

# Sea Level Rise & Flooding



Village of Mamaroneck  
Planning Department  
February, 2017

# Agenda

- Introduction to Sea Level Rise
  - Sea Level Rise Scenarios in Village of Mamaroneck
  - Impacts on Infrastructure and Commerce
  - Flood Event Scenarios
  - Recommendations
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# Sea Level Rise

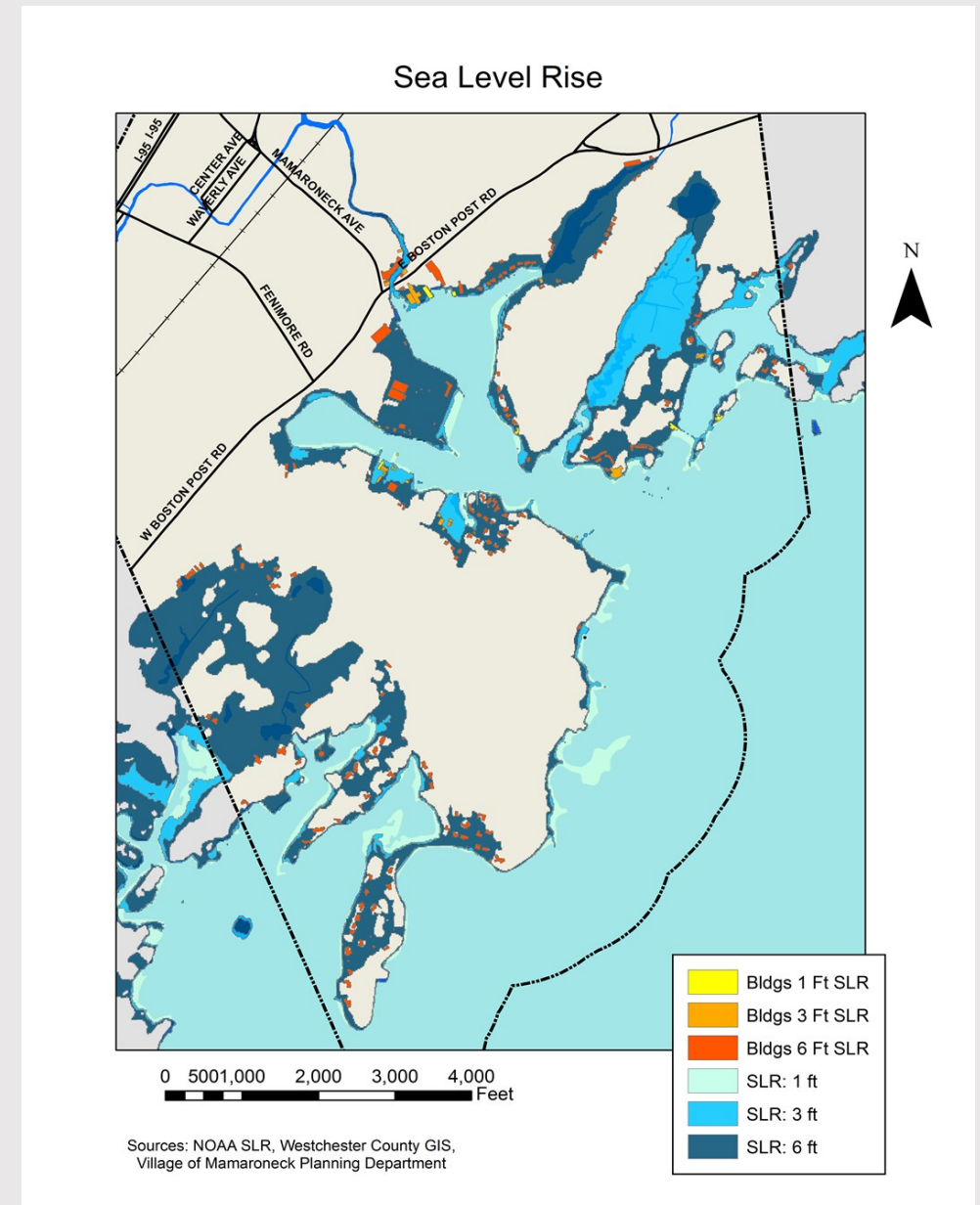
- As a result of global warming ice sheets are melting into the ocean causing sea levels to rise.
- The Village of Mamaroneck is at risk with approximately 9 miles of coastline on the Long Island Sound.



