

---

# Highlands, NJ Vulnerability to Sea-Level-Rise and Coastal Storm Damage

October 7, 2024



# Introductions

---



- Carolyn Broullon
  - Mayor, Borough of Highlands



- Shawn LaTourette
  - Commissioner, NJDEP
- Jenn Moriarty
  - Assistant Commissioner, NJDEP Watershed & Land Management
- Vince Mazzei
  - State Floodplain Administrator, NJDEP



- Colonel Alexander Young
  - Commander, USACE NY District
- Bethany McClanahan
  - Project Manager, USACE NY District

# Agenda

---

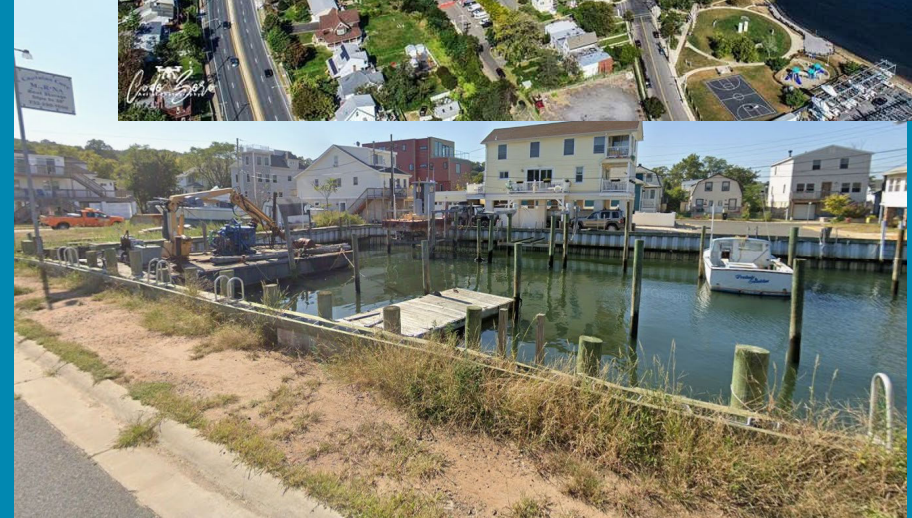
- Introductions
- Highlands' Vulnerability to:
  - Sea-level-rise
  - Coastal storms
  - Stormwater flooding (precipitation)
- Potential Projects to Address Vulnerability:
  - Highlands & Monmouth Hills Flood Mitigation & Green Infrastructure Project
  - US Army Corps of Engineers (USACE) Coastal Storm Risk Management Project
- Recap
- Q&A





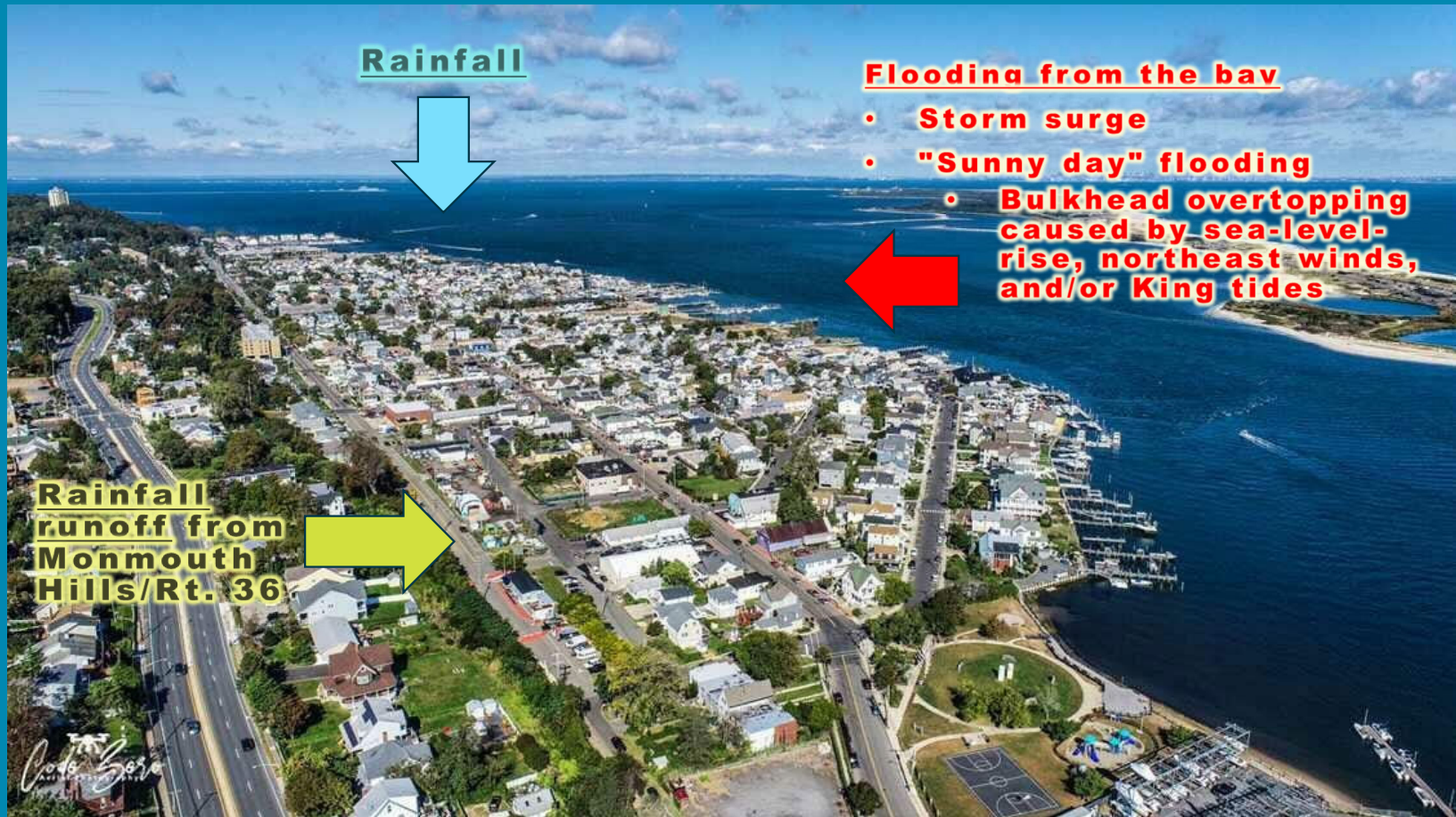
# Why is Highlands vulnerable to flooding?

- The land is naturally low-lying
- Inadequate/inconsistent bulkhead heights
- Backup of stormwater drains





# What types of flooding is Highlands vulnerable to?





Date: Oct. 29, 2012 (Hurricane Sandy)  
Location: Gravelly Point Road



SHOREGRafx



Date: Oct. 29, 2012 (Hurricane Sandy)  
Location: Sea Drift Ave



SHOREGRAFX



# Flooding from Backed-Up Stormwater Drains

---





# Flooding from Rainfall Runoff

---

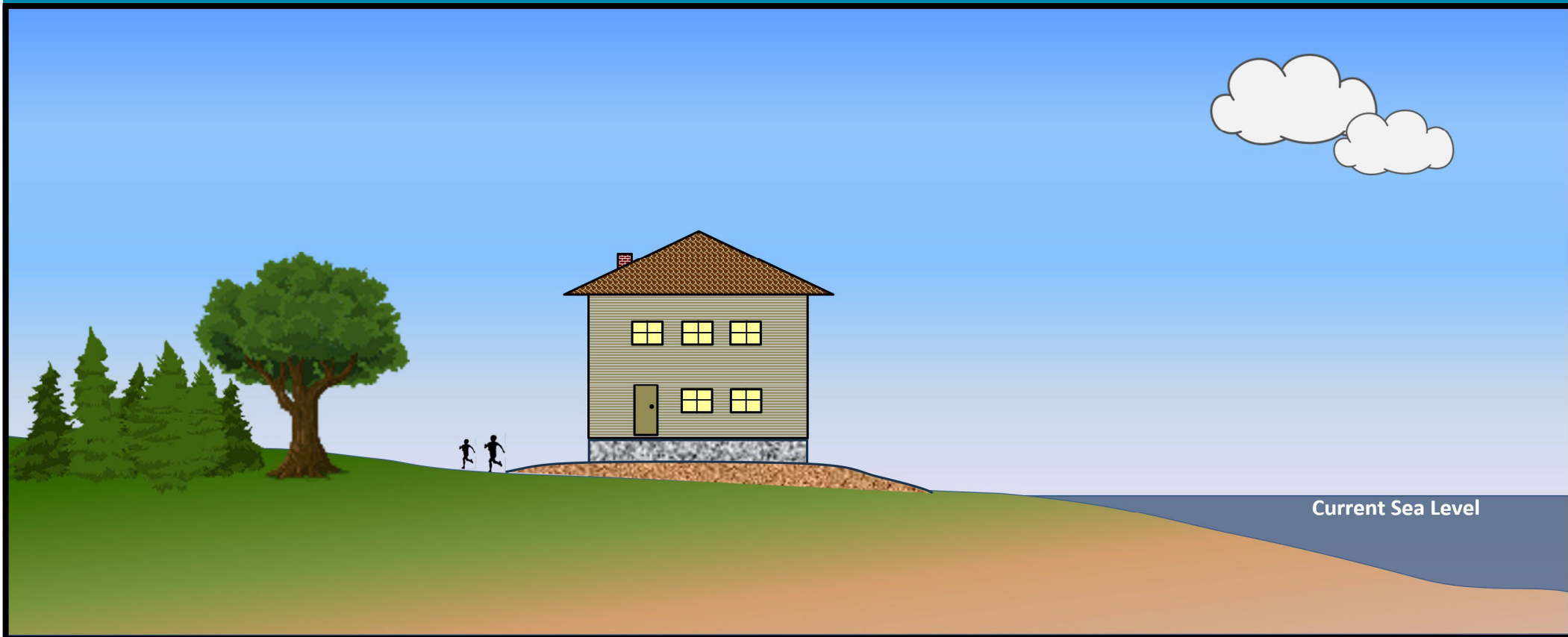
Date: Jun 20, 2019

Location: Monmouth Hills @ Rt. 36 near Waterwitch Ave



# Vulnerability to Sea-Level-Rise

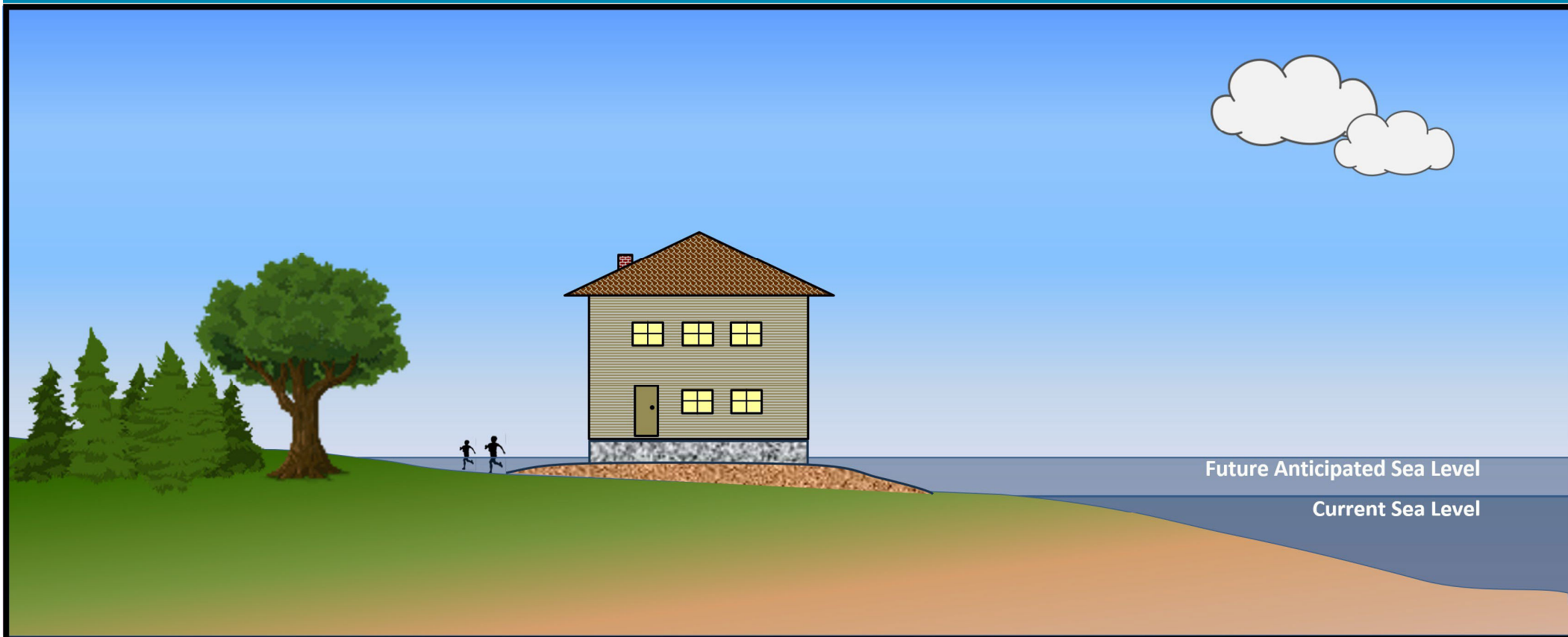
---





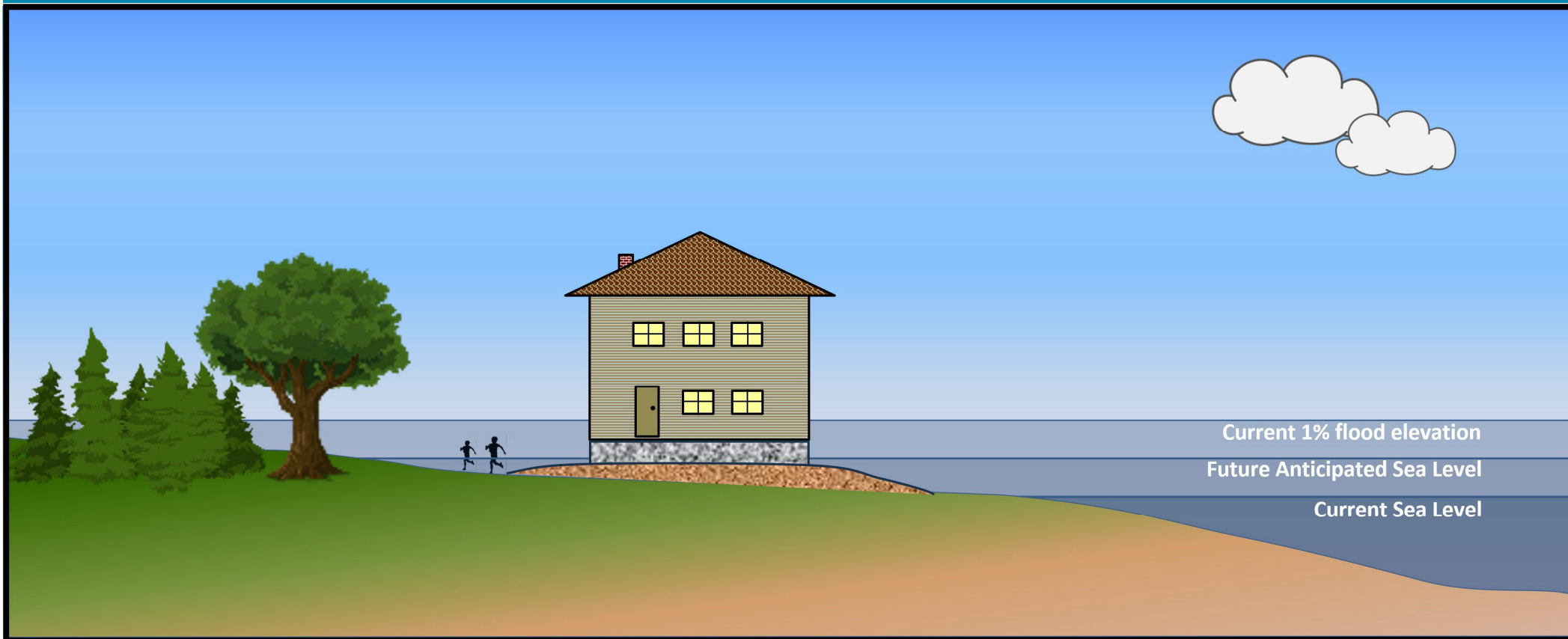
# Vulnerability to Sea-Level-Rise

---



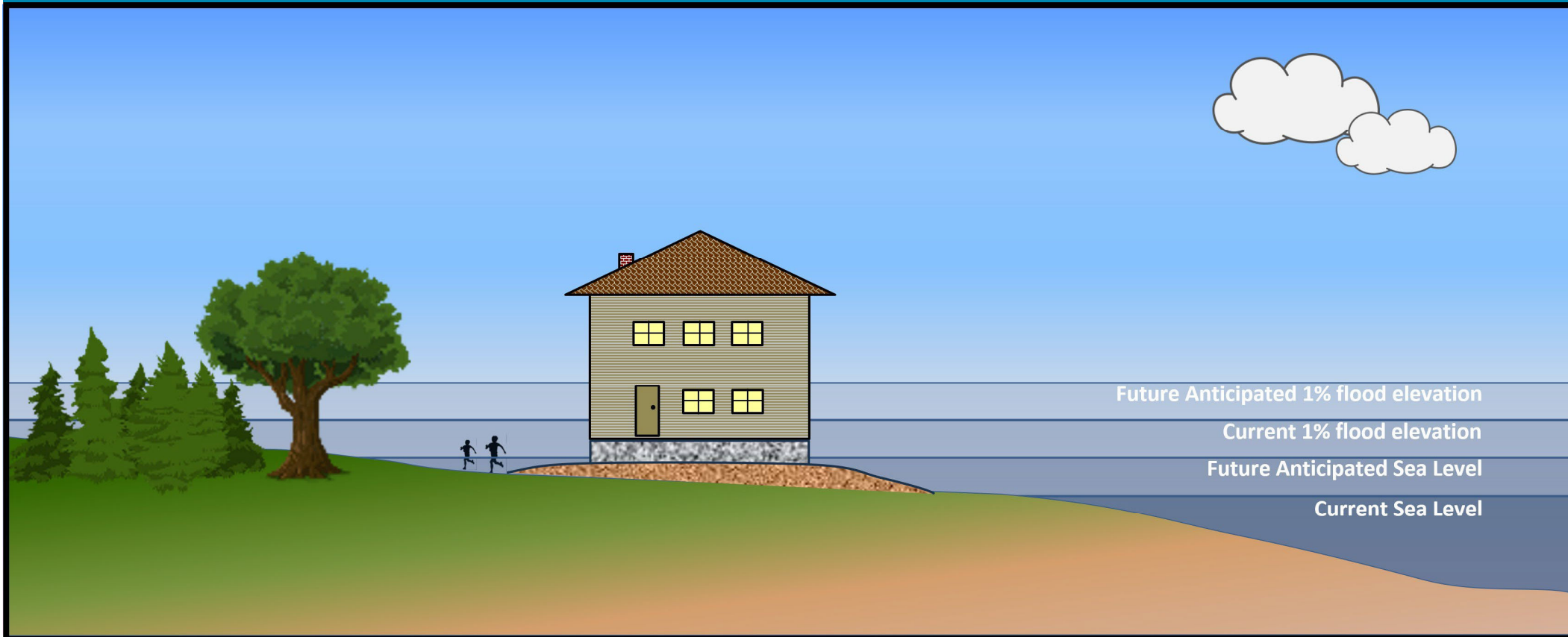
# Vulnerability to Sea-Level-Rise

---



# Vulnerability to Sea-Level-Rise

---









## 1 foot of Sea Level Rise





2 feet of Sea Level Rise



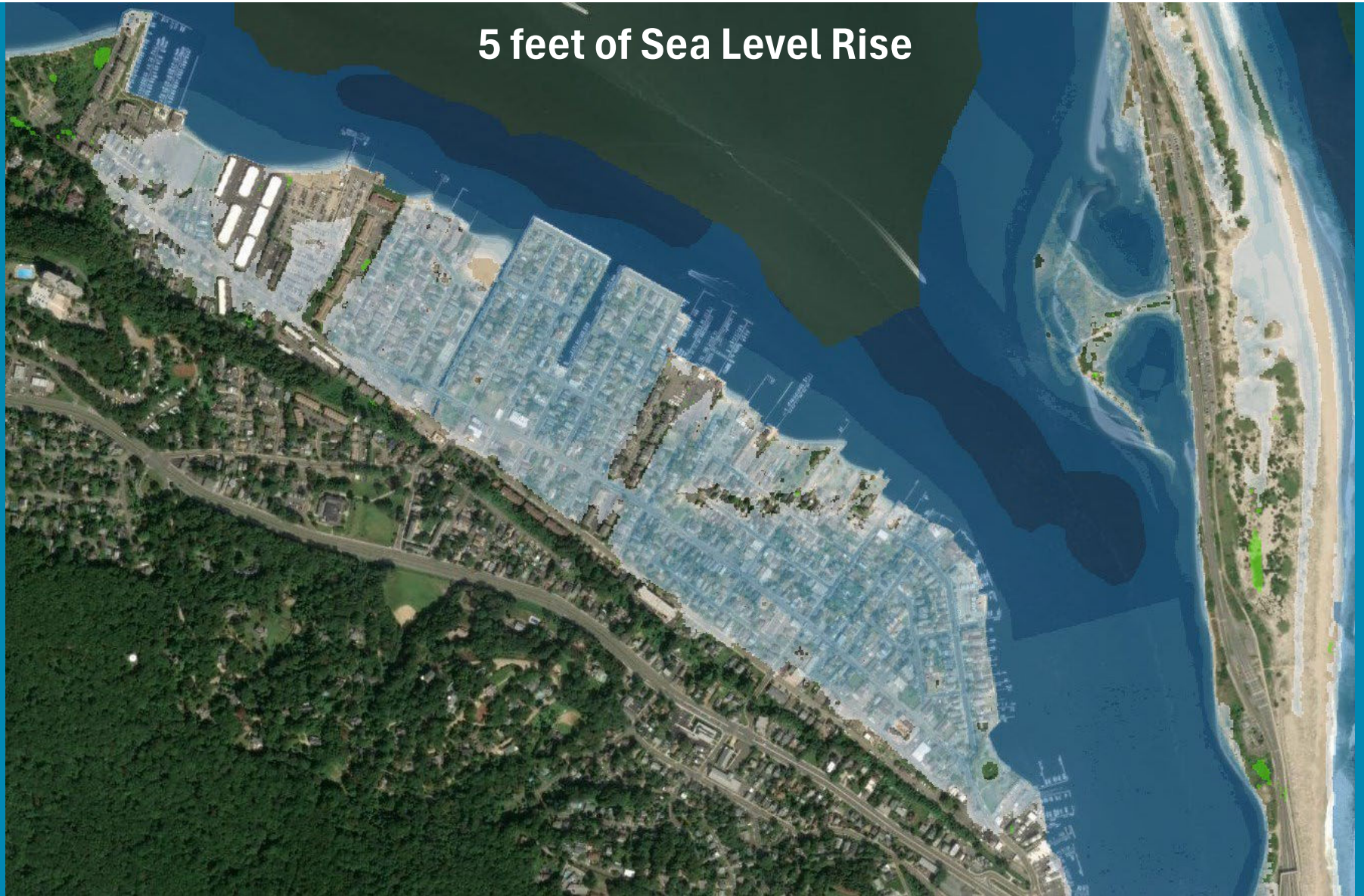


3 feet of Sea Level Rise





## 5 feet of Sea Level Rise





# Bay Ave & North St

Hurricane Sandy High Water Mark +  
Sea-Level-Rise

Proposed Height of  
USACE Floodwall  
(14.0 NAVD88)

Hurricane Sandy  
High Water Mark  
(~10.5 NAVD88)





# Bay Ave & North St

Present Day Storm Levels

Proposed Height of  
USACE Floodwall  
(14.0 NAVD88)

FEMA 100-Yr Storm

50-Yr Storm

10-Yr Storm

2-Yr Storm



October 29, 2012



# Bay Ave & North St

2-Yr Storm + Sea-Level-Rise

Proposed Height of  
USACE Floodwall  
(14.0 NAVD88)

2070  
2050  
2030  
2-Yr Storm  
(6.1 NAVD88)

Year	Likely Sea Level Rise
2030	0.5 – 1.1 feet
2050	0.9 – 2.1 feet
2070	1.4 – 3.1 feet



October 29, 2012



# Bay Ave & North St

10-Yr Storm + Sea-Level-Rise

Proposed Height of  
USACE Floodwall  
(14.0 NAVD88)

2070  
2050  
2030  
10-Yr Storm  
(8.0 NAVD88)

Year	Likely Sea Level Rise
2030	0.5 – 1.1 feet
2050	0.9 – 2.1 feet
2070	1.4 – 3.1 feet



October 29, 2012



# Bay Ave & North St

50-Yr Storm + Sea-Level-Rise

Proposed Height of  
USACE Floodwall  
(14.0 NAVD88)

2070

2050

2030

50-Yr Storm

(10.2 NAVD88)

Year	Likely Sea Level Rise
2030	0.5 – 1.1 feet
2050	0.9 – 2.1 feet
2070	1.4 – 3.1 feet



October 29, 2012



# Bay Ave & North St

FEMA 100-Yr Storm + Sea-Level-Rise

Year	Likely Sea Level Rise
2030	0.5 – 1.1 feet
2050	0.9 – 2.1 feet
2070	1.4 – 3.1 feet

Proposed Height of  
USACE Floodwall

(14.0 NAVD88) — 2070 —  
2050 —  
2030 —

FEMA 100-Yr Storm

Base Flood Elevation  
Zone AE (11.0 NAVD88)



October 29, 2012



# Marine PI (West)

Present Day Storm Levels

Proposed Height of  
USACE Floodwall  
(14.0 NAVD88)

= FEMA 100-Yr Storm

50-Yr Storm

10-Yr Storm

2-Yr Storm





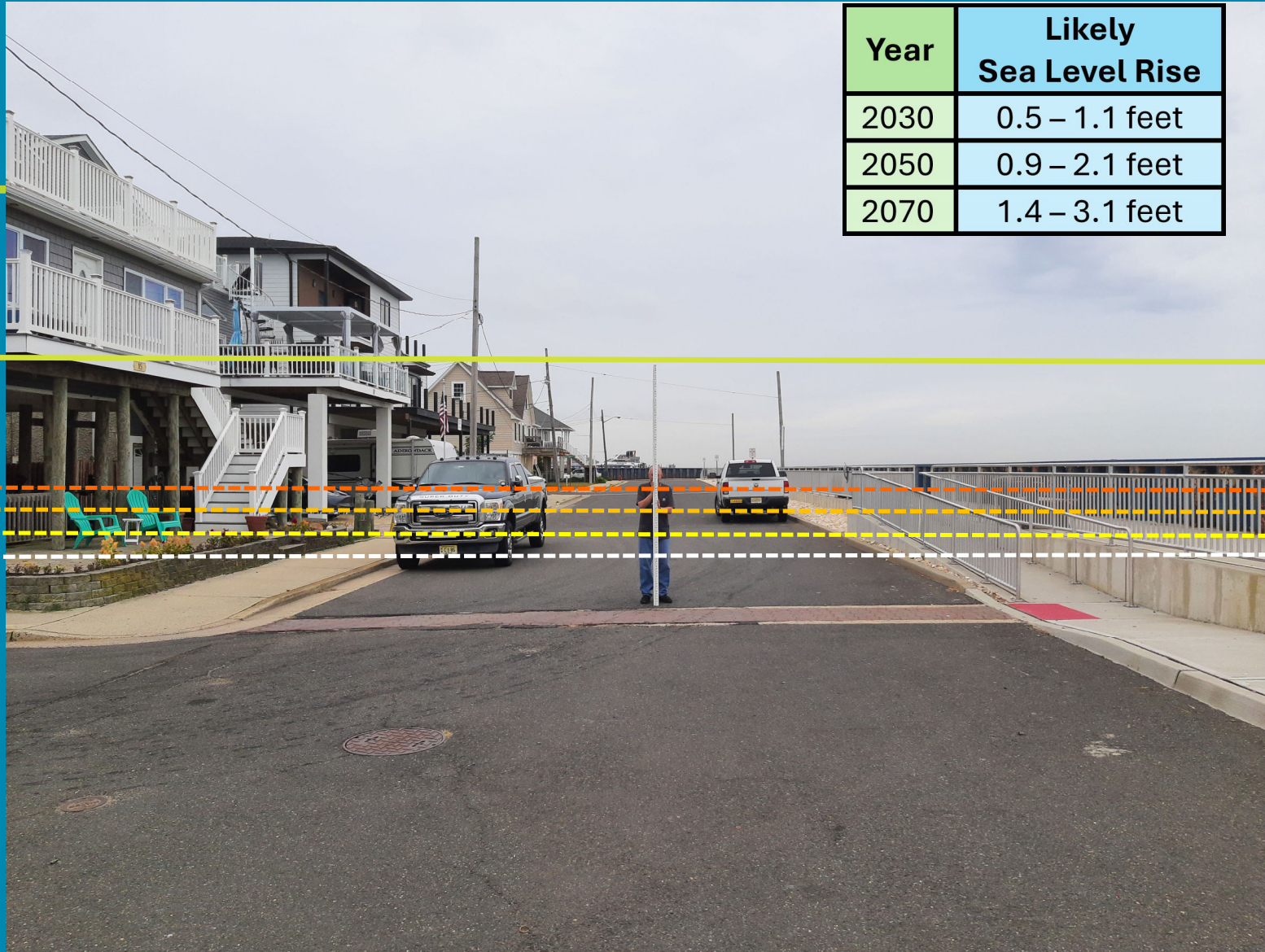
# Marine PI (West)

2-Yr Storm + Sea-Level-Rise

Proposed Height of  
USACE Floodwall  
(14.0 NAVD88)

2070  
2050  
2030  
2-Yr Storm  
(6.1 NAVD88)

Year	Likely Sea Level Rise
2030	0.5 – 1.1 feet
2050	0.9 – 2.1 feet
2070	1.4 – 3.1 feet





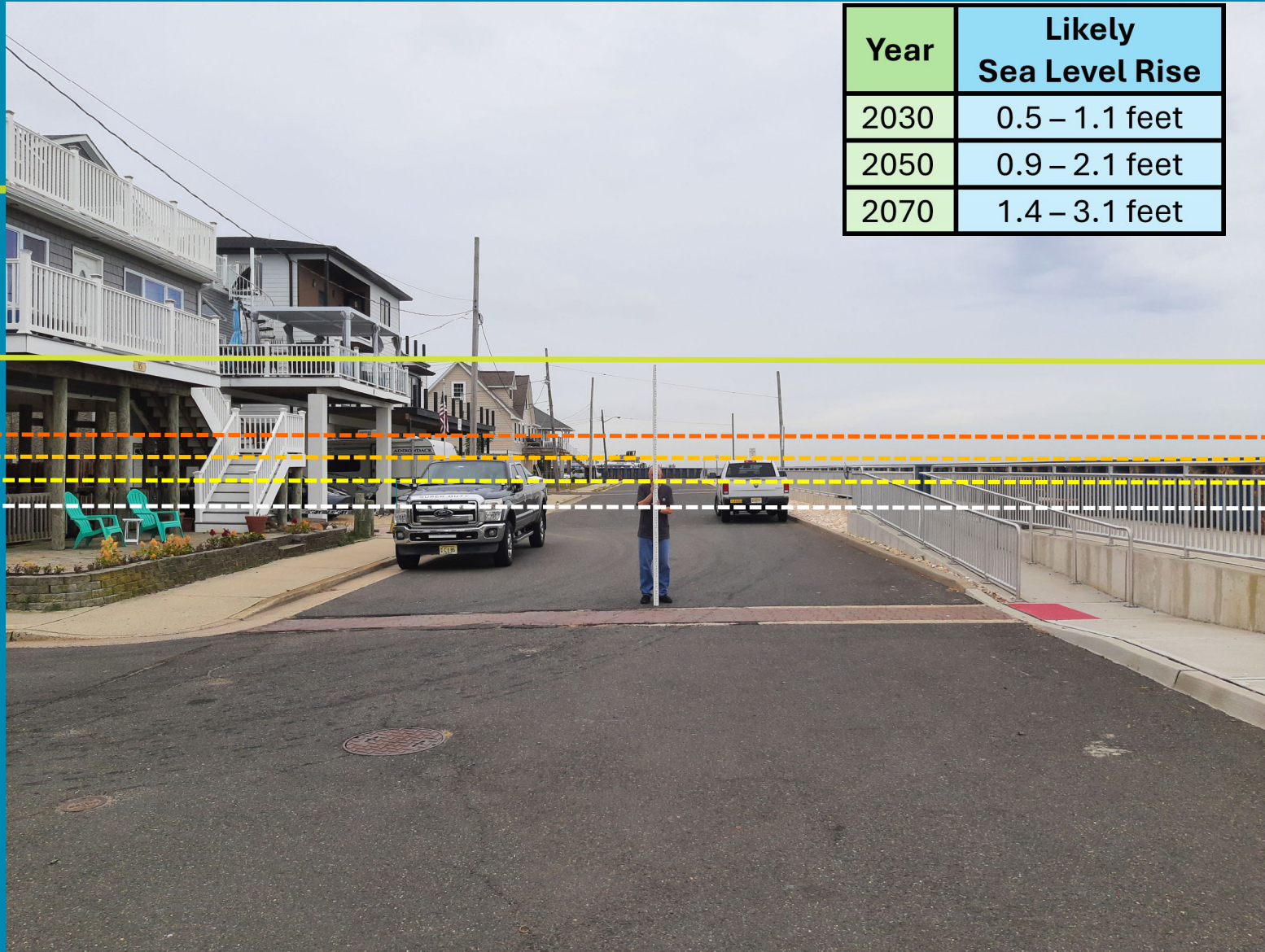
# Marine PI (West)

10-Yr Storm + Sea-Level-Rise

Proposed Height of  
USACE Floodwall  
(14.0 NAVD88)

2070  
2050  
2030  
10-Yr Storm  
(8.0 NAVD88)

Year	Likely Sea Level Rise
2030	0.5 – 1.1 feet
2050	0.9 – 2.1 feet
2070	1.4 – 3.1 feet





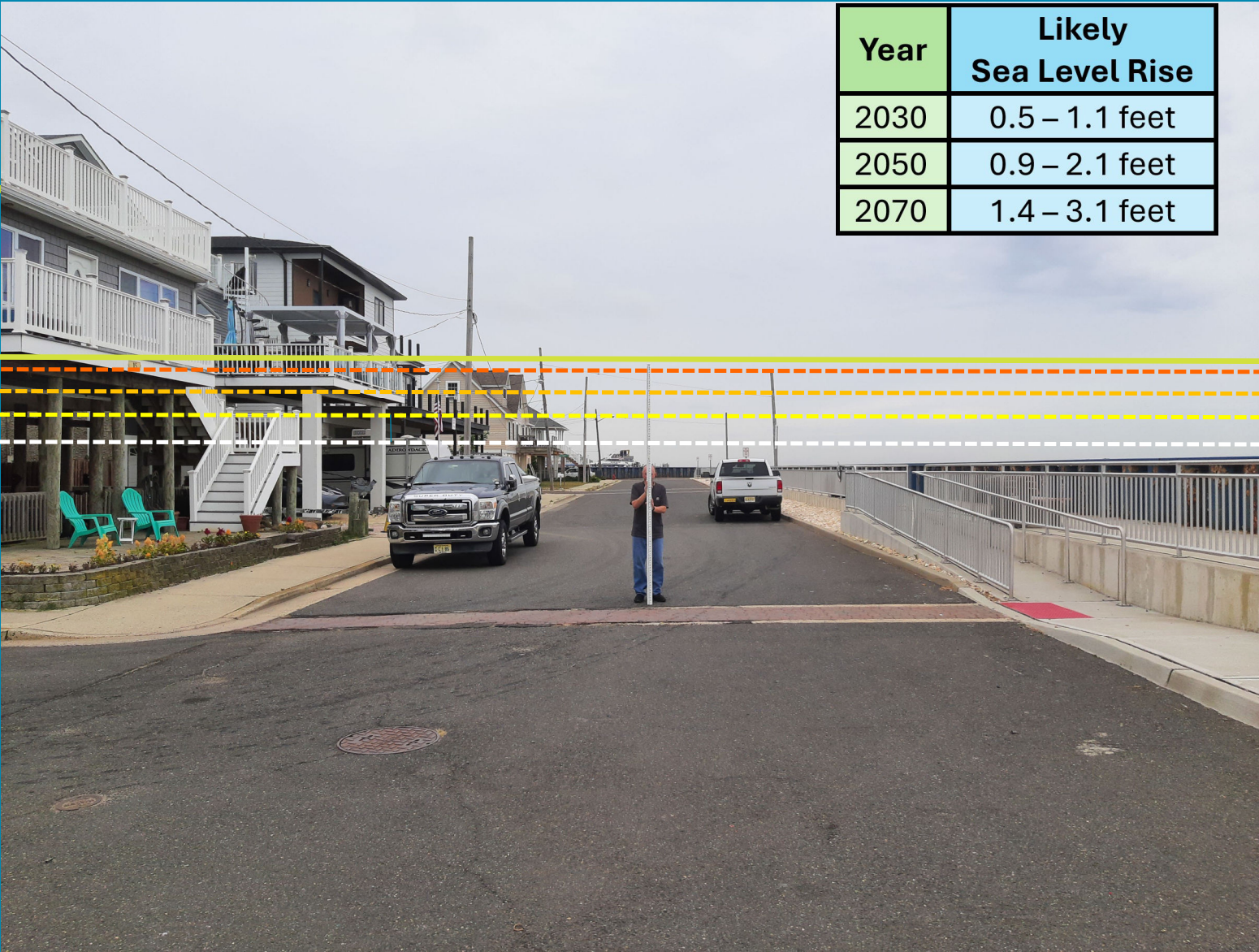
# Marine PI (West)

50-Yr Storm + Sea-Level-Rise

Proposed Height of  
USACE Floodwall  
(14.0 NAVD88)

2070  
2050  
2030  
50-Yr Storm  
(10.2 NAVD88)

Year	Likely Sea Level Rise
2030	0.5 – 1.1 feet
2050	0.9 – 2.1 feet
2070	1.4 – 3.1 feet





# Washington Ave (Captains Cove)

Present Day Storm Levels

Proposed Height of  
USACE Floodwall  
(14.0 NAVD88)

FEMA 100-Yr Storm

50-Yr Storm

10-Yr Storm

2-Yr Storm

Year	Likely Sea Level Rise
2030	0.5 – 1.1 feet
2050	0.9 – 2.1 feet
2070	1.4 – 3.1 feet





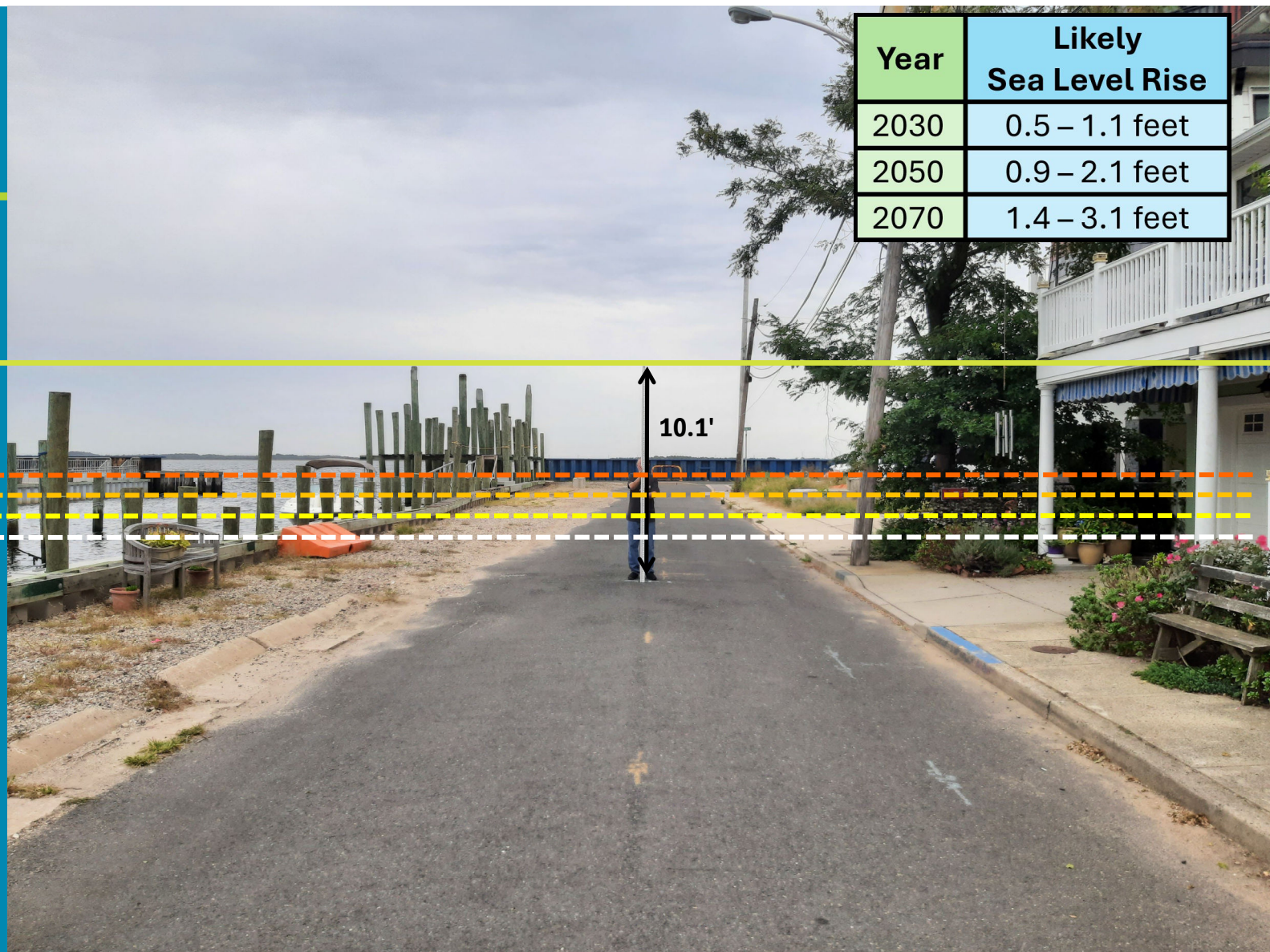
# Washington Ave (Captains Cove)

2-Yr Storm + Sea-Level-Rise

Proposed Height of  
USACE Floodwall  
(14.0 NAVD88)

2070  
2050  
2030  
2-Yr Storm  
(6.1 NAVD88)

Year	Likely Sea Level Rise
2030	0.5 – 1.1 feet
2050	0.9 – 2.1 feet
2070	1.4 – 3.1 feet





# Washington Ave (Captains Cove)

10-Yr Storm + Sea-Level-Rise

Proposed Height of  
USACE Floodwall  
(14.0 NAVD88)

2070  
2050  
2030  
10-Yr Storm  
(8.0 NAVD88)

Year	Likely Sea Level Rise
2030	0.5 – 1.1 feet
2050	0.9 – 2.1 feet
2070	1.4 – 3.1 feet





# Washington Ave (Captains Cove)

50-Yr Storm + Sea-Level-Rise

Proposed Height of  
USACE Floodwall  
(14.0 NAVD88)

2070  
2050  
2030

50-Yr Storm  
(10.2 NAVD88)

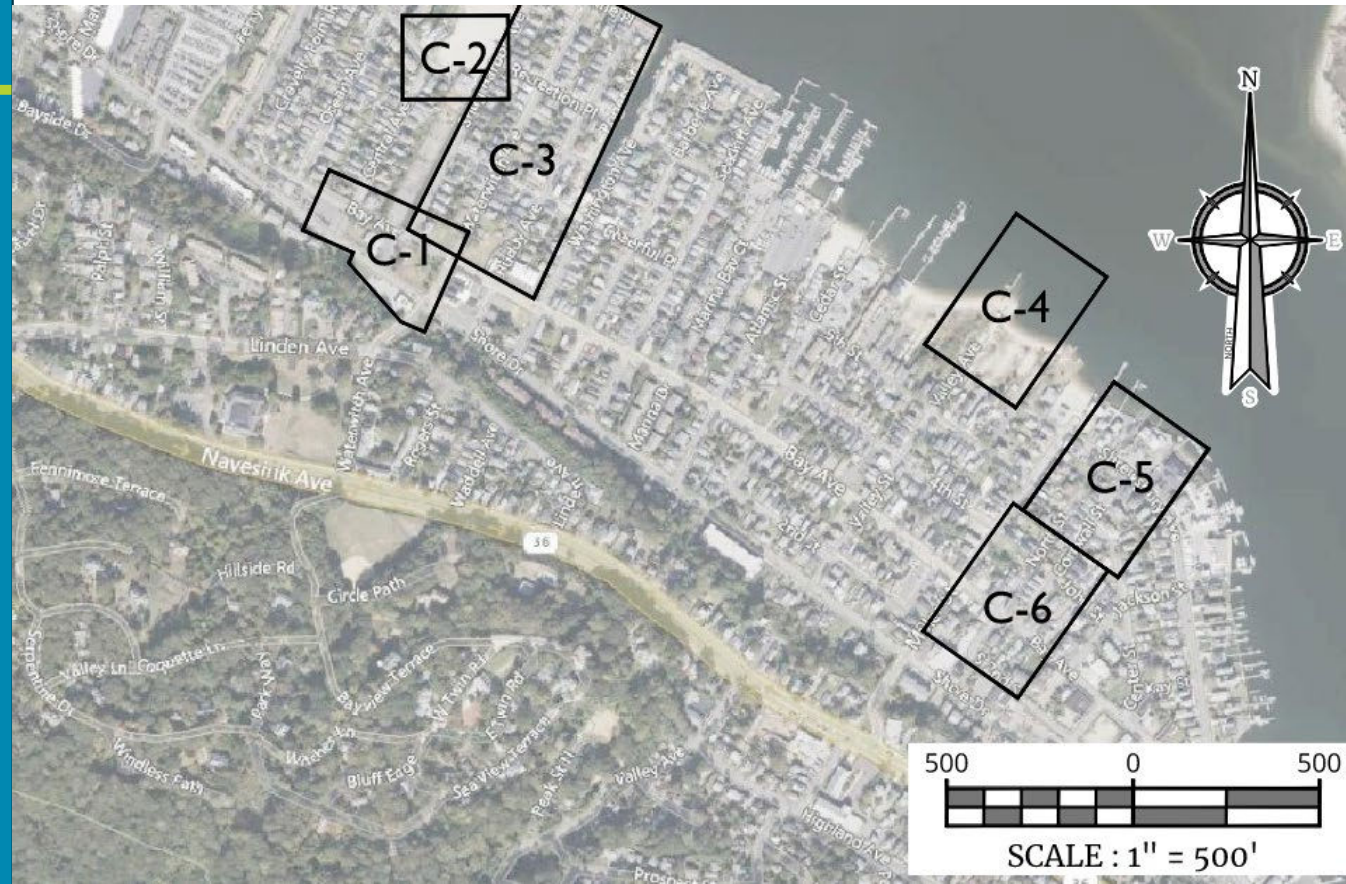
Year	Likely Sea Level Rise
2030	0.5 – 1.1 feet
2050	0.9 – 2.1 feet
2070	1.4 – 3.1 feet





# Highlands & Monmouth Hills Flood Mitigation and Green Infrastructure Project

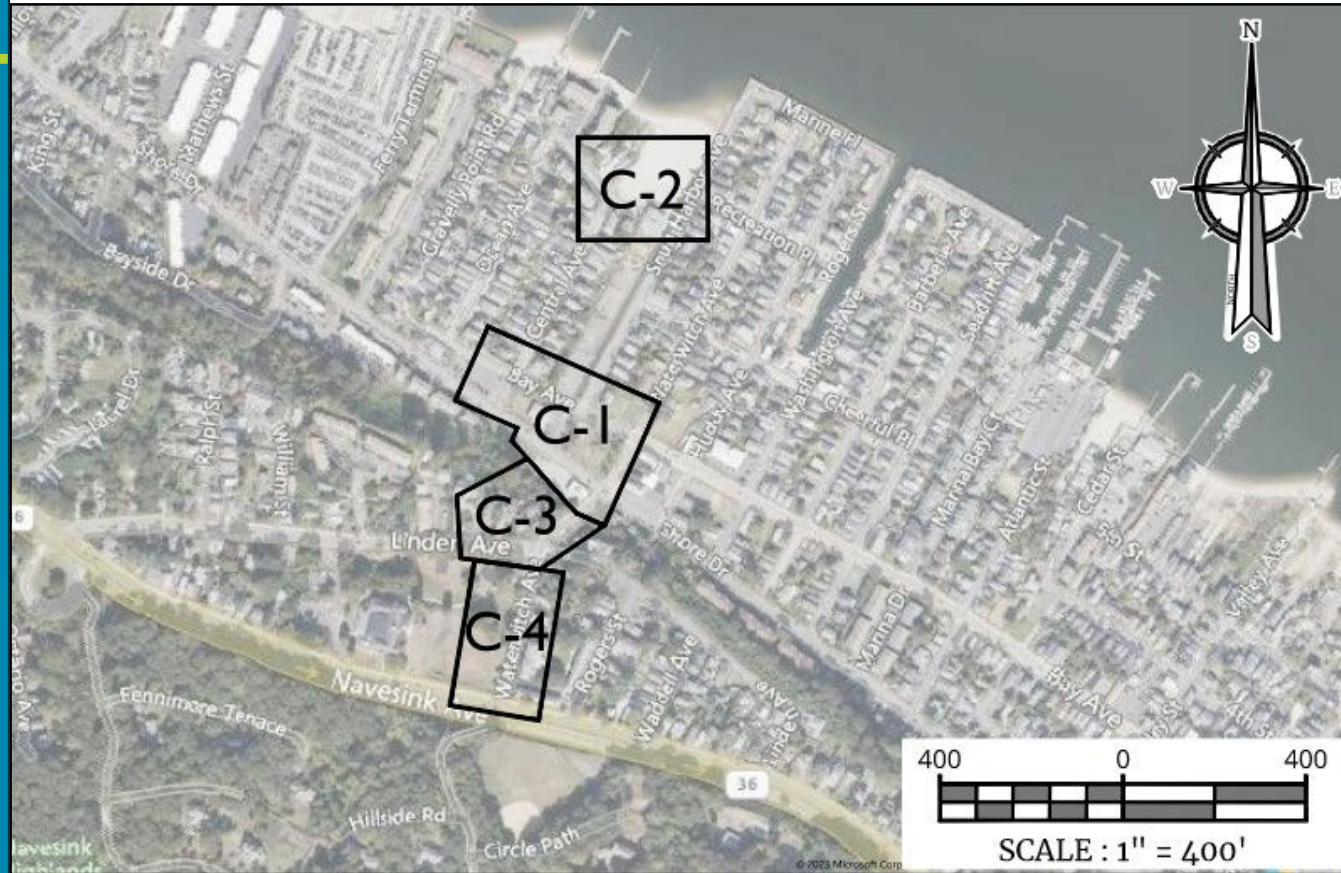
**Zone 1 - Borough of  
Highlands Pump  
Station  
Improvements –  
consisting of Snug  
Harbor Pump Station,  
Valley Street Pump  
Station, and North  
Street Pump Station**





# Highlands & Monmouth Hills Flood Mitigation and Green Infrastructure Project

## Zone 2 – Waterwitch Avenue Drainage Improvements





# Highlands & Monmouth Hills Flood Mitigation and Green Infrastructure Project

## Zone 3 – Monmouth Hills Drainage Improvements





# USACE Project





# USACE Coastal Storm Risk Management Project

---

- Project Description

- Reinforced Concrete Floodwall
- Road Closure Gate
- Detention Pond
- Pump Station
- Pressurized Pipes





# USACE Coastal Storm Risk Management Project

---

- Status
  - Design and construction of all project components to be complete by 2030 at the earliest.
- Funding
  - Total Estimated Construction Cost = \$148M



# USACE Project: Veterans Park

Phase 1: Road  
Closure Gate  
across Bay Ave  
(still in design)





# USACE Project: Floodwall Examples

---



# USACE Project

---

- Reinforced concrete-type floodwall
- Top of wall will be elevation 14.0 NAVD88
- Aspects of the project that will be addressed during design:
  - Exact alignment of the wall along each waterfront property
  - Crossover and access configuration
  - Aesthetic finish of the wall



# USACE Project: Next Steps

---

1. Finish Design
2. Execute Project Partnership Agreement (PPA)
3. Execute State Aid Agreement (SAA)
4. Obtain Easements
5. Construction
6. Operation & Maintenance



# Recap

---

- Highlands is highly vulnerable to flooding
- Flooding will continue to get worse and more frequent
- USACE, NJDEP, and the Borough are proposing several projects that will help reduce flooding and flood damage
- The Highlands Coastal Storm Risk Management Project will help keep the water out and greatly reduce vulnerability from bay flooding



# Thank you!

---

Please take the opportunity to fill out the Highlands Flood Vulnerability Survey if you haven't already:

[https://www.surveymonkey.com/r/  
FloodingVulnerability](https://www.surveymonkey.com/r/FloodingVulnerability)

Questions & Answers