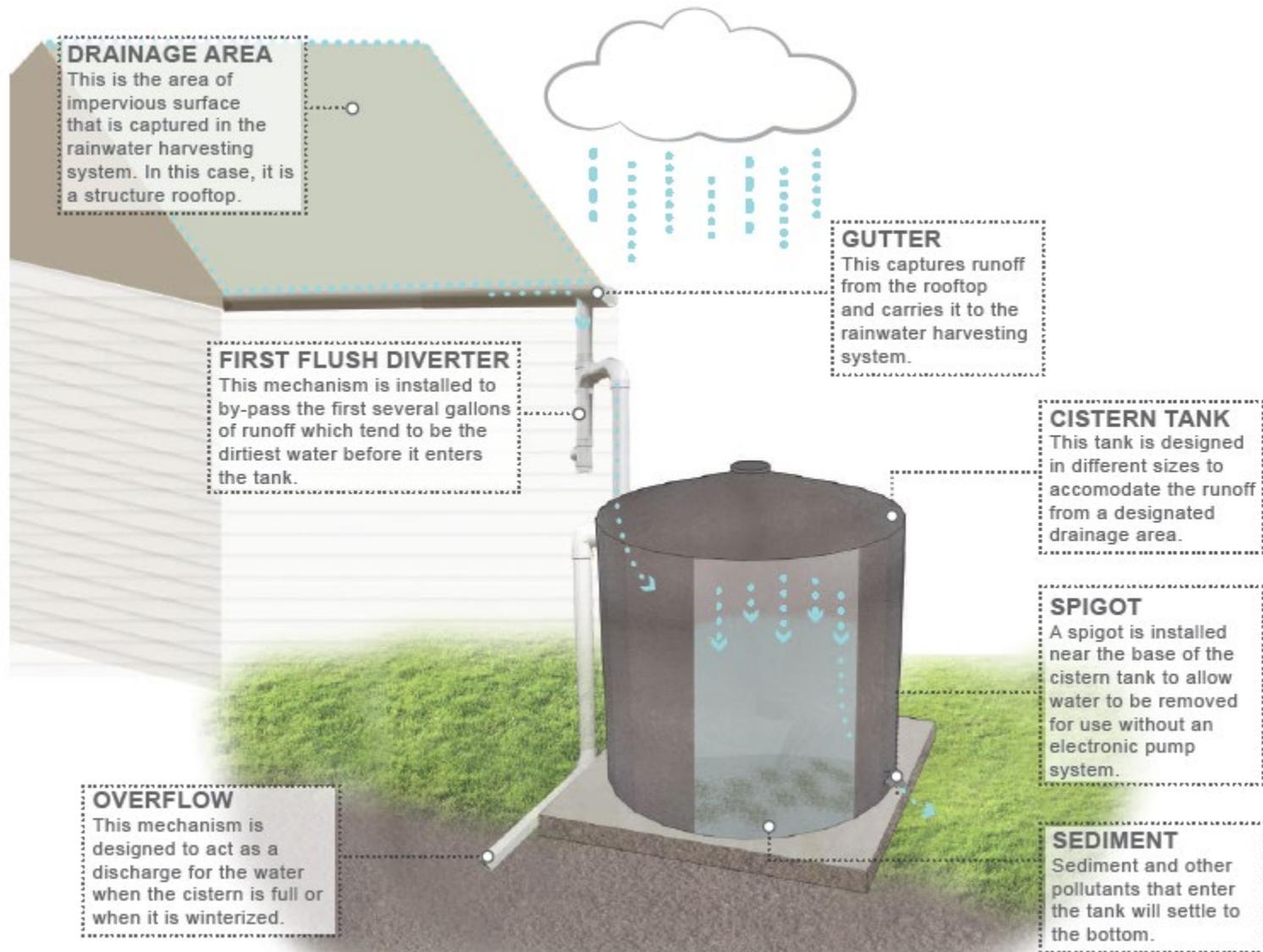
To learn more about Rain Gardens visit the [NEMO Rain Garden Website](#).

For more information about the App, if you are interested in expanding the App's tools to your area, to make suggestions or to simply heap praise upon the heads of your humble App designers, please [contact us](#).

Funding for national expansion of this app was provided by the United States Department of Agriculture/National Institute of Food and Agriculture, project #CONS2013-05768.



