

COMMANDER NAVY REGION MID-ATLANTIC

# UNDERSTANDING THE NAVY'S MID-ATLANTIC CLIMATE PARTNERSHIP STRATEGY



LEADERSHIP



VISION



TEAMWORK

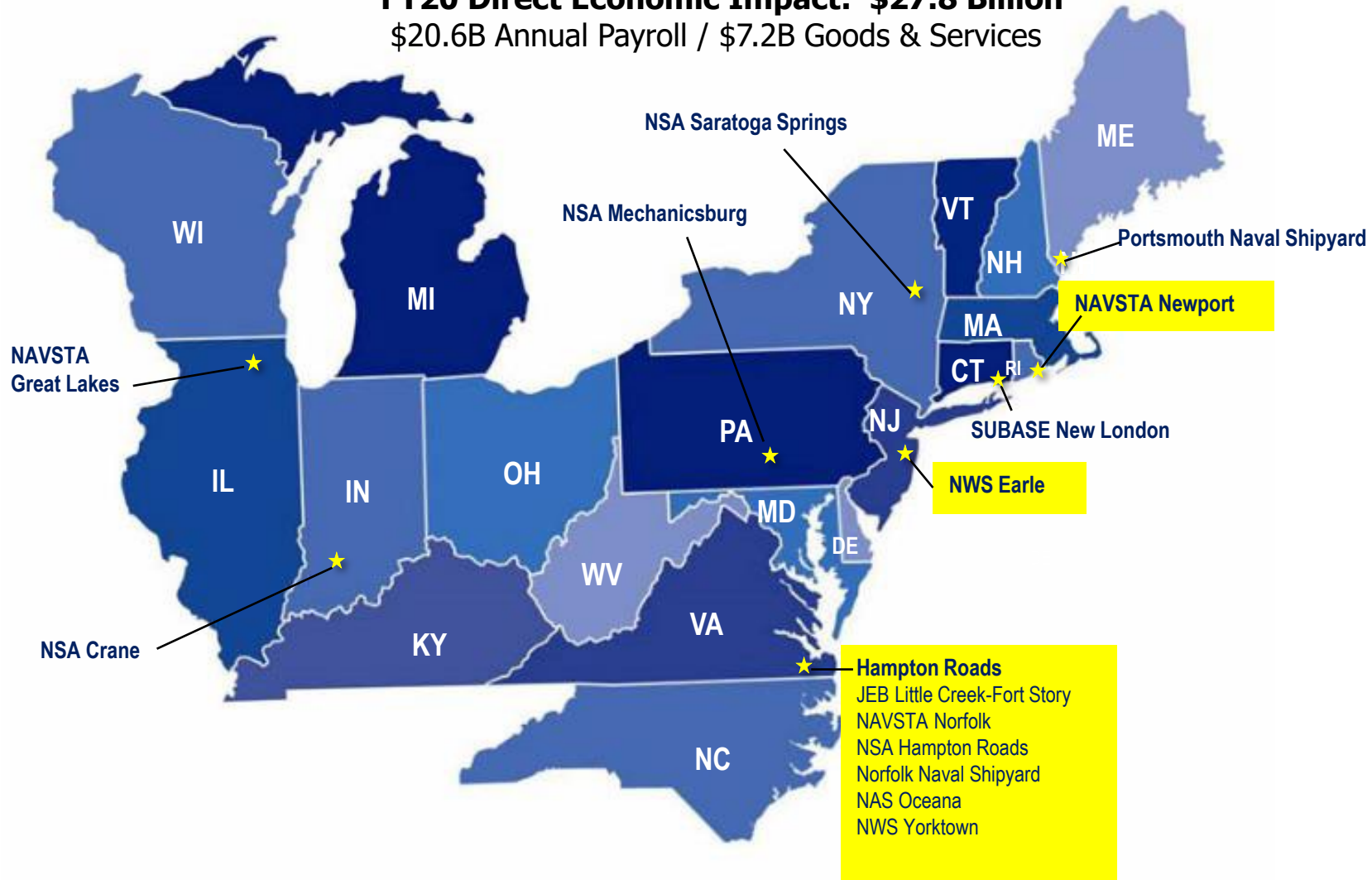


SERVICE

# CNRMA Area of Responsibility



**FY20 Direct Economic Impact: \$27.8 Billion**  
 \$20.6B Annual Payroll / \$7.2B Goods & Services



## Population (FY20)

- Active Duty: 96,835
  - Reserves/Students: 30,950
  - Family/Retirees: 293,729
  - Civilian Employees/  
Contractors: 95,552
- Total Navy Family: 517,066**

