

Land Use Strategies for Flood Resilience

October 22, 2021



NEW YORK STATE
Floodplain and Stormwater Managers Association

Agenda

Floodplain Management Background
Landuse Planning
Landuse Regulations
NYSFSMA Resources



Flooding along Route 28 in Mt. Tremper, NY
due to Tropical Storm Irene (Aug. 2011).

nyfloods.org

NEW YORK STATE
Floodplain and Stormwater Managers Association



Who We Are

NYSFSMA is an organization of multiple professions working together to make New York State safer, more flood-resilient, and better prepared for the flood risks facing the State.



NEW YORK STATE
Floodplain and Stormwater Managers Association

What We Do

Train
Advocate
Outreach
Collaborate



NEW YORK STATE
Floodplain and Stormwater Managers Association

Why We Do It

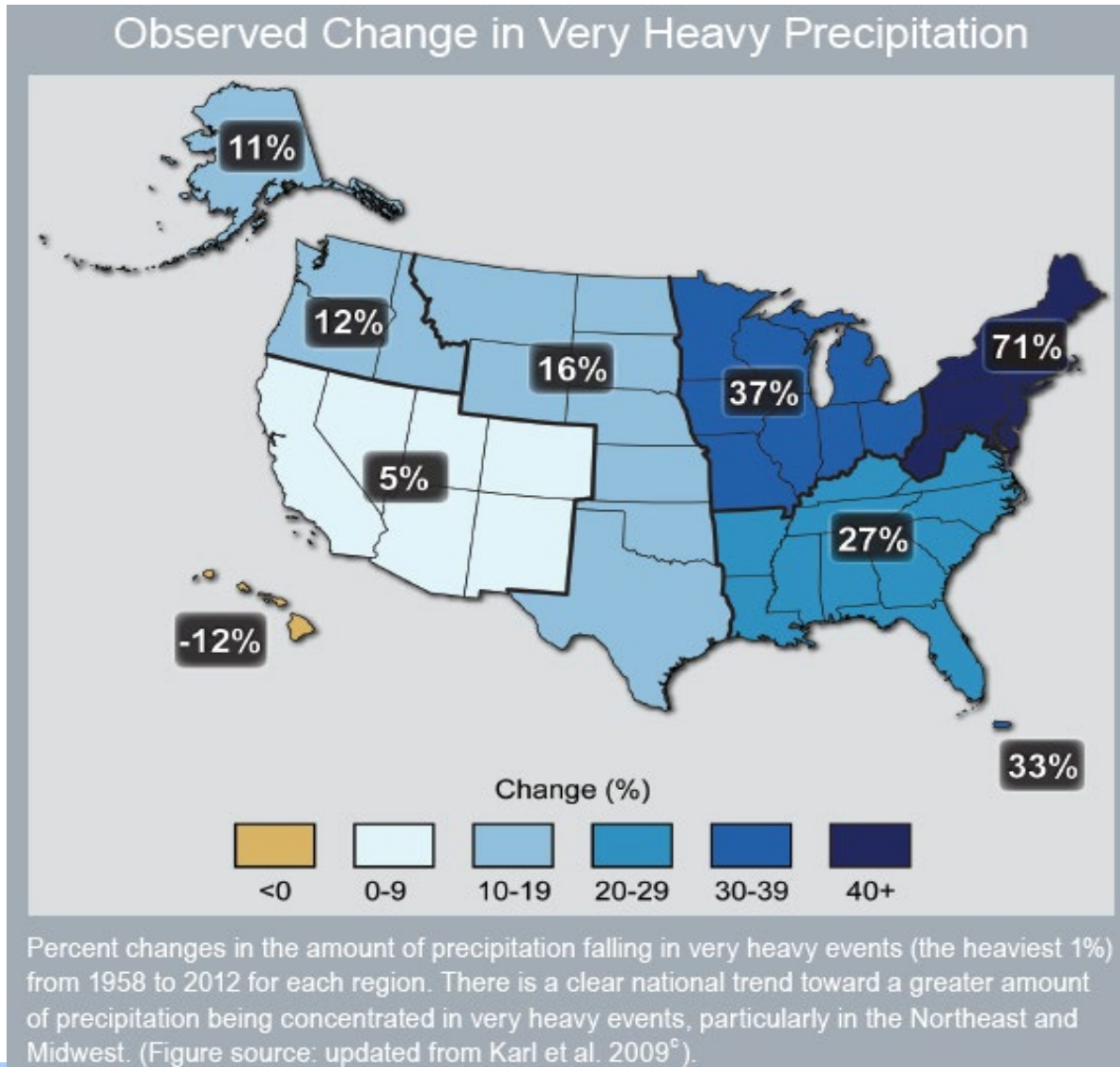
- Flooding is the most common and expensive disaster in NYS
- Every county in the NY has had at least 1 declared flood disaster in the last decade
- The risk is growing due to changing weather patterns and development
- Flood insurance rates are going up because of increased flood risk



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Flood Damages are Increasing



The northeastern US has experienced a 71% increase in very heavy precipitation events.*

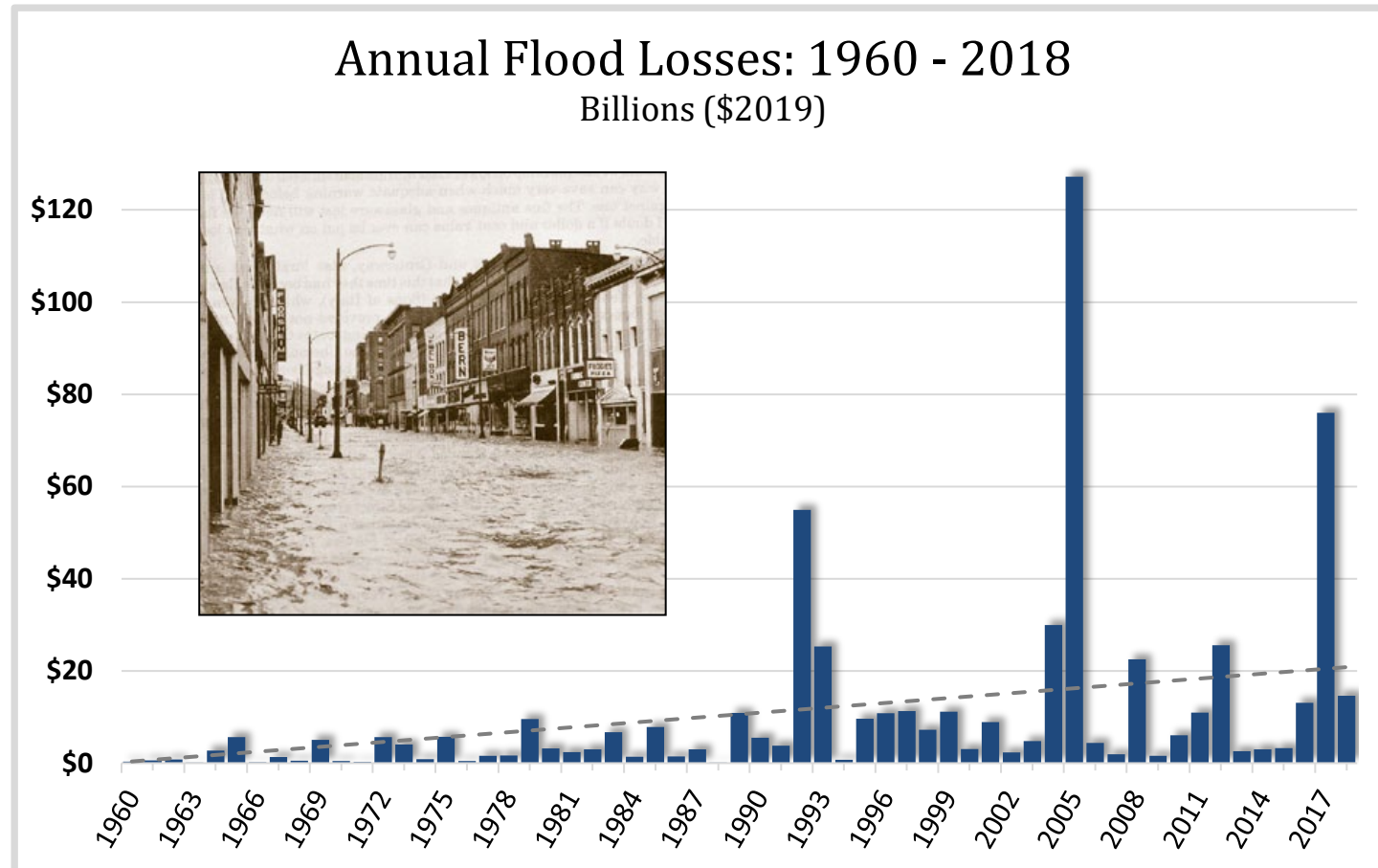
*National Climatic Data Center

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

- Gilbert White

Annual Flood Losses: 1960 - 2018

- Since 1960, losses have averaged nearly \$10 billion per year.
- Since the 60s, per person annual losses have increased by more than a factor of 6



CEMHS, 2019. Spatial Hazard Events and Losses Database for the United States, Version 18.1. [Online Database]. Phoenix, AZ: Center for Emergency Management and Homeland Security, Arizona State University.

National Flood Insurance Program (NFIP)



NFIP created in 1968 by federal legislation (National Flood Insurance Act of 1968) with additional legislation over the years. Voluntary program where communities who participate can get “low-cost” NFIP flood insurance.

NFIP establishes floodplain management standards that communities who participate in the program must enforce to stay in compliance.

Standards consist of building standards to reduce property damage and loss of life due to flooding

- Elevation (residential) or floodproofing (non-residential) for new structures in FEMA designated floodplain
- Substantial Damage/Substantial Improvement regulations

FEMA (who oversees NFIP) provides:

- Access to NFIP flood insurance
- Maps floodplains and provides flood insurance rate maps (FIRMs) to show extent of floodplains*
- Grants to assist with disaster relief

Mandatory Purchase Requirement

- Flood Disaster Protection Act of 1973 requires that federally backed mortgage holders purchase flood insurance for the life of the mortgage for structures located in the FEMA mapped floodplain.

