Welcome to APA Hazard Division

Christine Caggiano

Sea Level Change:
Coastal Hazard Zones, Best management practices, permitting and planning

October 2, 2020

APA Hazard Mitigation and Disaster Recovery Division

Matt Campo, Senior Research Specialist, Rutgers
Nicole Faghin, Coastal Management Specialist
Washington Sea Grant

Sea Grant Washington

RUTGERS
Edward J. Bloustein School of Planning and Public Policy

Sea Level Rise and Planning Series 2020 - 2021

WEBINAR 1: Sea Level Rise 101: How to Select and Use Sea Level Rise Data for Planning and Policy Decisions

WEBINAR 2: Integrating Sea Level Rise into Plans

LOCATION: http://www.youtube.com/planningwebcast

UPCOMING DECEMBER 2, 2020!
WEBINAR 4: Sea Level Rise and Capital Facilities Planning

Nicole Faghin
Washington Sea Grant

Sea Grant
Washington

Matt Campo
Rutgers University

RUTGERS
Edward J. Bloustein School
of Planning and Public Policy

An introduction

Nicole Faghin, Washington Sea Grant

Sea Grant
Washington

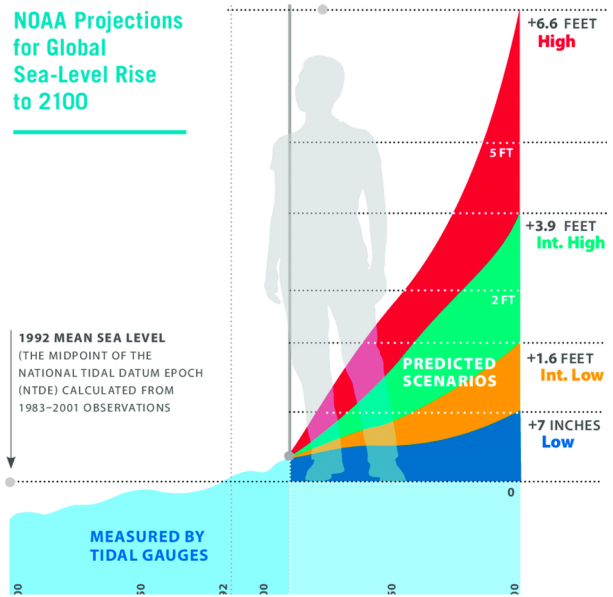
What we covered in the first webinar

Components of sea level change

Scenario vs Probabilistic models

Example from Washington State

Tools

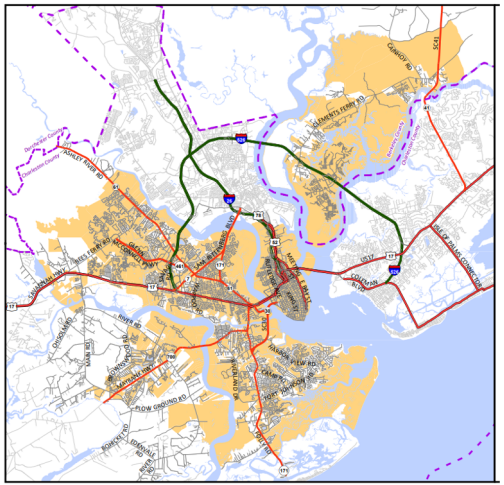


Link for our first webinar:

https://www.youtube.com/watch?v=qpFbcf5Mgpw&feature=youtu.be

What we covered in the second webinar

How different jurisdictions are using sea level rise projections in their planning processes



State coordinated approaches
Independent jurisdictional approach
Differing approaches to integrating projections

Link for our second webinar:
https://www.youtube.com/watch?v=PdezO76Sbmg&t=1614s

Overview of Coastal Hazard Zones

Matt Campo, Rutgers University

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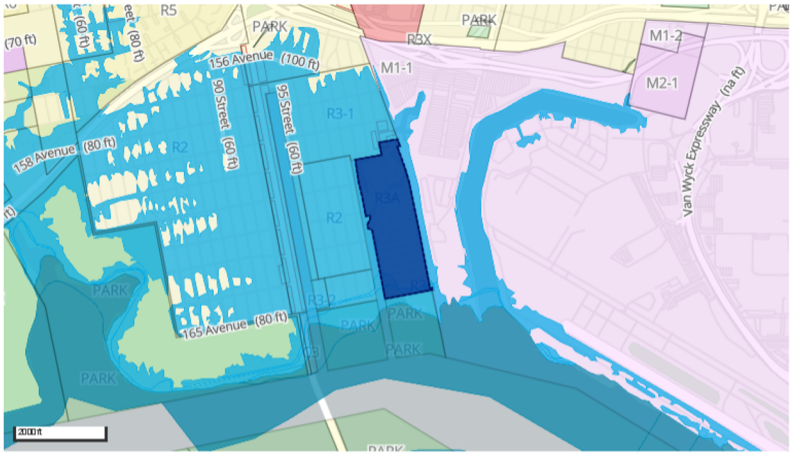
of Planning and Public Policy

Today, we will cover tools for implementation

- From the plan to the map (or ordinance, or…)
- Planning tools
  - Districts, zones, hazard areas...
- How to get there:
  - What authorities do you need?
  - What strategies partner with these tools?
  - What to know along the way...



Special Purpose District | CR

Special Coastal Risk District

Since 1969, the City Planning Commission has designated special zoning districts in response to areas of the City with unique characteristics. Each special district stipulates zoning requirements and incentives tailored to specific conditions that may not lend themselves to generalized zoning and standard development.

https://zola.planning.nyc.gov/

Introduction of our guest speakers

Lara Whitely Binder, King County, WA
Michael Marrella, New York City, NY
Matthew Simons, Norfolk, VA

NEXT IN THE SERIES....

TOPIC: Sea Level Rise and Capital Facilities Planning

DATE: December 2, 2020

Contact information

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Matthew.Simons@norfolk.gov

Preparing for Sea Level Rise in King County

LARA WHITELY BINDER

CLIMATE PREPAREDNESS SPECIALIST

KING COUNTY

APA HMDR Division Sea Level Rise Trainings

October 2, 2020

King County

CLIMATE ACTION

Clean Future. Strong Communities.

About the King County Shoreline – variations on a theme


West Point Treatment Plant


Low-lying arterials

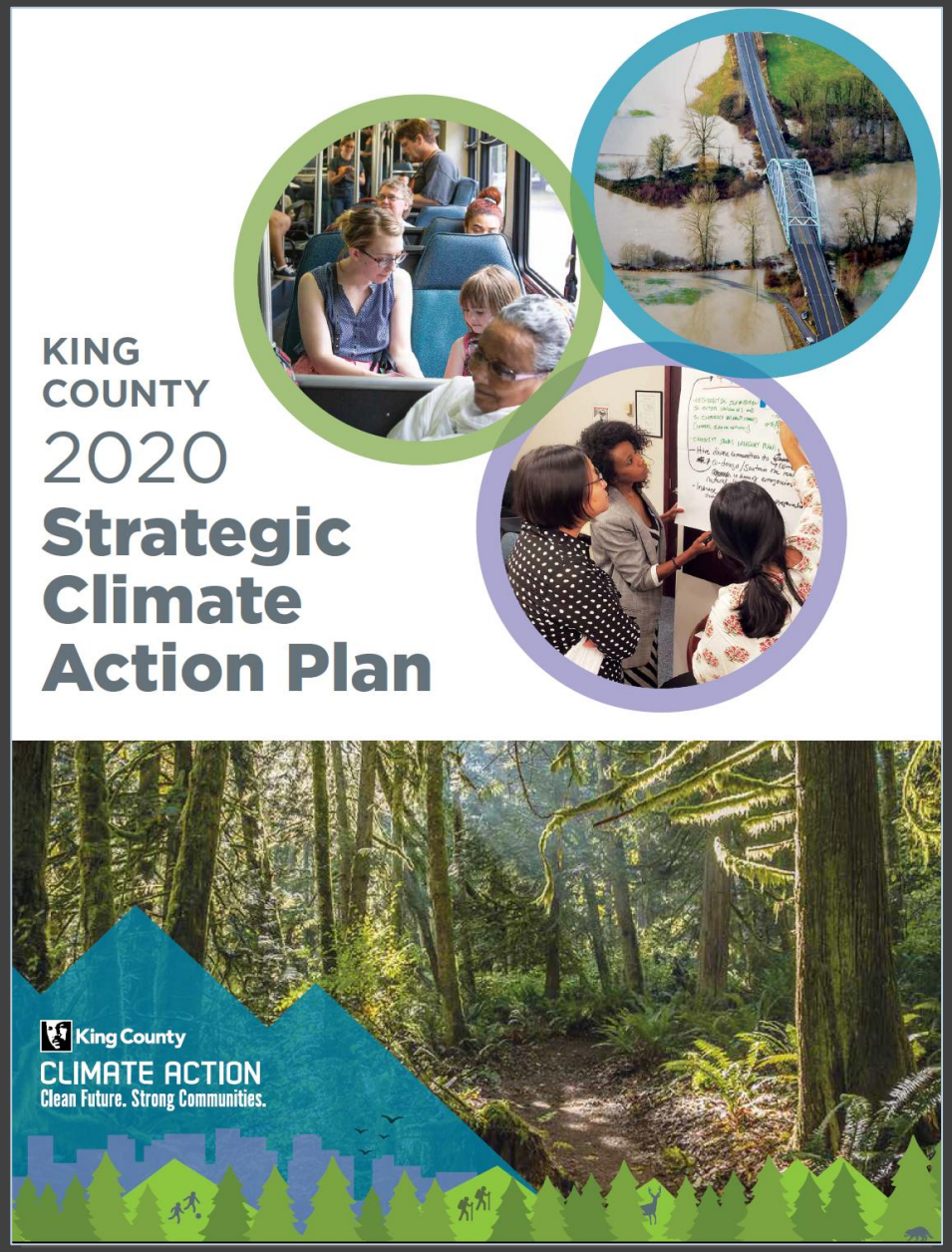

Natural areas


Outfalls and pump stations


Residential development


Aging bulkheads


Bluff erosion



KING COUNTY STRATEGIC CLIMATE ACTION PLAN (SCAP)

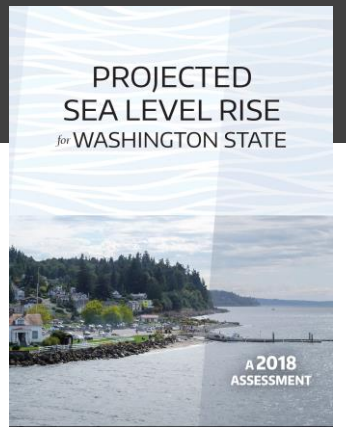
5-year strategy for:

