

RESILIENT NEIGHBORHOODS

- **Reduce risks from natural hazards such as flooding and coastal storms.**
Enable buildings and infrastructure to withstand flooding and other hazards while minimizing disruption to residents and businesses.
- **Foster economically and socially vibrant communities that are able to adapt to changing conditions.**
Support the continuing vitality of neighborhoods, considering both short-term needs and long-term challenges.
- **Coordinate land use planning with rebuilding activities and infrastructure investment.**
Identify practical strategies to address neighborhood needs and constraints



Phase 1 Resilient
Neighborhoods Study Area

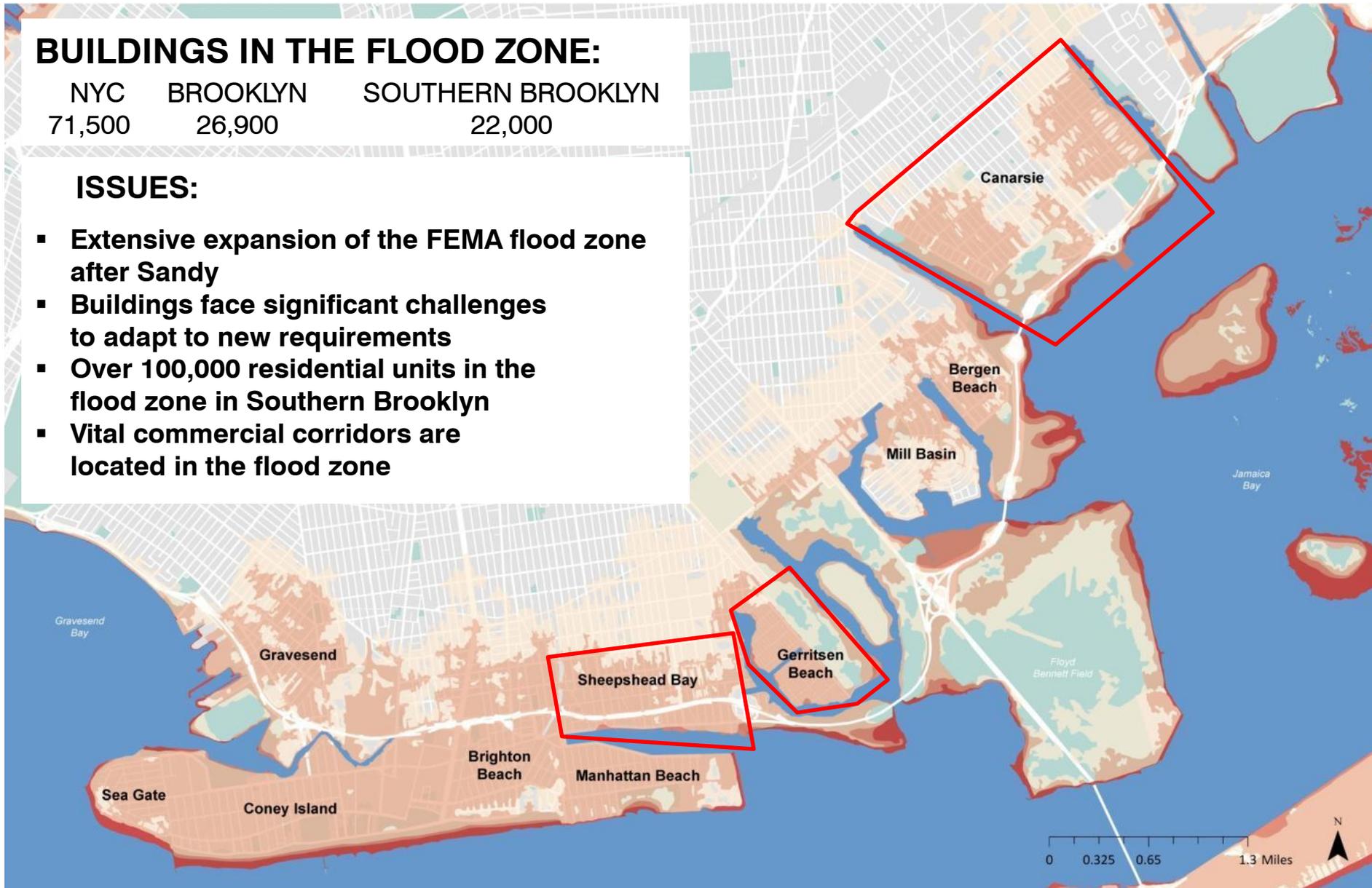
1% annual chance floodplain

BUILDINGS IN THE FLOOD ZONE:

NYC	BROOKLYN	SOUTHERN BROOKLYN
71,500	26,900	22,000

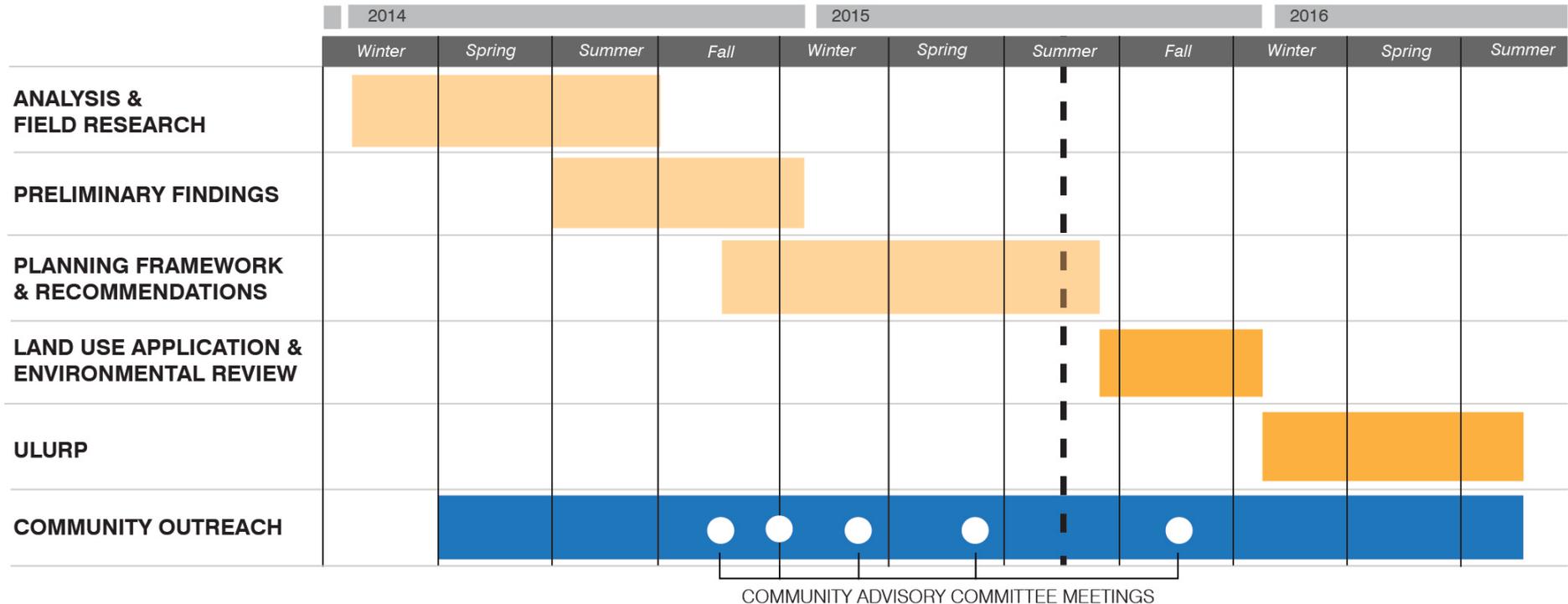
ISSUES:

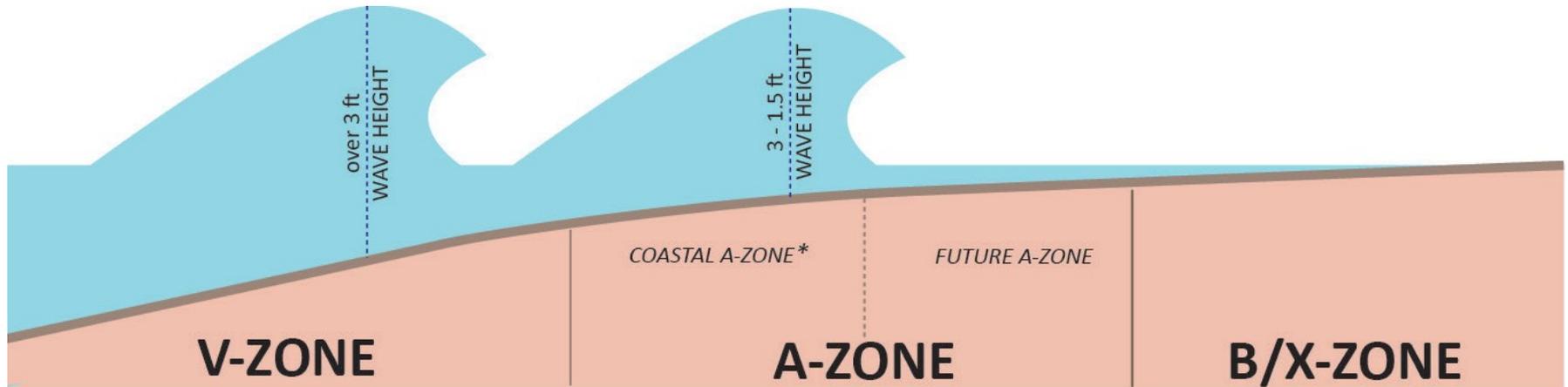
- Extensive expansion of the FEMA flood zone after Sandy
- Buildings face significant challenges to adapt to new requirements
- Over 100,000 residential units in the flood zone in Southern Brooklyn
- Vital commercial corridors are located in the flood zone