## Key Information

- 14 Installations/ 161 Special Use Areas / 48 NOSCs
- Facilities Structures
    - 131 Piers
    - 7 Runways
    - 9 Drydocks
  - Homeported Ships/Squadron:
    - 6 Carriers
    - 58 Surface Ships
    - 25 Submarines
    - 10 USCG/NOAA ships
    - 37 Aircraft Squadrons



# Climate Policy



administration

JANUARY 27, 2021

## Executive Order on Tackling the Climate Crisis at Home and Abroad

BRIEFING ROOM • PRESIDENTIAL ACTIONS

The United States and the world face a profound climate crisis. We have a narrow window to pursue action at home and abroad in order to avoid the most catastrophic impacts of that crisis and to seize the opportunity that tackling climate change presents. Done the action must go hand in hand with United States international leadership, aimed at significantly enhancing global action. Together, we must listen to science and meet the moment.

By the authority vested in me as President by the Constitution and the laws of the United States of America, it is hereby ordered as follows:

### PART 1 – PUTTING THE CLIMATE CRISIS AT THE CENTER OF UNITED STATES FOREIGN POLICY AND NATIONAL SECURITY

Section 901. Policy. United States international engagement to address climate change – which has become a climate crisis – is more necessary and urgent than ever. The scientific community has made clear that the scale and speed of necessary action is greater than previously believed. There is little time left to avoid setting the world on a dangerous, potentially catastrophic, climate trajectory. Responding to the climate crisis will require both significant short-term global reductions in greenhouse gas emissions and net-zero global emissions by mid-century or before.

It is the policy of my Administration that climate considerations shall be an

## Department of Defense Climate Adaptation Plan

September 1, 2021

To National Climate Task Force and Federal Chief Sustainability Officer

## CLIMATE ACTION 2030

Department of the Navy



# CNRMA Strategic Plan – Climate Resiliency



LOE 1: Resilient Built and Natural Installation Infrastructure

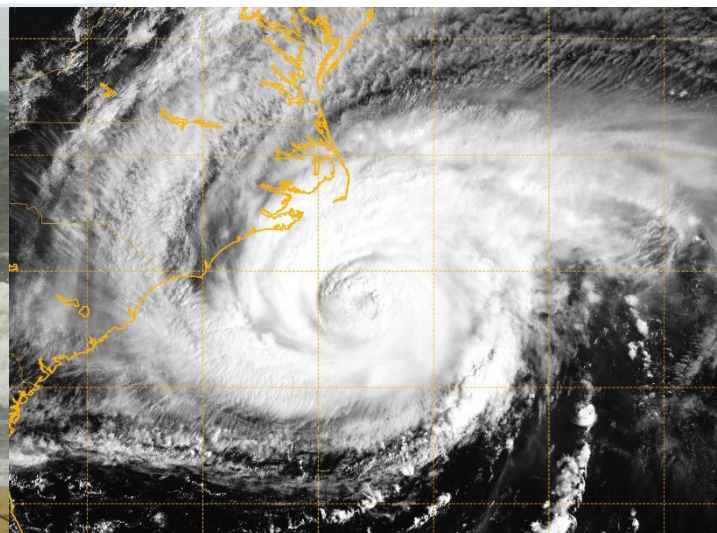
**LOE 2: Enhance Adaptation and Resilience Through Collaboration**

## END STATE

Strategies developed to identify and reduce risks to the mission supporting infrastructure from climate hazards such as increased flooding from sea level rise.