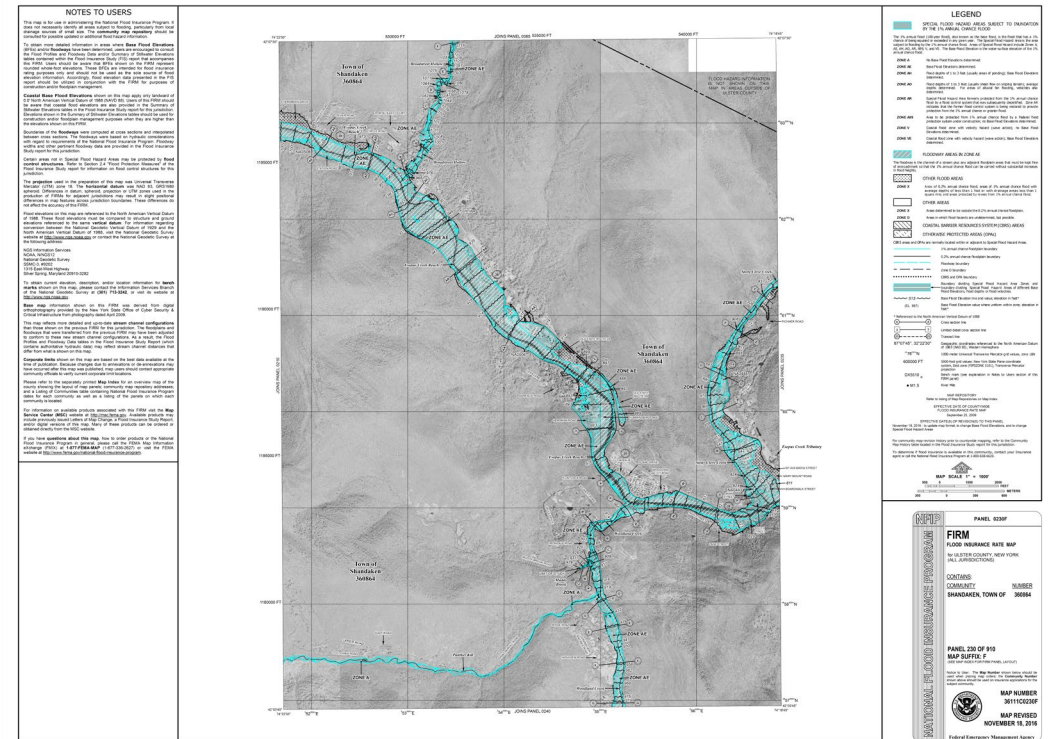
*Not all flooding areas are mapped on a FIRM

National Flood Insurance Program (NFIP)

nyfloods.org



- Flood Insurance
- Flood Insurance Rate Maps (FIRMS)
- Local floodplain management



**NATIONAL FLOOD
INSURANCE PROGRAM**

Flood Insurance Rate Map (FIRM) panel for a portion of the Town of Shandaken

Flood Hazard Maps

- **Show 1% annual probability flood**
(100-year floodplain)
- **Do not show**
 - Increased runoff from new development
 - Ditches
 - Debris blockage
 - Erosion
 - Larger storms



Town of Big Flats



Town of Campbell

Floodplain Development Standards

- Reduce vulnerability
- Reduce damage to other properties
- Do not account for
 - Erosion
 - Sediment
 - Safety



Town of Bath



Town of Rathbone



Town of Tuscarora



Why We Need Planners

- Floodplain development standards deal with how to build in a mapped floodplain
- Land use regulations can address the kinds of uses allowed in flood-prone areas
- We need to manage land use in all flood-prone areas—Floods don't read the maps
- We also need to protect natural resources to mitigate flooding

Flood risks should be addressed in local comprehensive plans
& land use regulations



Flood Risk Management

- Municipal responsibilities:
 - Protect health, safety, and welfare**
- This should include integrating flood safety into community plans, policies, practices, regulations, and investment decisions.

Government has an affirmative duty to prevent harm.

Objective: Promote development patterns that reduce flood damage & protect the beneficial functions of flood-prone areas.

Flood Risk Management Tools

nyfloods.org



- **Local Law for Flood Damage Prevention**

- Floodplain development standards

Standards for high risk areas

- **Local plans**

- Hazard mitigation plan – Generally focused on existing risks
- Comprehensive plan – Community vision. Goals and policies to achieve that vision.
- Recovery planning – Strategy to build back safer and stronger.
- Other – Economic development, infrastructure, watershed, etc.

- **Local land use regulations**

- Zoning
- Site plan review
- Subdivision of land

Proactively manage land use patterns

- Other – Riparian buffers, stormwater, driveways, timber harvesting, etc.

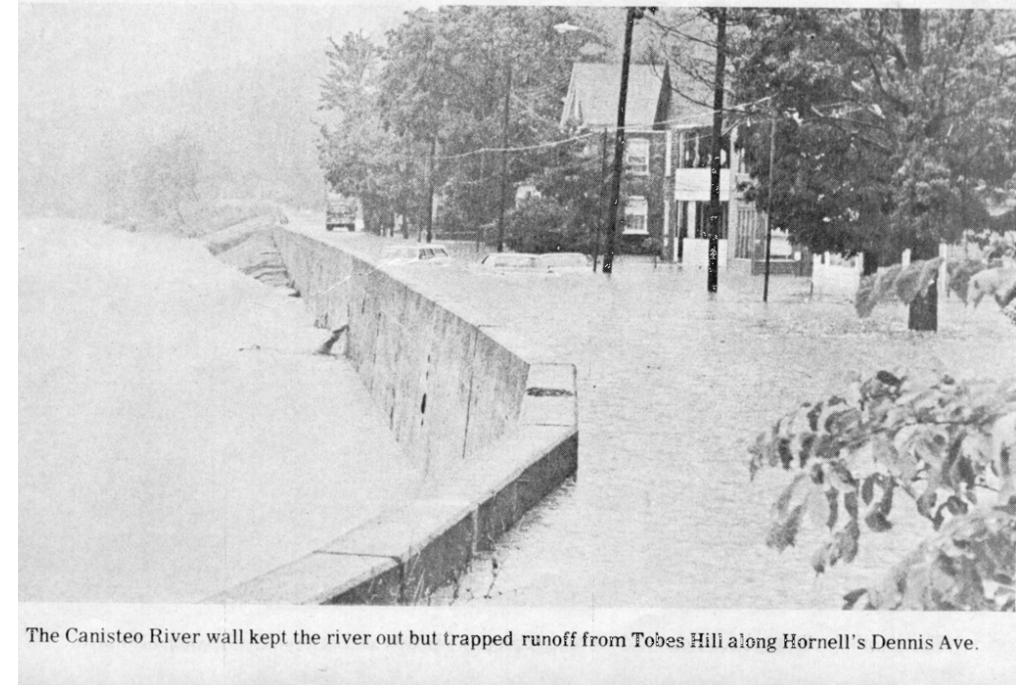


Local Comprehensive Plans

- **Expression of a community's desires** – land use, housing, community services, public safety, economic development, transportation, infrastructure, natural resources
- **Guide to decision-makers** — blueprint for land use regulations
- **Legal document** – In NYS, adoption of zoning laws must in accordance with a comprehensive plan

Promote Safety and Sustainability

- Flooding does not stop at flood zone boundary
- Variables that affect flood risk
 - Runoff from development
 - Loss of natural features
 - Altered stream channels and floodplains
- Build Better
 - Locations where development should not occur?
 - Flood-safe development
- Resilience
 - Flood warnings
 - Emergency response



The Canisteo River wall kept the river out but trapped runoff from Tobes Hill along Hornell's Dennis Ave.

Hornell, NY, 1972.

No Adverse Impact

Actions of one property owner should not be allowed to adversely affect the property or rights of others.

➔ Identify the impacts

➔ Mitigate the impacts



Steps in Comprehensive Planning



- **Research** – existing conditions, future trends, potential problems
- **Community goals and objectives** – must strike a balance between multiple interdependent issues and diverse viewpoints
- **Policy formation** – land use regulations, capital projects, development guidelines, operating procedures
- **Plan implementation** – regulatory and non-regulatory actions
- **Review and updating**

Research: Flood Hazards

- Regulated floodplain (1% annual probability)
- Floodway
- 500-year floodplain (0.2 % annual probability)
- Historic flooding, erosion, or drainage problems
- Flood insurance data
- Drainage infrastructure –
bridges, culverts, stormwater practices
- Levees
- Dams

Planning starts
with fact finding.



Bath, NY, 1935. Now protected by levees.

Research: Natural Features

- Rivers, streams, lakes
- Undeveloped floodplains and riparian buffers
- Wetlands
- Slope of the land
- Groundwater resources
- Parks and protected open space
- Other natural resource areas – forests, scenic vistas, critical habitat, recreation areas

Planning starts
with fact finding.



Town of Big Flats, NY.

Involve the Community

- **Effective communication** – Use lay terms. Focus on big issues (rather than technical details).
- **Maps** – Show streams, floodplains, other hazard information.
- **Historic flood photographs**
- **Stress safety issues**

Public engagement is essential for developing an effective comprehensive plan.



Town of Corning, NY.

Flood Resilience Strategies

- **Manage water where it falls**
- **Make room for water**
- **Live with floods**
- **Educate the public**



Town of Elmira, NY.

Each community is challenged with finding the appropriate balance between environmental, economic, and social concerns.

Comprehensive Plan

- **Vision** for a safe community
 - Protect life and property
 - Floodplains are meant to flood
 - Make room for water
- Develop **goals and objectives** that aim high
 - Identify high risk areas that should be kept free of development
 - Protect natural features that reduce flooding
 - Future land use map
- Develop feasible **recommendations**
 - Regulations, municipal operations, outreach, funding needs

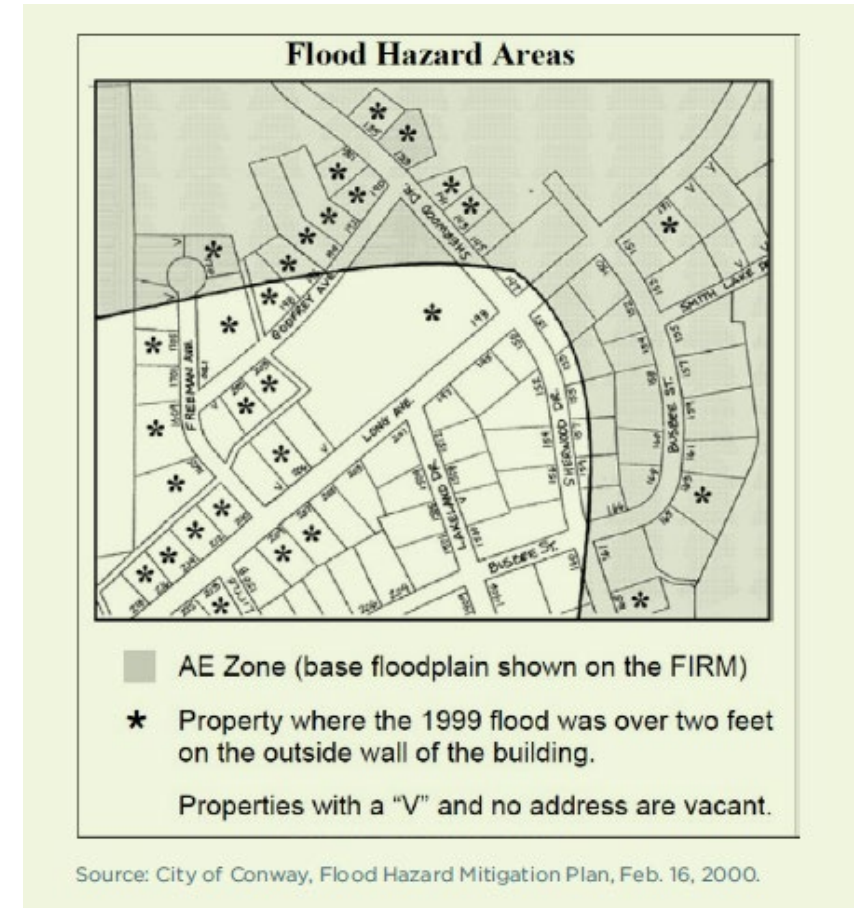


City of Corning, NY.