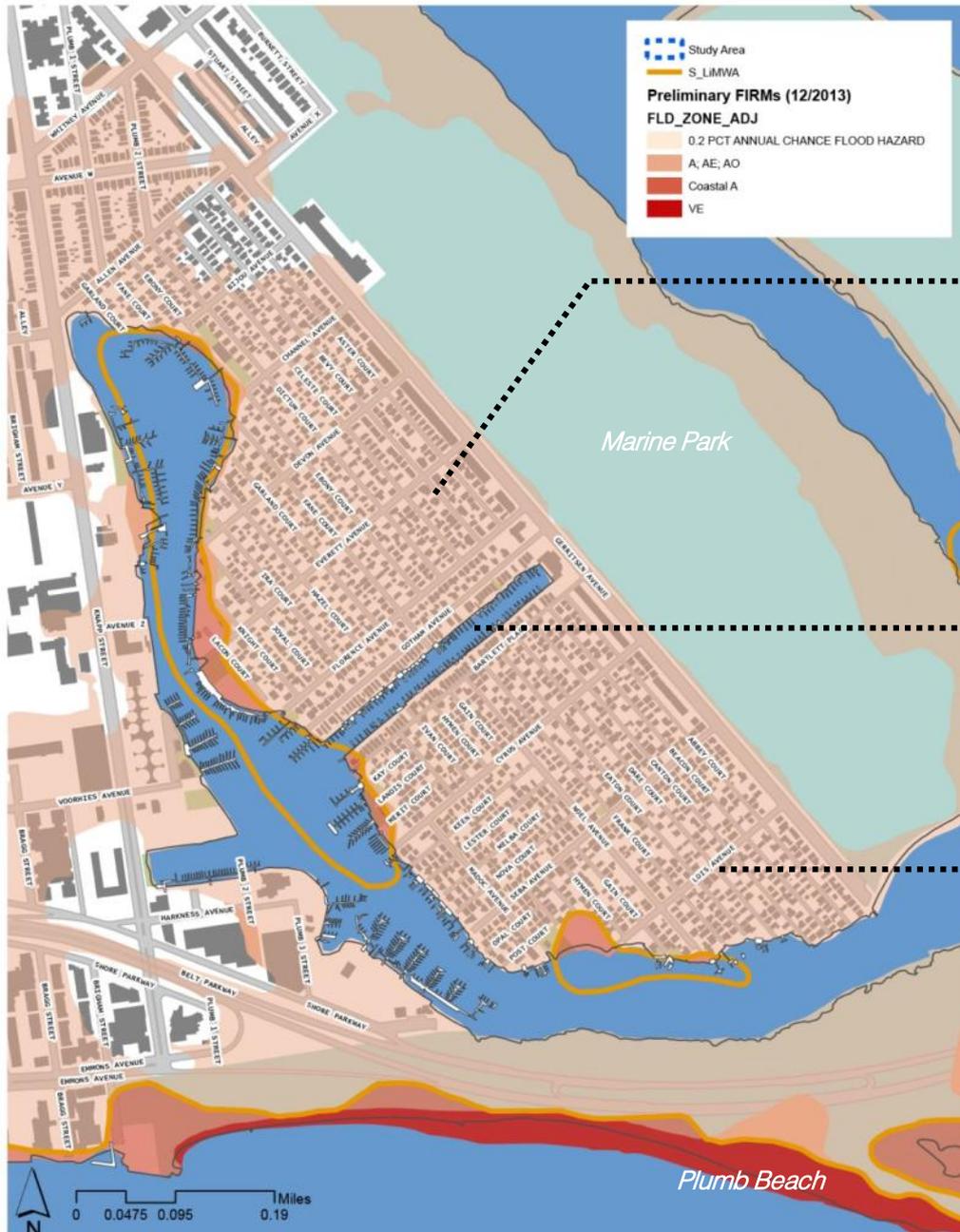


Public outreach and coordination:

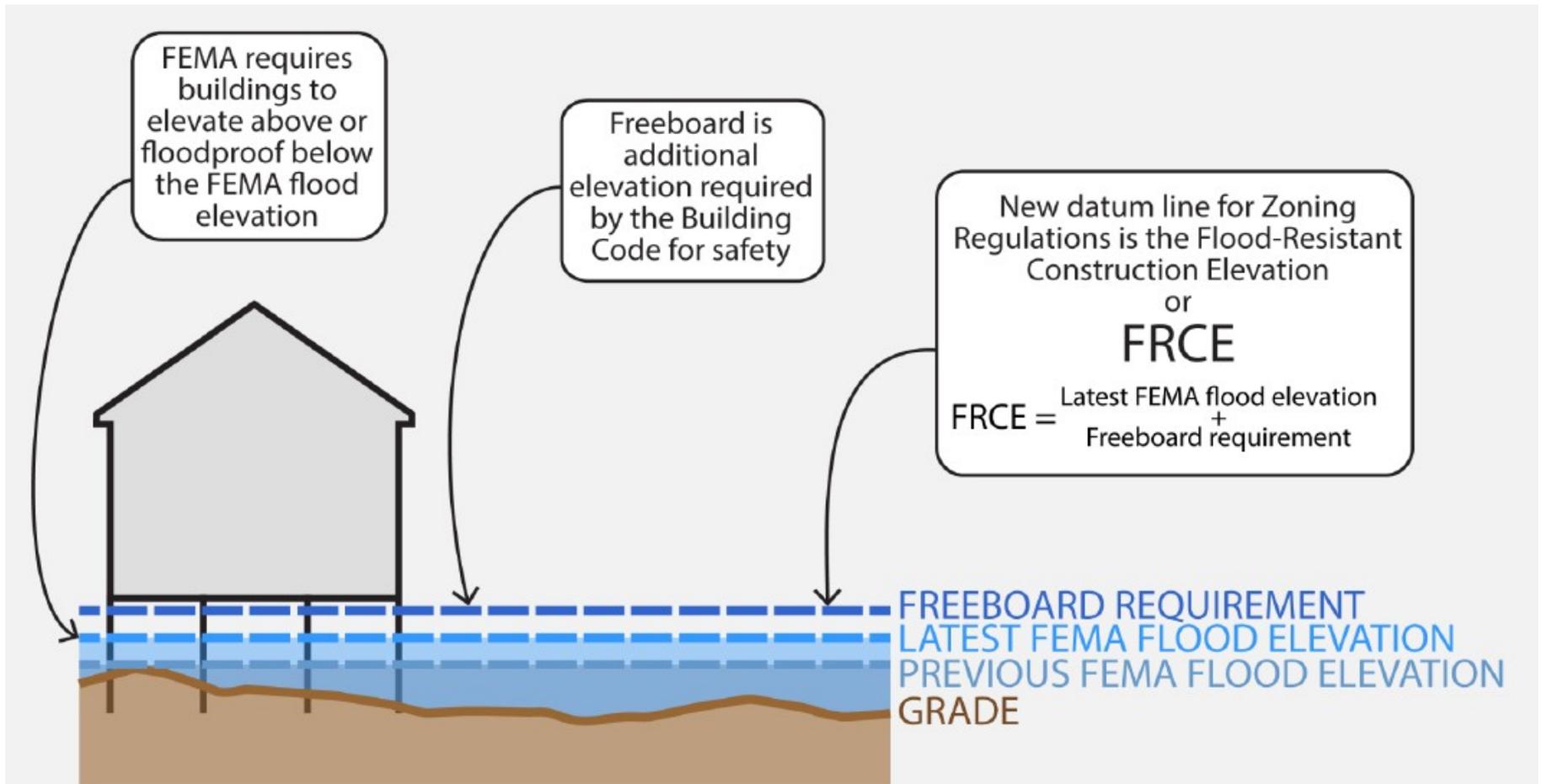
- Met with Community Board 15 to publicly launch study – Summer 2014.
- Convened Community Advisory Committee to discuss issues and needs in the study area. CAC met regularly throughout the winter and spring 2015.
- Ongoing coordination with other City agencies.