LEADERSHIP

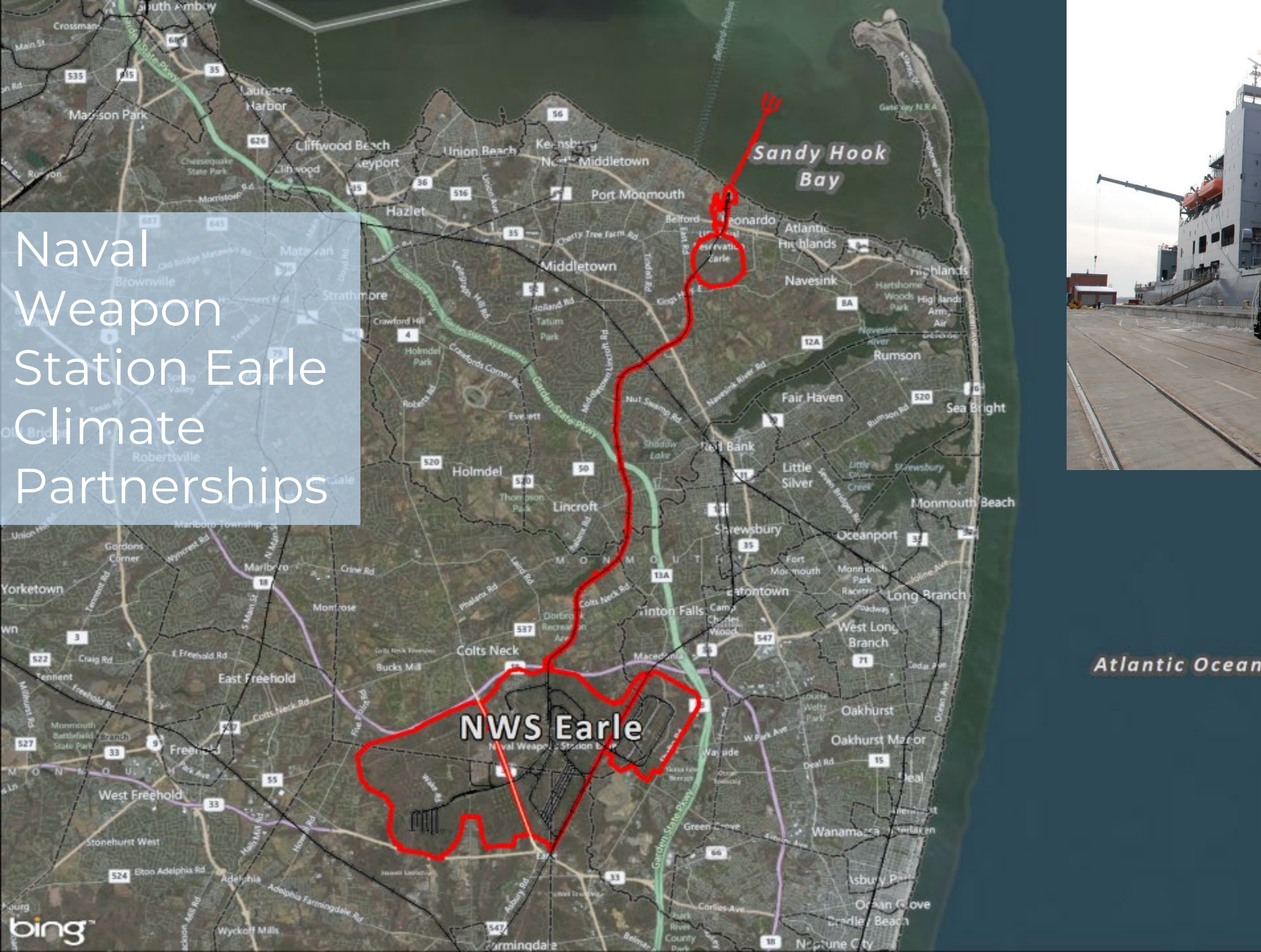


VISION

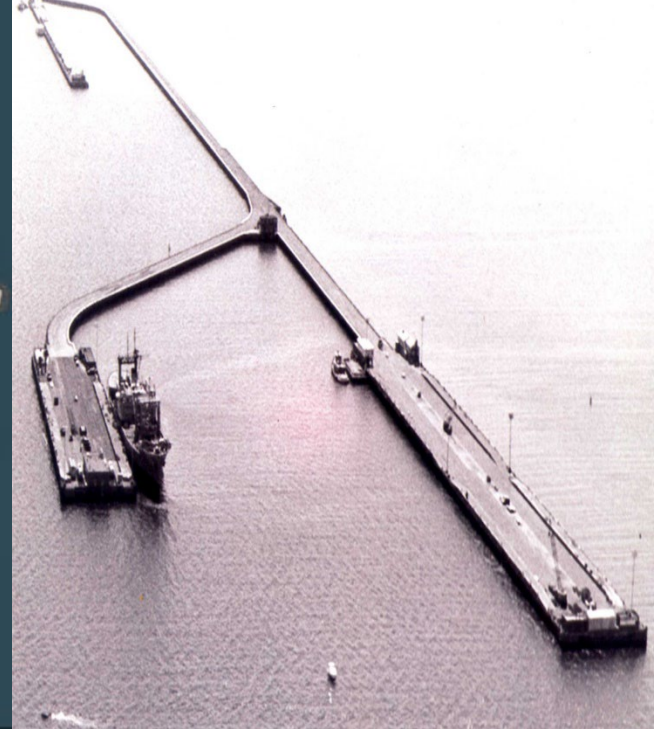


TEAMWORK

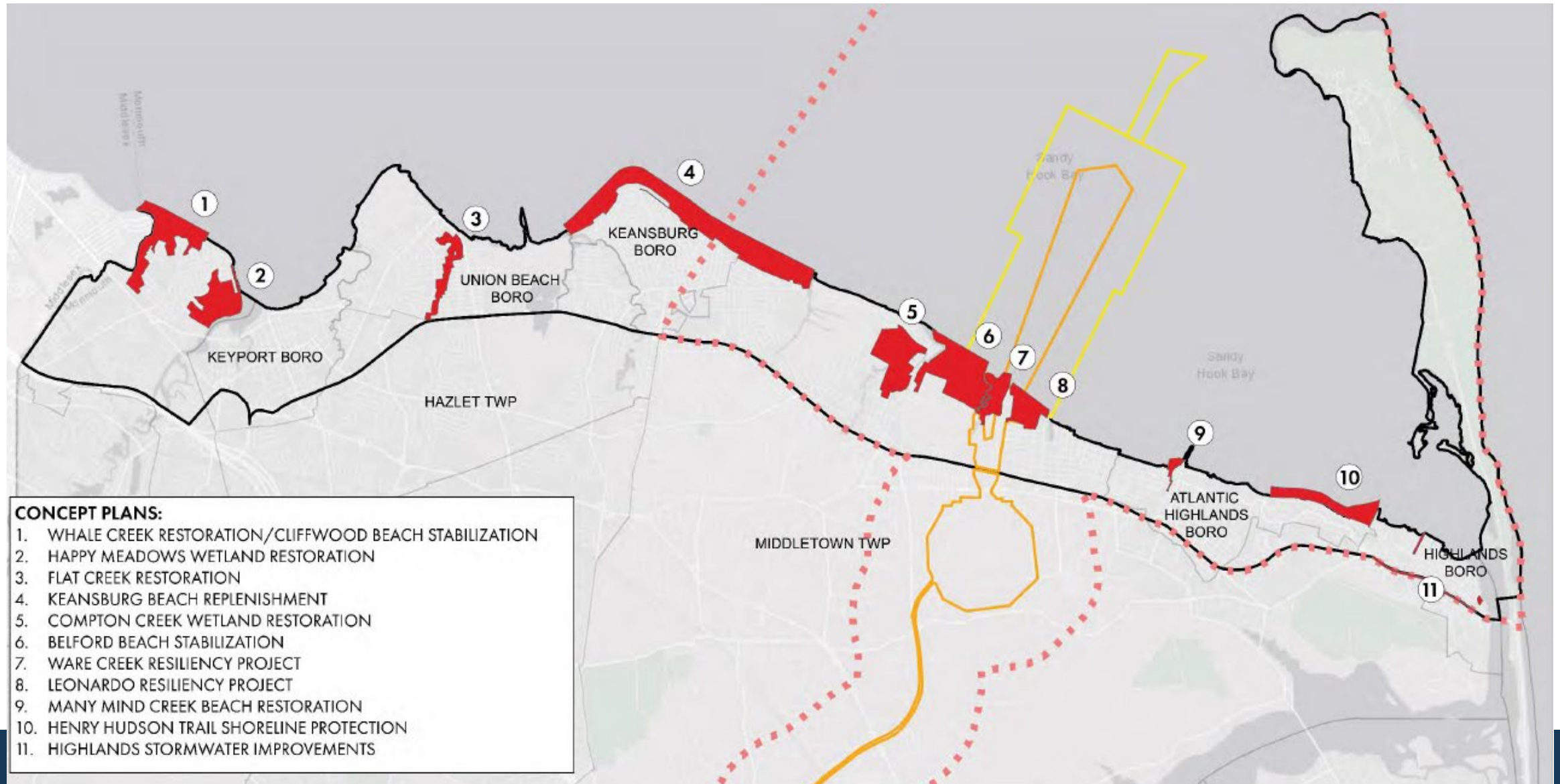
SERVICE



Naval  
Weapon  
Station Earle  
Climate  
Partnerships



# Coastal Resilience Planning Study



## CONCEPT PLANS:

1. WHALE CREEK RESTORATION/CLIFFWOOD BEACH STABILIZATION
2. HAPPY MEADOWS WETLAND RESTORATION
3. FLAT CREEK RESTORATION
4. KEANSBURG BEACH REPLENISHMENT
5. COMPTON CREEK WETLAND RESTORATION
6. BELFORD BEACH STABILIZATION
7. WARE CREEK RESILIENCY PROJECT
8. LEONARDO RESILIENCY PROJECT
9. MANY MIND CREEK BEACH RESTORATION
10. HENRY HUDSON TRAIL SHORELINE PROTECTION
11. HIGHLANDS STORMWATER IMPROVEMENTS

# NWS Earle Regional Resilience Planning



- Coordinate regional preparation for and adaption to a rapidly changing global environment based on recently completed Joint Land Use Studies
- Identify partners and agreement vehicles for project execution (e.g. cooperative agreement, IGSA)