Rainwater Harvesting Systems



Rain Barrels



Cisterns





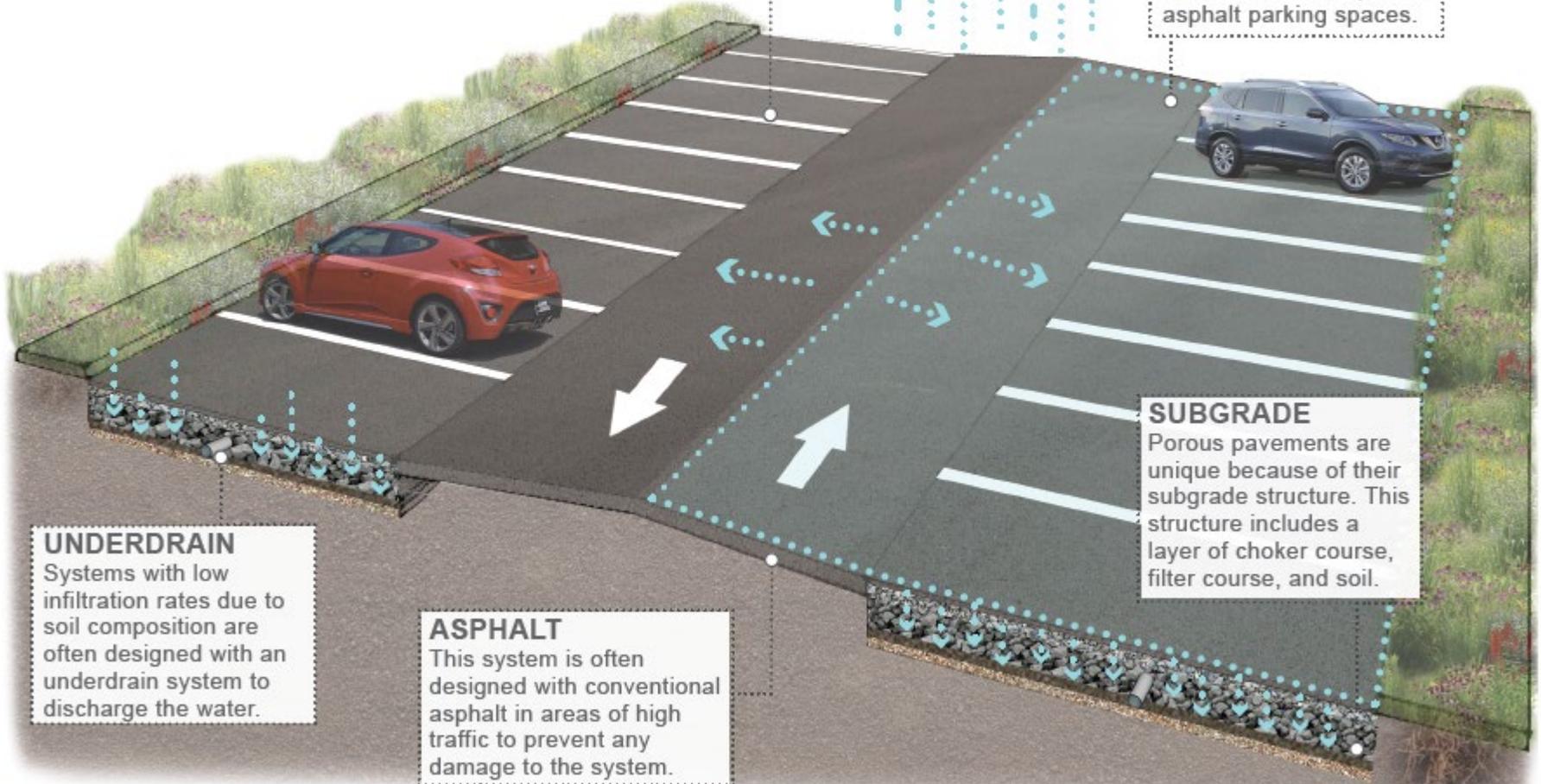
Permeable Pavement

POROUS ASPHALT

It is common to design porous asphalt in the parking stalls of a parking lot. This saves money and reduces wear.

DRAINAGE AREA

The drainage area of the porous asphalt system is the conventional asphalt cartway and the porous asphalt in the parking spaces. Runoff from the conventional asphalt flows into the porous asphalt parking spaces.



UNDERDRAIN

Systems with low infiltration rates due to soil composition are often designed with an underdrain system to discharge the water.