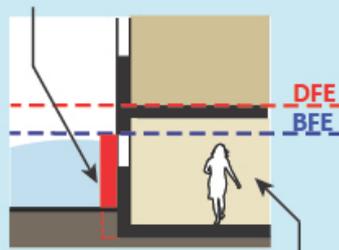
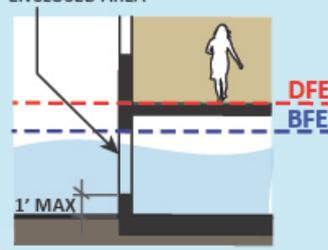
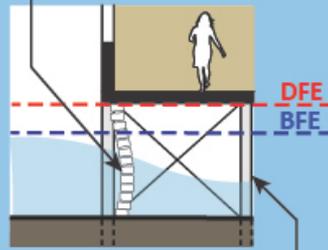




RESILIENT CONSTRUCTION REQUIREMENTS



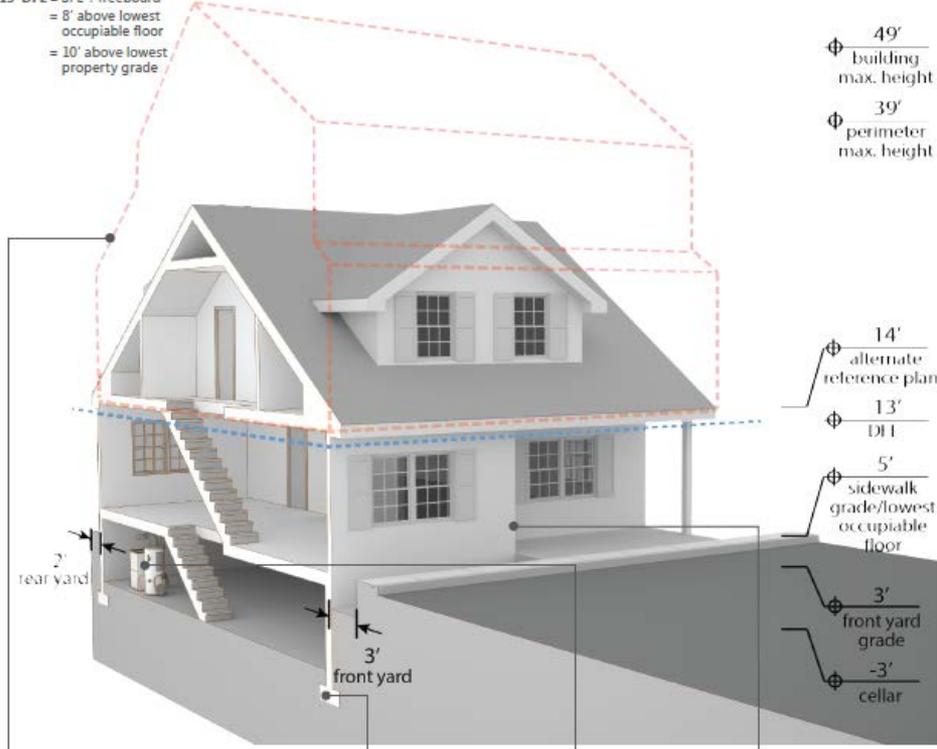
RESILIENT CONSTRUCTION REQUIREMENTS

FLOOD HAZARD AREA	A ZONE		V ZONE
FLOODPROOFING STRATEGY	DRY FLOODPROOFING WATERTIGHT STRUCTURE e.g. FLOOD SHIELDS	WET FLOODPROOFING WATER TO RUN-IN / RUN-OUT BY GRAVITY ONLY e.g. FLOOD VENTS	WET FLOODPROOFING VIRTUALLY OPEN STRUCTURE e.g. BREAKAWAY WALLS
GROUND FLOOR CONFIGURATION & STRUCTURAL REQUIREMENTS	<p>FLOOD SHIELDS PREVENT WATER FROM ENTERING</p>  <p>NON-RESIDENTIAL SPACE</p> <p>LOWEST FLOOR ALLOWED TO BE EXCAVATED BELOW GRADE NOT PERMITTED FOR ENTIRELY RESIDENTIAL BUILDINGS</p>	<p>1 INCH OF NET OPEN AREA PER 1 SQ. FT. OF ENCLOSED AREA</p>  <p>1" MAX</p> <p>LOWEST FLOOR TO BE AT/OR ABOVE DESIGN FLOOD ELEVATION</p>	<p>BREAKAWAY WALL</p>  <p>VERTICAL FOUNDATION MEMBER</p> <p>BOTTOM OF LOWEST STRUCTURAL MEMBER TO BE AT/OR ABOVE DESIGN FLOOD ELEVATION</p>
PERMITTED USE BELOW DFE	<ul style="list-style-type: none"> ✓ PARKING ✓ ACCESS ✓ STORAGE ✗ RESIDENTIAL ✓ NON-RESIDENTIAL 	<ul style="list-style-type: none"> ✓ PARKING ✓ ACCESS ✓ STORAGE ✗ RESIDENTIAL ✗ NON-RESIDENTIAL 	<ul style="list-style-type: none"> ✓ PARKING ✓ ACCESS ✓ STORAGE ✗ RESIDENTIAL ✗ NON-RESIDENTIAL

EXISTING CONDITIONS

FLOOD ELEVATION

13' DFE = BFE + freeboard
 = 8' above lowest occupiable floor
 = 10' above lowest property grade

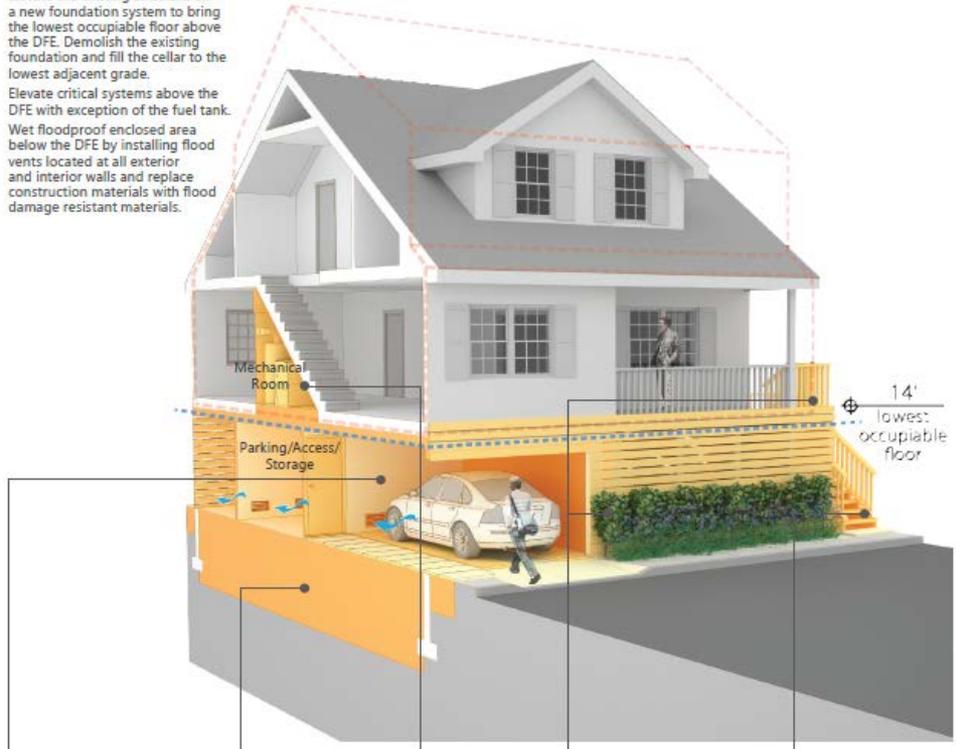


ILLUSTRATIVE RETROFIT STRATEGY

DETACHED

ELEVATE & WET FLOODPROOF

Elevate the existing structure on a new foundation system to bring the lowest occupiable floor above the DFE. Demolish the existing foundation and fill the cellar to the lowest adjacent grade.
 Elevate critical systems above the DFE with exception of the fuel tank.
 Wet floodproof enclosed area below the DFE by installing flood vents located at all exterior and interior walls and replace construction materials with flood damage resistant materials.



ZONING ENVELOPE

The building has non-compliant front, rear, and one side yard, and does not provide the required parking. Existing non-compliances must be considered when retrofitting buildings.
 Per zoning, the allowable building height is measured from 9' above the sidewalk grade by application of the Alternate Reference Plane rule, which permits the building envelope base height to be shifted above the DFE in order to accommodate usable parking, access, or storage. This rule is available where the DFE is between 6'-9' above sidewalk grade.
 The floor area is overbuilt which is an existing non-compliance. Zoning allows the relocation of existing non-compliant floor area above the DFE within the adjusted bulk envelope.

STRUCTURAL SYSTEMS

One-and-a-half story wood frame combustible construction type on unreinforced masonry foundation. The wood structure is not sufficiently tied to the foundation.

CRITICAL SYSTEMS

The electrical panels and the hot water heater are located in the cellar. The fuel tank is located in the rear yard at grade.

ACCESS

Building access is provided at the front and rear entrances, both at sidewalk grade, which is 2' above property grade.

USE

The existing non-compliant yards and overbuilt square footage remain.
 Relocation of the critical systems to above the DFE within the building envelope results in a 90 s.f. area loss. Zoning allows for the square footage to be relocated to a new addition within the bulk envelope.
 Use below the DFE is for vehicular parking and storage.
 The application of the Alternate Reference Plane rule provides necessary height for parking clearance.

STRUCTURAL SYSTEMS

Elevate the structure on new reinforced concrete or masonry unit foundation and columns. Fill the site to the lowest adjacent grade.
 The relocation of the critical systems may require additional structural support.
 Insulate and fireproof the underside of lowest level to enclose building envelope.