- Identify funding strategies for both design and construction at the local, state and federal levels to increase climate resiliency in support of the installation.
  - Resiliency and Environmental Protection Integration (REPI)
  - Office of Local Defense Community Cooperation (OLDCC) Grant
  - National Defense Authorization Act (NDAA)
  - National Fish and Wildlife Foundation (NFWF)
  - America the Beautiful Challenge
  - National Coastal Resilience Fund



# Partnership/Implementation



IGSA with New Jersey Department of Environmental Protection (NJDEP) – Readiness and Environmental Protection Integration (REPI) funded in the amount of \$1.9M.

- Climate Resiliency Projects

## Partnerships with Monmouth County

- Multi-Year Agreement (MYA) for REPI acquisition projects
- IGSA for offsite stormwater management projects
- Joint Land Use Studies (JLUS) with Monmouth County
  - JLUS report completed 2017
  - Coastal Resilience Planning Study completed 2019

## Cooperative Agreement with Monmouth University

- \$1M Cooperative Agreement with Monmouth University for REPI 2022.
- \$450,000 Grant from the DoD NDAA 2022
- Proposal for Naval Weapons Station Earle and Baykeeper for funding from NFWF

## Proposed NY/NJ Sentinel Landscape Partnership Initiative



New Jersey Department of Environmental Protection



Monmouth University Urban Coast Institute





# Proposed New Jersey/Delaware Sentinel Landscape



## Partners

### New Jersey/Delaware Federal Partners

#### Department of Defense (DoD)



#### U.S. Department of Agriculture (USDA)



#### Department of Interior (DoI)



### Department of Defense

- Naval Weapons Station Earle (NWSE)
- Picatinny Arsenal
- Joint Base McGuire Dix Lakehurst (JBMDL)
- Dover Air Force Base
- New Jersey National Guard
- Delaware National Guard
- Air National Guard

### US Department of Agriculture (USDA)

- Farm Service Agency (FSA)
- Natural Resources Conservation Service (NRCS)