Local Land Use Regulations

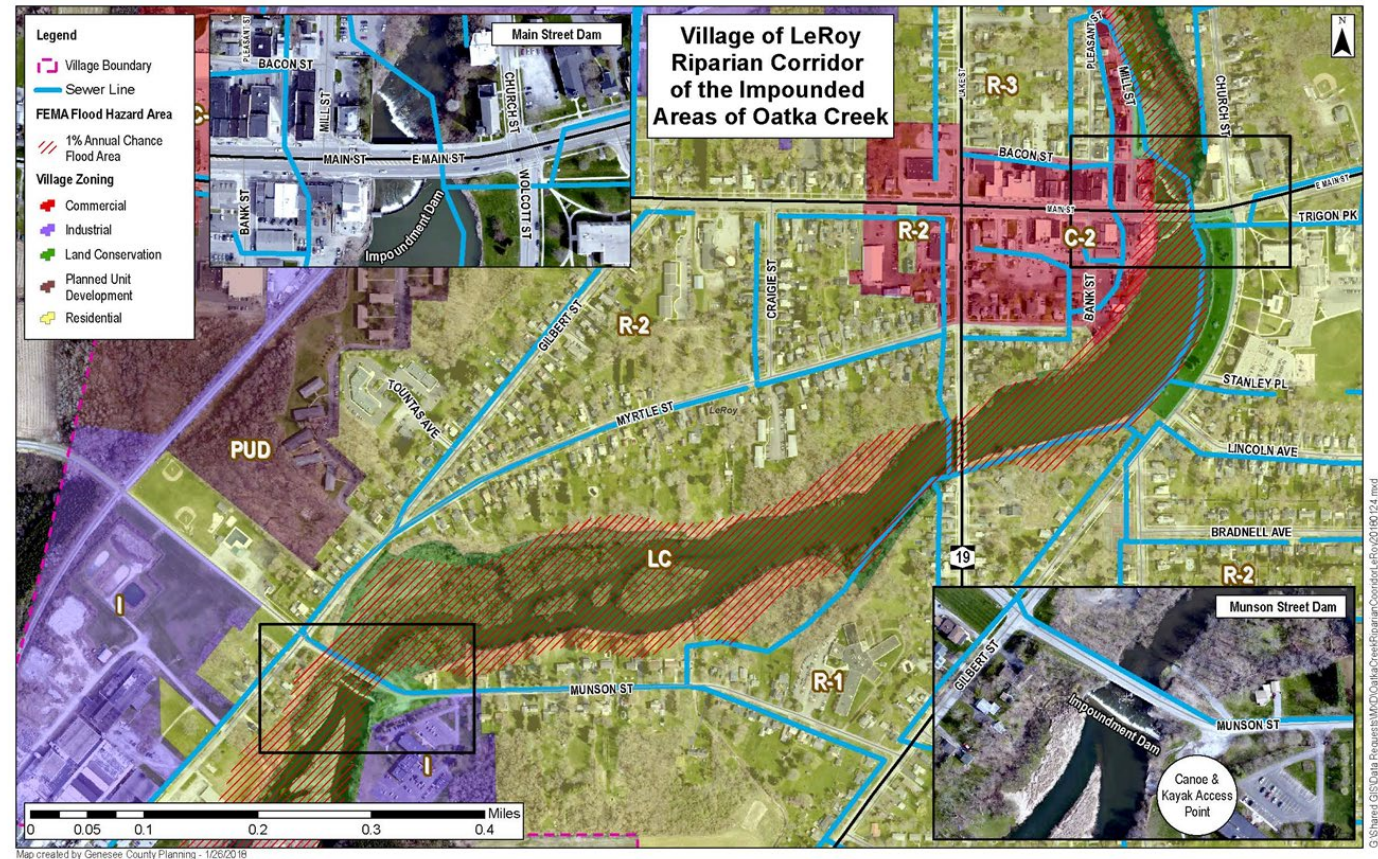
Police Power

- ✓ Power to regulate for the purpose of the public health, safety, welfare, comfort, peace and prosperity
- ✓ The regulation of floodplains is for public safety
- ✓ So long as it is reasonable and not “arbitrary and capricious”



Local Land Use Regulations

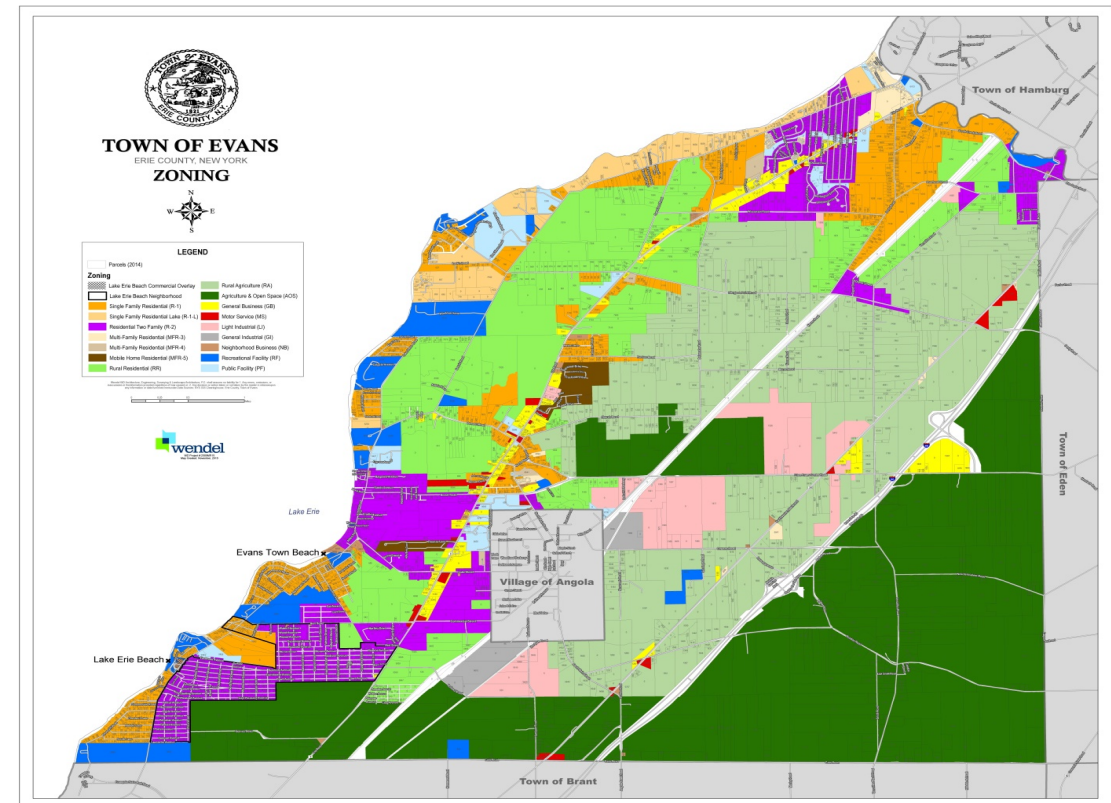
1. Zoning
2. Subdivision of Land
3. Site Plan Review



Zoning

The way land in a municipality is used and developed.

- the uses to which property may be devoted
- the siting of development on land
- the density of development on property





Zoning Examples

- Zoning districts/special use permits
- Incentive zoning (bonus zoning)
- Overlay zoning
- Performance or incentive zoning
- Floating zones
- Planned Unit development
- Transfer of Development Rights

**ZONING
CHAPTER 211
TOWN OF GREECE**



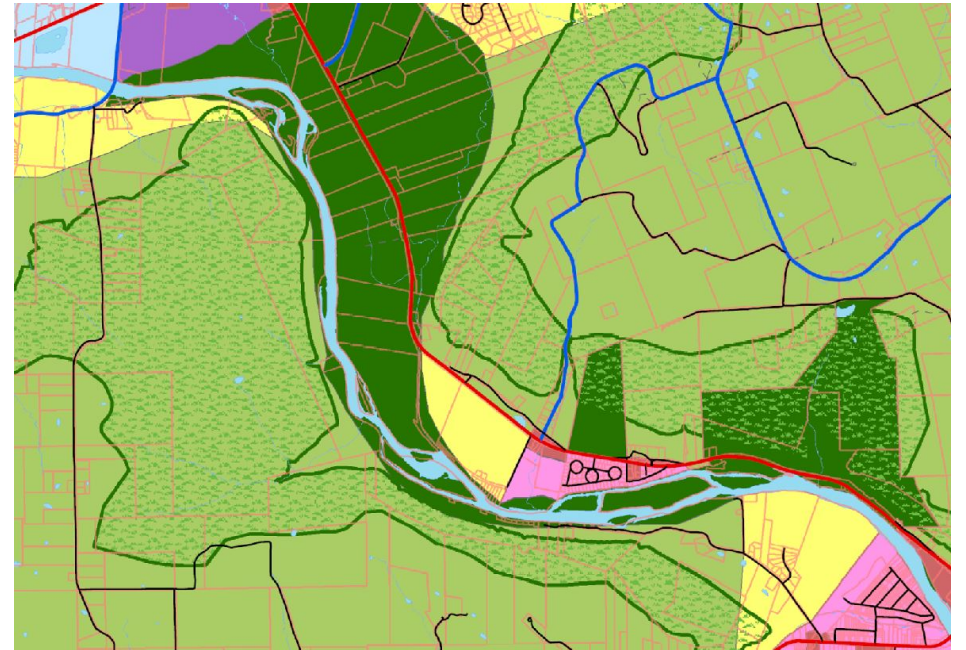
Pursuant to Chapter 211 of the Town of Greece Code
(The Zoning Ordinance of the Town of Greece),
Adopted by the Town Board on March 19, 2020

GREECE TOWN BOARD

William D. Reilich, Supervisor
Michael Barry, (1st Ward)
William Murphy, (2nd Ward)
Joshua Jensen, (3rd Ward)
Diana Christodaro, (4th Ward)

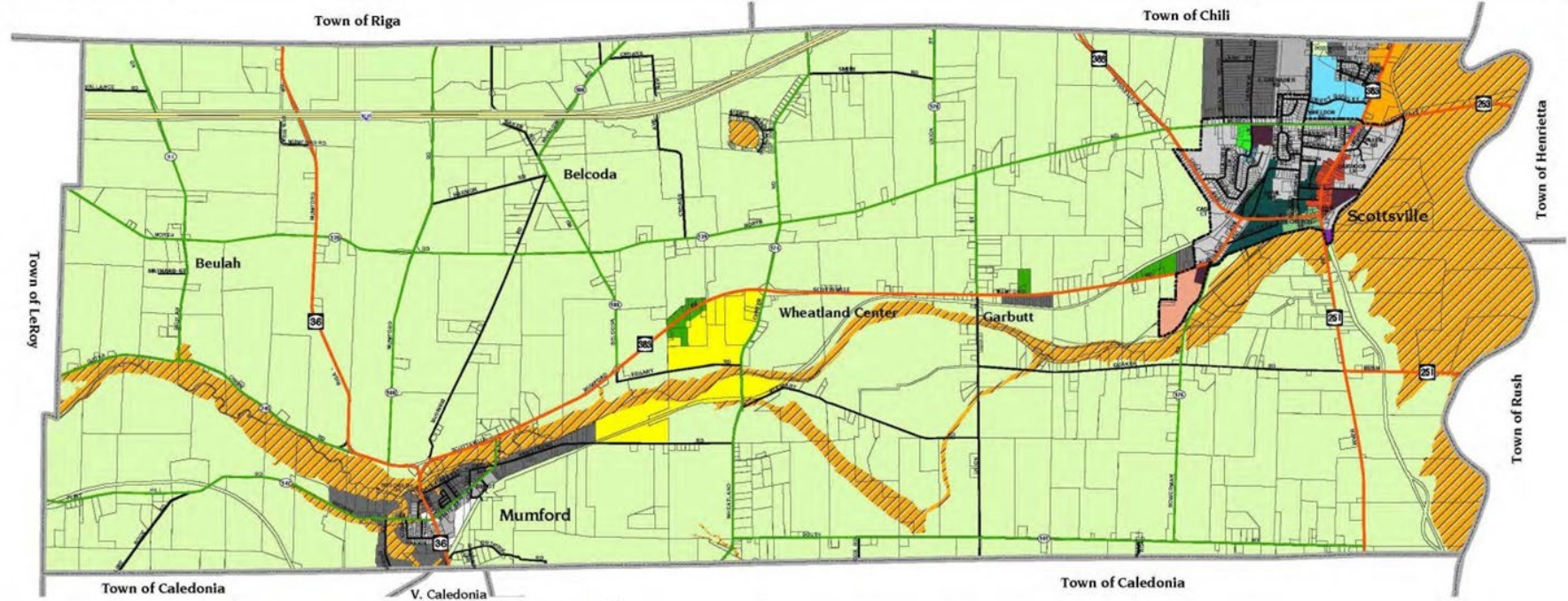
Flood/Floodplain Zoning District

- Density controls (e.g., minimum lot sizes of 5 acres or larger)
- Uses that may be incompatible with flood risks
- Open space uses
- Conservation zone

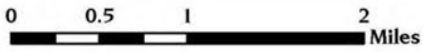


Town of Wheatland - Village of Scottsville Comprehensive Plan 2004-2024

Figure 2.15
Existing
Zoning



Data Source(s):
Monroe County Department
of Environmental Services



Legend

- Village of Scottsville
- Parcels
- Interstates
- State Routes
- County Roads
- Town/Village/Private Roads

- #### Wheatland Zoning
- AGRICULTURAL RURAL
 - FLOOD HAZARD
 - HIGHWAY COMMERCIAL
 - INDUSTRIAL PARK
 - RESIDENCE GARDEN APARTMENT
 - RESIDENCE R-12
 - RESIDENCE R-16
 - SHOPPING CENTER BUSINESS

- #### Scottsville Zoning
- CENTRAL BUSINESS DISTRICT
 - GENERAL BUSINESS
 - HISTORIC DISTRICT, ONE FAMILY RESIDENCE
 - LIGHT INDUSTRIAL
 - MULTI-FAMILY RESIDENCE
 - ONE FAMILY ATTACHED RESIDENCE
 - ONE FAMILY RESIDENCE
 - TWO FAMILY RESIDENCE
 - UNZONED



MRBgroup
Engineering, Architecture, Surveying, P.C.

Zoning Map of the Town of Southport, New York



Zoning Districts	
	AR: Agricultural Residential
	CN: Commercial Neighborhood
	CR: Commercial Regional
	C: Conservation District
	I: Industrial
	Planned Development District
	R1: Residential- Low Density
	R2: Residential- Moderate Density
	R3: Residential- High Density

Date: August 15, 2018



Special Permits

- Conditional use in the land use district (e.g., cluster residential development)



Overlay Zoning

Common set of standards that apply to a designated area within several different “underlying districts”

- ✓ Floodplain management regulations

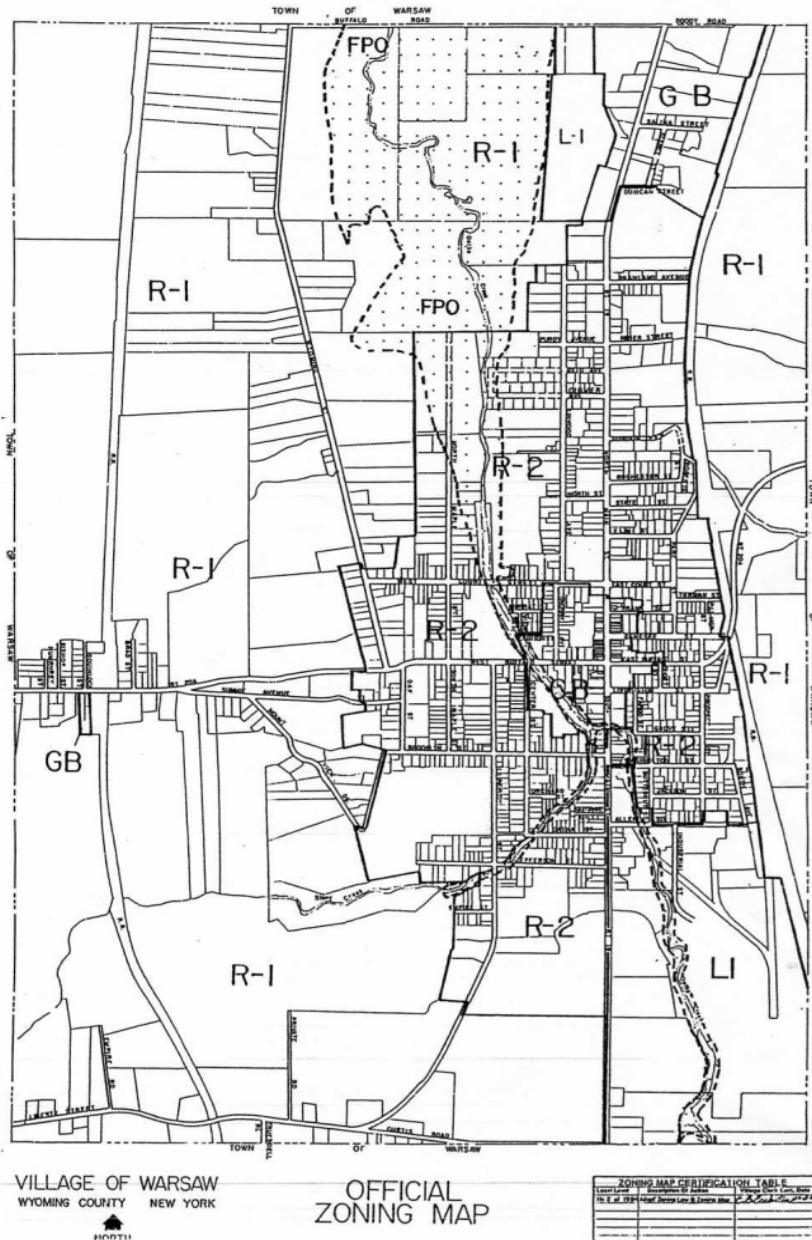
The standards of the overlay zone apply in addition to those of the underlying zoning district(s):

- Use restrictions (e.g. new construction, critical facilities, hazardous materials)
- Landscaping requirements (such as green infrastructure)
- Setback standards from streams (or environmentally sensitive areas)



Require green infrastructure and low-impact development techniques:

- 1) **Avoid** or minimize disturbance by preserving natural features and using conservation design techniques.
- 2) **Reduce** the impacts of development by decreasing impervious cover.
- 3) **Manage** the impacts of development by using natural features and runoff reduction practices to slow down the runoff, promote infiltration and evapotranspiration, and minimize the need for structural “end-of-pipe” practices.





Incentive Zoning

Development Incentive Bonuses - community benefits or amenities

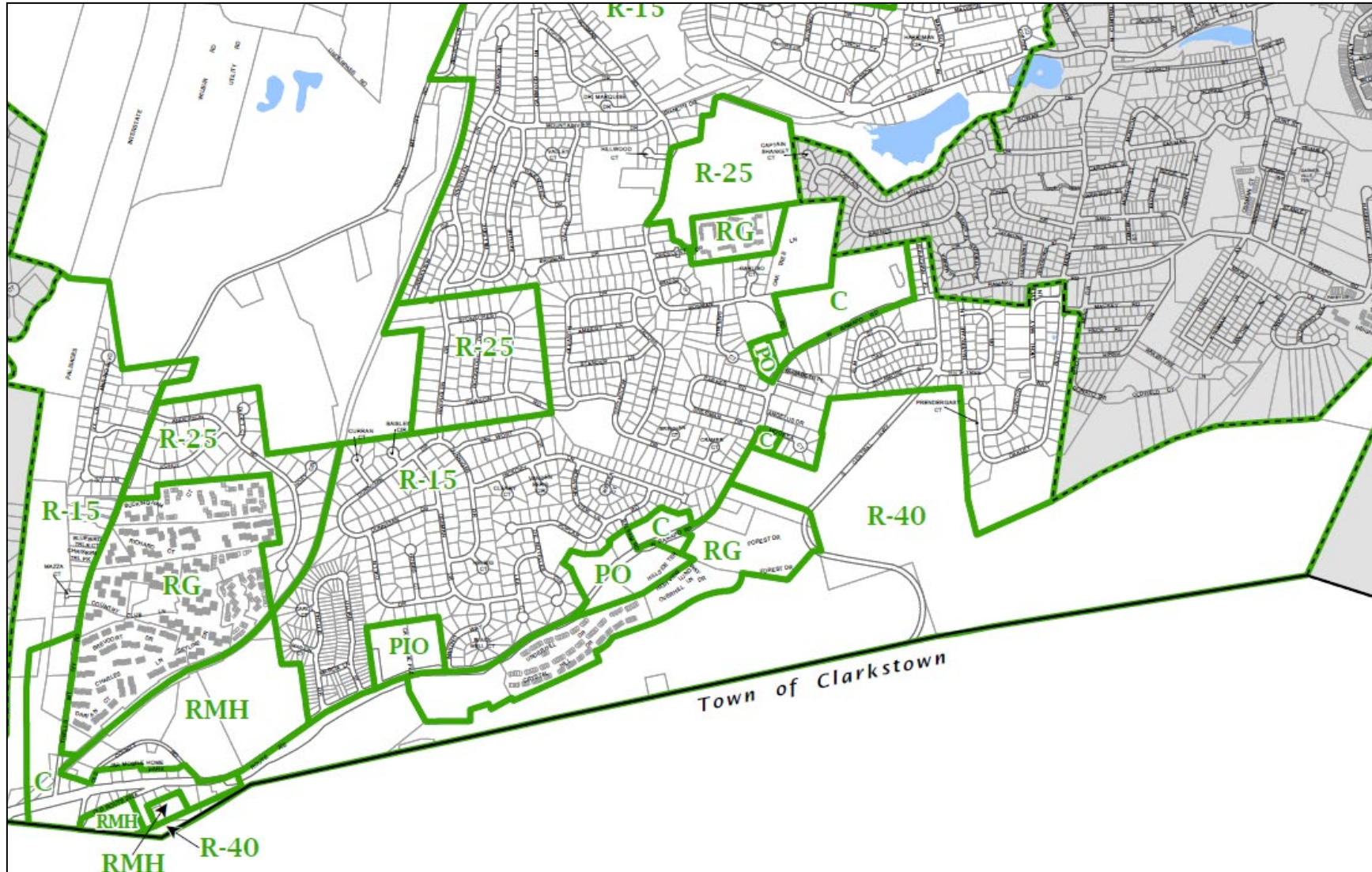
Examples

- Public pedestrian and/or vehicular access to the waterfront and to water-dependent uses
- Publicly accessible waterfront promenades, pedestrian linkages, nature preserves, hiking and blue trails
- Publicly accessible open space and play areas, particularly on or close to the waterfront
- Restoration of wetlands
- Protect or restore connectivity between natural areas where needed to support ecosystem function