CRITICAL SYSTEMS

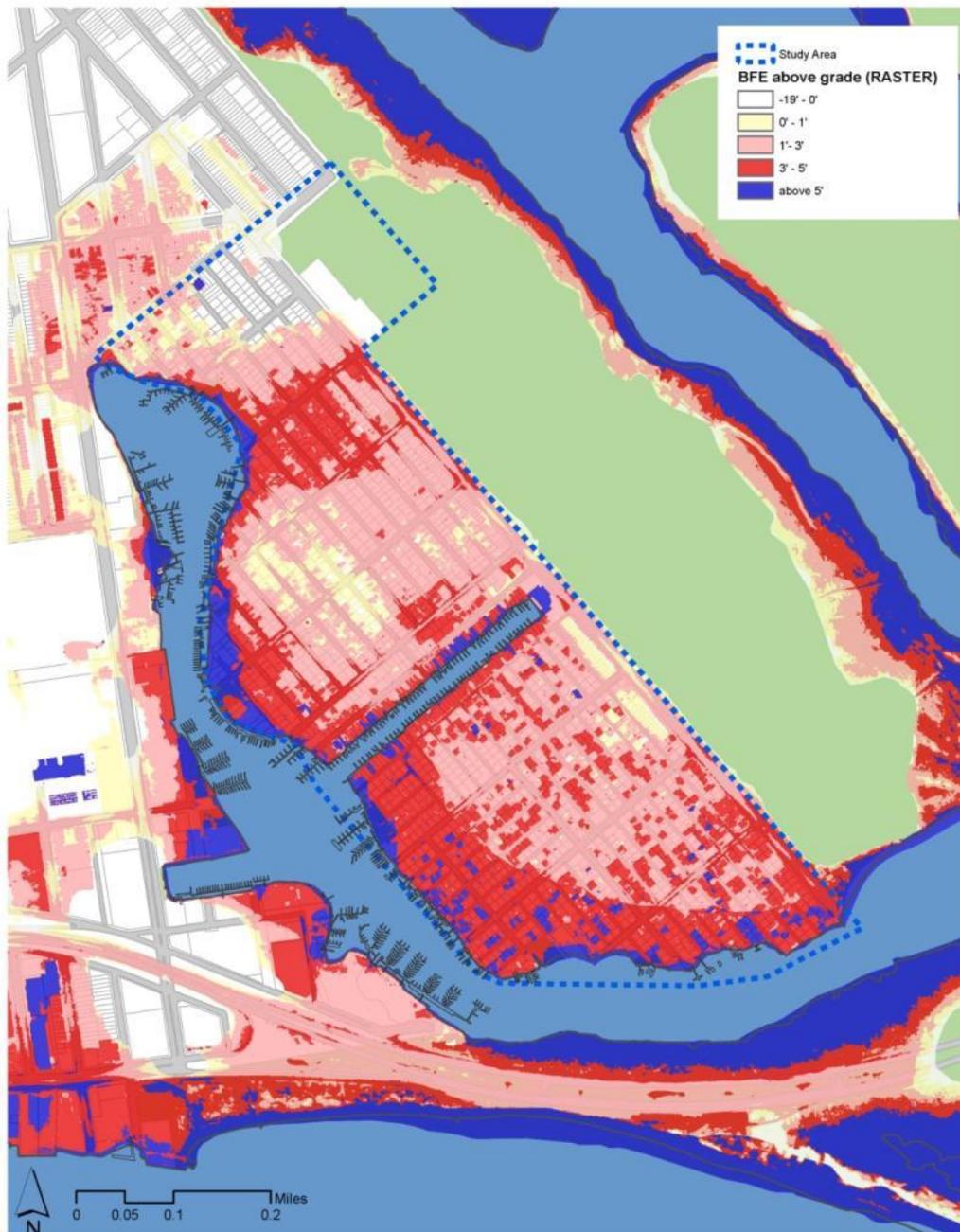
Elevate systems above the DFE to an interior fireproofed and vented enclosure. Install isolation and/or vibrations pads as needed.
 Fuel tank may remain at grade; fasten as required to resist buoyancy and load pressure from water and debris.

STREETSCAPE

The application of the Alternate Reference Plane Rule requires two zoning streetscape mitigations. Note, these requirements may be waived if the front setback is less than 3 feet.
 The planting along 60% of the width of the lot frontage fulfills one zoning mitigation requirement.
 The stair turn at the front entry provides the second mitigation measure.
 Lattice located below the DFE provides visual transition at the streetwall.

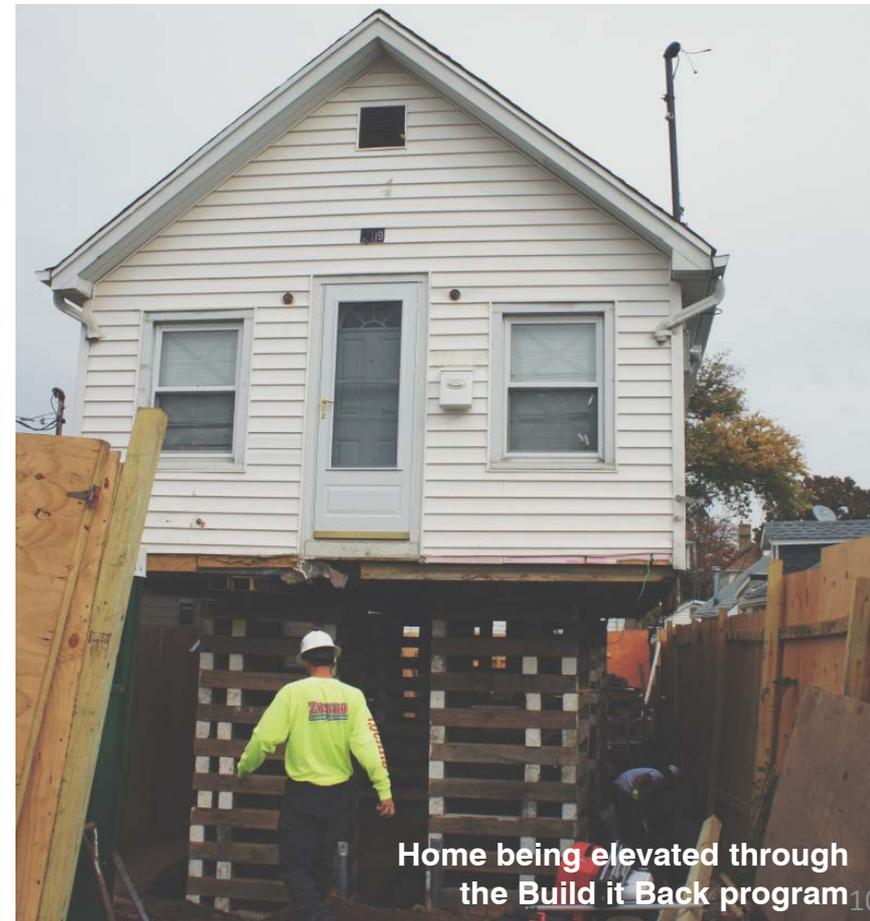
ACCESS

The building entrance is relocated to 9' above sidewalk grade. The stairs may be located underneath or adjacent to the structure depending on available yard space and clearance underneath the structure. Here the access may be located at the side yard.
 Install a curb cut for parking at the new garage.