ASPHALT

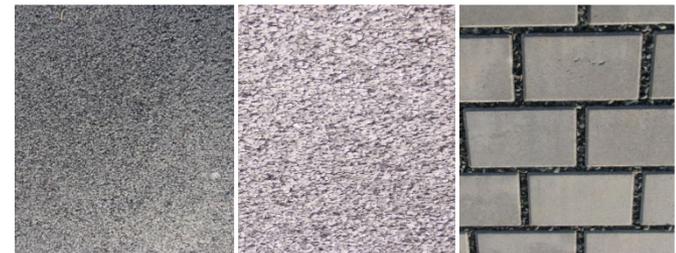
This system is often designed with conventional asphalt in areas of high traffic to prevent any damage to the system.

SUBGRADE

Porous pavements are unique because of their subgrade structure. This structure includes a layer of choker course, filter course, and soil.

Permeable Pavements

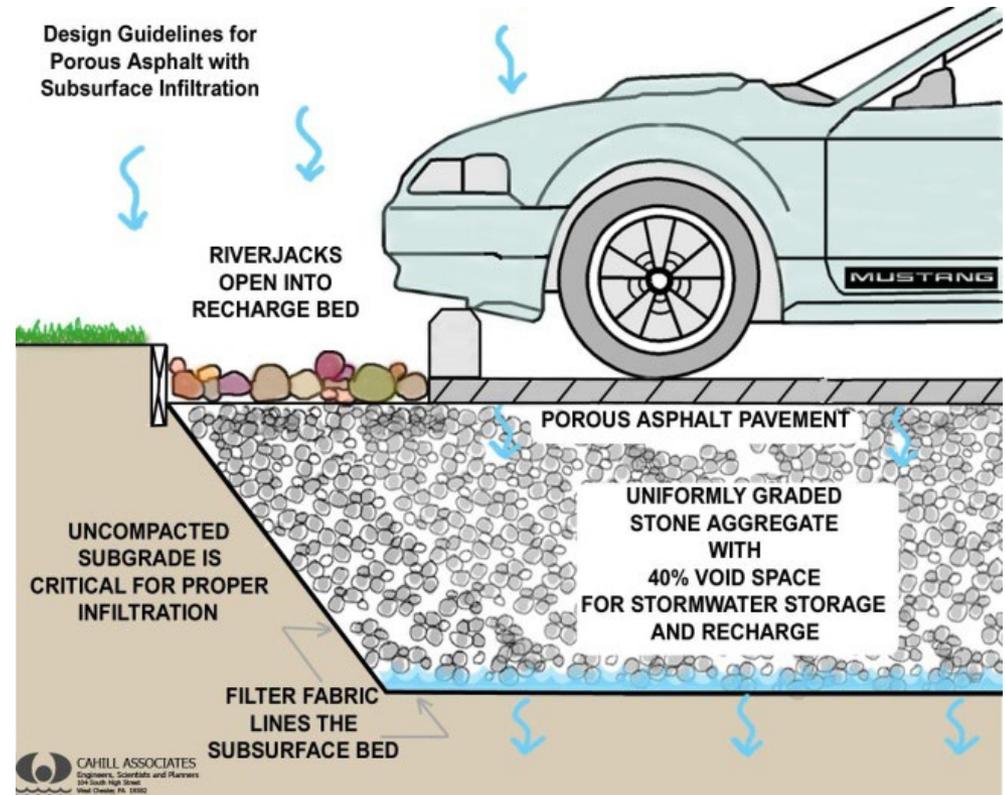
- Underlying stone reservoir
- Porous asphalt and pervious concrete are manufactured without "fine" materials to allow infiltration
- Grass pavers are concrete interlocking blocks with open areas to allow grass to grow
- Permeable pavers systems are concrete pavers with infiltration between the spaces of the pavers
- Ideal application for porous pavement is to treat a low traffic or overflow parking area



ADVANTAGES

- Manage stormwater runoff
- Minimize site disturbance
- Promote groundwater recharge
- Low life cycle costs, alternative to costly traditional stormwater management methods
- Mitigation of urban heat island effect
- Contaminant removal as water moves through layers of system

COMPONENTS



Porous Asphalt





Pervious Concrete



Permeable Pavers

A photograph showing a driveway paved with interlocking concrete grass pavers. The pavers are arranged in a grid pattern, with green grass growing through the openings. The driveway is covered with fallen autumn leaves and some dry grass. In the background, there is a chain-link fence and a dark vehicle parked on the left. The overall scene is outdoors during autumn.

Grass Pavers



Questions?