# SLR Scenarios

Sea Level Rise	Total Buildings Value	# of Structures	Acres	% of Total Landmass Lost	Timeline
1 Foot	\$5,613,900	8	42	2%	NYSERDA Model: 2050s Rapid Ice Melt: 2030s
3 Feet	\$26,791,100	34	96	5%	NYSERDA Model: 2080s Rapid Ice Melt: 2060s
6 Feet	\$181,059,050	248	330	17%	NYSERDA Model: Past 2100 Rapid Ice Melt: 2090s

\*Buildings were joined to assessment data for entire property- value represents amalgamated value of buildings on a lot. Value of tax exempt structures not represented.



\*Data portrayed above are not suitable for site-specific analysis. Data are provided by NOAA and is subject to their use disclaimer.



# Impacts on Commerce

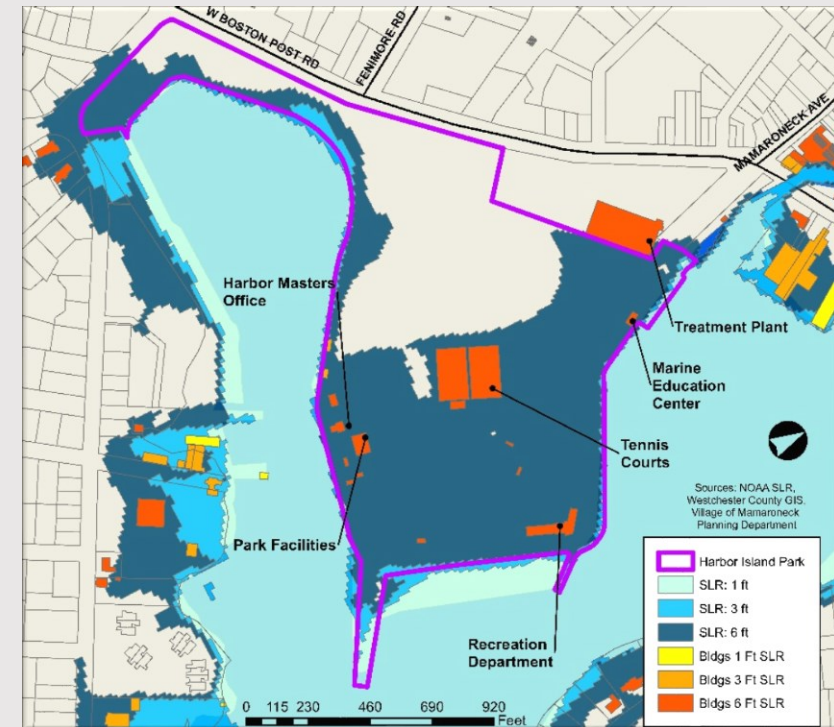
- The Village has a number of vital marine businesses located in areas that will become inundated as a result of SLR.
- Businesses include boatyards, yacht facilities, and water-enhanced recreation clubs.
- At 6 ft of SLR the majority of Harbor Island Park will become inundated.



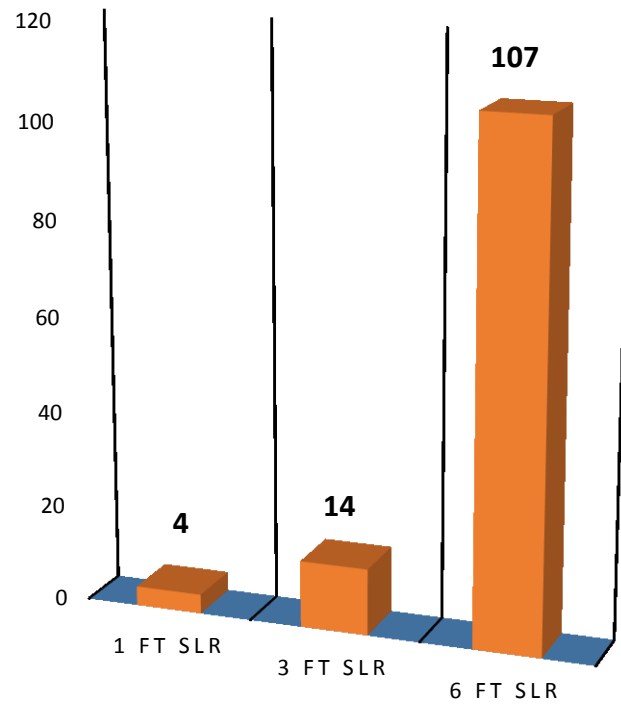
**Mamaroneck Water Treatment Plant (Westchester County)  
and commercial boatyards**