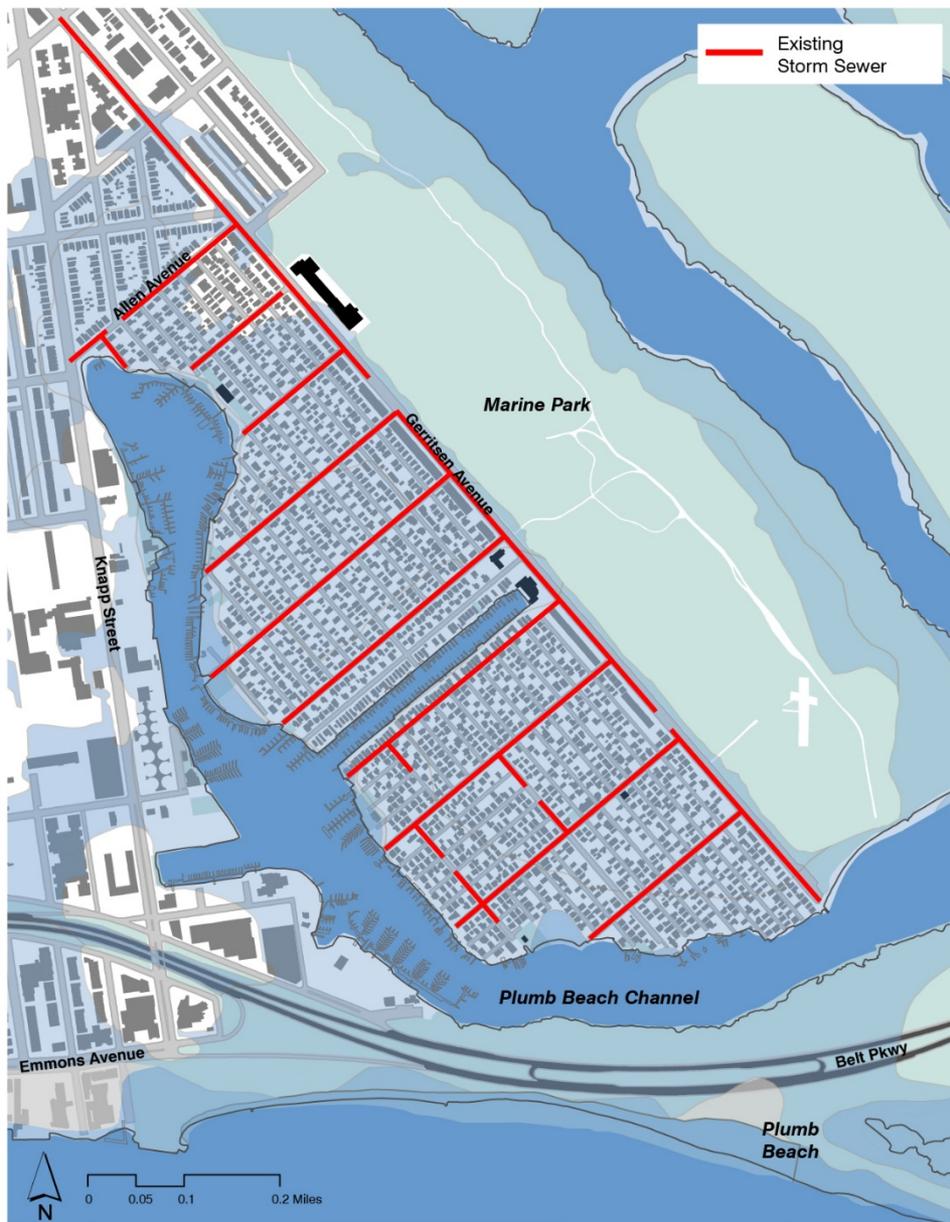


Gerritsen Beach Statistics:

- 5,000 residents
- 1,800 buildings
- 2,400 residential units
- 1,360 one-family homes (62%)
- 859 Build it Back Registrants



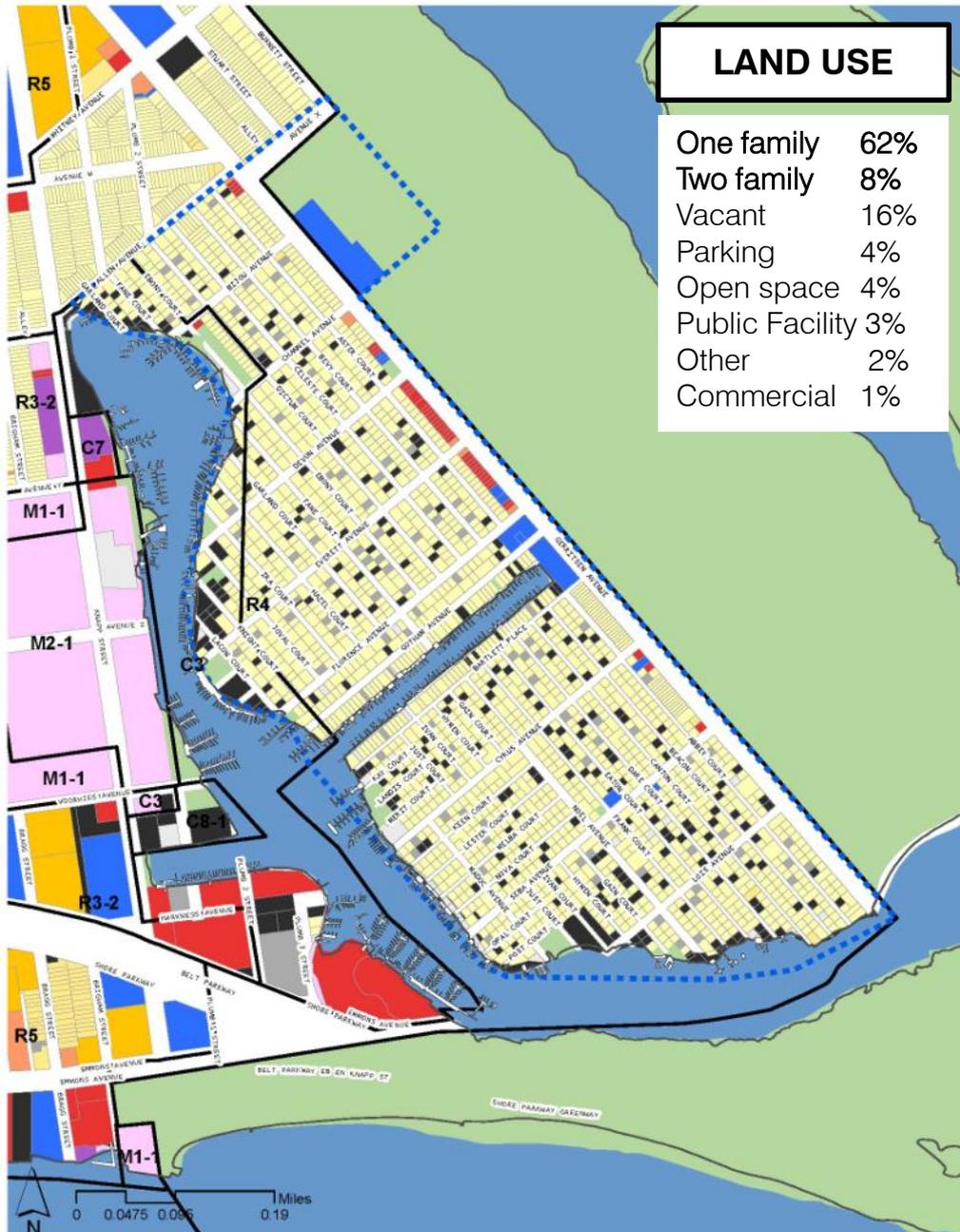
INFRASTRUCTURE and DEVELOPMENT TRENDS



STORM SEWER INFRASTRUCTURE



COMBINED LOT PATTERNS



Vacant lots used for parking and / or side yards

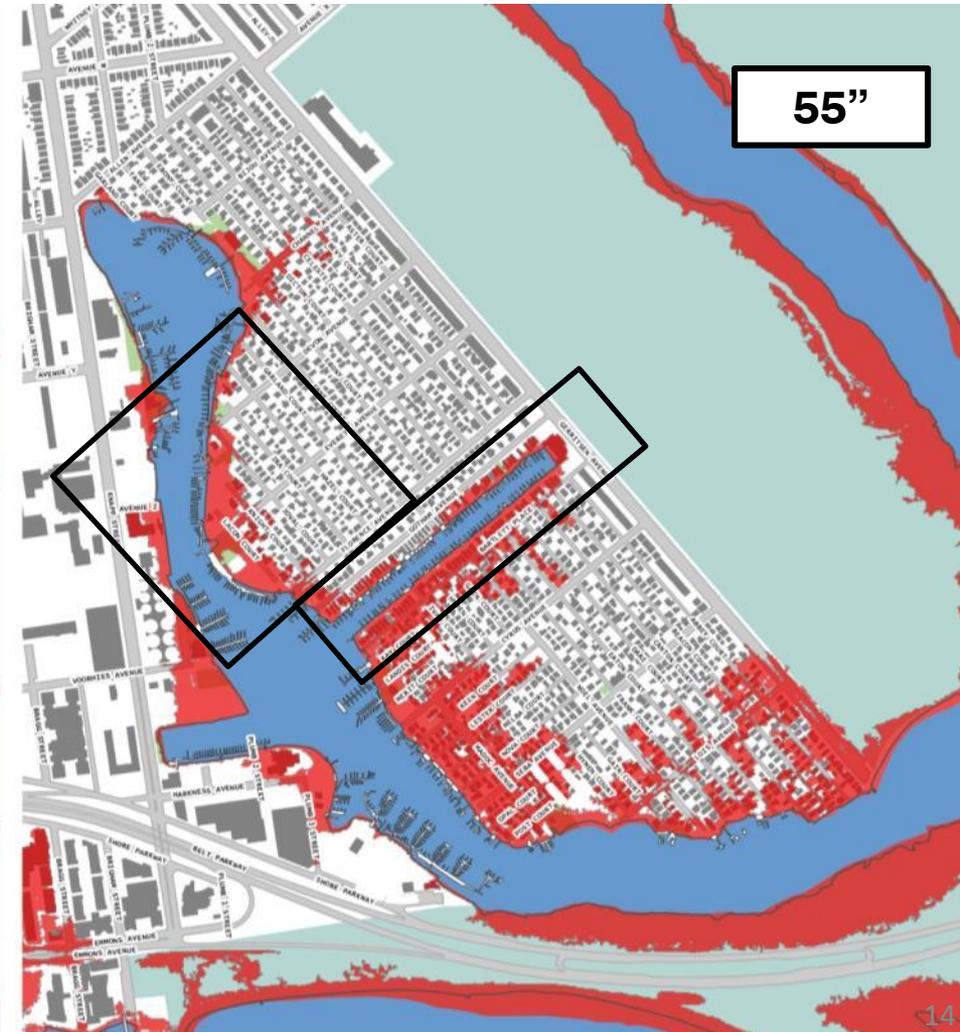
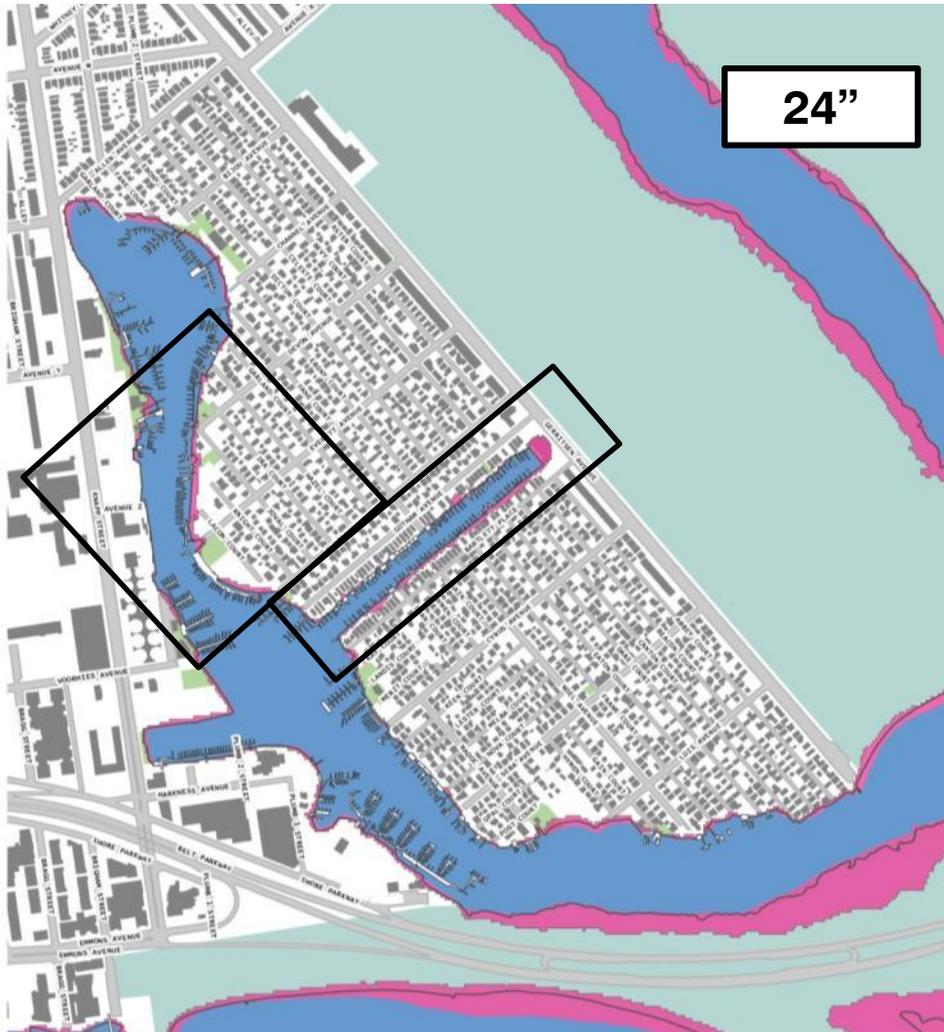