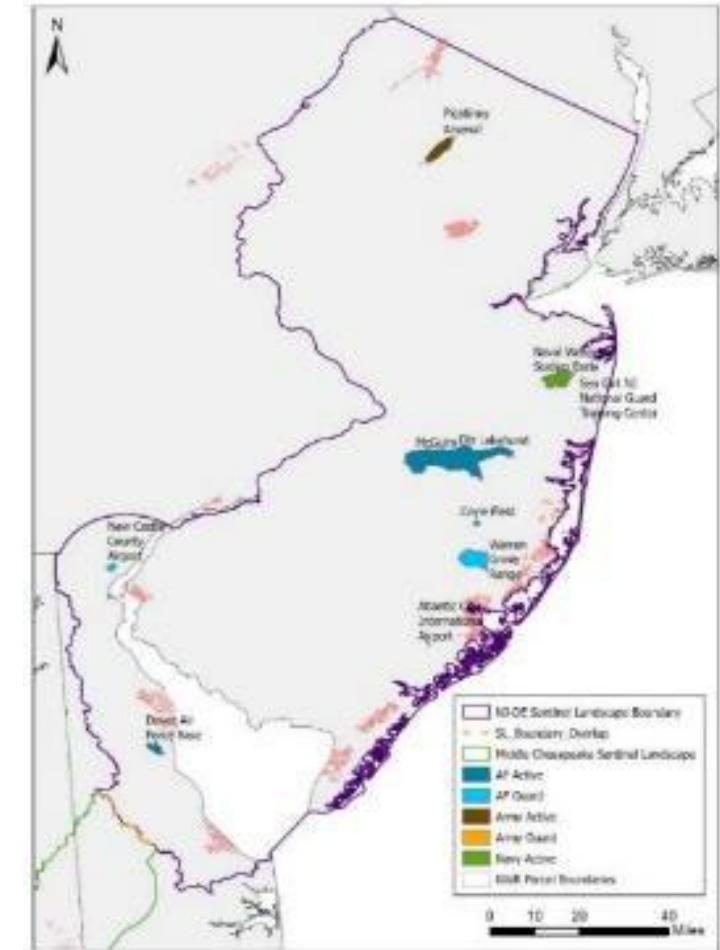
### Department of Interior (DOI)

- US Fish and Wildlife Service

## Goals

- ✓ Manage encroachment and maintain military readiness/training areas
- ✓ Build on existing Federal and State programming
- ✓ Protection and management of agriculture, forest, and Natural landscapes including watersheds, rivers, and wildlife
- ✓ Partnering with public and private organizations to carry out conservation projects or natural resource restoration efforts around military Installations