# Impacts on Infrastructure & Facilities

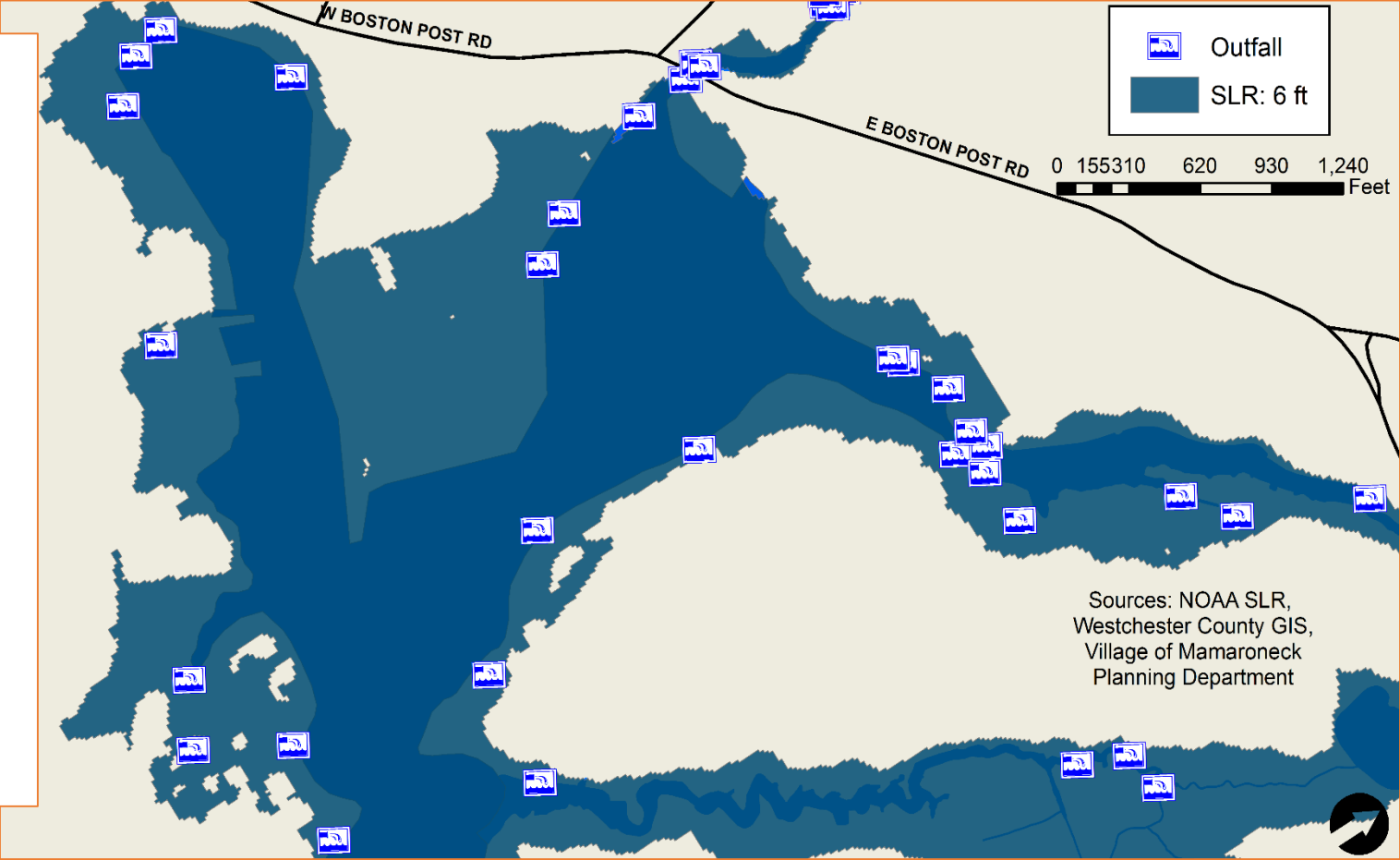
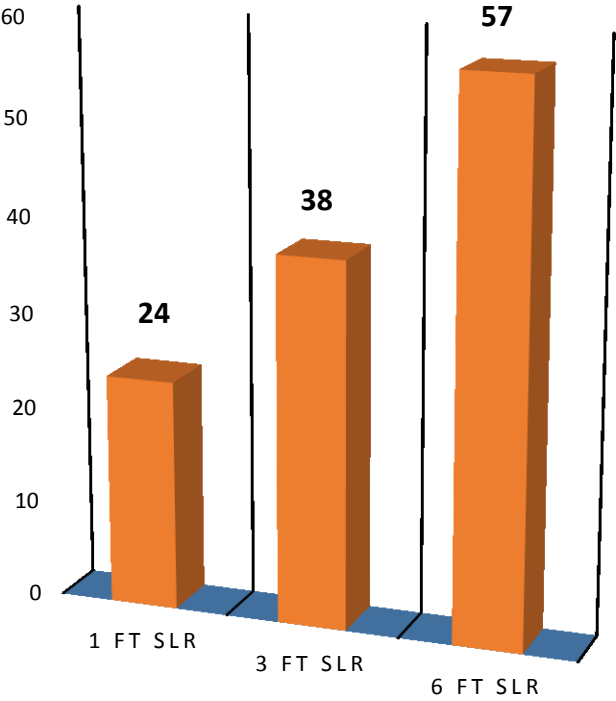
- Harbor Island Park hosts multiple Village and community facilities that will face inundation.
- Critical infrastructure is at risk including sanitary sewer pipes, pump stations, force mains, drainage manholes and outfalls and village-owned roadways and buildings.



## INUNDATED MANHOLES



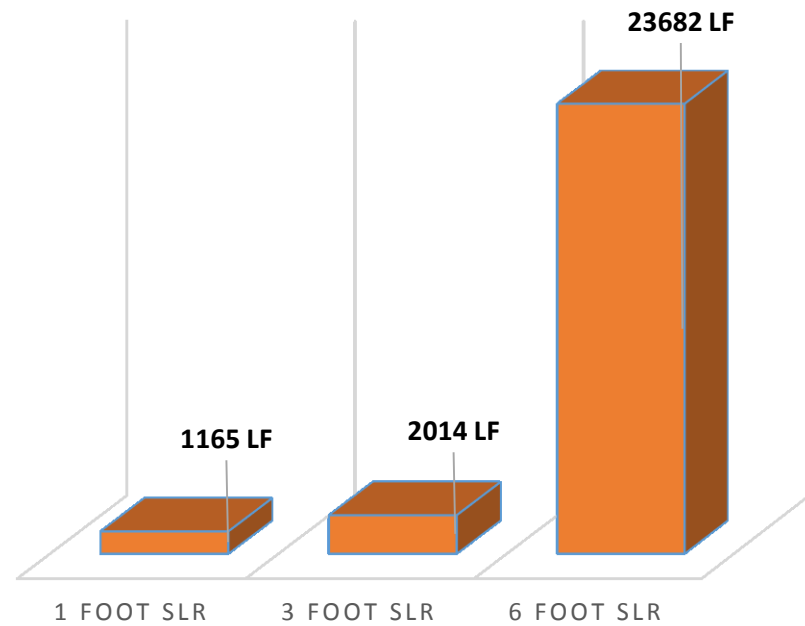
**INUNDATED OUTFALLS**



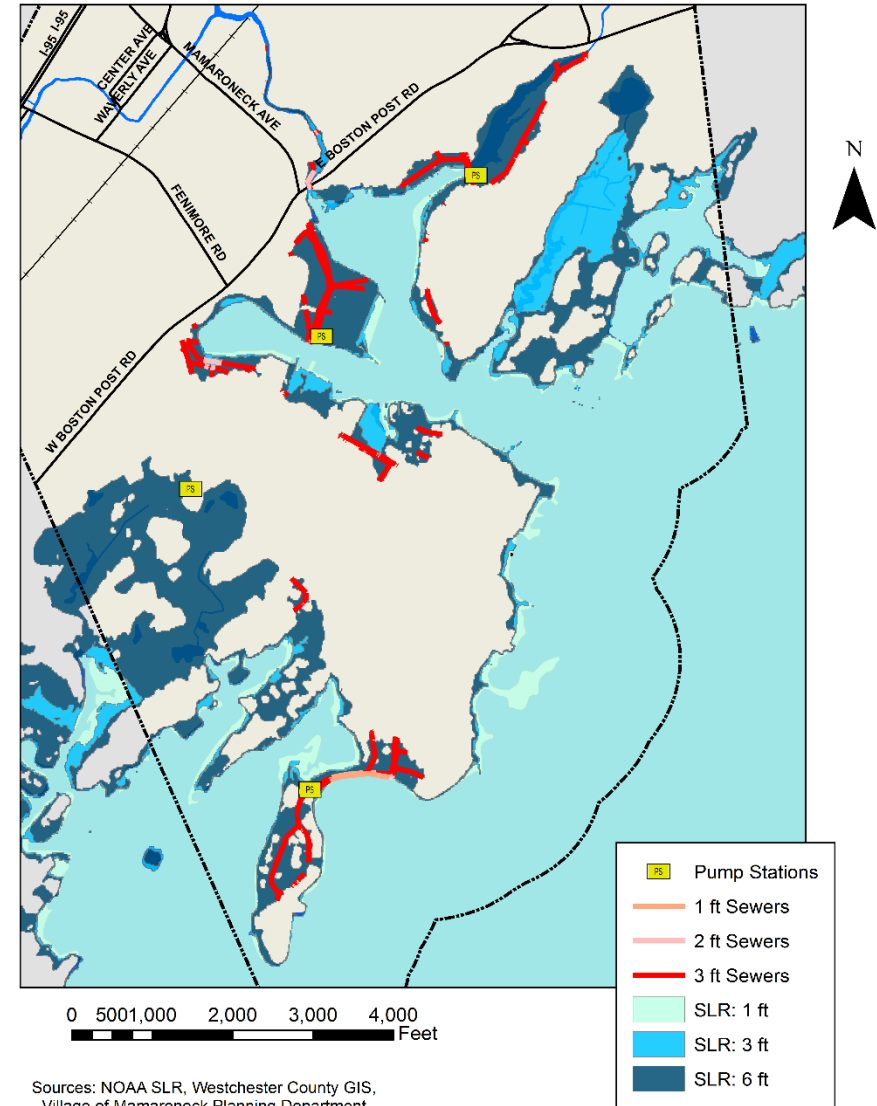
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## LINEAR FEET OF SEWER BY SLR



## Pump Stations & Sewers Impacted by SLR



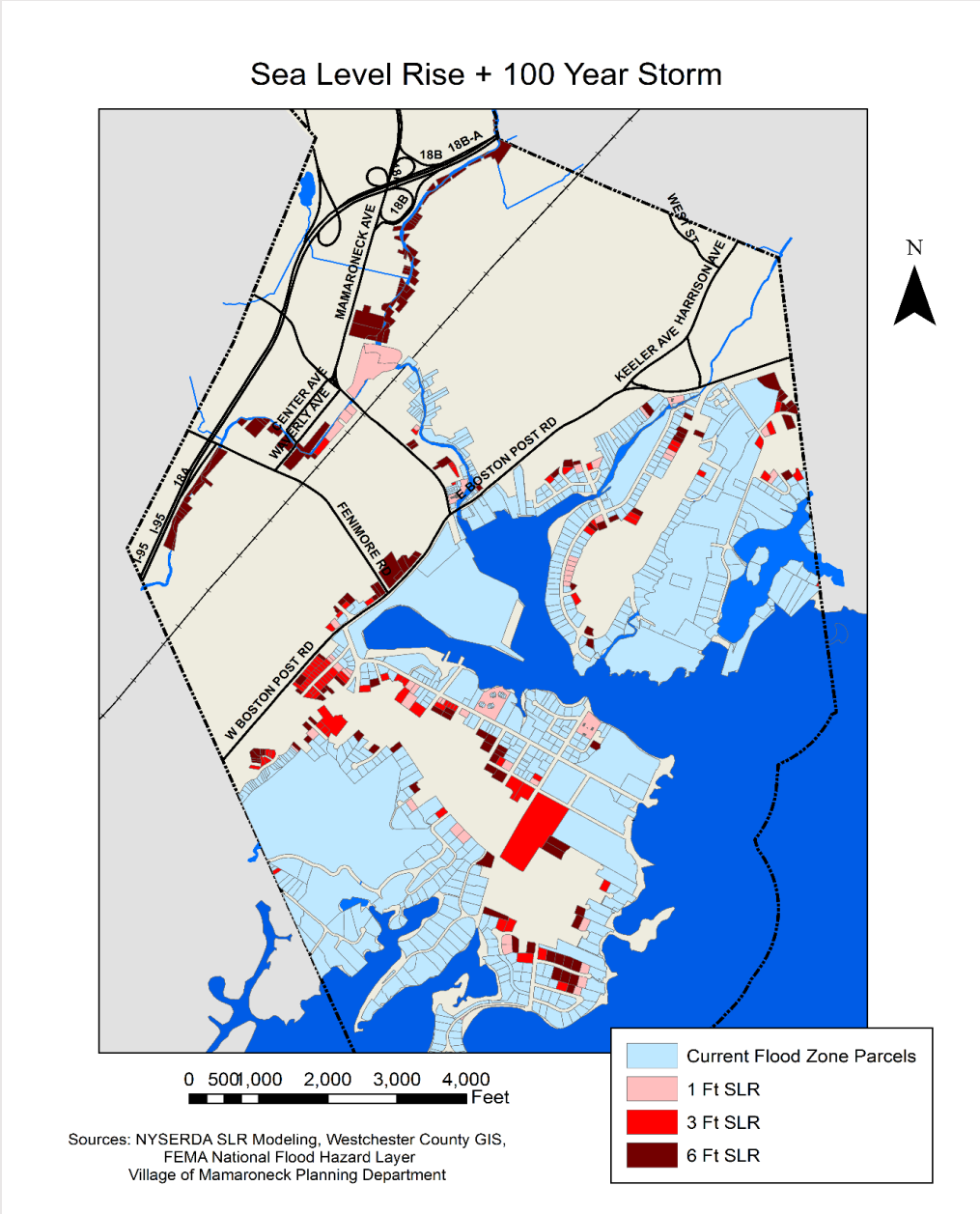
Sources: NOAA SLR, Westchester County GIS,  
Village of Mamaroneck Planning Department

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# Flood Event Scenarios

## 100 Year Storm

Sea Level Rise	Total Value Building Only (in 2017 dollars)	25%-75% Damage (in 2017 dollars)	# of Additional Properties	Timeline
1 Foot	\$30,456,200	\$7,614,050-\$22,842,150	56	NYSERDA Model: 2050s Rapid Ice Melt: 2030s
3 Feet	\$79,656,146	\$19,914,037-\$59,742,110	164	NYSERDA Model: 2080s Rapid Ice Melt: 2060s
6 Feet	\$166,610,419	\$41,652,605-\$124,957,814	327	NYSERDA Model: Past 2100 Rapid Ice Melt: 2090s

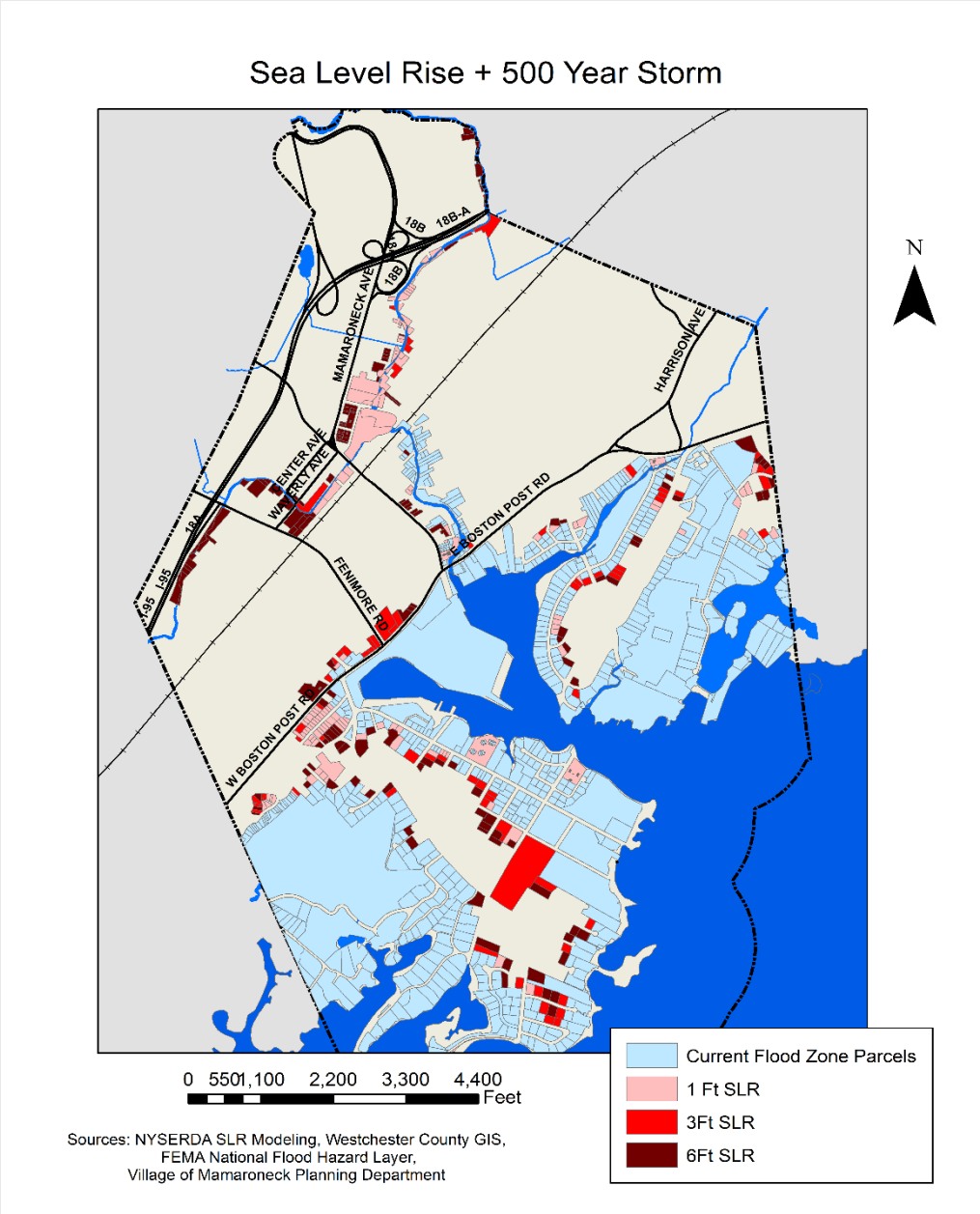


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# Flood Event Scenarios

## 500 Year Storm

Sea Level Rise	Total Value Building Only (in 2017 dollars)	25%-75% Damage (in 2017 dollars)	# of Additional Properties	Timeline
1 Foot	\$50,131,096	\$12,532,774-\$37,598,322	144	NYSERDA Model: 2050s Rapid Ice Melt: 2030s
3 Feet	\$99,636,119	\$24,909,030-\$74,727,089	227	NYSERDA Model: 2080s Rapid Ice Melt: 2060s
6 Feet	\$189,636,918	\$47,409,230-\$142,227,689	404	NYSERDA Model: Past 2100 Rapid Ice Melt: 2090s



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# Recommendations

- Repair or replace failing seawalls with new higher walls. Particular care should be given to historic nature of the seawalls. Wherever possible the Village should partner with Westchester County to improve resiliency of both Harbor Island Park and the water treatment plant.
  - Seawalls are used in the Netherlands to protect from flooding and sea level rise.
- Plant native plantings and restore wetlands wherever possible. Wetlands serve as vital habitats, stabilize the shoreline, and lessen wave action during coastal events.
  - While not explicitly aimed at mitigating SLR, the Village restored wetlands in the West Basin in 2007.
- Begin tracking sea level rise at Harbor Island Park to inform future projections using high-accuracy locally derived data.
- Reduce our local contributions to carbon emissions.

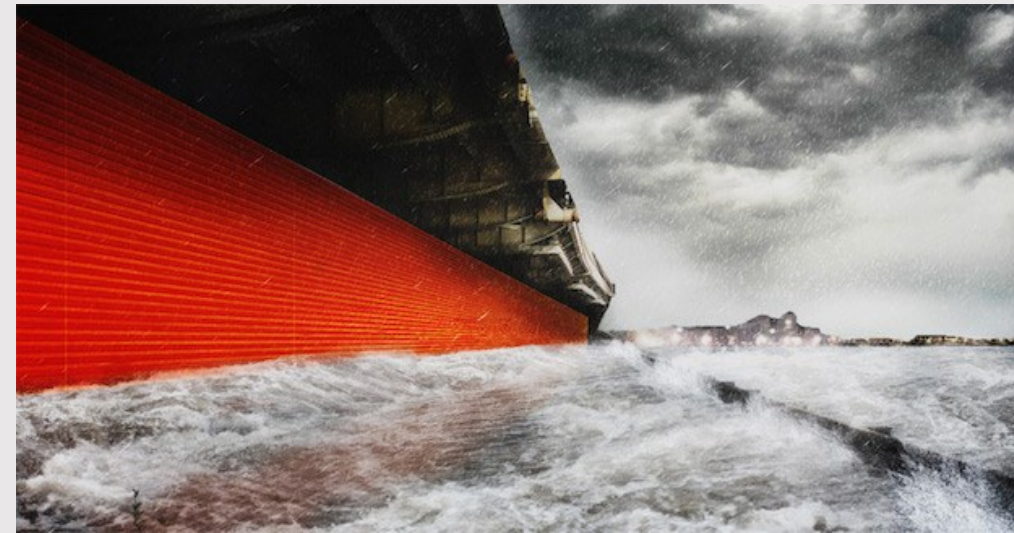


Harbor Island Wetland Restoration



# Recommendations

- Explore ways to address sea level rise along privately owned areas of the shoreline, through either code requirements or incentives.
- Permit the raising of homes to heights that incorporate expected sea level rise. Current freeboard requirements of two feet above base flood elevation work towards that goal, but may need to be revisited as sea levels rise and projections become more accurate.
- Consider installation of vegetated berms to protect from both storm surge and sea level rise. May also create increase public access to waterfront.
  - Berms are being used by NYC in the Big U project around lower Manhattan.
- Explore use of other structural interventions including automated flood walls that retract to maintain view sheds.
  - Another method of flood control used in the Netherlands.
- Raise or relocate critical infrastructure such as pump station and force mains in areas that are expected to be inundated.
- Raise or relocate facilities (managed retreat).
  - The City of Beacon recently moved a development project from the bank of the Hudson River uphill in recognition of SLR.



# Questions & Contacts

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# Data Use Disclaimers

**NYSERDA SLR Model Use Disclaimer:** This electronic tool provides estimated projections of the potential impact of future sea-level rise and storm surge on inundation and coastal flooding that could occur in portions of New York State. The estimated projections of future sea level are based on the best available scientific information but have large uncertainties and are subject to change as the state of the science evolves. The values do not reflect the likelihood of changes in climate or sea level.

This tool is intended to be used only as a screening-level tool to consider potential policy responses to sea-level rise and coastal flooding. It is not intended for, nor suitable for, navigation, site-specific analysis for permitting or other legal purposes. The data and maps in this tool are provided “as is,” without warranty to their performance, merchantable state, or fitness for any particular purpose. There is no warranty that access to content will be uninterrupted or error-free; that content will be virus-free; or that content will be complete, accurate, or timely. The entire risk associated with the results and use of these data is assumed by the user. Under no circumstances, including but not limited to negligence, shall the creators of this mapping tool be liable for any direct, indirect, incidental, special, or consequential damages.

**NOAA SLR Mapper Use Purpose & Disclaimer:** The purpose of this data viewer is to provide coastal managers and scientists with a preliminary look at sea level rise and coastal flooding impacts. The viewer is a screening-level tool that uses nationally consistent data sets and analyses. Data and maps provided can be used at several scales to help gauge trends and prioritize actions for different scenarios.

The data and maps in this tool illustrate the scale of potential flooding, not the exact location, and do not account for erosion, subsidence, or future construction. Water levels are shown as they would appear during the highest high tides (excludes wind driven tides). The data, maps, and information provided should be used only as a screening-level tool for management decisions. As with all remotely sensed data, all features should be verified with a site visit. The data and maps in this tool are provided “as is,” without warranty to their performance, merchantable state, or fitness for any particular purpose. The entire risk associated with the results and performance of these data is assumed by the user. This tool should be used strictly as a planning reference tool and not for navigation, permitting, or other legal purposes.