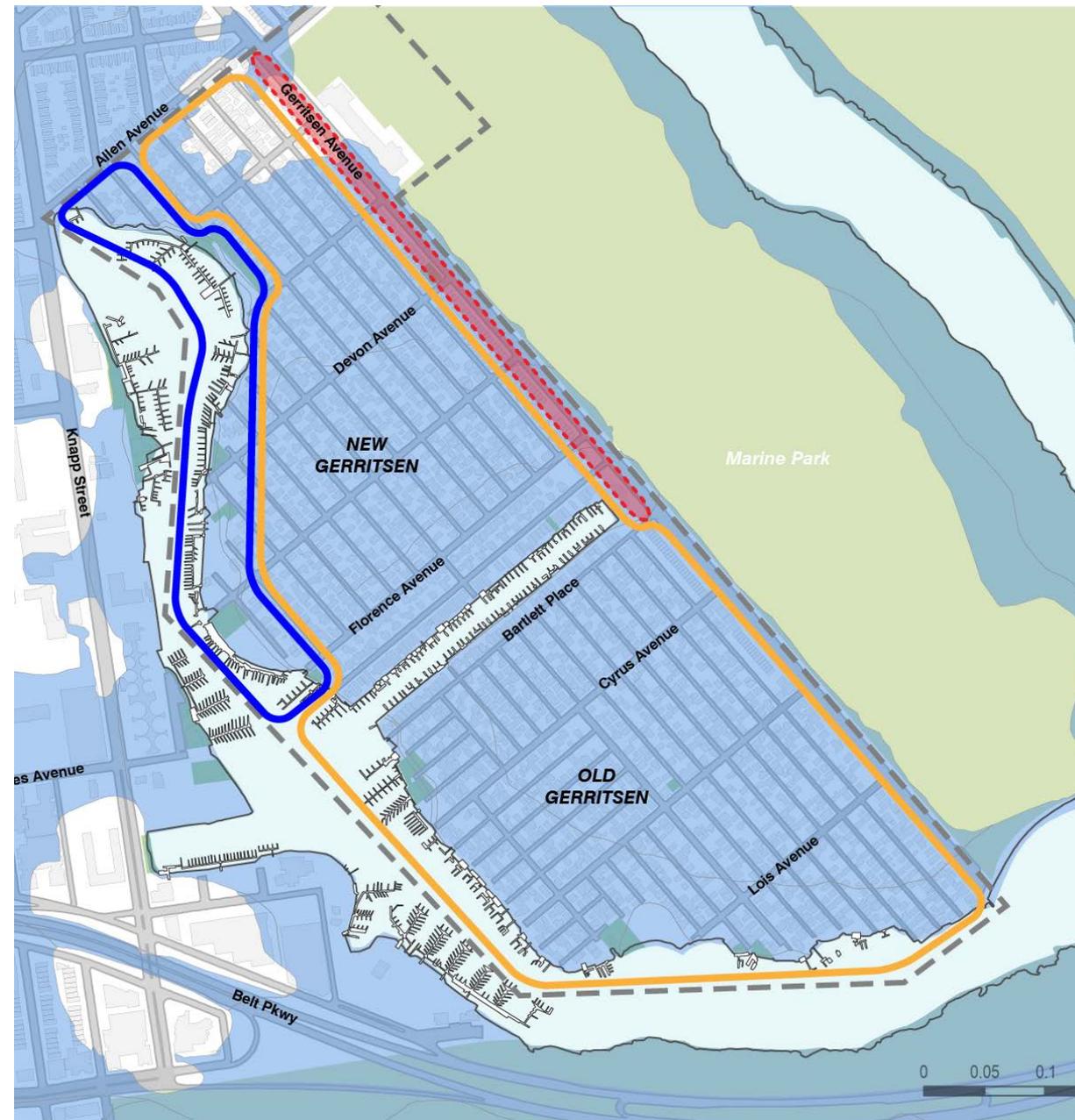
Shallow yards

- **Sunken lots and residential uses below the FRCE:** vulnerability to coastal flooding is exacerbated by high BFEs and a widespread sunken lot condition. Residential uses are also found below the FRCE level throughout the neighborhood.
- **Large homes on shallow lots with limited light and air:** Lots with narrow yards that pose challenges for existing zoning compliance, elevation strategies, ADA access, streetscape, and neighborhood character
- **Narrow streets:** Many of the streets have unusually narrow widths (as low as 20ft), particularly in the southern section of the neighborhood, which present safety risks and accessibility issues during emergencies
- **Density:** current zoning designation allows for multi-family development, which could over-stress the limited storm sewer infrastructure



- **Current and future exposure to coastal flooding:** the neighborhood is entirely mapped within a flood zone with medium to high BFEs. Projections show that portions of area along the water's edge are at high risk of recurrent inundation to less severe storms (10 and 50-yr storms) as well as to daily flooding (55" SLR projections) in the next 100 years.





RESIDENTIAL CORE

NEW GERRITSEN: Low scale residential with large homes on small shallow lots (35x50') limited space for access. Low BFE (2-3 ft).

CANAL: Low scale residential high exposure to flood risk and greater future vulnerability. Narrow lots (24x66') fronting narrow street.

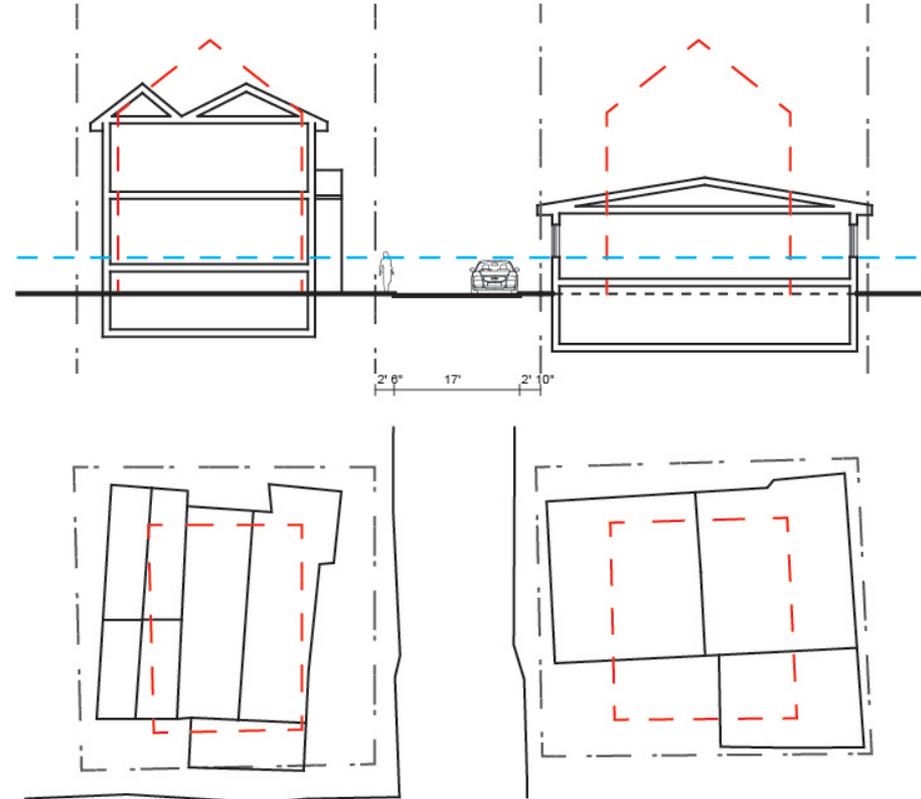
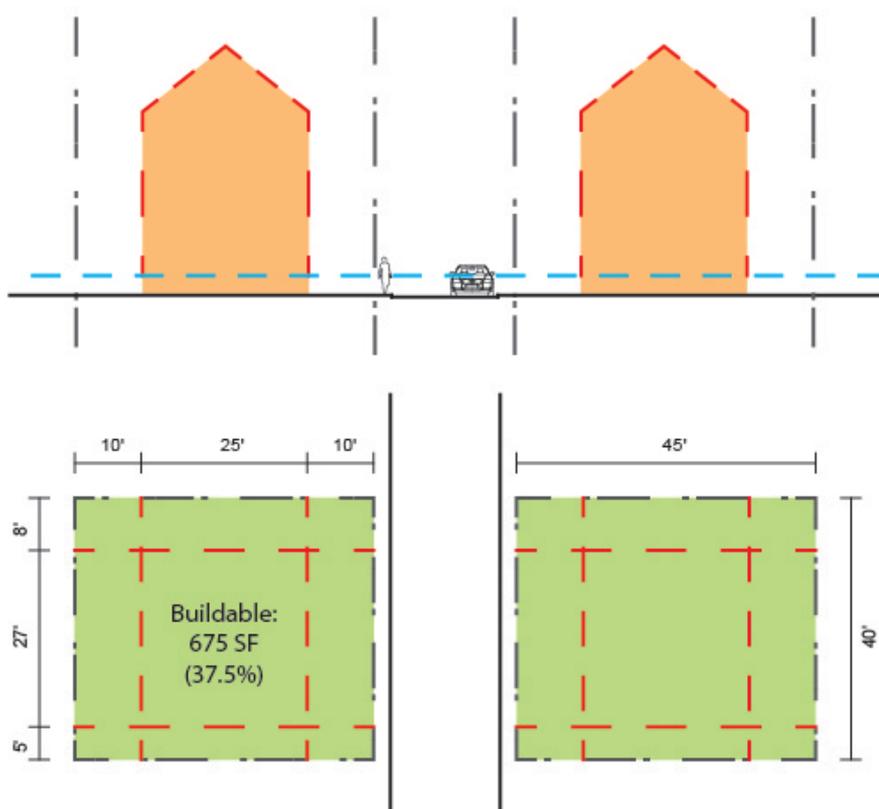
OLD GERRITSEN: Low scale residential, medium to high exposure to flood risk, sunken lots condition. Large homes on small shallow lots (40x45') with non-complying yards and limited space between homes.

GERRITSEN AVENUE

Local retail corridor with one-story attached building types. Low BFE (2-3 ft). Limited uses because of existing zoning designation.

WATERFRONT

Low scale residential character with several recreation maritime uses and vacancies to the north of the study area. High exposure to flood risk and to future tidal flooding.



ZONING REQUIREMENTS

Lot Area: 1,800 sf
 Max FA: 1,620 sf
 Max Lot Coverage: 45%
 FAR: 0.9 (with attic allowance)
 Front Yard: 10 ft
 Rear Yard: 10 ft (shallow lots)
 Side Yards: 13 ft
 Off-street parking: 1
 Streetscape Enhancements: 1

BUILT CHARACTER

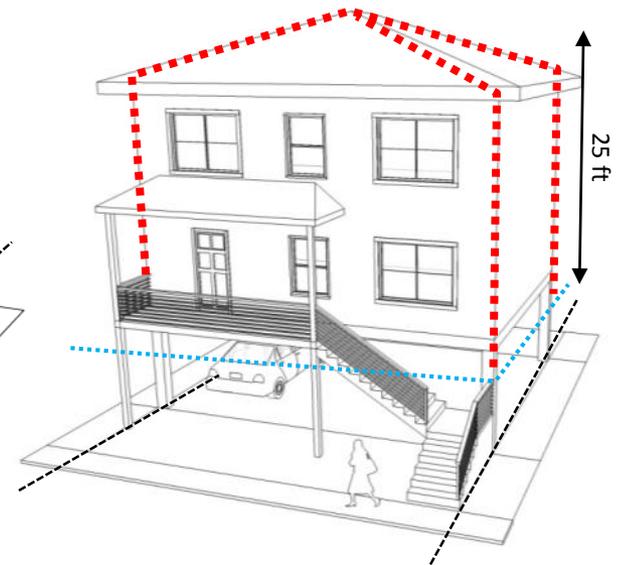
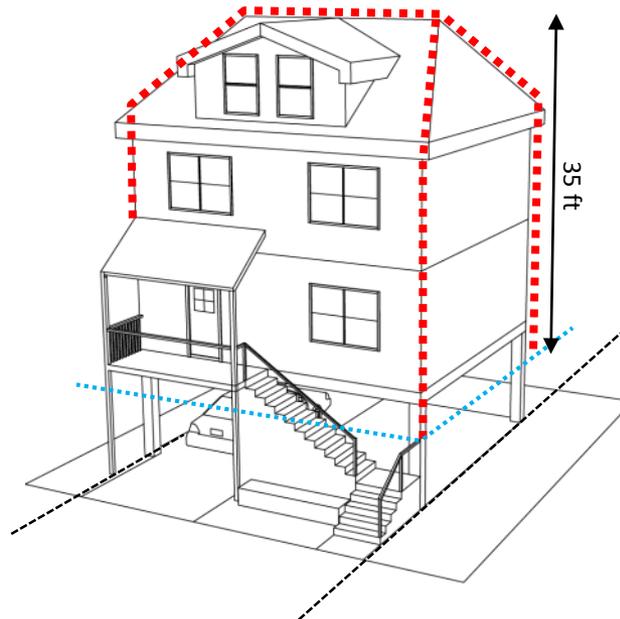
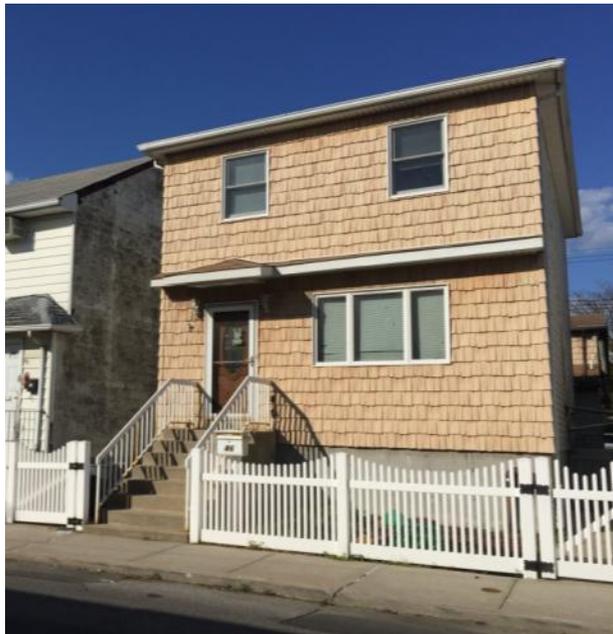
Lot Area: 1700 sf
 FA: 1755 sf
 FAR: 1.0
 Lot Coverage: 60%

Lot Area: 1,800 sf
 FA: 945 sf
 FAR: 0.5
 Lot Coverage: 52%

Built Character

R4

R4-1



- Single and two family detached homes
- Max building height 2 to 3 stories
- Often do not comply with side yard regulations

- Allows for multi-family buildings
- Max building height 35ft above FRCE (already 6-8ft above street level)
- Inefficient footprint due to zoning requirements

- Limits new development to 1 and 2 family homes
- Allows for a more efficient footprint
- Max building height 25ft or two stories

GOALS and PRIORITIES

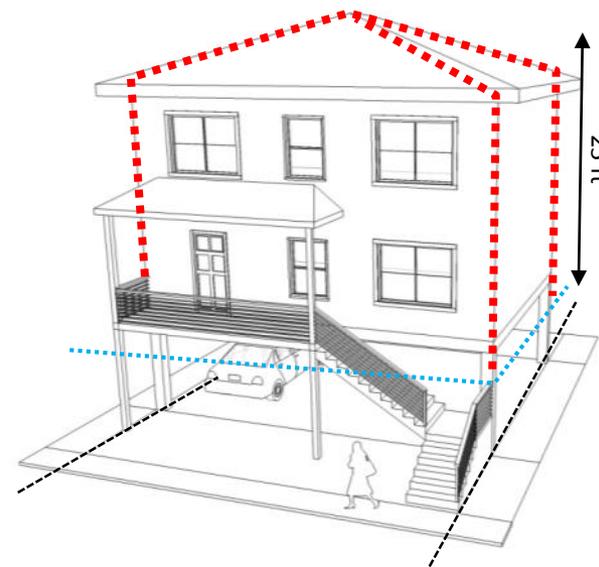
- **Incentivize resiliency**
investments and adaptation to future risks
- **Preserve existing neighborhood character**
- **Preserve existing density to not stress infrastructure**



RESIDENTIAL CORE

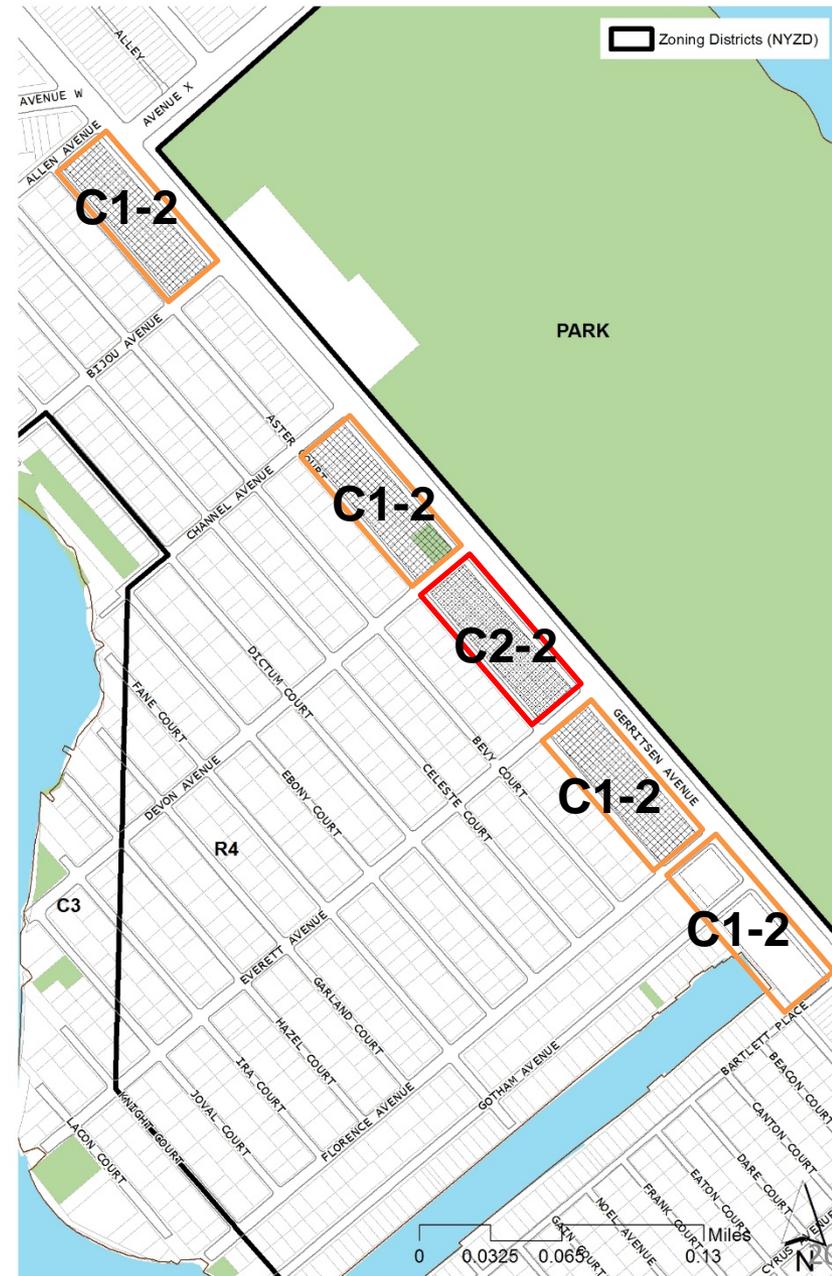
- **Rezone** from multi-family R4 to **one and two family R4-1** to prevent out of context development
- **Reduce side yard requirements** to allow for a better building layout
- **Limit height at 25 feet** or two (2) stories to match existing built character
- **Further limit new development** to one-family homes for lots < 3,000 sf in line with existing infrastructure capacity

R4-1 with special bulk and density provisions



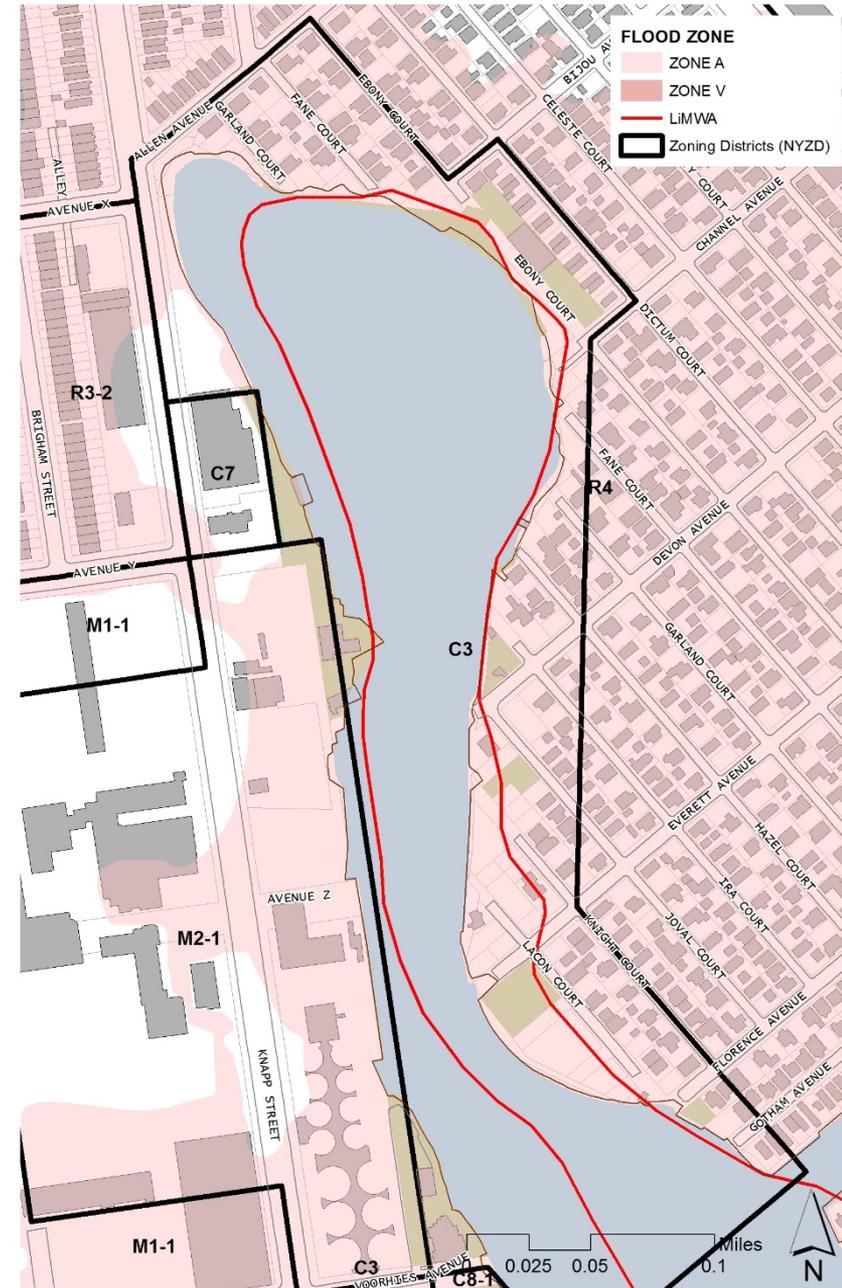
GERRITSEN AVENUE

- Allow for a **wider range of uses** to serve the local community
- Expand commercial overlay along Gerritsen Avenue to match the existing C2-2 designation



WATERFRONT

- On lots not directly fronting the water, **rezone** from multi-family C3 to **one and two family R4-1** to prevent out of context development
- Limit development in areas at higher risk along the waterfront to commercial uses only



GOALS and PRIORITIES

- Incentivize resiliency investments and adaptation to future risks
- Preserve existing neighborhood character
- Preserve existing density to not stress infrastructure

STRATEGIES

- Limit density to 1-2 family homes and identify zoning district that better suits existing built form (new construction)
- Assist Build it Back and homeowners in elevation and reconstruction process:
 - Special Regulations for Neighborhood Recovery
- Coordinate with capital agencies on planned and future investments in the neighborhood

- Investigate current bulkhead condition and necessary measures to address future risks
 - Improve city-owned bulkheads
- Continue planned improvements to street and sewer infrastructure
 - DOT street drainage plan
 - DOT street reconstruction / DEP sewer upgrade
- Explore opportunities for coastal protection
 - USACE Jamaica Bay Reformulation Study