## Geographic Scope of Work



# Naval Station Newport MIRR

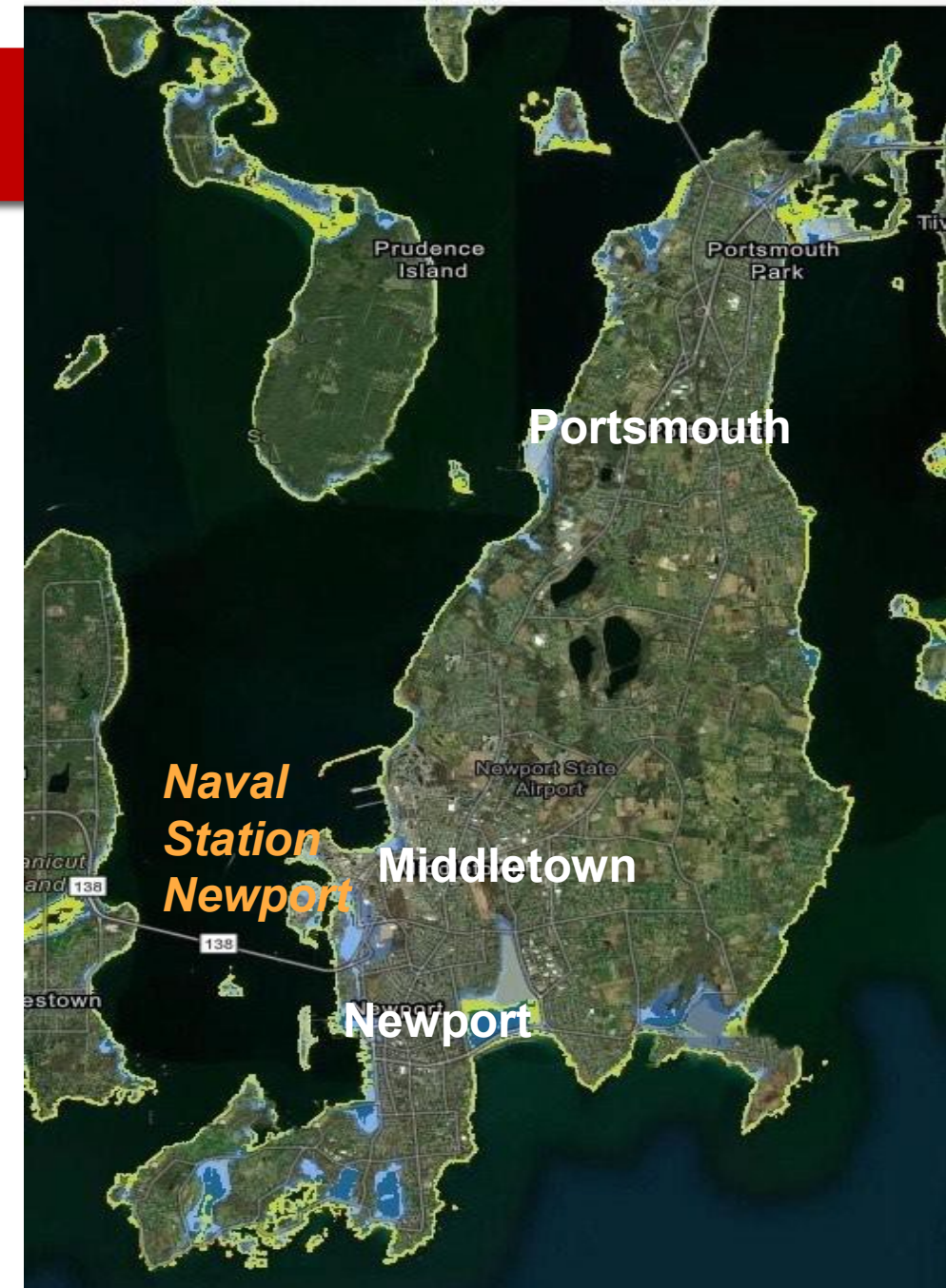
## Project goals

Produce a **Military Installation Resilience review** and implementation action plan to 'protect and preserve military readiness and defense capabilities' while supporting continued community economic development

**Model feasible current and future storm** scenarios

**Assess the impacts to infrastructure assets and consequences** that could potentially adversely affect the installation related to key infrastructure and services.

**Develop a decision-support tool** that can be used for real-time preparedness and response, as well as longer term planning.



# Tools Developed for MIRR Analysis



**Storm Models using ADCIRC(Advanced CIRCulation)** – 12 different storm scenarios modeled – each event models with three sea level rise predictions – 1 ft, 3ft, and 5ft.

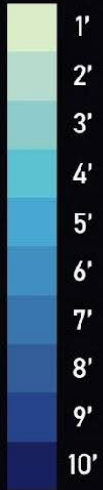
**Hazard Consequence Threshold (HCT) Data Collection and Methodology** – 86 facilities - 152 assets (65% on base / 35% off base)

**Online Dashboard Tool for Viewing Storm Modes and Consequences** –Interactive dashboard integrates storm model results with HCTs to summarize complex into actionable information for emergency management planning and response

**3D Visualizations for Communicating Risk and Storm Impacts** – created to help stakeholders and Tabletop Exercise subject matter experts during Tabletop Exercise understand the extent of flooding from the modeled storms.

**Hurricane Evacuation Models from Naval Postgraduate School** – This tool supports evacuation decisions associated with future storms integrated across the localities and the installation





# Coasters Harbor Island

Hurricane of 1938 modeled with 1' of Sea Level Rise

THE  
UNIVERSITY  
OF RHODE ISLAND



PennState  
College of Arts and Architecture

# Burma Road, Defense Highway



**Ownership:** NAVSTA Newport

**The problem:** The road serves for *evacuation and the supply network*. Low points where stormwater is channeled across the road are *vulnerable to inundation*. Loss of this route could *affect response capacity* for multiple jurisdictions. High-use by many marine trades industries, public boat ramp, and more.