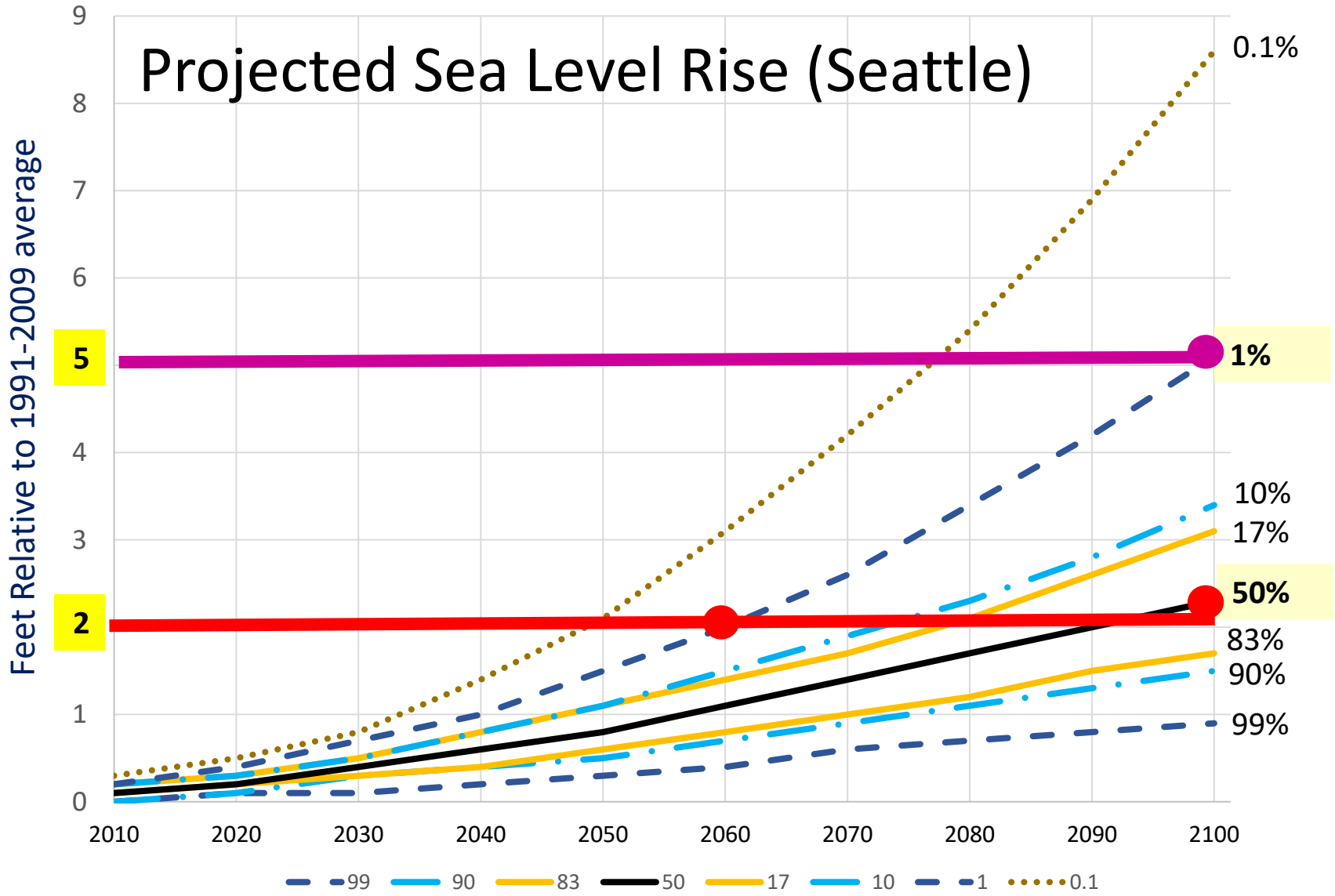
- reducing greenhouse gas emissions
- preparing for the impacts of climate change
- advancing climate equity

EARLY (AND ONGOING) QUESTIONS

1. How much sea level rise do we plan for?
2. How do we address developed properties?
3. How do we address the nearshore squeeze?
4. When to move infrastructure?
5. How/when to engage on impacts to other concerns not managed by the County?
6. What information is needed to make the difficult decisions?

“Picking the Number(s)” for King County





Probability of exceedance value =

% probability that sea level rise will be *higher* than the value shown

Yellow = values King County used in most recent mapping

Source: Washington Coastal Resilience Project, Miller et al. (2018)

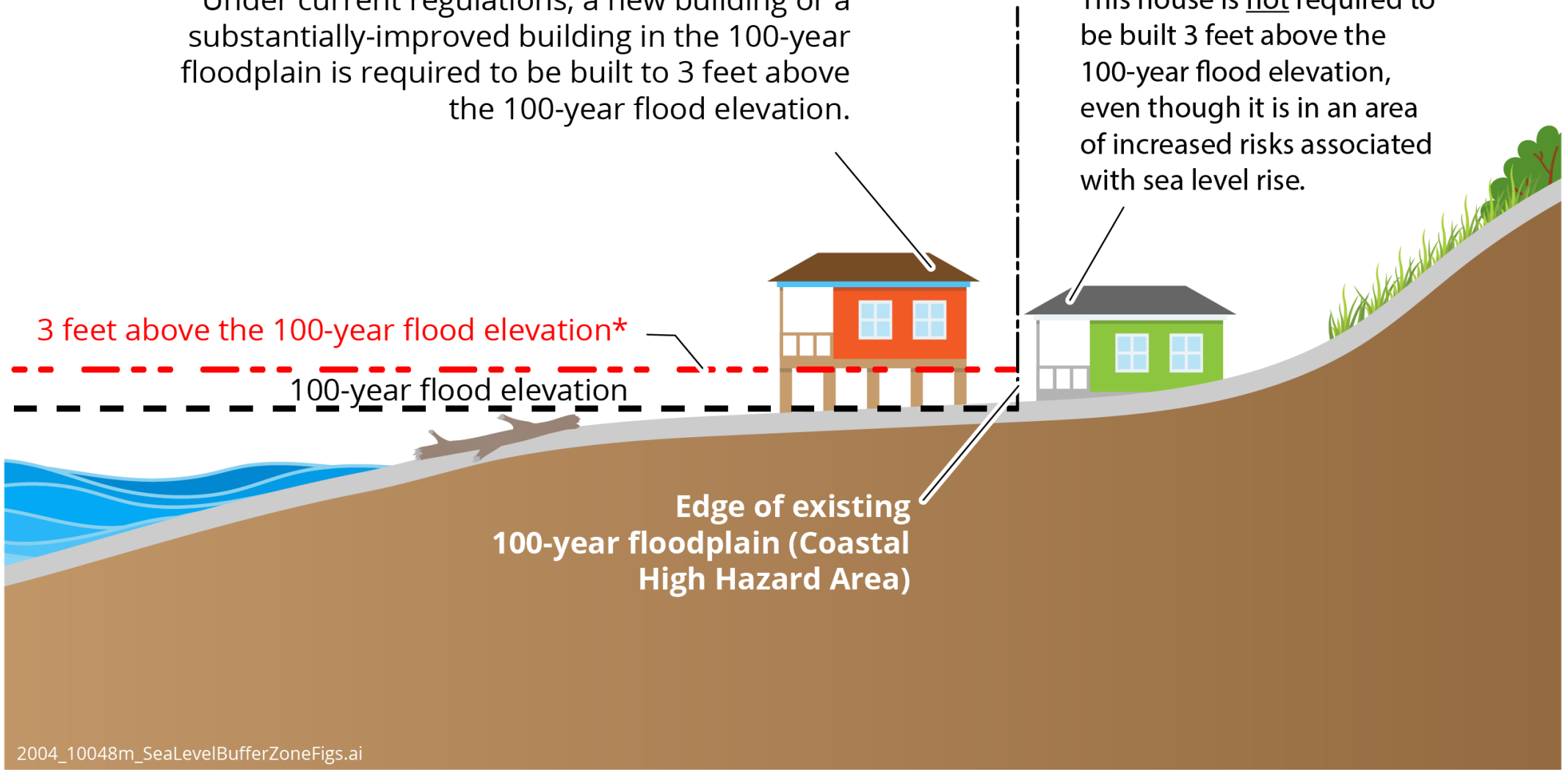
Addressing Changes in Coastal Flood Risk

Existing Coastal Floodplain Regulations

(Prior to new code amendments adopted July 24, 2020)

Under current regulations, a new building or a substantially-improved building in the 100-year floodplain is required to be built to 3 feet above the 100-year flood elevation.

This house is <u>not</u> required to be built 3 feet above the 100-year flood elevation, even though it is in an area of increased risks associated with sea level rise.



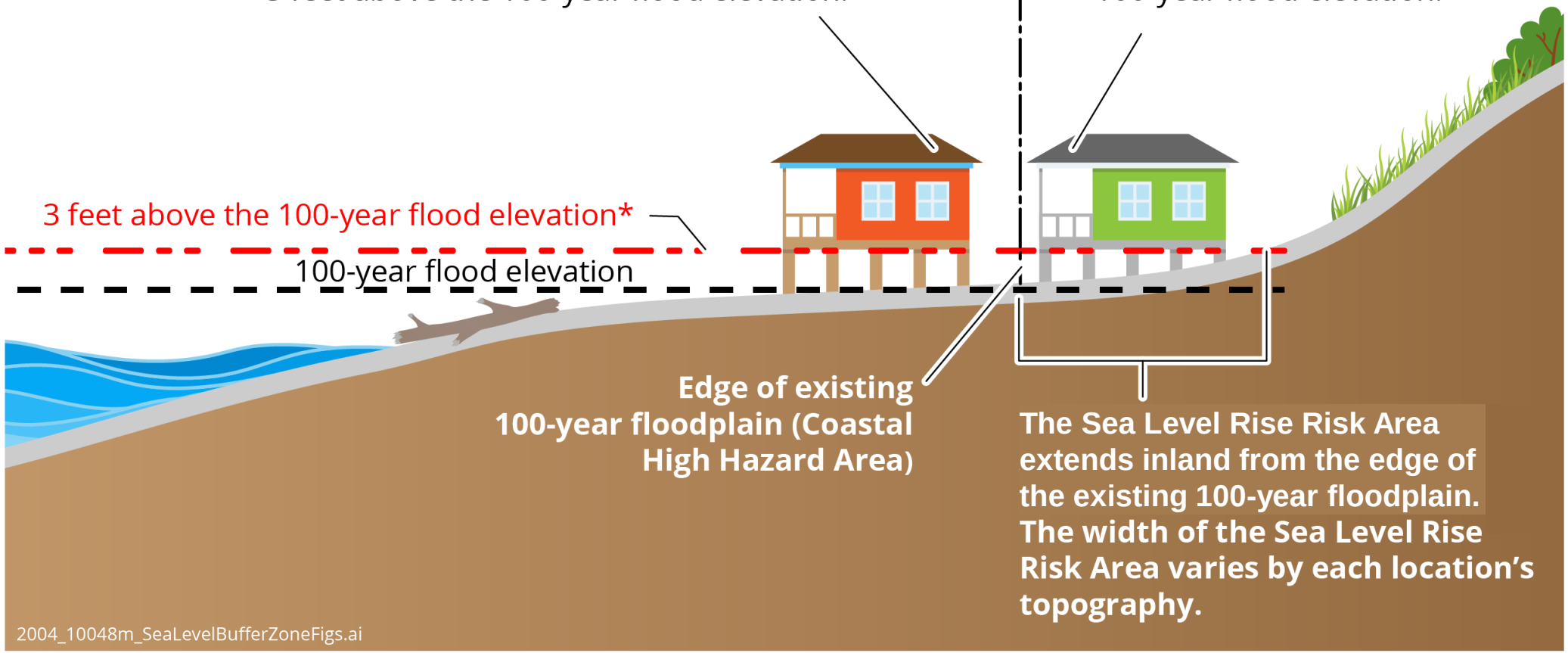
* The 100-year flood elevation varies by location and specific coastal hazard zone. For maps of King County's coastal high hazard areas, visit: https://www.kingcounty.gov/services/environment/water-and-land/flooding/maps/flood-insurance-rate-maps.aspx.

Existing Coastal Floodplain Regulations

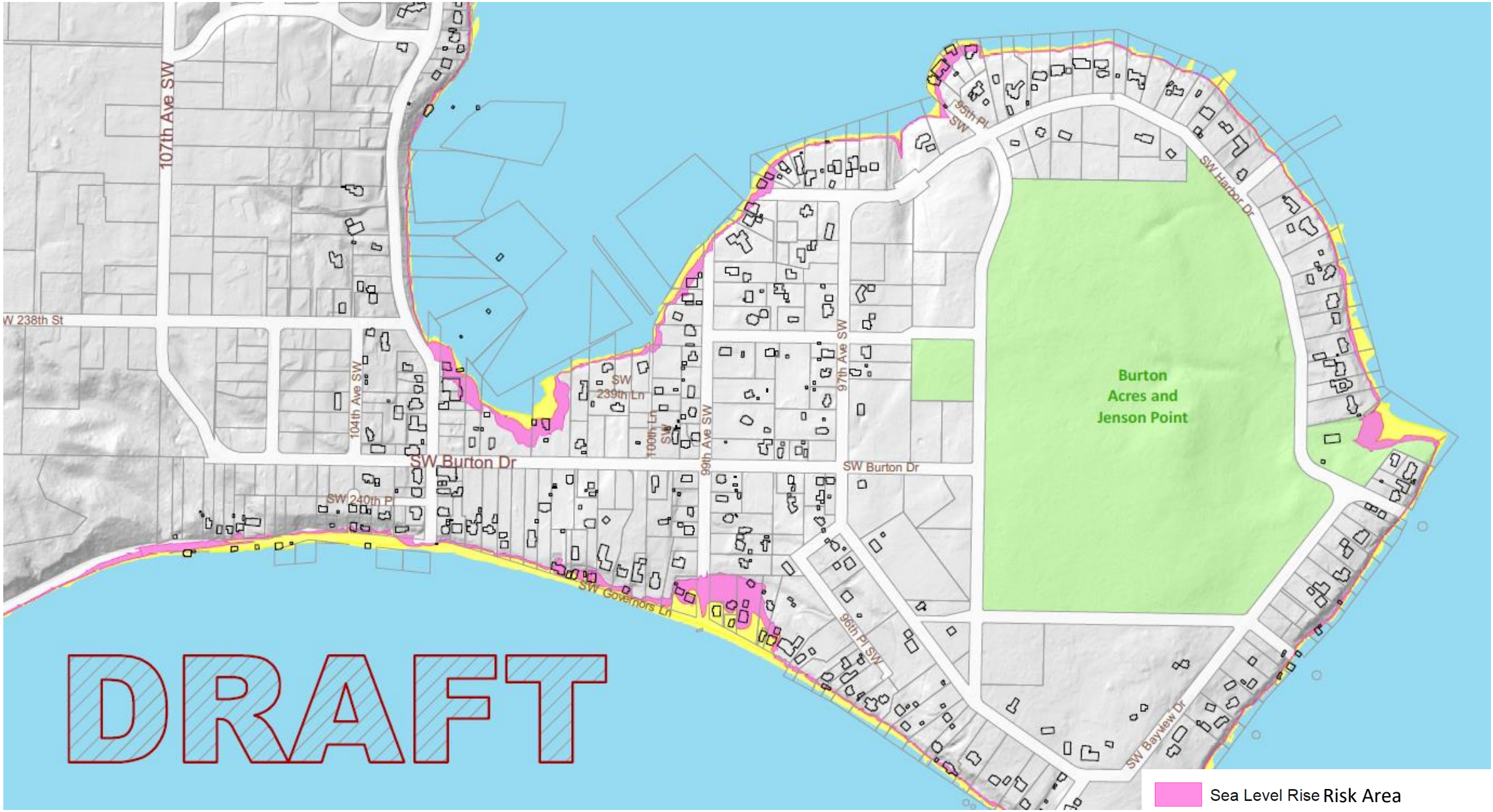
New Sea Level Rise Risk Area

Under current regulations, a new building or a substantially-improved building in the 100-year floodplain is required to be built to 3 feet above the 100-year flood elevation.

Under the adopted regulations, this building is now required to be built 3 feet above the 100-year flood elevation.



* The 100-year flood elevation varies by location and specific coastal hazard zone. For maps of King County's coastal high hazard areas, visit: https://www.kingcounty.gov/services/environment/water-and-land/flooding/maps/flood-insurance-rate-maps.aspx.


107th Ave SW
W 238th St
104th Ave SW
SW 239th Ln
100th Ln SW
99th Ave SW
97th Ave SW
95th Pl SW
SW Harbor Dr
SW Burton Dr
SW Burton Dr
SW 240th Pl
SW Governors Ln
96th Pl SW
SW Bayview Dr
Burton
Acres and
Jenson Point
DRAFT
Sea Level Rise Risk Area
Preliminary 100-year Floodplain – Coastal Only
Current Mean Higher High Water

WHY 3 FEET?

Connection to existing policy

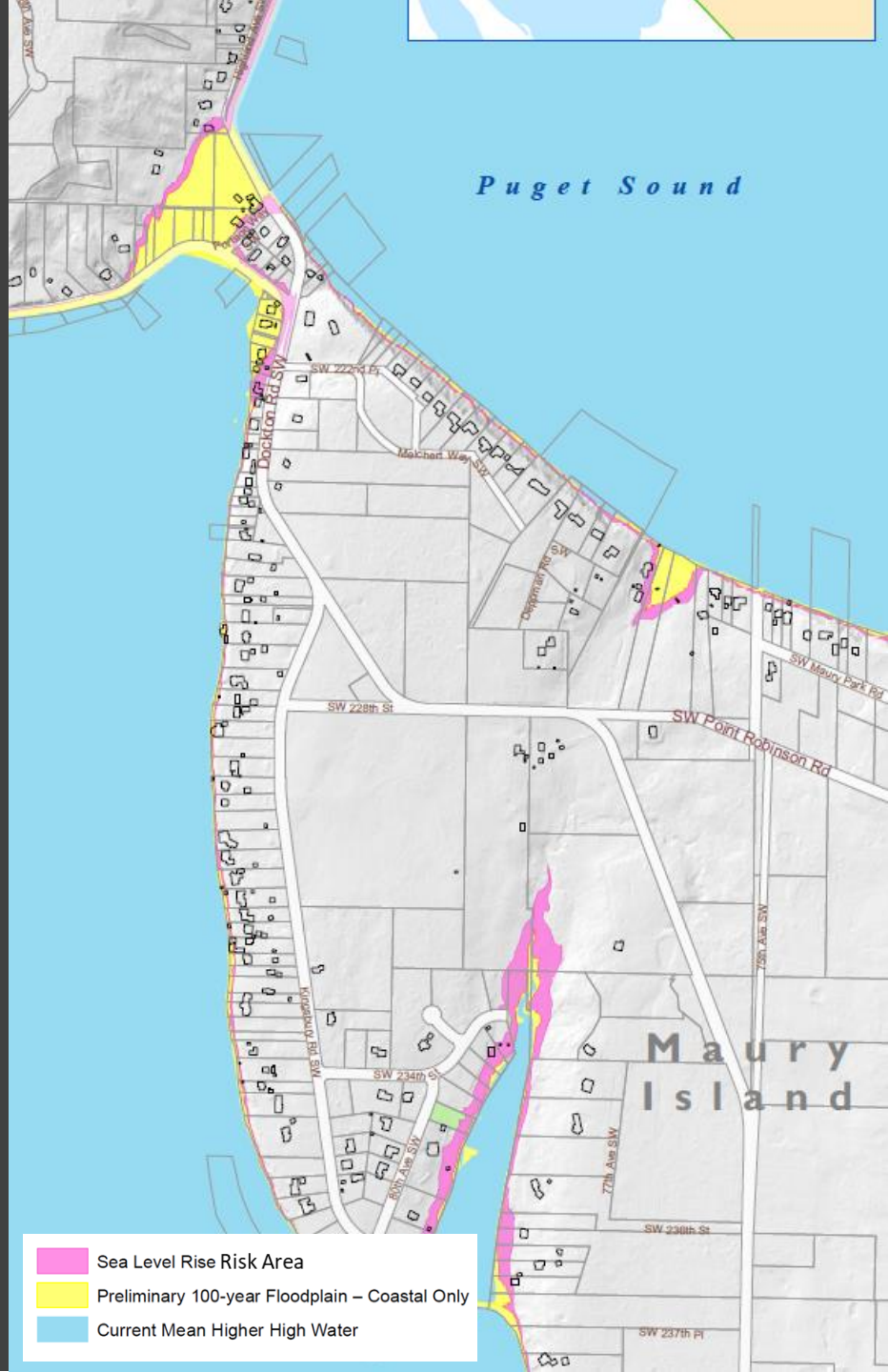
- Simple extension of the existing +3 feet BFE requirement in the 100 yr-floodplain
- Connects the SLR provisions to FEMA designated flood zones

Connection to Science

- Within the range of projected SLR by 2100

Limits of traditional SLR mapping

- Mapping SLR is not mapping changes in coastal flooding
- 2011 coastal flood mapping: 2 feet of SLR increases flood elevations between 0.5 to 6 feet, depending on site specific conditions



OTHER ADOPTED CHANGES….

Steep Slopes

Increases set-back from 50 feet to 75 feet unless a geotech study is completed.

Study needs to account for SLR conditions anticipated to occur over 50 years.

Groundwater Wells

No new wells in the coastal high hazard area.

New wells in SLR Risk Area need surface seal that prevents potential for saltwater intrusion in the next 50 years.

…and Fails

Bulkheads -- dropped

Increased toe of bulkhead elevation and/or setback distances

No bulkhead if raising structure cost less

Approach and existing code needed more work

Challenges, beyond science and $

Differentiating between **managing for the public interest** (healthy, safety, economy, environment) **vs. let the buyer beware**

Managing the dynamic nature of SLR in high-inertia systems: current 100 year floodplain has some level of protection, but

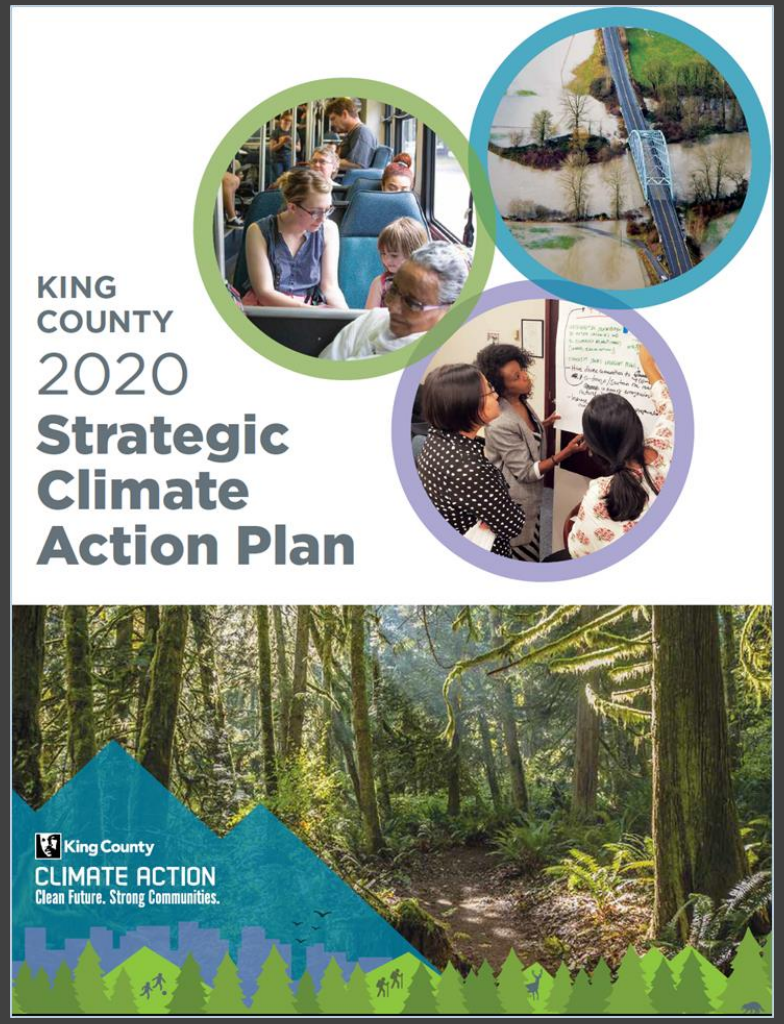
1) current FEMA mapping does not incorporate SLR,
2) remapping is *slow,* and
3) policy change tends to be incremental.

Challenges (cont'd)

The legacy of past decisions: code changes apply to major remodels and new development, but most of the shoreline is already built out. How do we deal with those risks and impacts?

Disconnected time horizons:

- Classic issues regarding time horizon of elected officials
- Current homeowner's time horizon versus longer-term public safety/public interest considerations
- Asset life time vs. reality



www.kingcounty.gov/climate

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Climate Preparedness Specialist

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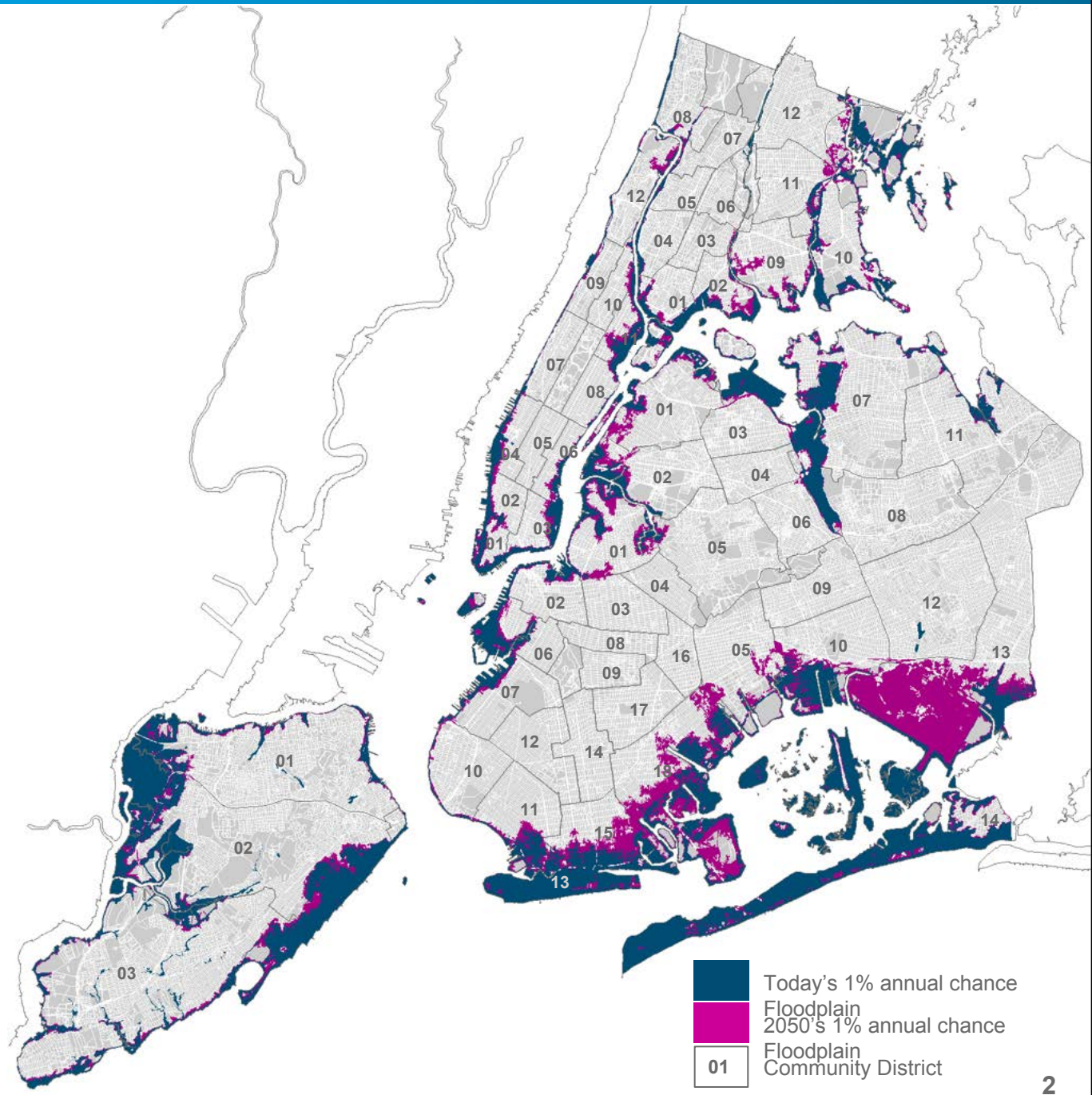
206.263.0825

King County
CLIMATE ACTION
Clean Future. Strong Communities.

Toward a Resilient Land Use Strategy

Coastal Flood Risk

	Current 1% annual chance Floodplain	2050's 1% annual chance Floodplain
People	400,685	794,534
Buildings	80,907	122,132



Source: The current floodplain is based on the 1% annual chance floodplain established by the FEMA 2015 Preliminary Flood Insurance Rate Maps (PFIRM). The 2050s floodplain is based on FEMA's Preliminary Flood Insurance Rate Map data and the New York City Panel on Climate Change's 90th Percentile Projections for Sea-Level Rise in the 2050s.

Managing Risk

Sandy reinforced that resilient building design can reduce risks to severe flood events.

Neponsit, Queens

Arverne by the Sea, Queens

NYC PLANNING

Coastal Flood Risk: Frequent Innundation

Tidal Flooding*		
	2020s Projected	2050s Projected
Residential Units	2,400	13,400
Buildings	1,600	7,000
Land Area (Acres)	5,300	7,500
Streets (Miles)	11	47

***Numbers rounded for clarity.**

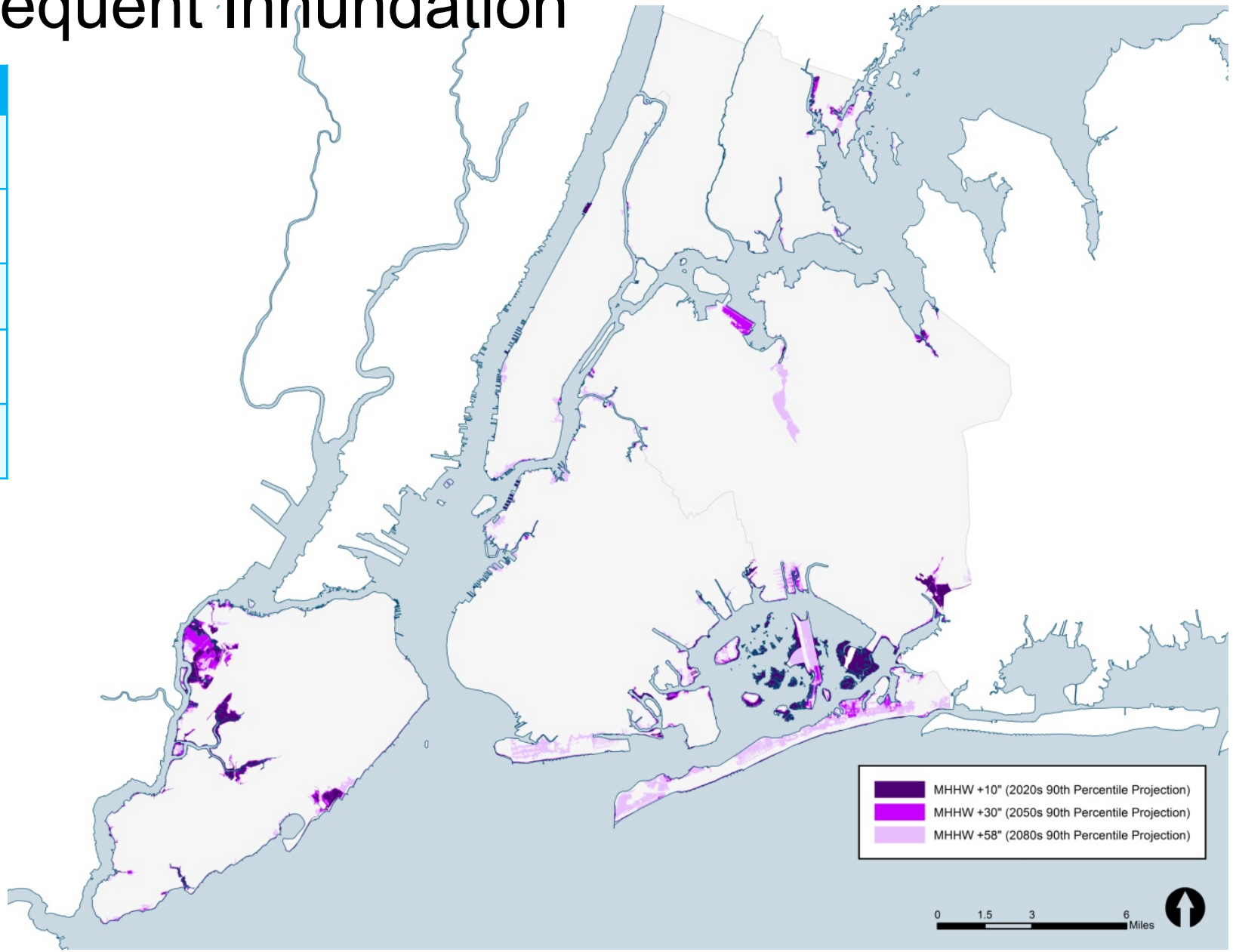


Table 3.1. New York City sea level rise projections[a] for the 2020s, 2050s, and 2100, relative to 2000–2004, (NPCC, 2015)

Sea level rise baseline (2000–2004)	Low estimate (10th percentile)	Middle range (25th–75th percentile)	High estimate (90th percentile)
2020s	+2 in.	+4–8 in.	+10 in.
2050s	+8 in.	+11–21 in.	+30 in.
2080s	+13 in.	+18–39 in.	+58 in.
2100	+15 in.	+22–50 in.	+75 in.

Land Use Planning in the Floodplain
Citywide vs. Local Approach

*Where flood **risk is exceptional**, including where sea level rise will lead to **future daily tidal flooding***

*Where **risk** from extreme events **can be managed** through infrastructure and **context can support growth***

Limit Density

In some areas, there is a need to limit future density to decrease the exposure to damage and disruption.

Support Planned Density

Adjust zoning to allow all buildings to meet resiliency standards, by providing flexibility and removing zoning obstacles.

Encourage Density

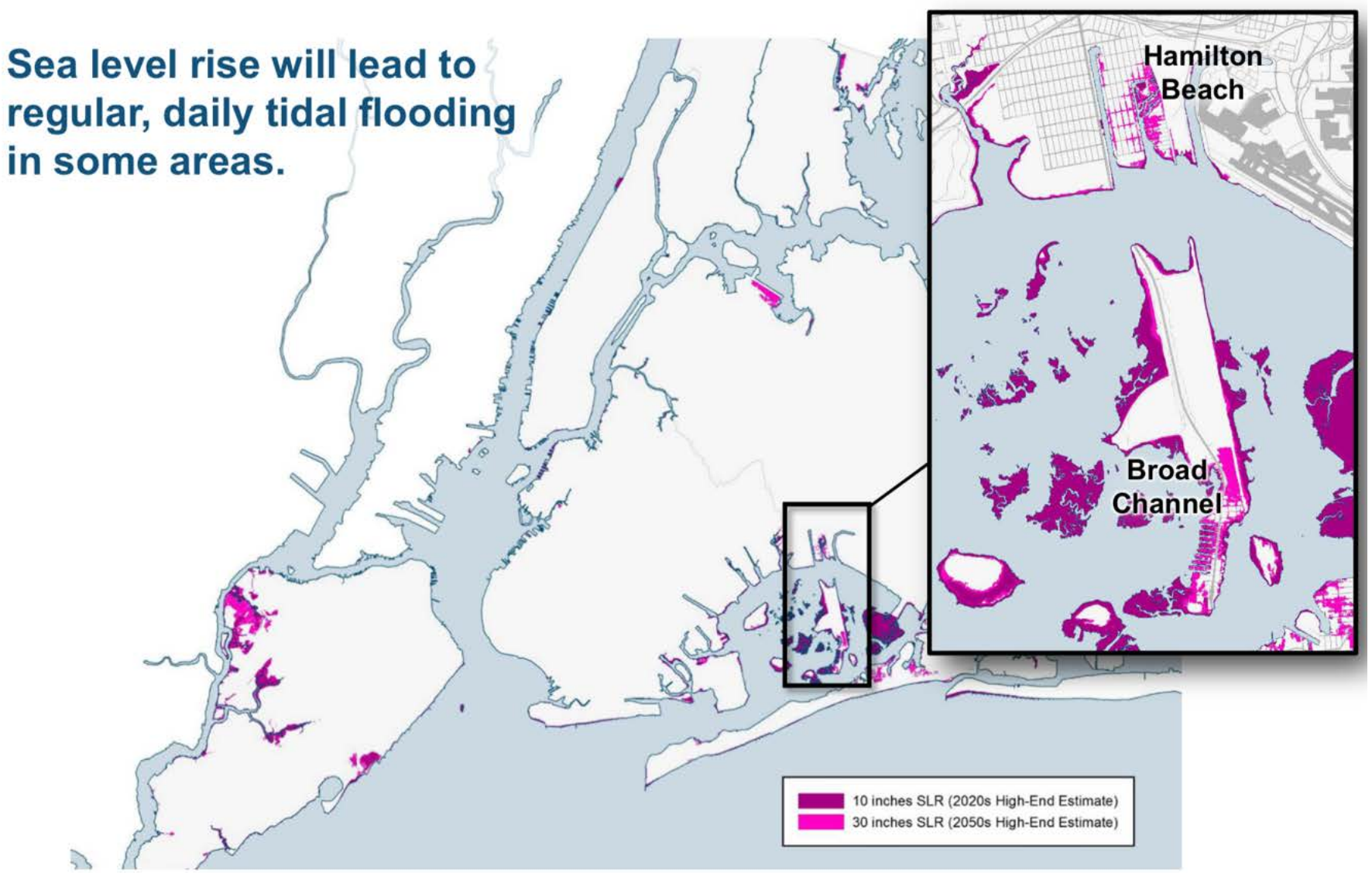
In other areas, the city can encourage new development, as to increase the resilient building stock.

The Special Coastal Risk Districts were established to deal with extradordinary conditions

Areas currently facing frequent and routine flooding that can't feasibly be addressed by infrastructure and where conditions are likely to grow worse over time:
Hamilton Beach, Broad Channel

Areas where other plans and programs call for different land use patterns:
NYS Enhanced Buyout Areas

Coastal Flood Risk: Frequent Innundation



Shoreline of
Broad Channel

NYC PLANNING

Flood Risk and Land Use Planning – South Queens

Broad Channel Characteristics

- Entirely within the current 1% annual chance floodplain, including areas subject to high velocity wave activity
- The area already experiences periodic tidal flooding, a condition likely to worsen with sea level rise
- Limited vehicular access to/from neighborhood
- Zoning was updated in 2017 to limit increasing the population of this highly vulnerable area
- $48M street and bulkhead raising project

Super moon high tide flooding in Broad Channel

Late 1800s: Area developed with small houses built on stilts as a summer getaway

1914: Formally settled by Broad Channel Development Corporation (BCDC)

1930s: Cross Bay Boulevard constructed

1939: BCDC declared bankruptcy; City became owner

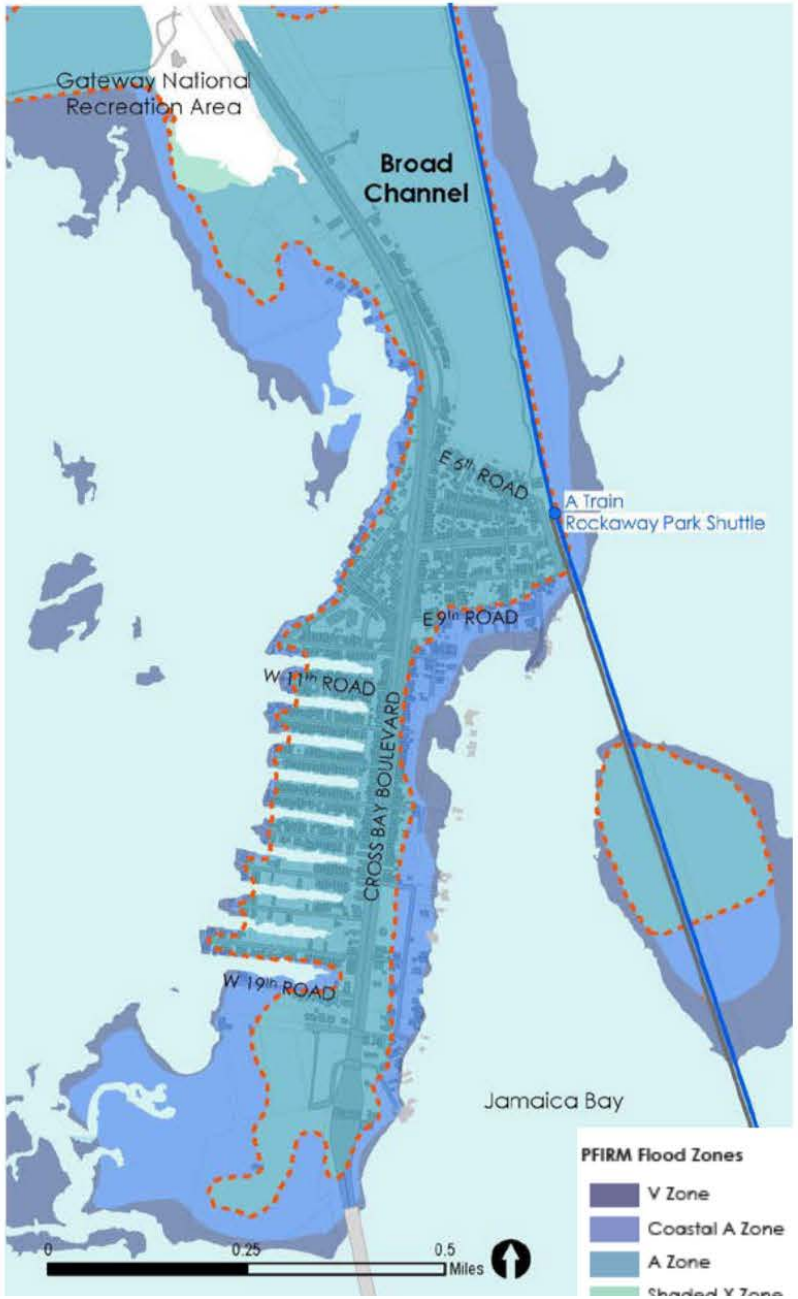
1982: Agreement reached for residents to purchase property from City

1988: First sanitary sewers constructed

2012: Hurricane Sandy

1924

2012



In Broad Channel:

- **2,500** Residents
- **1,000** Buildings
- **$68,900** Local Median Household Income (Queens $57,210)
- **78%** of Housing Units are Owner-Occupied (Queens 44%)

In the floodplain:

- **2,500** Residents
- **1,000** Buildings

NYC PLANNING

Existing Zoning and Land Use

R3-2

- Allows all residential building types
- 0.6 FAR (includes 0.1 attic allowance)
- 40’ min. lot width (D); 18’ min. lot width (SD, A)
- 21’ max. perimeter wall height
- 35’ max. building height
- 15’ required front yard
- 5’ min. side yard width (D)
- 1 parking space required per unit
- 1.0 FAR for community facilities

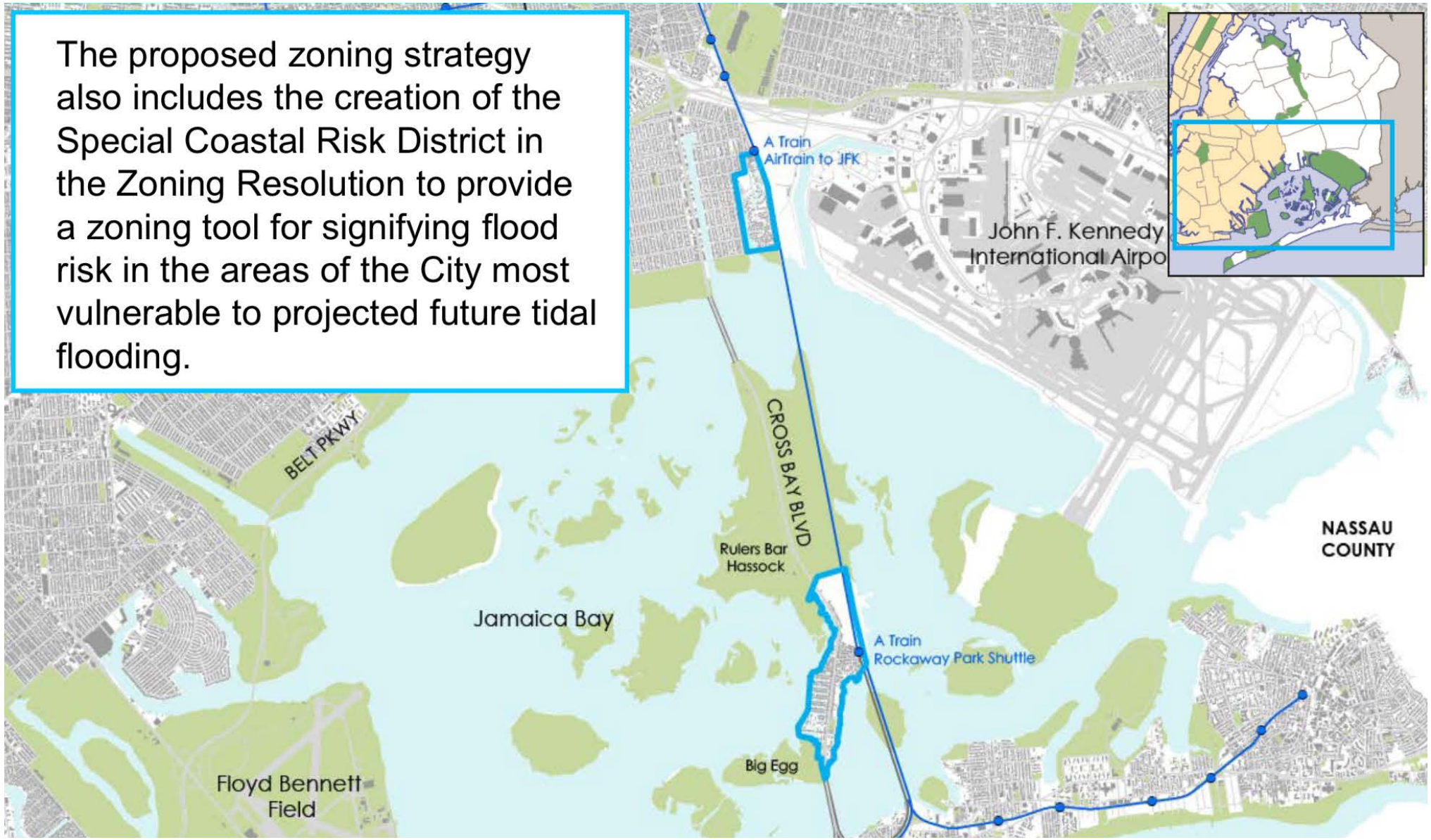
C1-2 Overlays

- Max. commercial FAR is1.0 when mapped in R3-2
- Permits local commercial uses
- Parking requirements vary by use, but typically one off-street parking space is required for every 300 sq ft of commercial floor area

Broad Channel: 2050s Sea Level Rise Projections

226 Buildings
MHHW + 11” (25th percentile projection)
368 Buildings
MHHW + 21” (75th percentile projection)
744 Buildings
MHHW + 30” (90th percentile projection)

The proposed zoning strategy also includes the creation of the Special Coastal Risk District in the Zoning Resolution to provide a zoning tool for signifying flood risk in the areas of the City most vulnerable to projected future tidal flooding.



Special Coastal Risk District

A Broad Channel Subdistrict would be created to reflect this neighborhood's exceptional flood risk and established low-density building patterns.

The Broad Channel Subdistrict would modify the underlying regulations of the proposed R3A and C3A districts to limit future residential development to single-family detached houses only.

In addition, community facilities with sleeping or overnight accommodations would be prohibited.

R3A

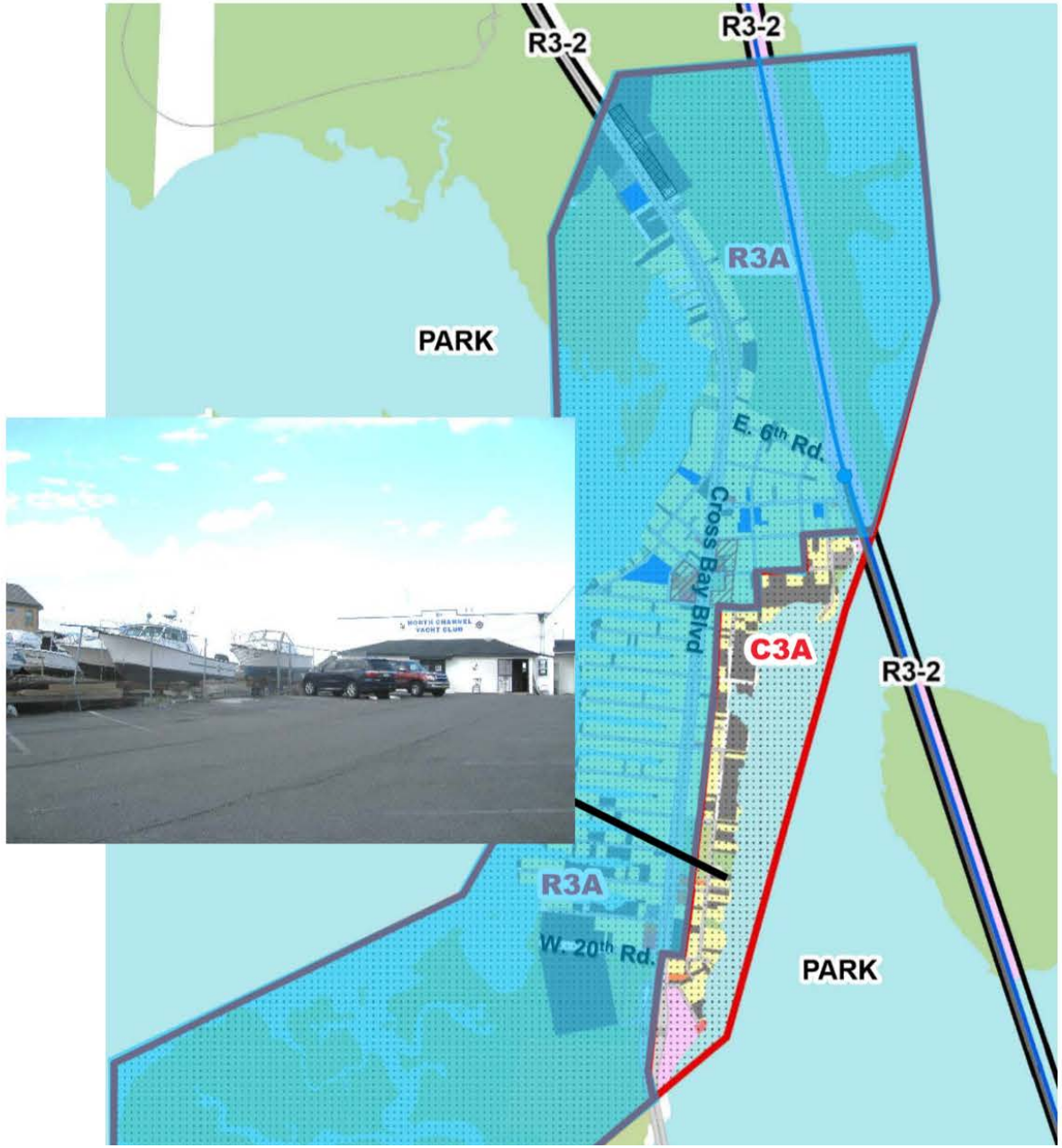
R3A is proposed for the majority of the rezoning area.

R3A districts permit one- and two-family detached residential buildings*

- 0.6 FAR (includes 0.1 attic allowance)
- 25’ min. lot width
- 21’ max. perimeter wall height
- 35’ max. building height
- 10’ required front yard
- 4’ min. side yard width
- 1 parking space required per unit
- 1.0 FAR for community facilities

*Modified by proposed Broad Channel Subdistrict of the Special Coastal Risk District

C3A



C3A is proposed on Broad Channel's southeast shore

C3A would more closely reflect the mix of single-family detached residences and water-dependent uses, including marinas and boat storage facilities in this area

Commercial uses are permitted a maximum FAR of 1.0

C3A districts have a residential equivalent of R3A*

*Modified by proposed Broad Channel Subdistrict of the Special Coastal Risk District

C1-3

A rezoning of Broad Channel's commercial node from C1-2 to C1-3 is proposed to slightly reduce the off-street parking requirement.

C1-2 generally require space one per 300 sq ft of commercial floor area; C1-3 generally require one space per 400 sq ft of commercial floor area

A high off-street parking requirement could present an impediment to property owners should they need to reconstruct a damaged or destroyed commercial building on a small lot

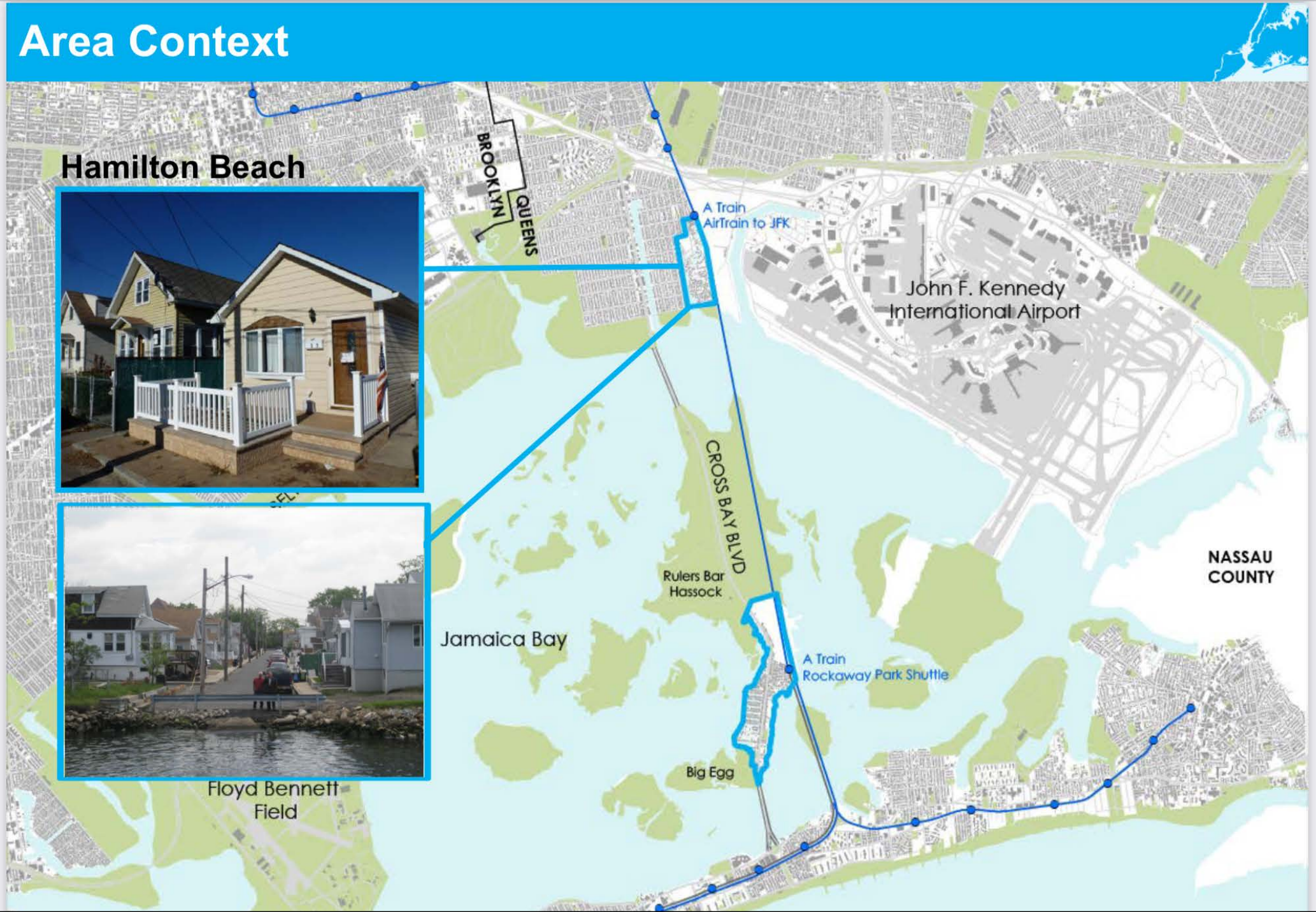
C1-2 and C1-3 permit the same range of commercial uses to serve local shopping needs and have the same maximum 1.0 FAR for commercial uses

What’s next?

Flood Risk and Land Spectrum

Appendix on Hamilton Beach

Area Context



Area Demographics

In Hamilton Beach:

- **1,400** Residents
- **400** Buildings
- **$71,400** Median Household Income* (Queens $57,210)
- **75%** of Housing Units are Owner-Occupied* (Queens 44%)

In Hamilton Beach's floodplain:

- **1,400** Residents
- **400** Buildings

*Combines data for Old Howard Beach and Hamilton Beach


Broad Channel
BROOKLYN
QUEENS
A Train
AirTrain to JFK
John F. Kennedy
International Airpo
CROSS BAY BLVD
Rulers Bar
Hassock
NASSAU
COUNTY
Jamaica Bay
A Train
Rockaway Park Shuttle
Big Egg

Existing Zoning and Land Use

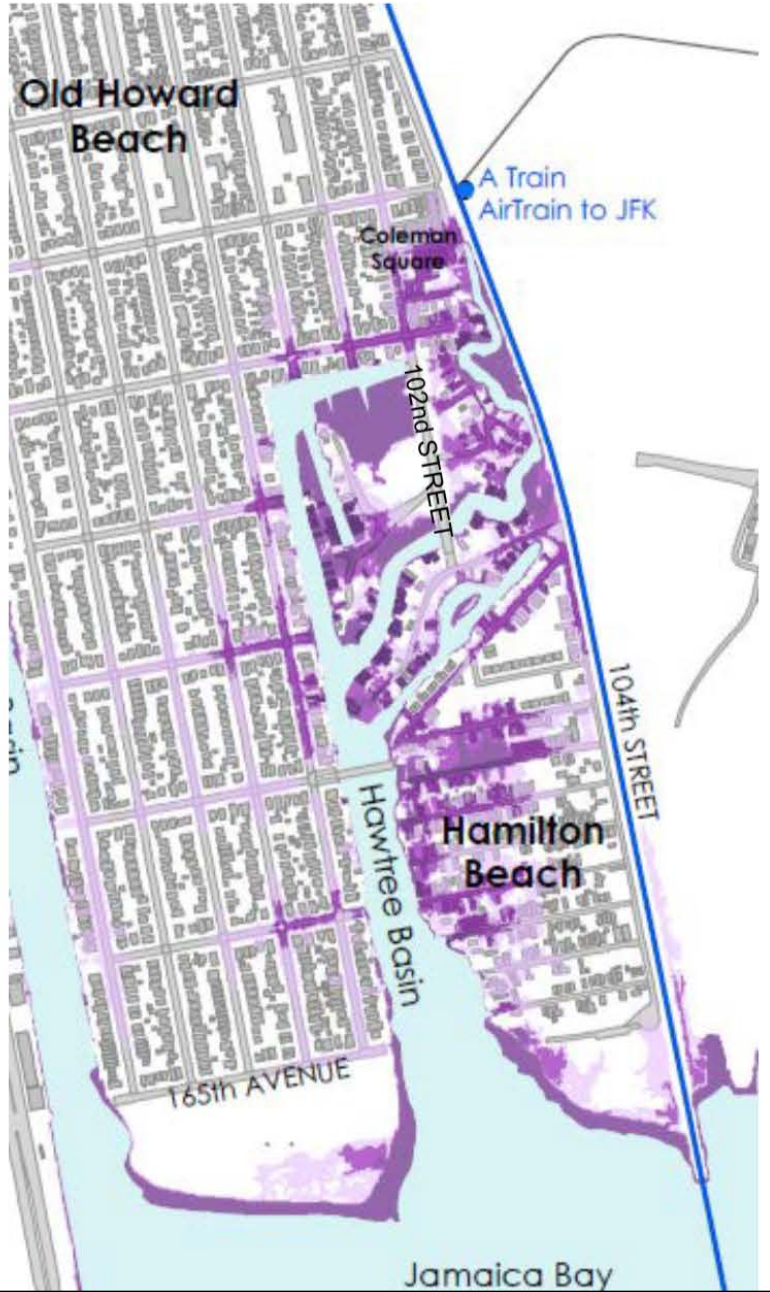
R3-1

- Allows one- and two-family detached and semi-detached residences allowed
- 0.6 FAR (includes 0.1 attic allowance)
- 40’ min. lot width (D); 18’ min. lot width (SD)
- 21’ max. perimeter wall height
- 35’ max. building height
- 15’ required front yard
- 5’ min. side yard width (D)
- 1 parking space required per unit
- 1.0 FAR for community facilities

C1-2 Overlays

- Max. commercial FAR is 1.0 when mapped in R3-2
- Permits local commercial uses
- Parking requirements vary by use, but typically one off-street parking space is required for every 300 sq. ft. of commercial floor area

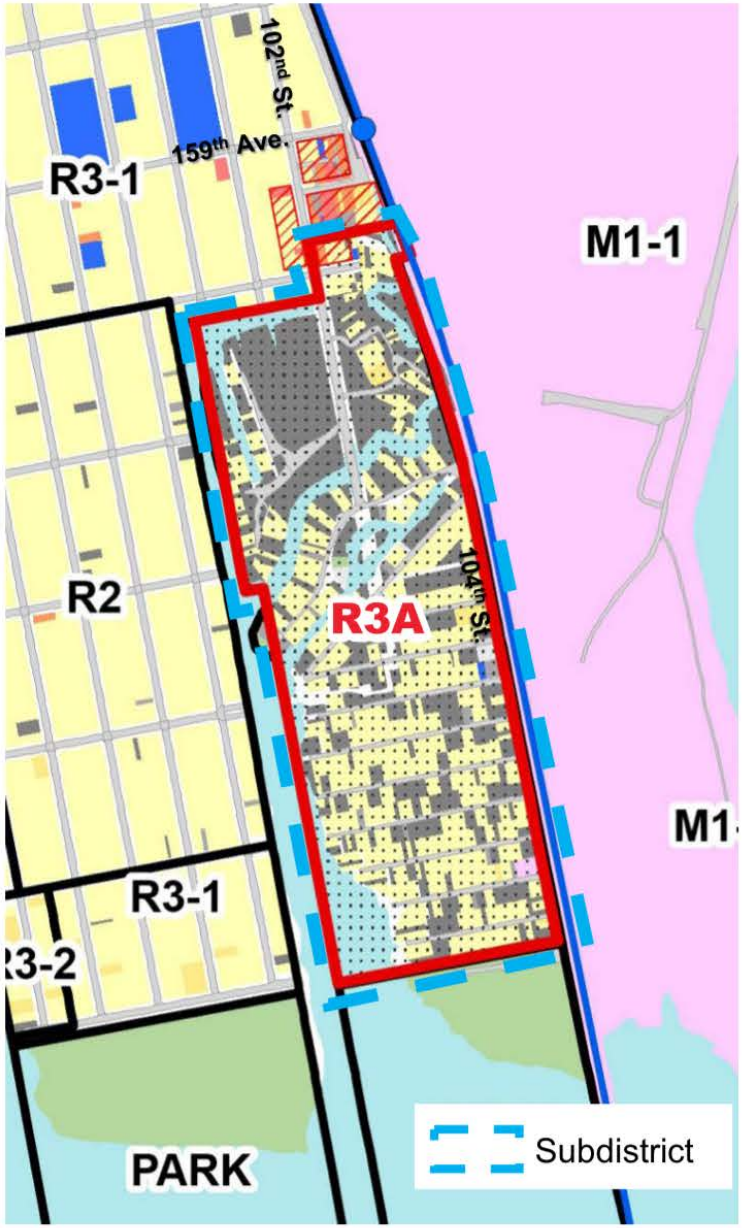
Flood Risk and Sea Level Rise Projections



Hamilton Beach: 2050s Sea Level Rise Projections

65 Buildings
MHHW + 11” (25th percentile projection)
178 Buildings
MHHW + 21” (75th percentile projection)
310 Buildings
MHHW + 30” (90th percentile projection)

Special Coastal Risk District – Hamilton Beach Subdistrict



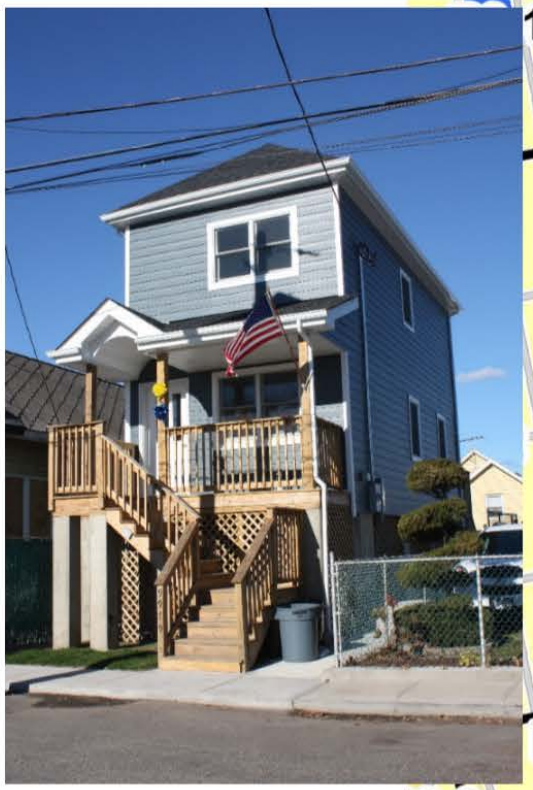
The proposed zoning strategy would establish the Hamilton Beach Subdistrict in the Zoning Resolution as part of the newly created Special Coastal Risk District.

The Hamilton Beach Subdistrict would modify the underlying regulations of the proposed R3A district to limit new development to single-family detached residences, except on lots at least 40 feet wide where two-family detached residences would be permitted.

This modification would limit future development in an area vulnerable to projected future tidal flooding while recognizing the range of lot widths in the neighborhood.

In addition, community facilities with sleeping or overnight accommodations would be prohibited.

Proposed R3A



R3A is proposed for the majority of the rezoning area.

R3A districts permit one- and two-family detached residential buildings*

- 0.6 FAR (includes 0.1 attic allowance)
- 2,375 sq ft minimum required lot area
- 25’ minimum lot width
- 21’ maximum perimeter wall height
- 35’ maximum building height
- 10’ required front yard
- 8’ required total side yards
- 1 parking space required per unit
- 1.0 FAR for community facilities

*Modified by proposed Hamilton Beach Subdistrict of the Special Coastal Risk District

Proposed C1-3 Overlay

A rezoning of the Coleman Square commercial node from C1-2 to C1-3 is proposed to match existing commercial uses and development patterns

C1-2 generally require one space per 300 sq ft of commercial floor area; C1-3 generally require one space per 400 sq ft of commercial floor area

In addition, the high off-street parking requirement could present a zoning impediment to property owners should they need to reconstruct a damaged or destroyed building on a small lot

C1-2 and C1-3 permit the same range of commercial uses to serve local shopping needs and have the same maximum 1.0 FAR for commercial uses

Coastal Hazard Zones, Best Management Practices, Permitting and Planning

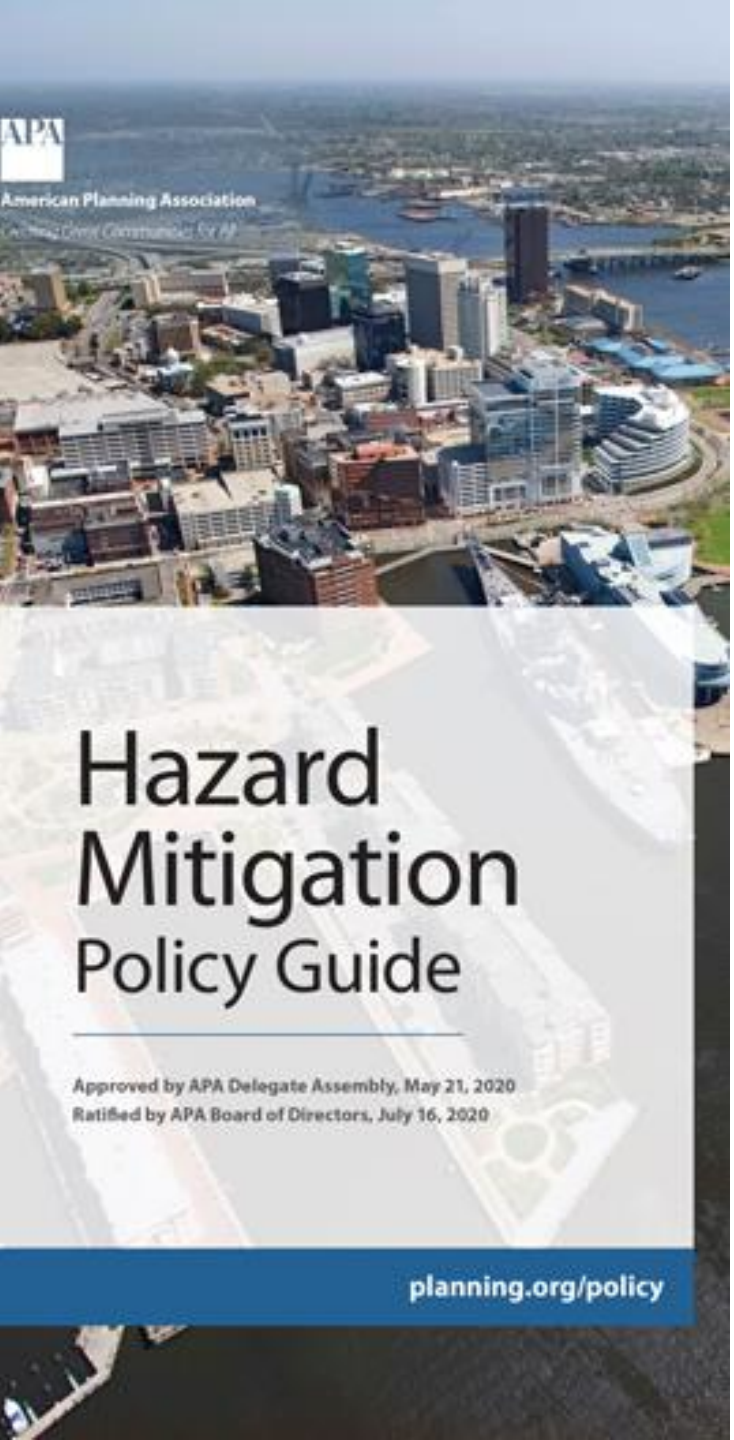
American Planning Association
Hazards Mitigation and Disaster Recovery Division
October 2, 2020

Matthew Simons, AICP, CFM
Principal Planner and
Floodplain Administrator
City of Norfolk, VA

Norfolk, VA

- Located in southeastern Virginia
- 1.7 million regional population
- Home to world's largest Naval base
- 2nd largest port on eastern seaboard
- Urban coastal community; 97% developed

Living with the Water



Sea Level Rise and Coastal Land Subsidence

- Policy Outcome 15.7

Encourage local and regional long-term visioning efforts and strategic planning in and around communities threatened by sea level rise that consider a range of alternatives, including adaptation and strategic, managed retreat from the shoreline.

Tested tools such as transfer of development rights can be adapted to ease the financial and fiscal issues of managed retreat.

Coastal Resilience & Upland Resilience Overlay (CRO & URO) Districts

- All Special Flood Hazard Areas and the X Shaded (0.2% annual chance) area are located within the CRO.
- The entire X (unshaded) area is located in the URO.
- Higher resiliency standards were introduced in 2018 through new Resilience Quotient (RQ) standards.

Resilience Quotient

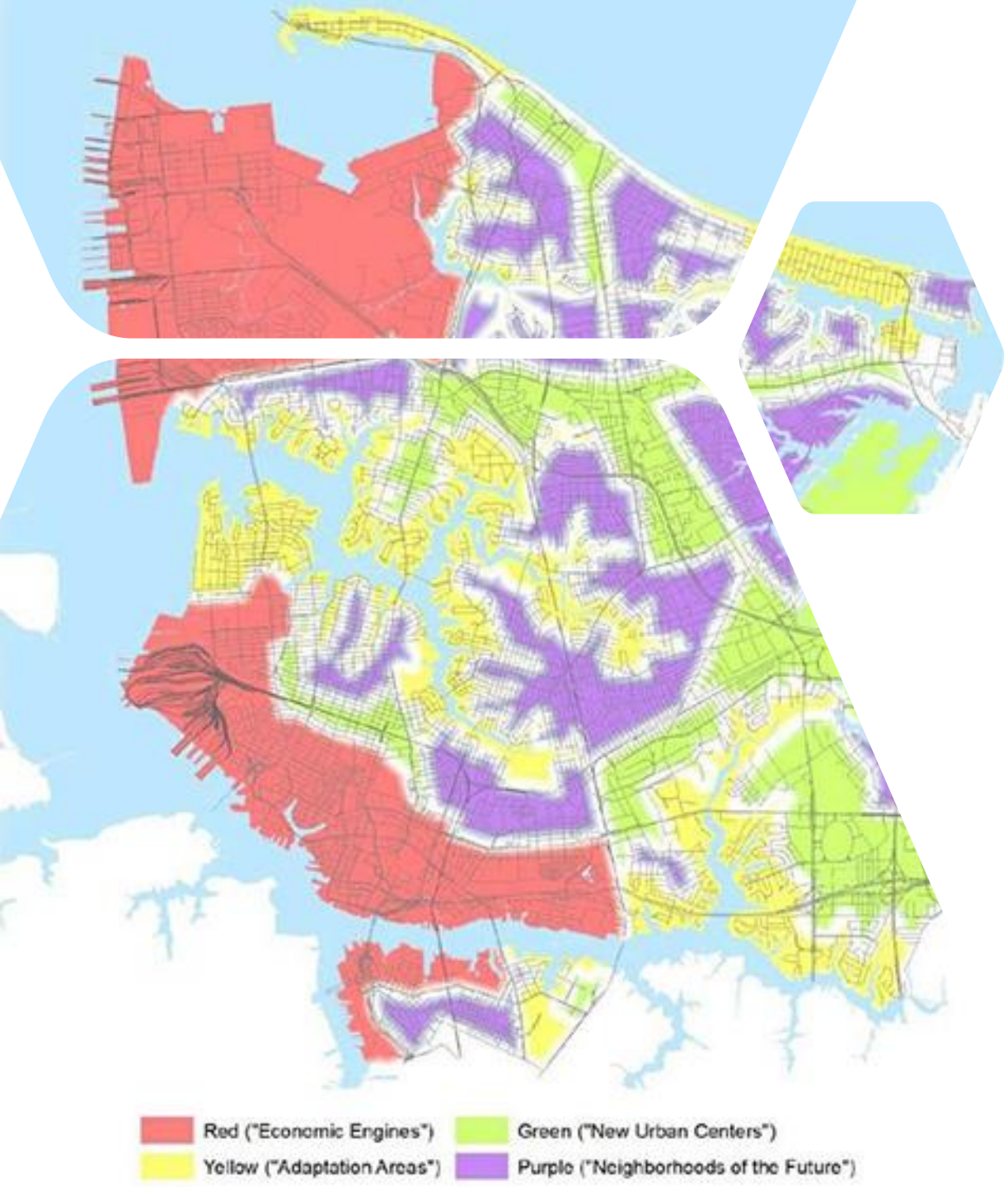
- Both the CRO and URO districts subject new development to Resilience Quotient (RQ) development standards.
- RQ standards can be satisfied on a points-based system derived from three components:
    - Risk Reduction
    - Stormwater Management
    - Energy Resilience
- Minimum RQ points are scaled based on the intensity of the proposed development (square footage, number of units, etc.)

Implementation

- Norfolk has partnered with Wetlands Watch and the Elizabeth River Foundation to develop an environmental land trust to facilitate the implementation of a RQ points market.
- Four RQ points may be captured for use in the URO district for each development right extinguished in the CRO district by direct purchase or easement.
    - Life rights are permissible for properties already developed.

Elizabeth River Project
Making restoration a reality

WETLANDS WATCH

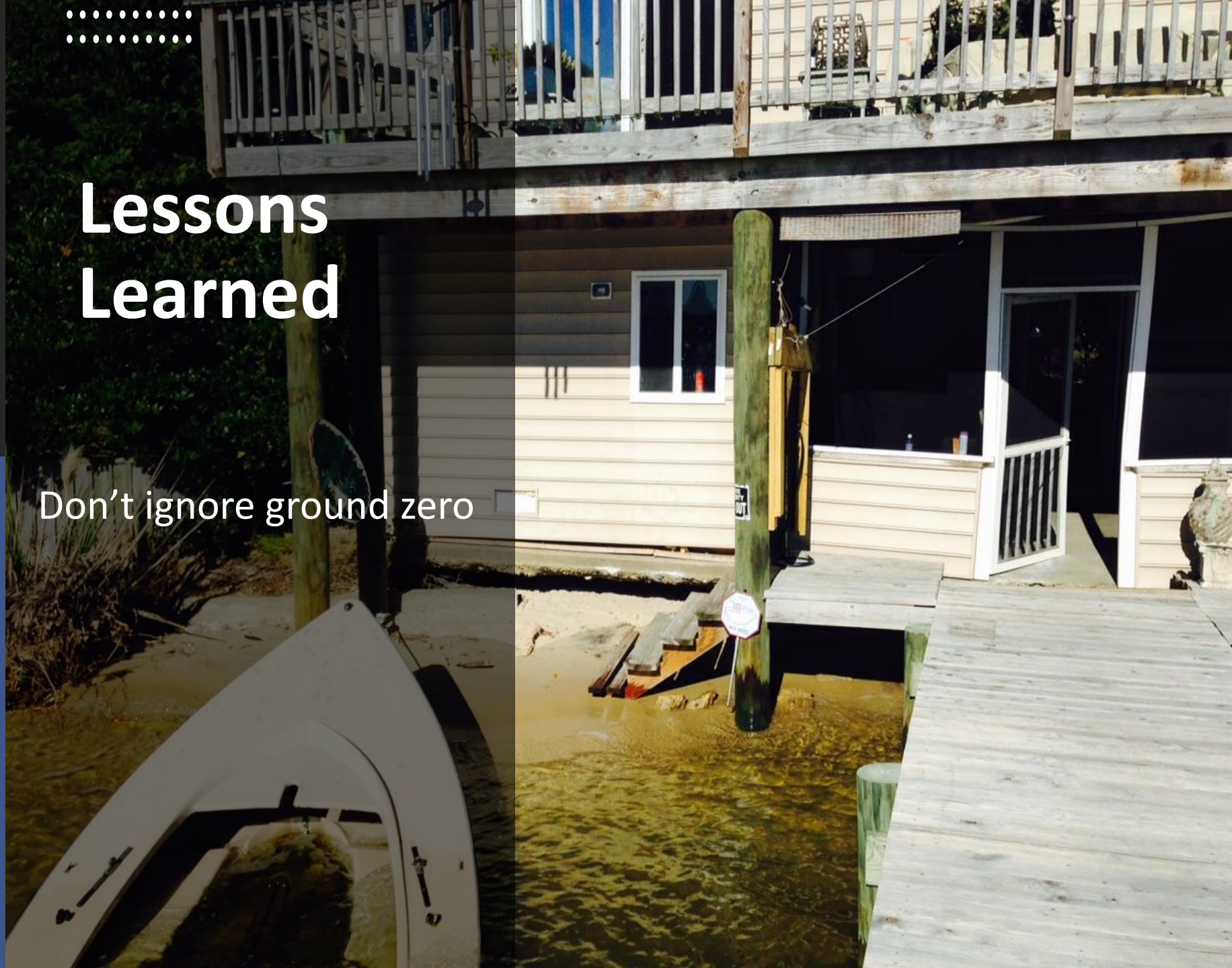


Enabling Framework

- Virginia is a Dillion Rule state.
- VA State code has been expanded over the years to require a robust comprehensive plan, and further provides an expansive list of factors to be considered into adopted zoning ordinances.
  - Including the recommendations of the Comp Plan.

Lessons Learned

Don’t ignore ground zero

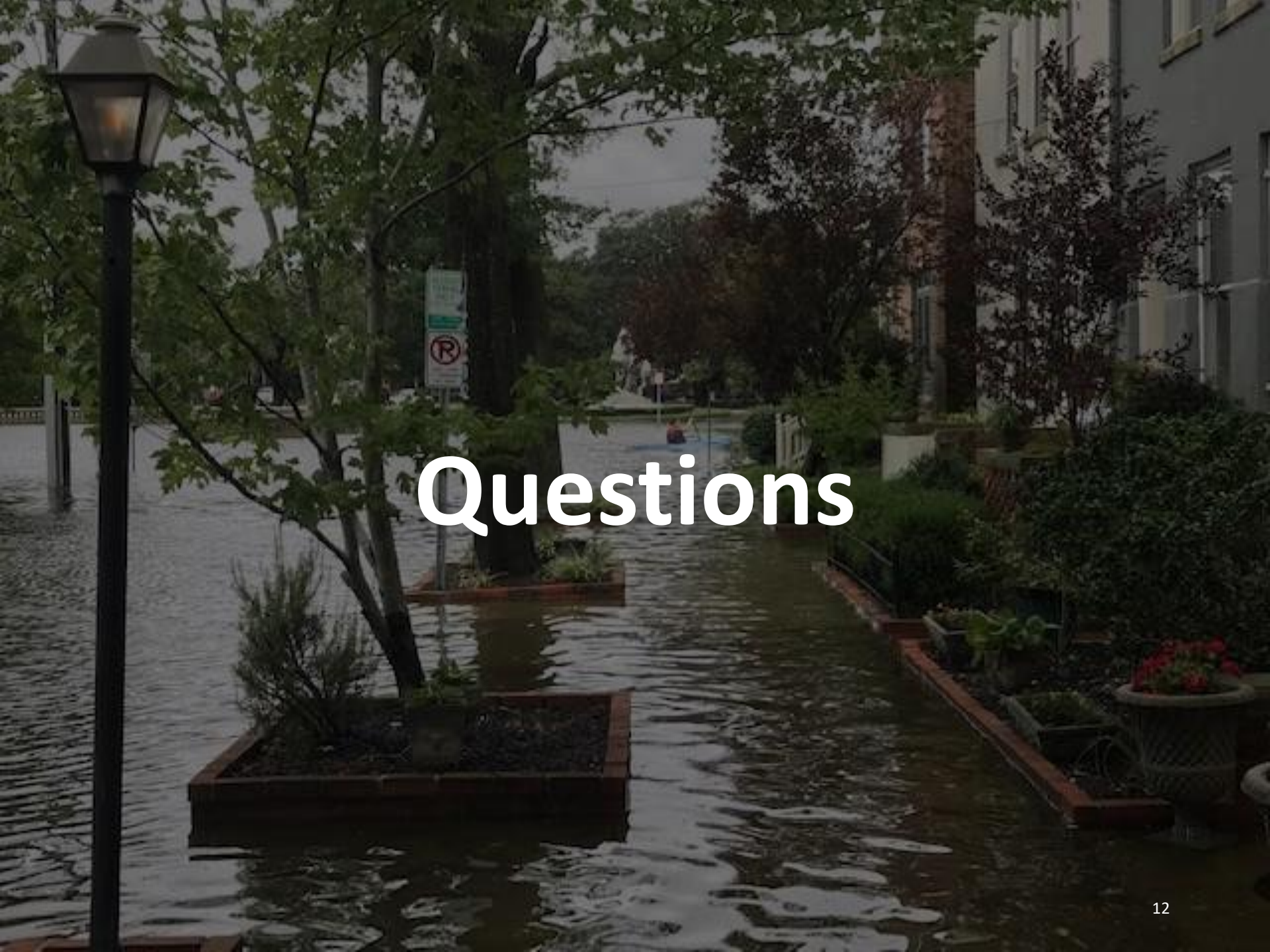


Lessons Learned

Coastal Erosion Rates

Lessons Learned

Sunny Day Flooding


Questions