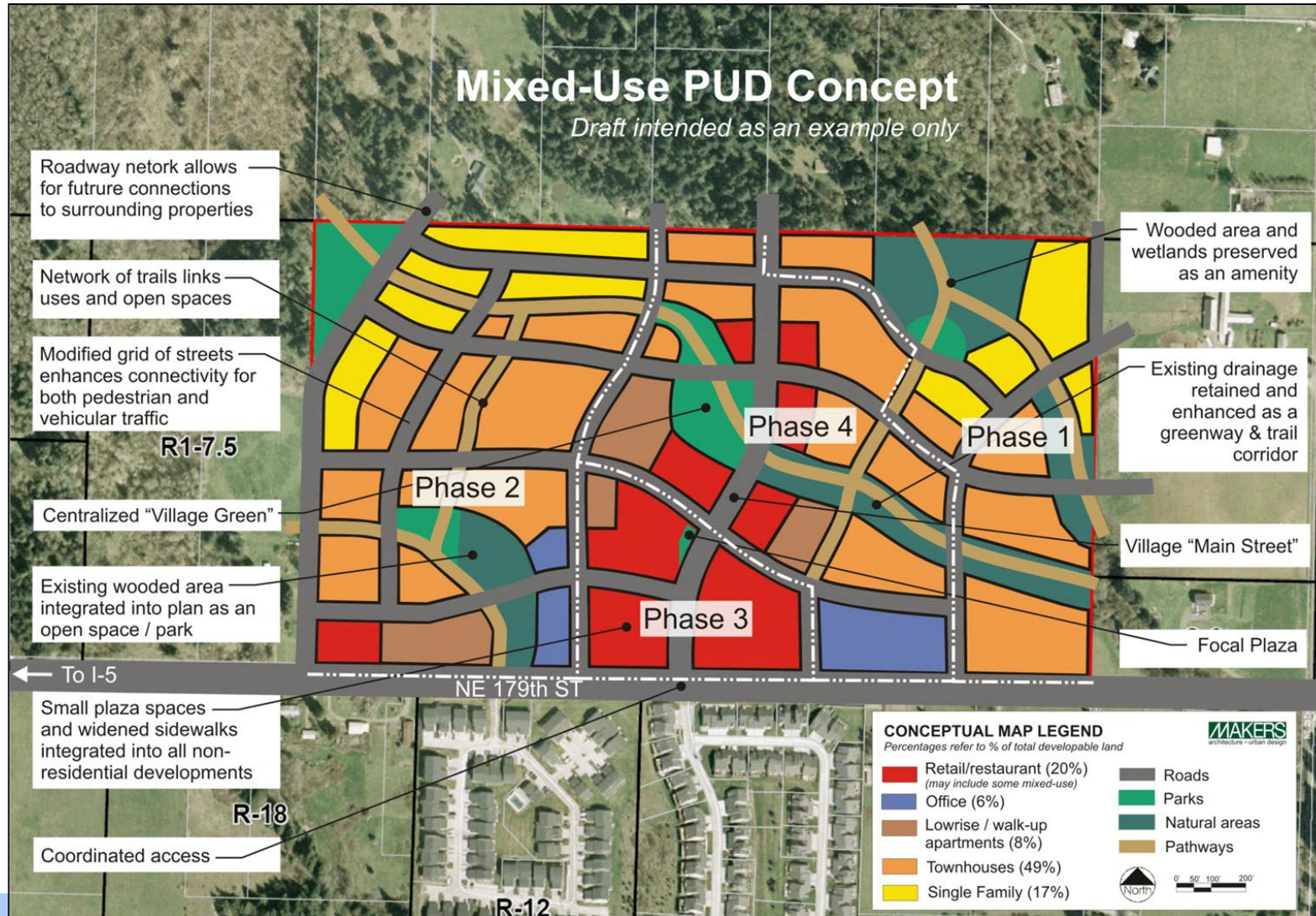


Floating Zones

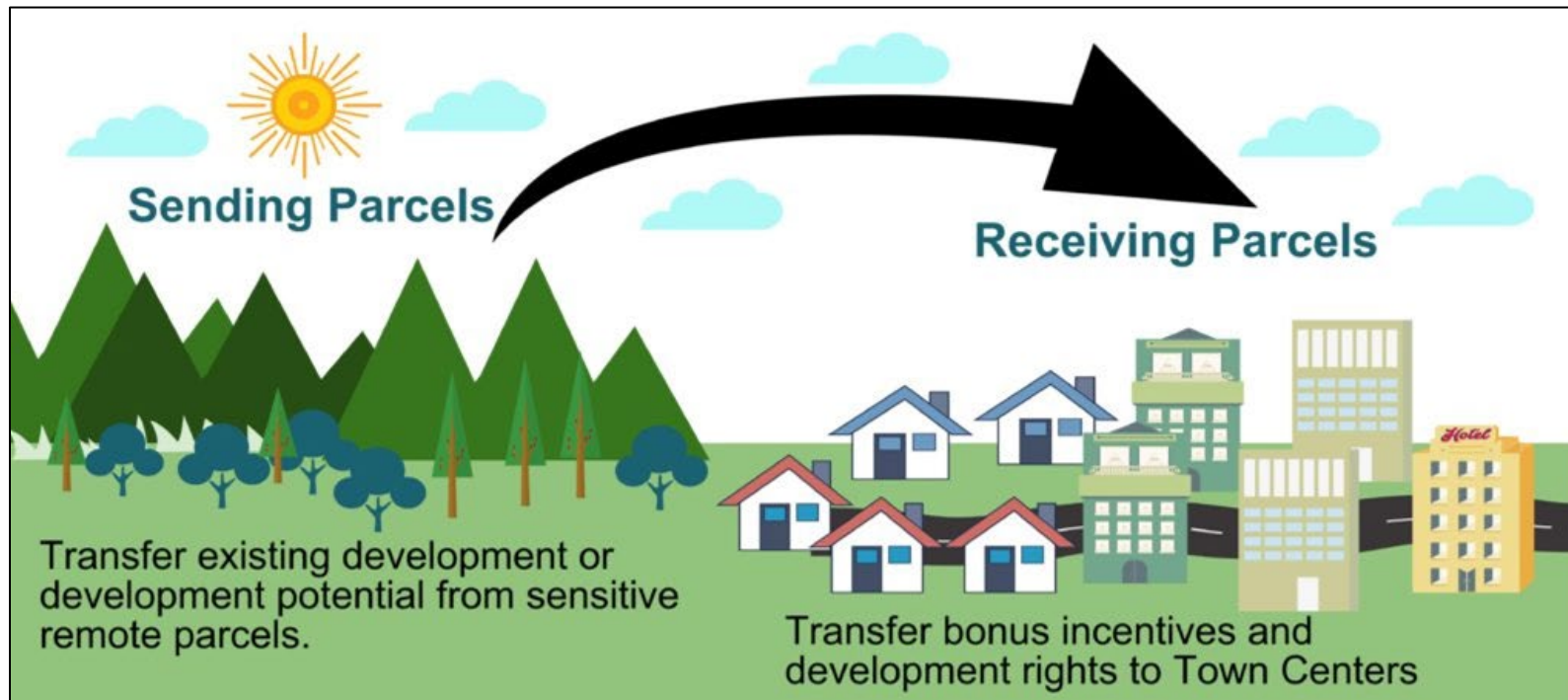
- The standards and allowable uses for a floating zone are set forth in the text of the municipality's zoning regulations, but the actual district is not mapped
- The district “floats” in the abstract until a development proposal is made for a specific parcel of land and the project is determined to be in accordance with all of the applicable floating zone standards
- At that time the municipality maps the floating zone by attaching it to a particular parcel or parcels on the zoning map

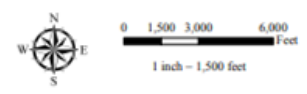
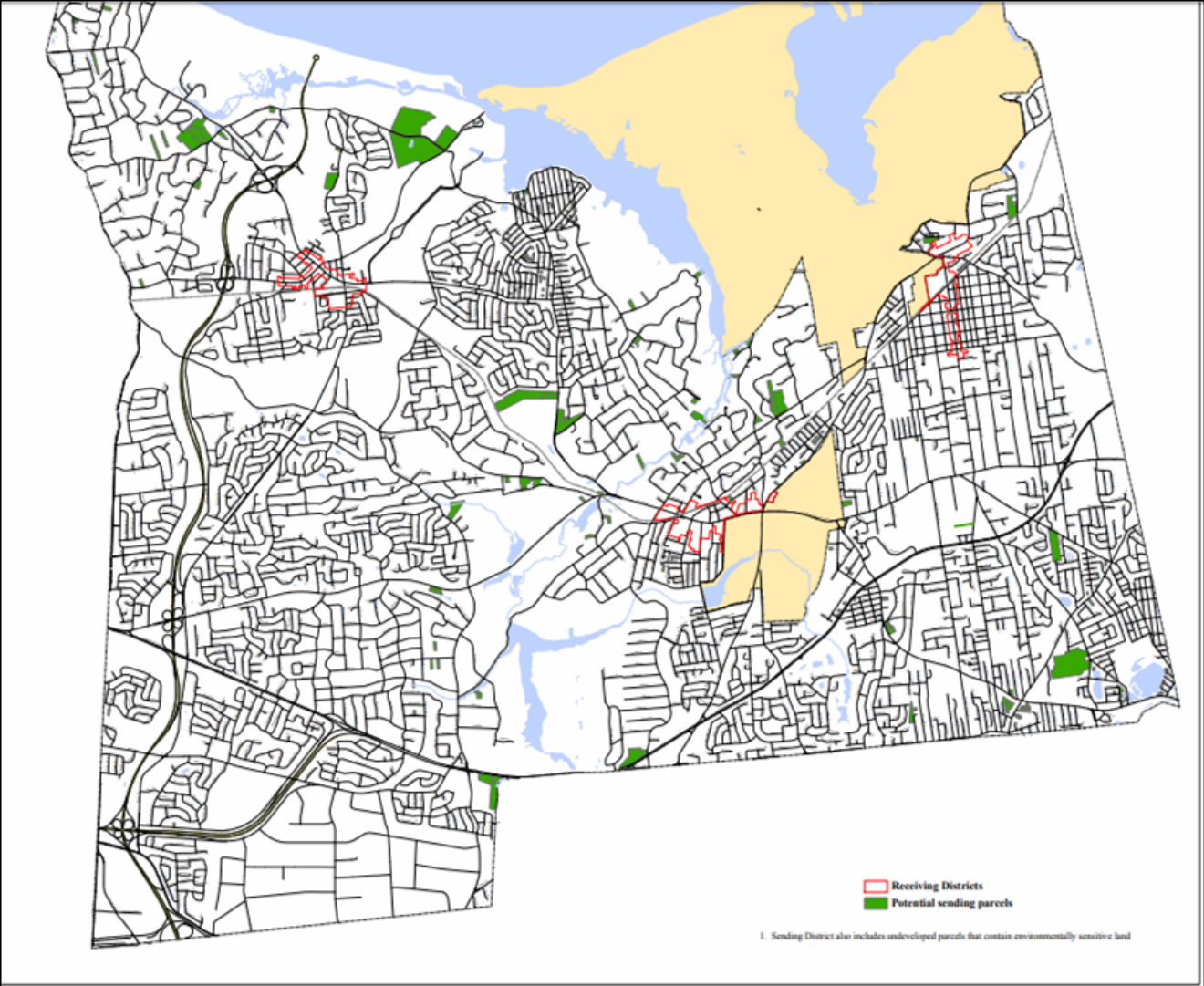


Planned Unit Development



Transfer of Development Rights



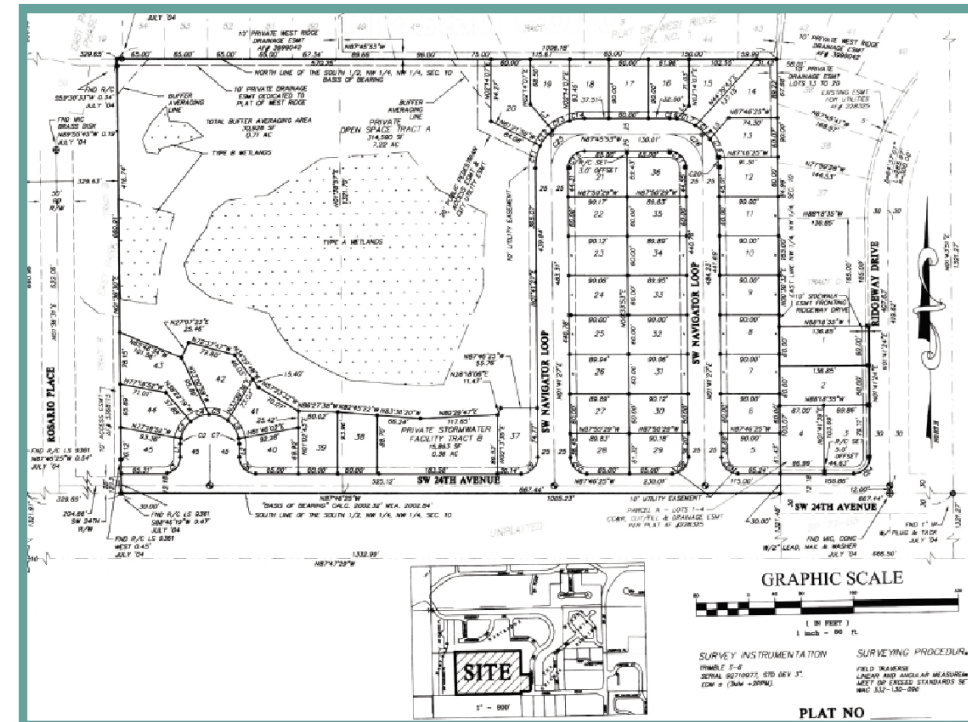
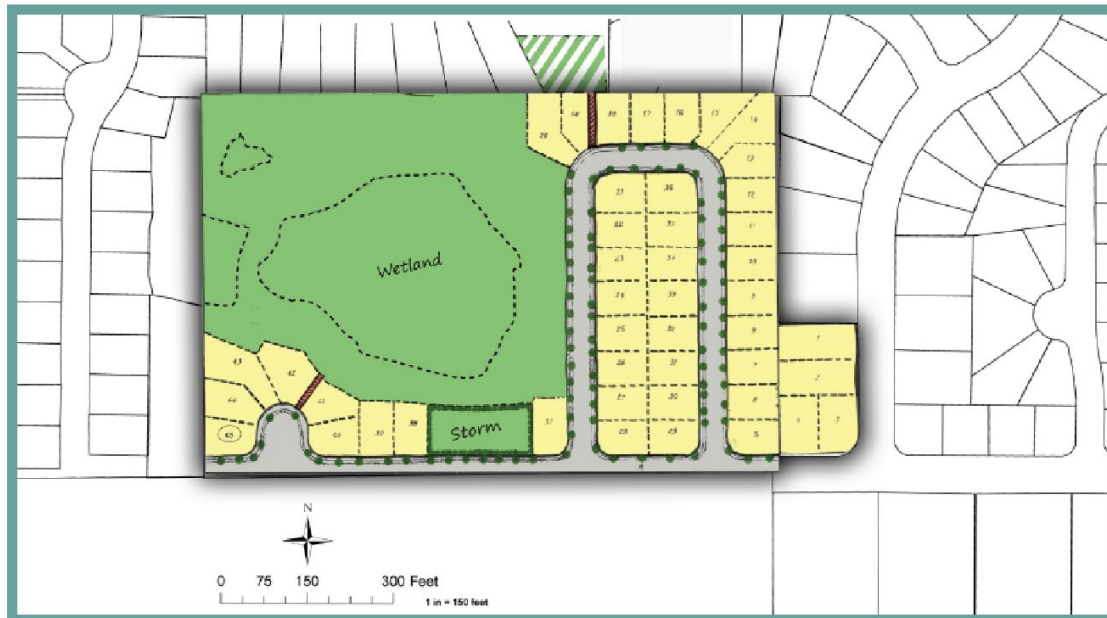


**TOWN OF SMITHTOWN
TRANSFER OF
DENSITY FLOW RIGHTS MAP**

Prepared by: Town of Smithtown Planning Department

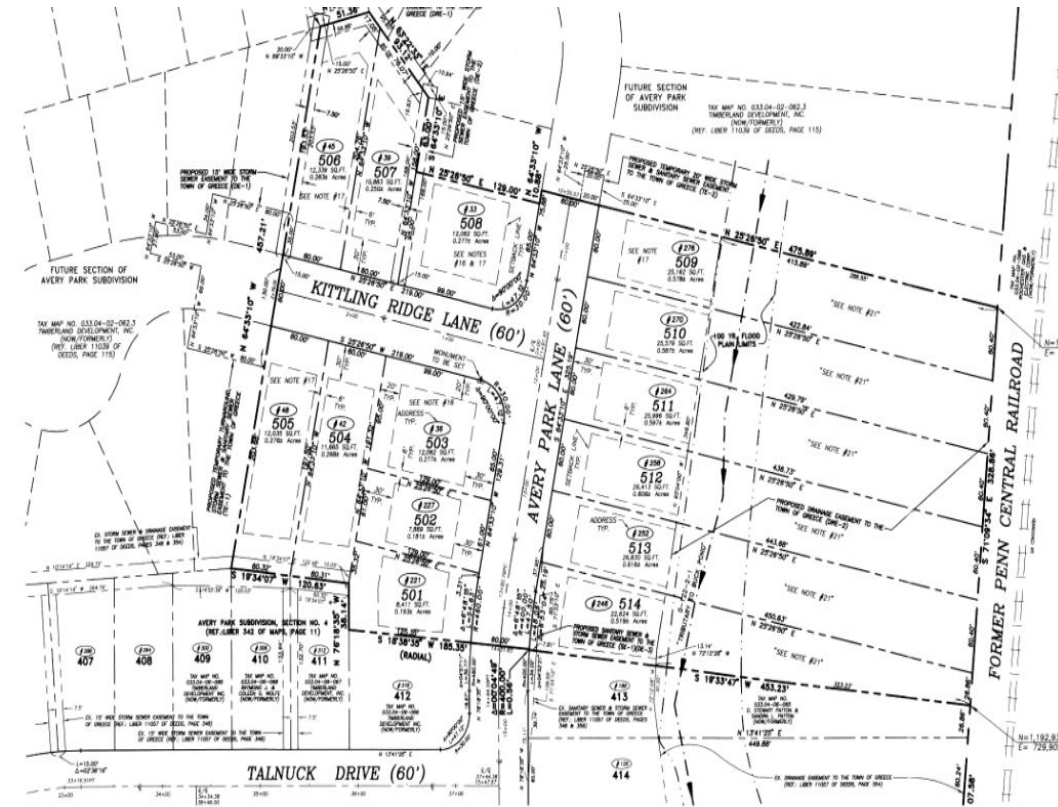
Subdivision of Land

How land is used - ensure that when development does occur, it will be accompanied by adequate services and facilities



Common Subdivision Standards

- Lot layout
- Physical character of the land
- Environmentally sensitive lands
- Street layout
- Interconnected network of streets
- Utilities
- Bicycle lanes
- Sidewalks and curbs
- Water supply and sewage disposal systems
- Stormwater runoff
- Building design
- Other improvements such as lighting
- Private bridges



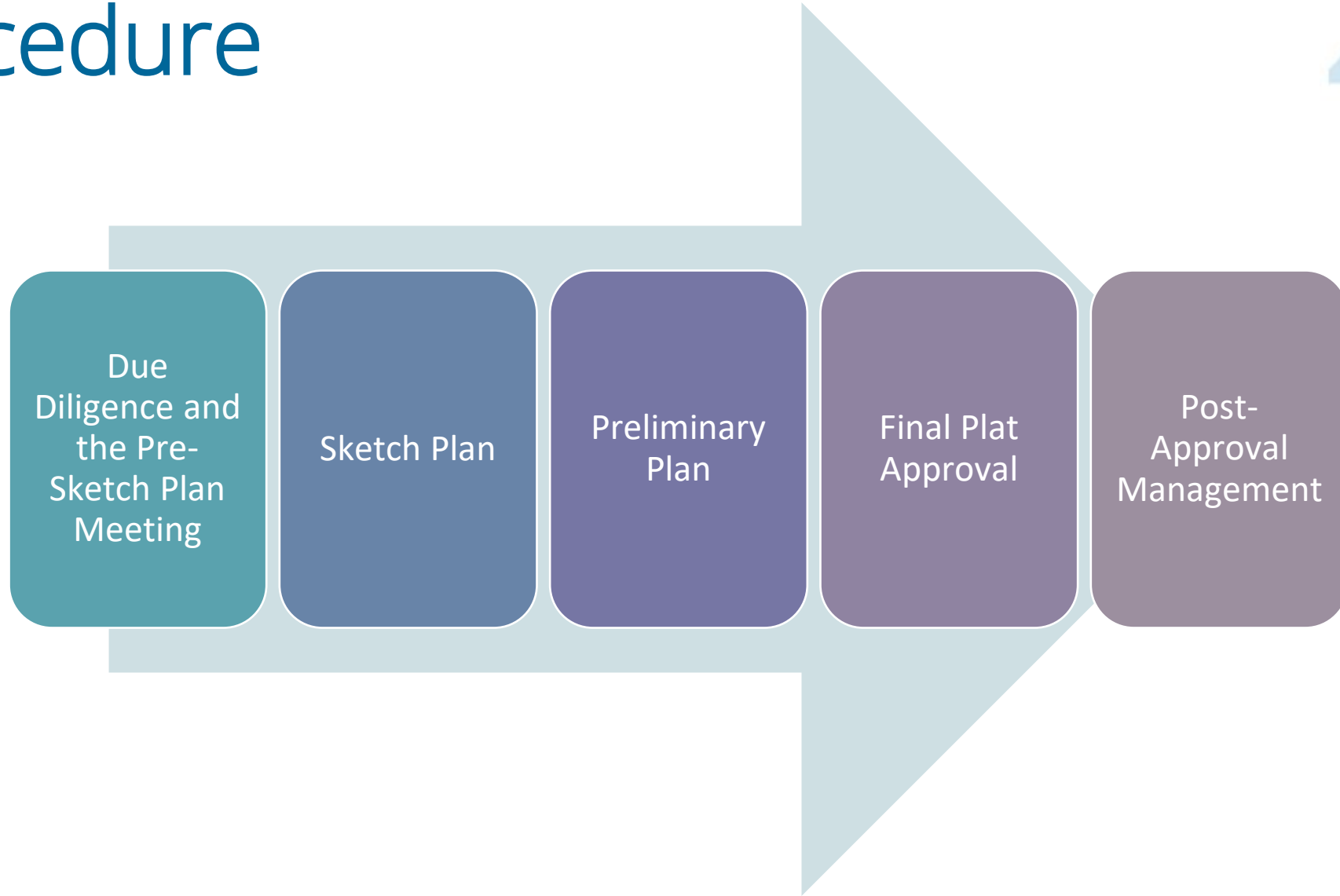
Cluster Development / Conservation Subdivision



- Needs to be outlined in subdivision regulations
- Consider “by-right” development option



Procedure



Locally adopted subdivision regulations for flood risk



Geographic Features

- Waterbodies without Identified Floodplains
- Riparian Areas
- Alluvial Fans
- Dams
- Levees



Layout and Design

- Impact Analysis and Mitigation
- Use Restrictions

Infrastructure

- Ingress and Egress
- Local Road Systems
- Utilities



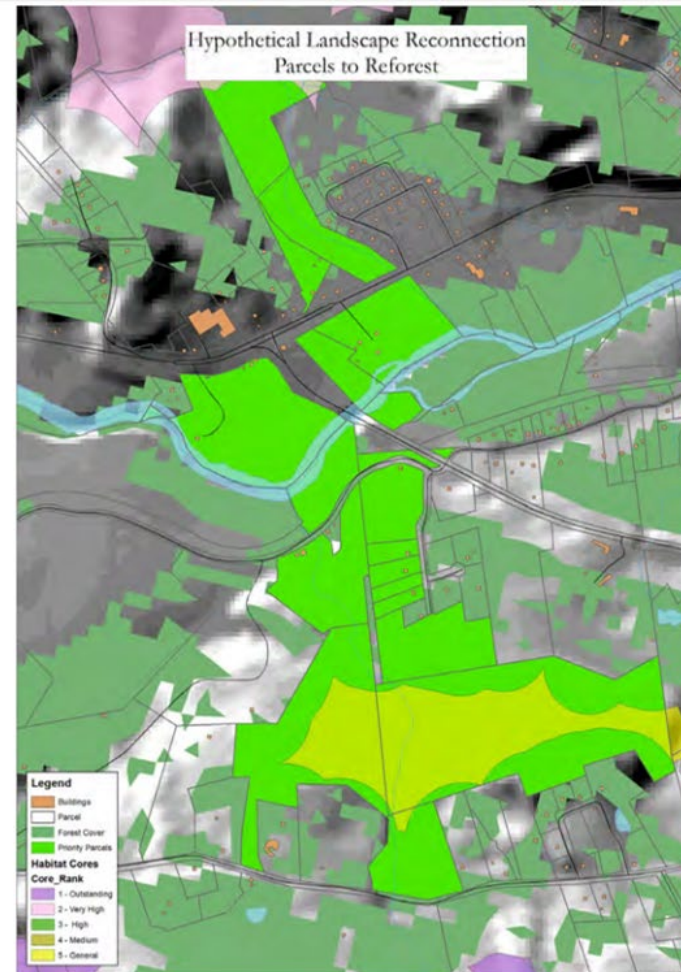
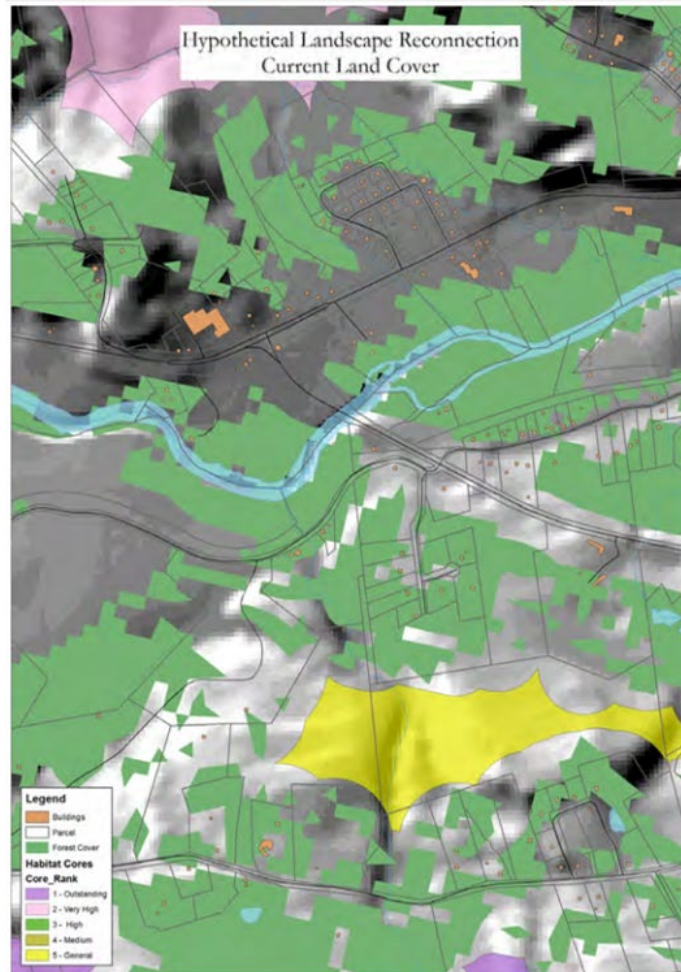


Non-structural and Structural

- ✓ Avoid land disturbance, pavement, and other impervious cover adjacent to streams, rivers, lakes, wetlands, and other water bodies
 - ✓ Ensure building sites are natural grade elevation above the regulatory floodplain
 - ✓ Avoid the 100-year floodplain for building sites, wells, or septic fields
 - ✓ Develop evacuation plans for larger subdivisions
-
- Elevate road surfaces to or above the base flood elevation or allow only a nominal amount of water to flow over the road during the 100-year flood event
 - Size culverts and bridges (other than driveway culverts) to a 100-year storm frequency
 - Locate utility easements outside flood hazard areas where possible



Watershed Management

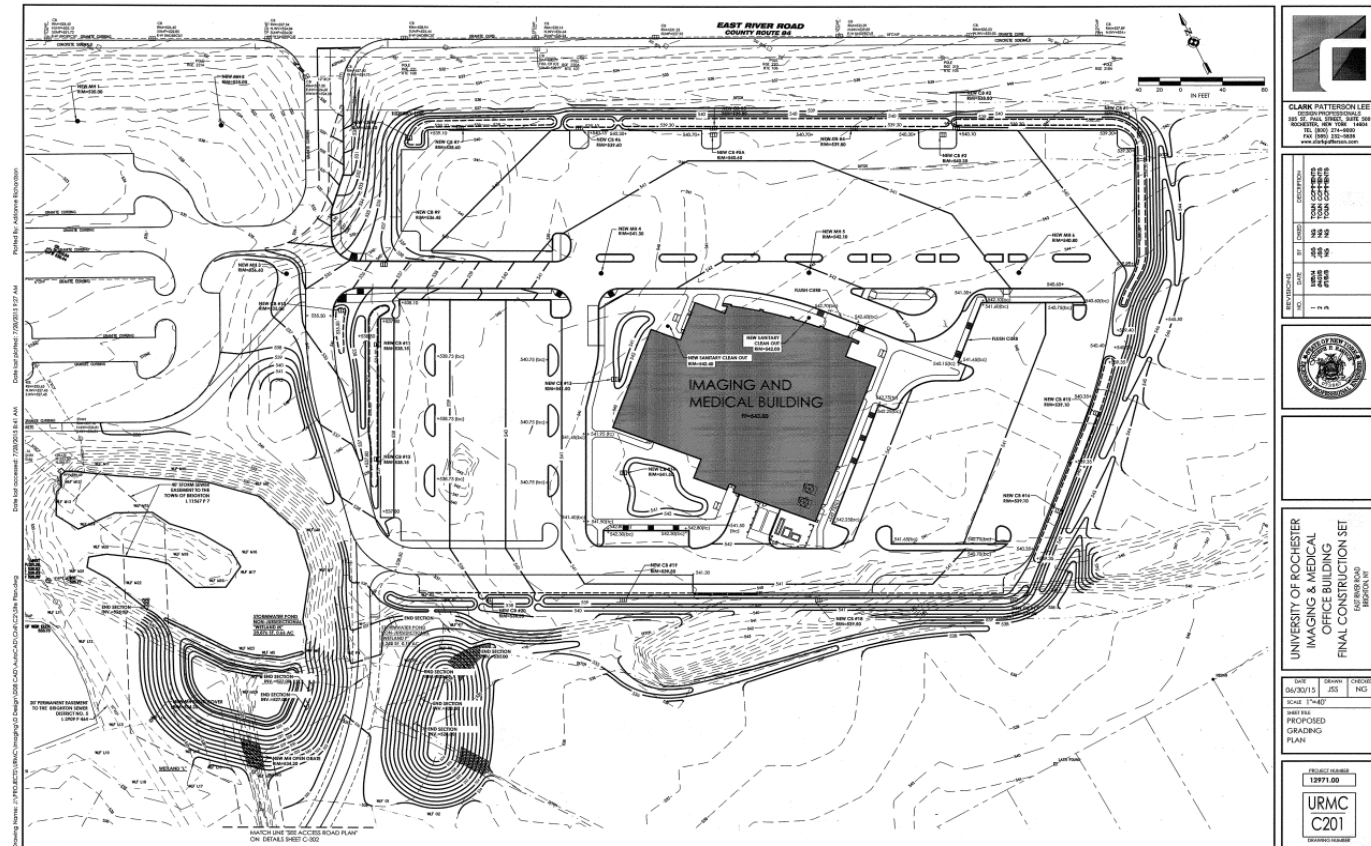


Site Plan Review

- Component of a zoning ordinance or separate enactment
- Review can apply to general class of uses (drive-in facility such as a fast food restaurant, bank or neighborhood convenience retailer) or to a proposed action in a particular area (coastal zone)

Site Plan Review

1. Illustrates the intended design, arrangement, and uses of the land to be improved
2. Describes the proposal's physical, social and economic effects on the community



Typical Development Considerations

- Means of access
- Parking
- Landscaping (e.g. filling and grading)
- Buffers (e.g. stream setbacks)
- Architectural features (e.g first floor elevation)
- Location of structures (e.g in or outside of floodplain)
- Impact on adjacent land uses and other elements related to the health, safety and general welfare of the community

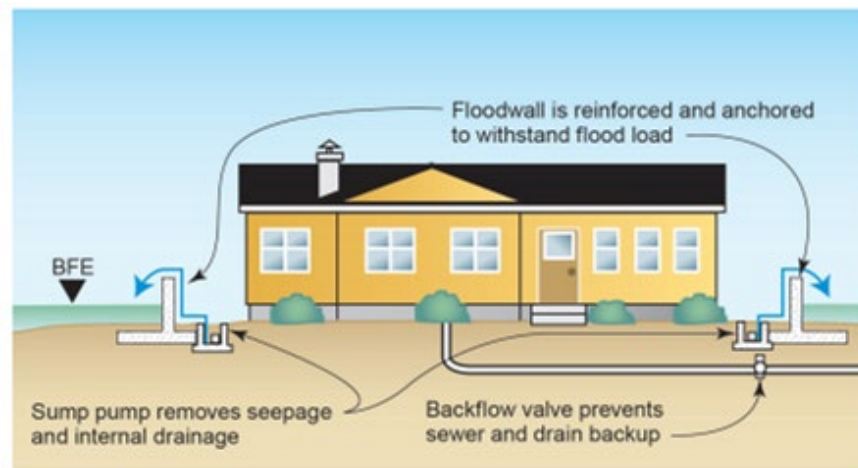
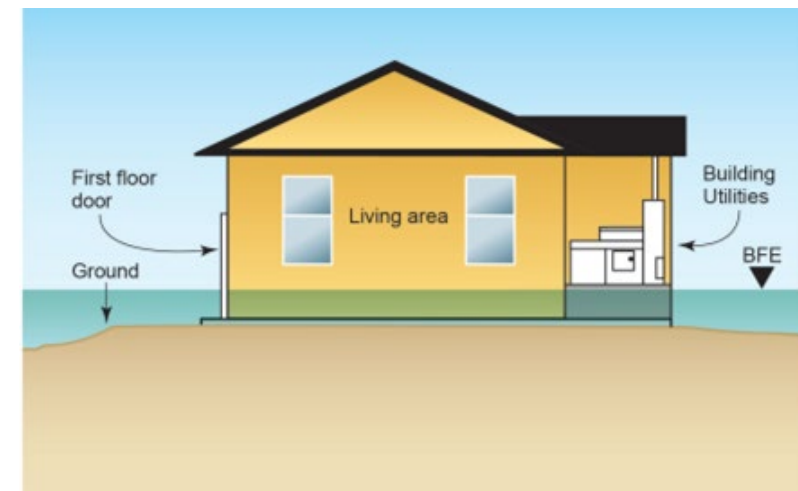
Review standards related to flood safety

- The first step in reducing runoff is to avoid impacts to the site as much as possible by preserving natural features and undisturbed areas.
- Reduce impervious cover.
- Natural features should be used to disconnect impervious areas and manage the stormwater runoff as close to the source as possible.
- Incorporate Better Site Design and Low Impact Development policies into the site plan review.
- SMPs should be to be designed and sized for a reasonable inspection and maintenance period.
- The approving board should require that all approvals be contingent upon compliance with the flood management law.

Architectural Considerations – Flood Resilience



- Basement
- Flood openings
- Elevate/floodproof building utilities
- Flood damage-resistant materials
- Barrier measures



WELCOME TO THE NEW YORK STATE FLOODPLAIN AND STORMWATER MANAGERS ASSOCIATION

MEMBER LOGIN

Not a Member? [SIGN UP](#)

STATEWIDE FLOODING STATISTICS

\$135.7M 

Annualized Loss from Flooding (1996-2018)

83 

Annualized Number of Flooding Episodes (1996-2018)

23.19% 

Daily Probability of Flooding Episode

8 

Annualized Number of Severe Flooding Episodes (1996-2018)

2.38% 

Daily Probability of Severe Flooding Episode

46 

Total Flooding Injuries (1996-2008)

84 

Total Flooding Fatalities (1996-2008)

[CLICK TO VIEW MORE DATA VISUALIZATION](#)

Source: NOAA NCEI Storm Events Dataset - [View Link](#)



RESOURCES

Useful Links, Checklists, Job Aides, Documents, Publications, and Info on Policies and Programs.

[LEARN MORE](#)



TRAINING

Well trained floodplain administrators and public officials are an essential component of keeping our communities safe.

[LEARN MORE](#)



ADVOCACY

NYSFSMA advocates on your behalf with Federal and State agencies on flood-related issues that are important to New York.

[LEARN MORE](#)

ARTICLES

No Recent Items

THE FIRST STREET FOUNDATION FLOOD RISK MODEL:

ASFPM TALKING POINTS

THE FIRST STREET FOUNDATION HAS DEVELOPED AN INTERACTIVE FLOOD RISK MODEL. ASFPM AND NYSFSMA SUPPORT ALL EFFORTS TO INCREASE AWARENESS OF FLOOD RISK, BUT WANT MODEL USERS TO BE AWARE OF ITS LIMITATIONS. BEFORE USING THE MODEL, WE SUGGEST THAT YOU REVIEW THE TALKING POINTS.

YOU MAY VIEW THE TALKING POINTS AT

[ASFPM TALKING POINTS RE FIRST STREET FOUNDATION FLOOD RISK MODEL](#)

[VIEW MORE](#)

SUCCESS STORIES



Elevation of Historic Flood-Prone Home in Stockade Neighborhood, Schenectady, NY

[VIEW ALL](#)

Our Training

- Annual conference
 - returning in Spring 2022
- Workshops
- Website
 - enhanced in 2020
- Webinars
 - new in 2021



nyfloods.org

TRAINING RESOURCES

We've compiled valuable training videos and courses, job aids, useful forms and links to state and federal program information to help you do your job more effectively! Don't see a topic of interest? Contact us to suggest it.



FLOODPLAIN MANAGEMENT

Training on Floodplain Management Topics

- National Flood Insurance Program (NFIP) Overview
- Elevation Certificates
- Floodplain Development Permits

[VIEW ALL](#)



FLOOD HAZARD MAPPING

Training on Topics Related to Flood Insurance Rate Maps, Map Change Processes, and Related Topics

- How to read and use Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies (FIS)
- Letters of Map Change

[VIEW ALL](#)



FLOOD INSURANCE

Training on Flood Insurance Related Topics of Interest to Floodplain Administrators

- Flood Insurance - How it Relates to Roles/Responsibilities of Floodplain Administrators
- Community Rating Systems (CRS)

[VIEW ALL](#)

CONCLUSION



Current Approaches Create Future Disasters

If we continue to encourage at-risk development and ignore the impact to others, can we accept the consequences...

... and, are you willing to pay for it?

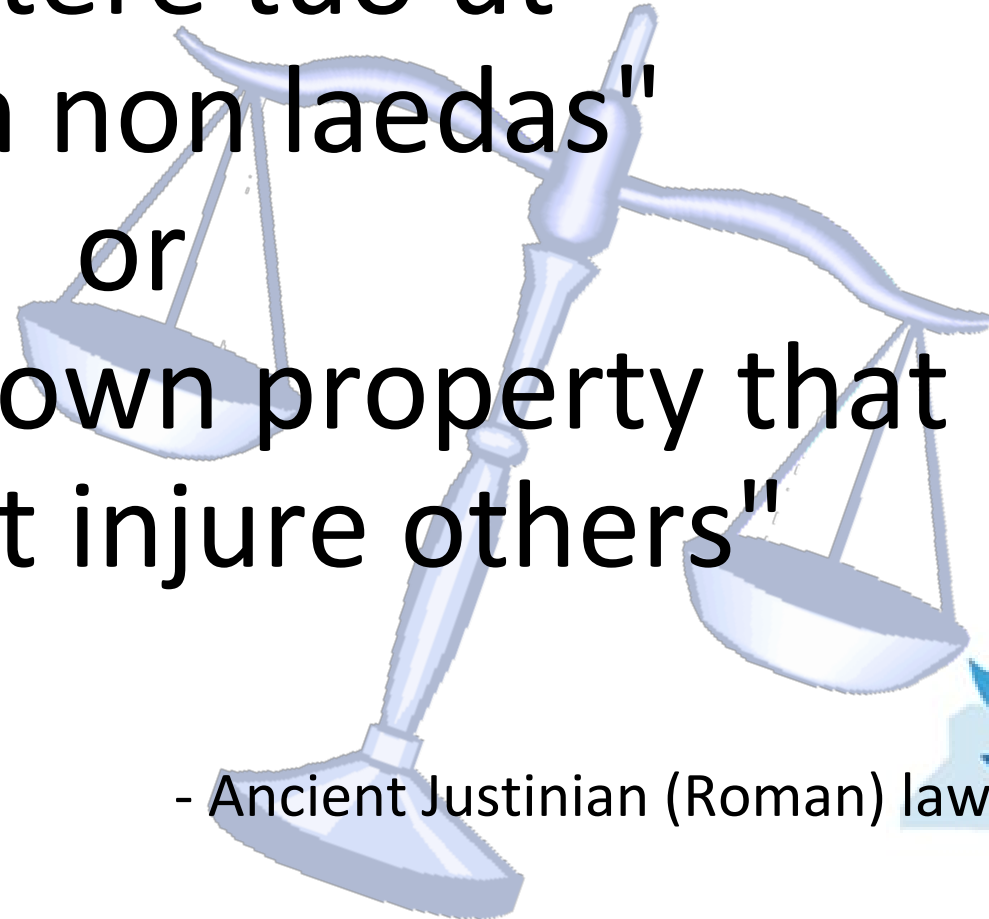


It is the civic duty of local governments to protect the health, safety, and welfare of the people who are served.

"Sic utere tuo ut
alienum non laedas"

or

"So use your own property that
you do not injure others"



nyfloods.org

- Ancient Justinian (Roman) law

Questions? Comments?

Brent Gotsch, CFM Resource Educator
Janet Thigpen, CFM Flood Mitigation Specialist
John Caterino, CFM Planner

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