## **Possible solutions:**

Existing plans recommend:

- ***Make the road a viable alternative*** for north-south traffic flows on Island to increase capacity
- ***Transfer the road to the State*** to provide an important evacuation route for navy personnel and Island residents

**Proposed partners:** NAVSTA Newport, RIDOT, Town of Portsmouth

# Modified Hurricane of 1938 Plus 1' SLR: September 21, 0800 - 2000

## Map Layers

### Impacted Assets



### Asset Vulnerability

#### Vulnerability

- Flooding
- Wind
- ◆ Both
- Unknown

### Transportation Low Points



### NAVSTA Boundary, MIRT FY18



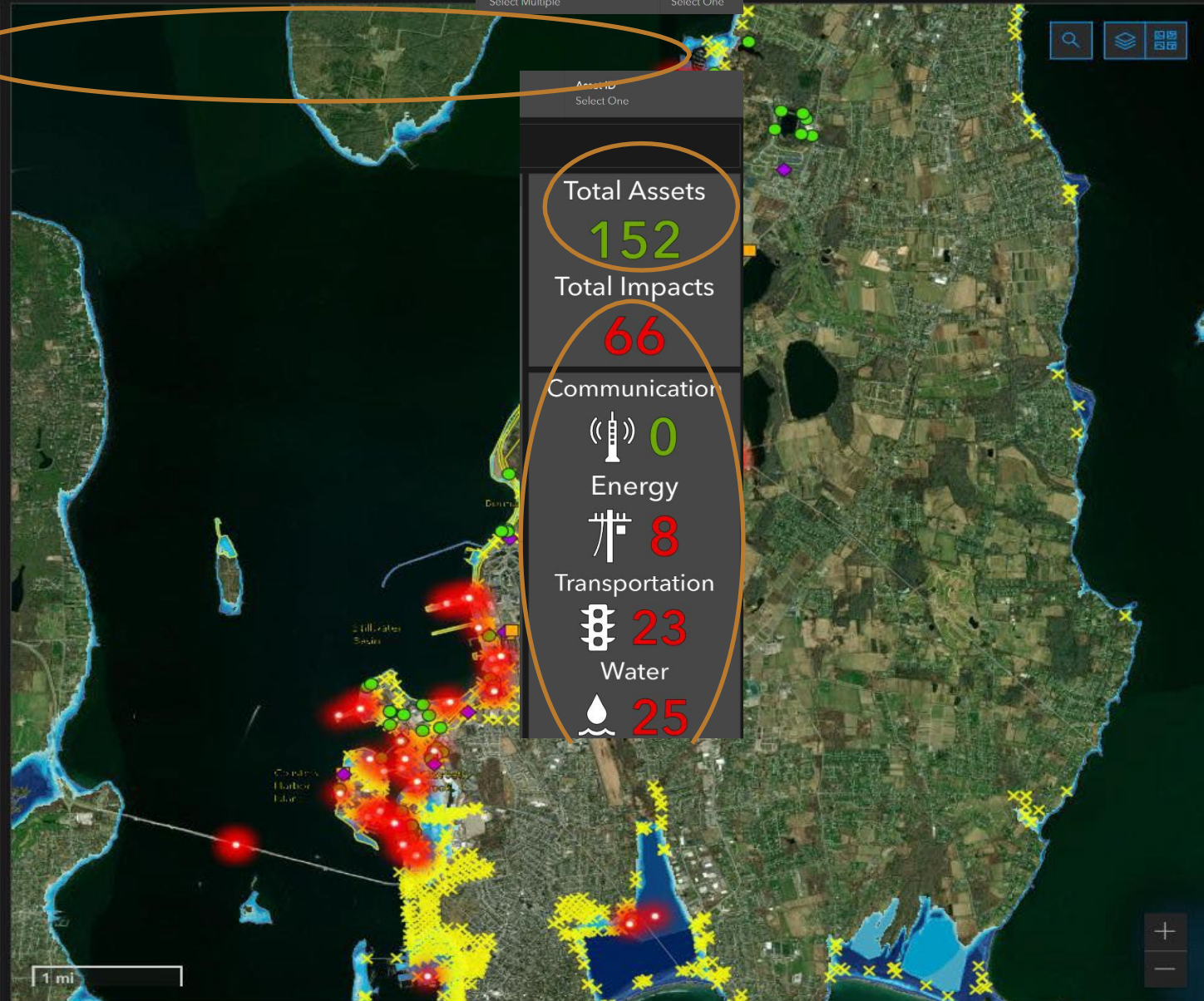
### RI Municipal Boundaries



### Hurricane of 1938, Maximum Inundation (ft)

#### Hurricane of 1938, