



Local Ordinance: Resilient Quotient to address Flooding & More

Point-Based System for Managing Shocks & Stresses

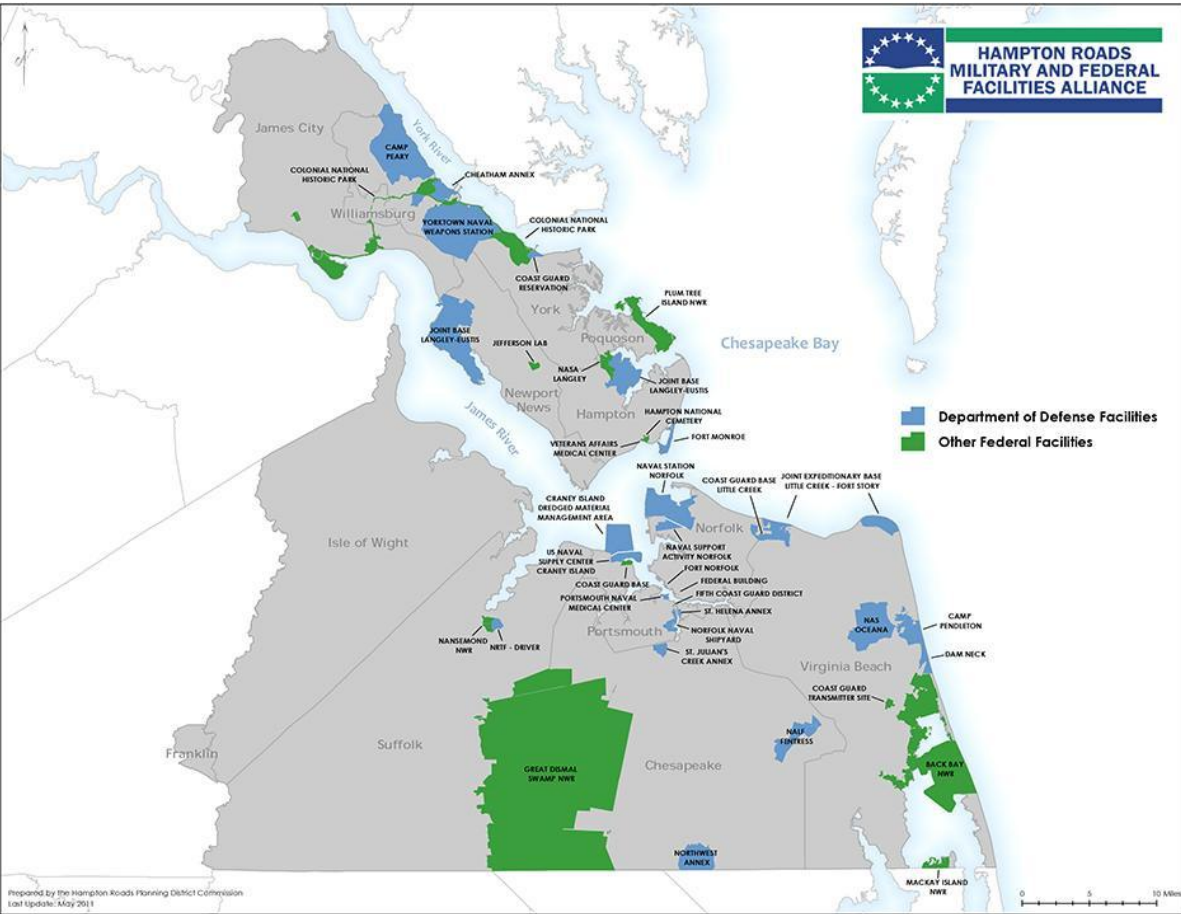
*2020 Local Government Forum: Building Local Community
Resilience Against Climate-Related Flooding*

September 24, 2020

Norfolk Councilwoman Andria McClellan

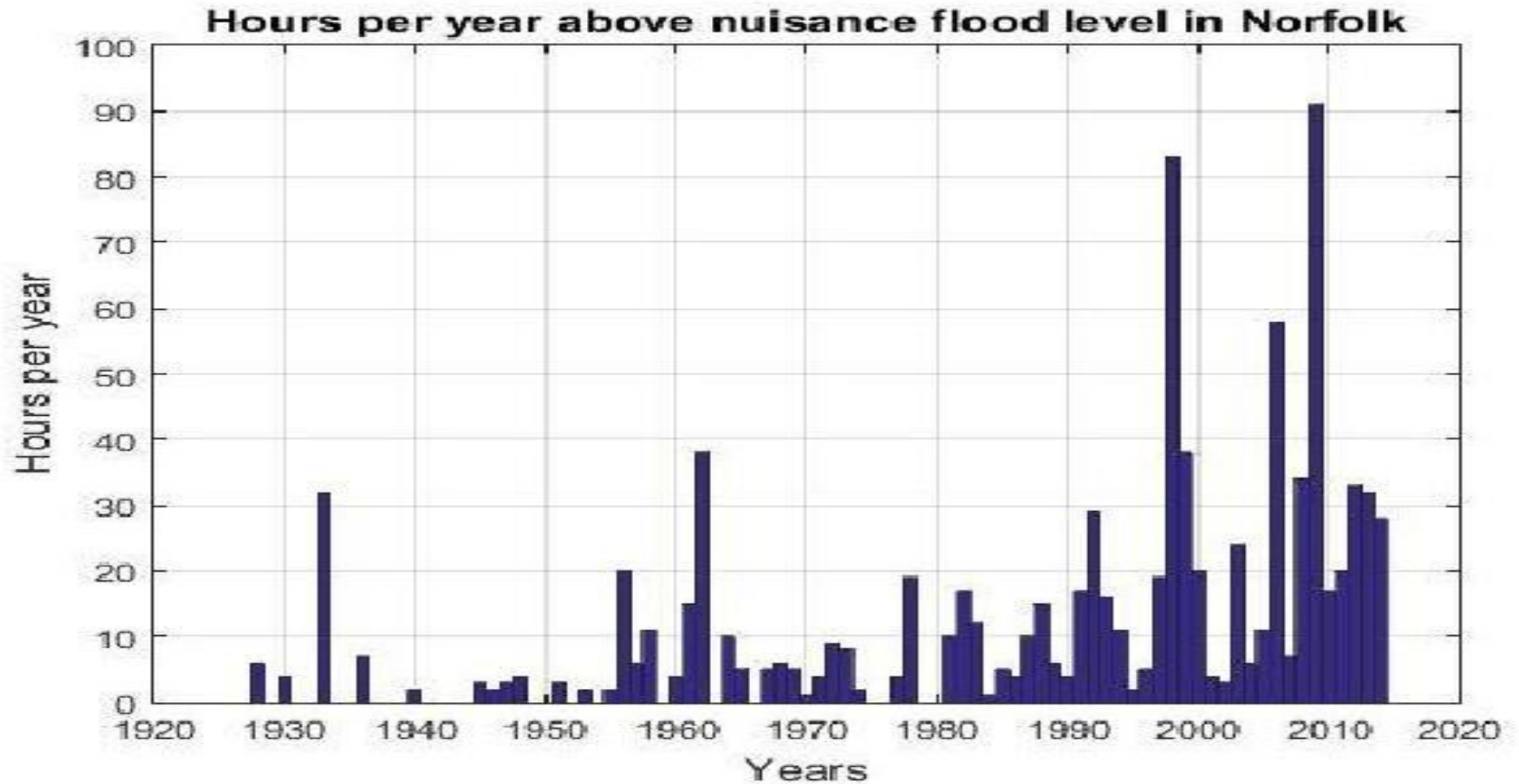
Andria.McClellan@Norfolk.gov

Our region has the nation's largest concentration of military and federal assets.

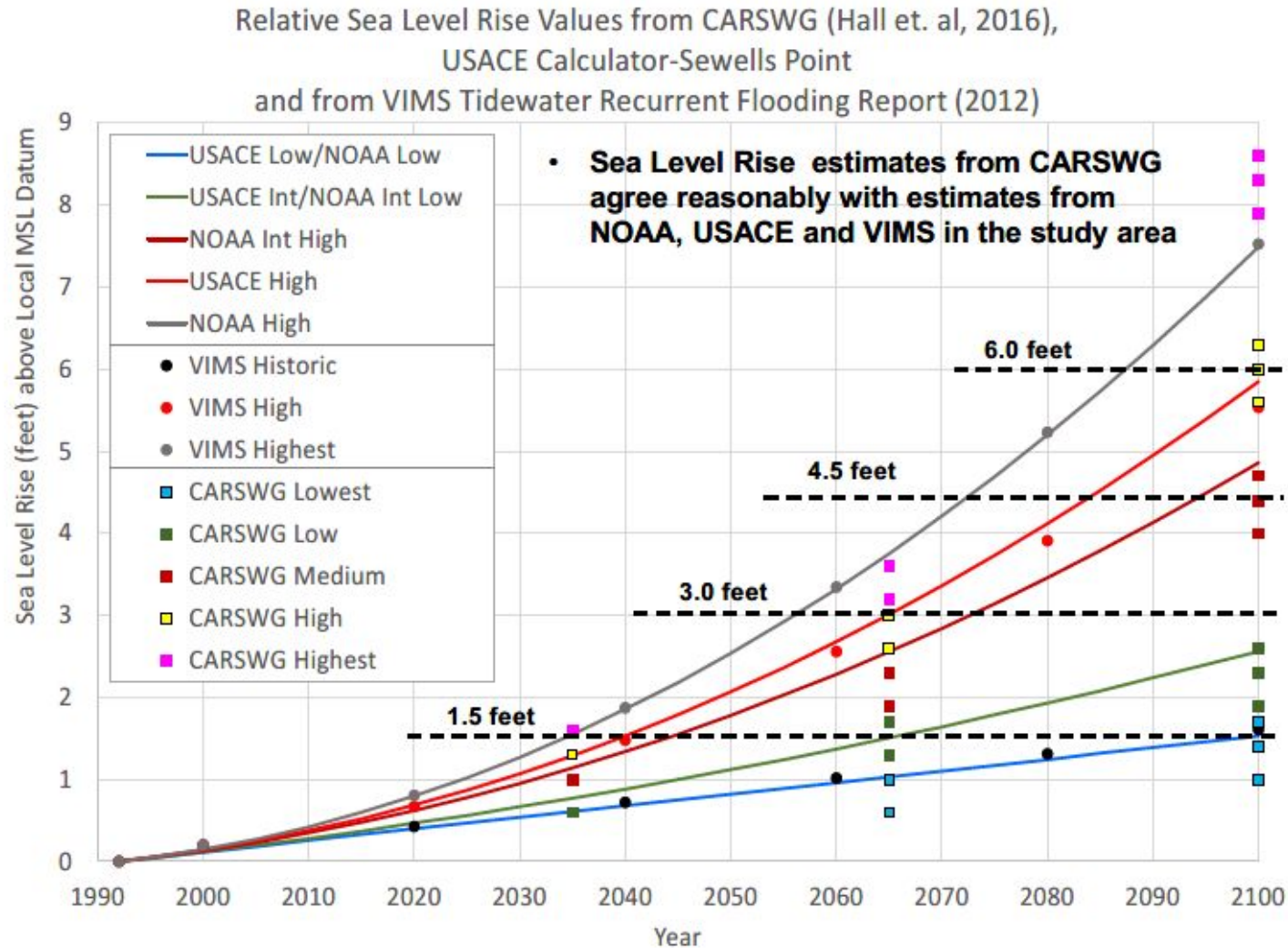


And our access roads flood regularly.

"Sunny Day Flooding" is real!



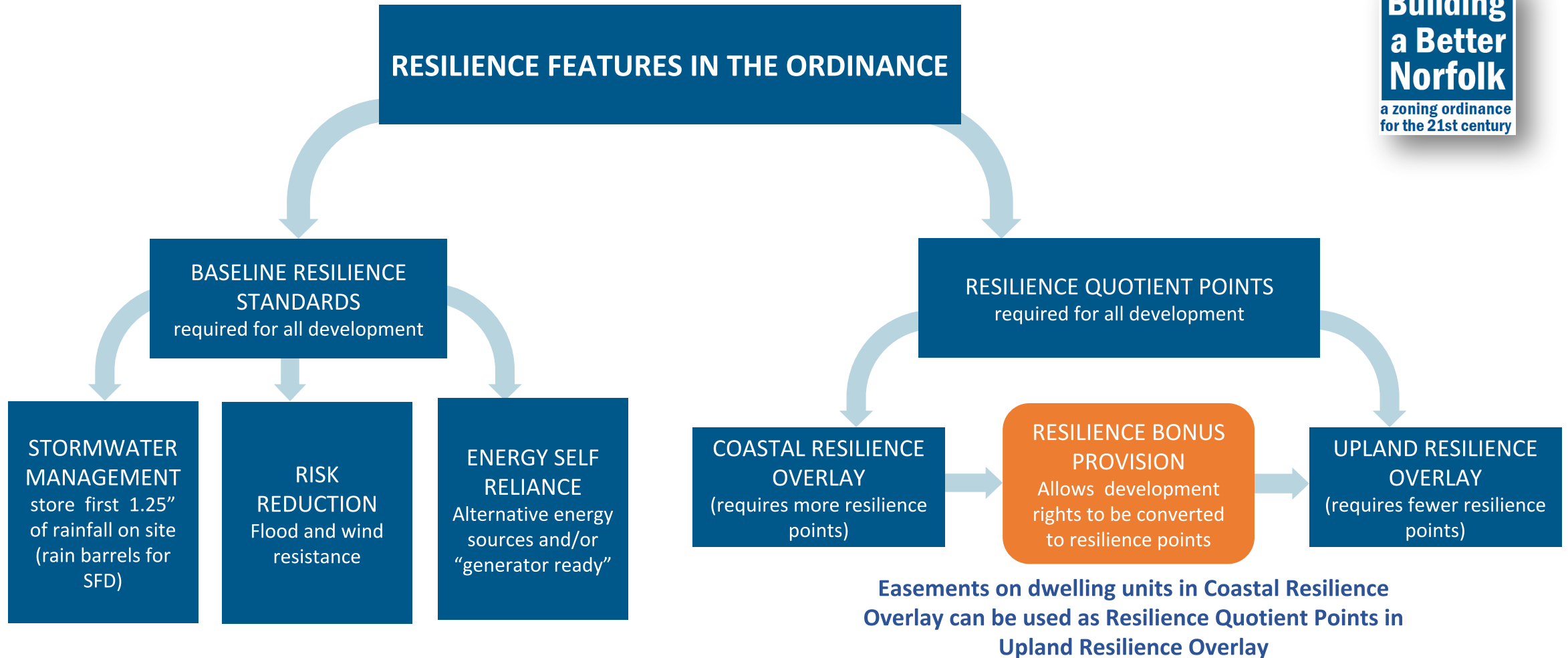
Adopted SLR estimates for planning *regionwide*



2050: 1.5'
2080: 3'
2100: 4.5'

How can Zoning Respond to Resilience Challenges?

- Norfolk has adopted “Rise Above the Risk” Approach
- Freeboard requirements:
 - 3’ in SFHA
 - 18” in Shaded X
 - 16”-24” everywhere else in City
 - No new basements
- But, not enough...a new zoning ordinance was needed
 - 3 year process, finally adopted in 2018
 - Push back from building community





Provide Flexibility to Developer and Property Owner to use the resilience tactics that work best for the specific project while still contributing positively to meeting the City's resilience strategies

Premise of Resilience Quotient

Resilience Strategy in Zoning

Focus on flexibility and choice

- Must do—build into requirements
- Should do—create options
- Nice to do—provide a bonus

Add operational characteristics

Resilience Quotient is a blend of all



Resilience Quotient

Creating the most resilience-focused zoning ordinance in America

- Encouraging the use of resilient technologies
 - Stormwater management
 - Risk mitigation
 - Energy resilience
- Required of new development

TABLE 5.12.6: RESILIENT POINT SYSTEM FOR RESIDENTIAL DEVELOPMENT

Resilient Development Activity	Points Earned
Component 1: Risk Reduction	
Construct building to meet 110-mile wind load design requirements of the VUSBC	2.00
Elevate the ground story finished floor and all significant electrical and mechanical equipment no less than 3 feet above highest adjacent grade	1.00, plus 0.50 per ft. above 3 ft.
Construct an impact-resistant (hail, tree damage) roof	0.50
Install impact (hurricane or wind) resistant windows	0.50
Install operable storm shutters	0.50
Establish operating procedures for how the project will handle loss of off-site or grid power, transition to a backup source of power, and transition back to normal operation	0.50
Component 2: Stormwater Management	
Install a "green roof" on at least 50 percent of the total roof area (25 percent for renovated buildings) and only plant materials permitted in Section 5.2, Landscaping Standards	2.00
Install a "green roof" on at least 25 percent of the total roof area and only plant materials permitted in Section 5.2, Landscaping Standards	1.00

C. ALTERNATIVE N

Any multiple dwelling resilience quotient sta

of the portion of the site plan review process established in Section 5.12.4, Compliance with Resilience Quotient Standards, above. The point system provides options within each of three components and each development shall achieve a minimum number of points from the menu of options shown in Table 5.12.6, Resilient Point System for Residential Development, based on the number of dwelling units within the development as shown below.

- (1) 1 to 5 units: 4 points total, no less than 1 point per component.
- (2) 6 to 29 units: 5 points total, no less than 1.5 points per component.
- (3) 30 to 89 units: 6 points total, no less than 1.5 points per component.
- (4) 90 to 199 units: 8 points total, no less than 2 points per component.
- (5) 200 or more units: 10 points total, no less than 2 points per component.

Resilience Quotient Administration

- Point system is only one option of several:
 - Elevating the structure (8-16 inches) and capturing stormwater (200 gallons for SFD, first 1.25 inches of rainwater for others)
 - Structures achieving LEED Gold or equivalent are exempt
 - Historic rehabs are exempt
- Zoning Administrator authorized:
 - To approve minor deviations from point system, or
 - To review proposed alternatives that achieve the same resilience goals

Resilience Quotient Example



The Tern Conceptual Master Plan

Norfolk, Virginia
May 2, 2018

SITE DATA:

Total Site Area: ± 7.2 a.c.
Proposed Zoning: PD

Units Provided: 96 Units

4 Story Townhomes (20'x47'): 22 Units

3 Story Townhomes (21'x34'): 49 Units

Carriage Homes (26'x26'): 25 Units

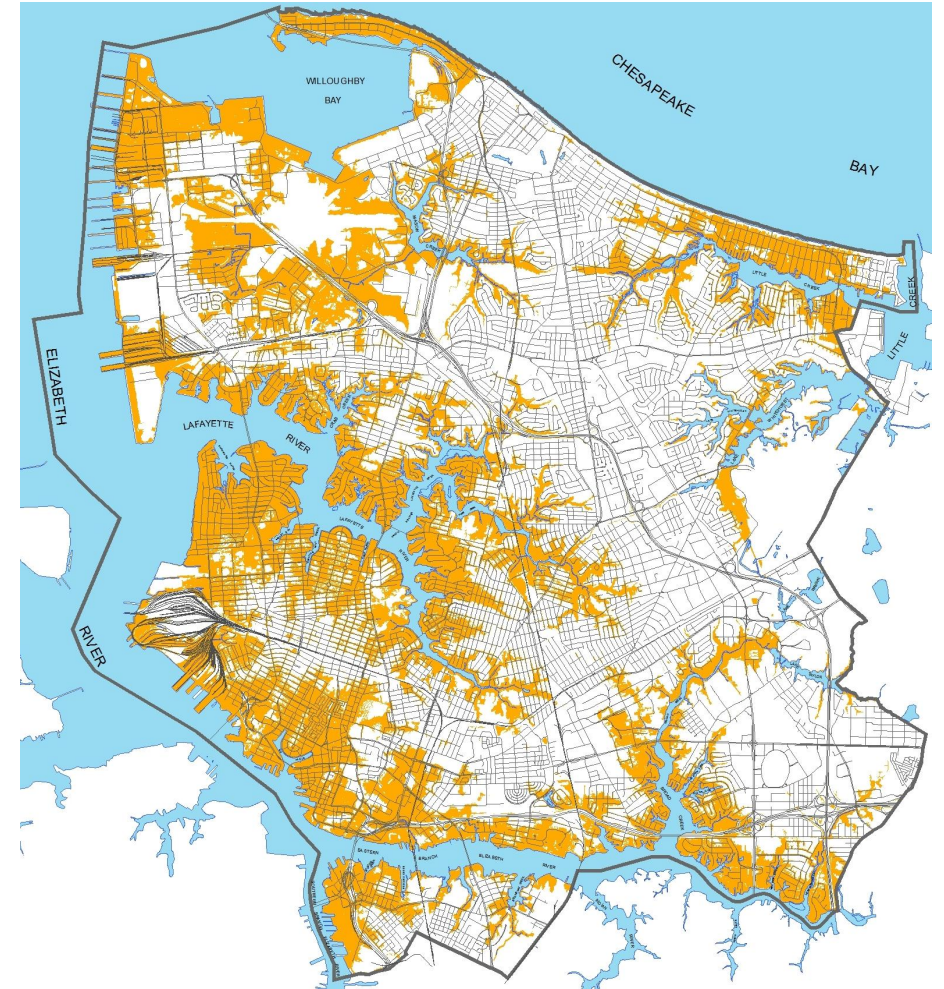


Points Breakdown

Total Project (96 townhomes, 30,000 sf retail)	8.0 points
Component 1	3.0
Construct to 110-mile wind	2.0
Elevate the ground story first floor elevation	1.0
Component 2	3.0
Treat 25% of site generated runoff	1.0
Treat an additional 25% of site generated runoff	1.0
Provide fenced community space	1.0
Component 3	2.0
Equip each unit with a generator hookup	1.0
Provide 2 operable windows on 2 exterior walls	0.5
Re-use existing non-historic retail building	0.25
Install tankless water heating system (in 1/2 units)	0.25 (1/2)

Resilience Overlays

- Coastal Resilience Overlay
 - Applies to high flood risk areas
- Upland Resilience Overlay
 - Applies outside high flood risk areas
- Neighborhood Resilience Overlay
 - Applies to selected neighborhoods



Resilience Overlays

- Coastal Resilience Overlay (CRO)
 - Applies to all properties within a high-risk flood zone (V, A, or X-shaded)
 - Requires:
 - Additional points from Resilience Quotient table
 - All landscaping to be salt tolerant/native species
 - All parking and open space to be pervious
 - Limits parking to 110% of the minimum required



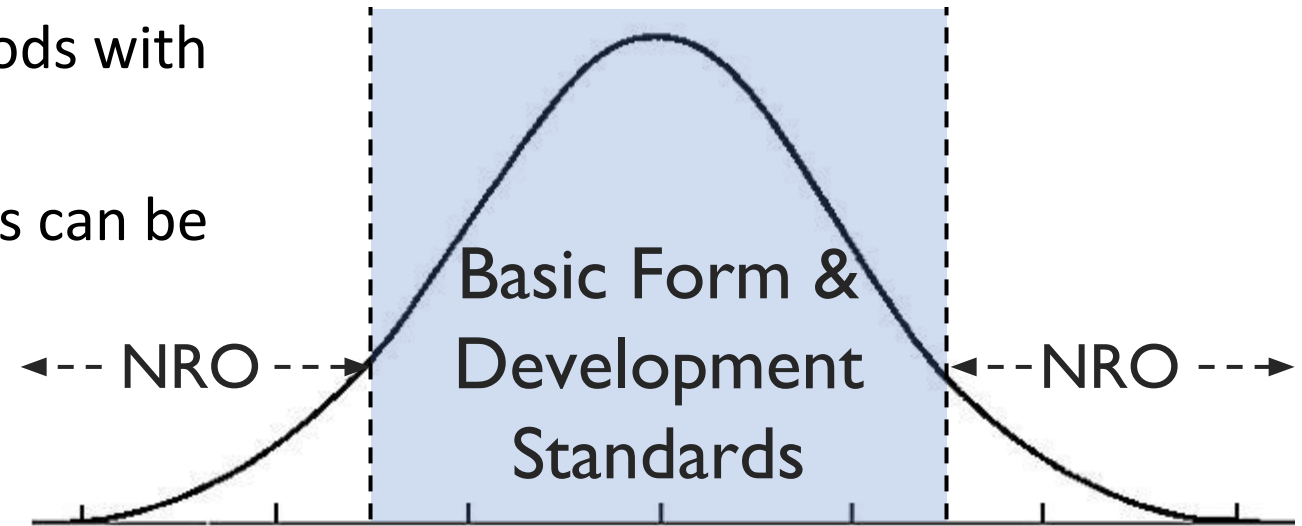
Resilience Overlays

- Upland Resilience Overlay (URO)
 - Applies to all properties outside a high-risk flood zone
 - Allows up to four points to be counted towards the point system requirements for extinguishing a development right in the CRO



Resilience Overlays

- Neighborhood Resilience Overlay (NRO)
 - Designed to support neighborhoods with unique development character
 - Form and development standards can be tailored to fit needs of individual neighborhoods





Operational Standards

Several uses are required to maintain power through generators:

- Assisted Living
- Nursing Home
- Pharmacy
- Bank
- Convenience Store
- Grocery Store
- Gas Station

What else is Norfolk doing?

- 100 Resilient Cities
- Adopted the country's "most resilient zoning code"
- Climate Action Plan
- NDRC/HUD \$\$ creating "coastal community of the future"
- RISE Accelerator challenge grants
- Smart Sensors/WAZE connected city
- **Regional** efforts
 - HRPDC Coastal Resilience Subcommittee, inventory of all water projects, legislative agenda
 - GetFloodFluent.org
 - American Flood Coalition membership
- NFIP Community Rating System, reducing flood insurance rates

Thank you!



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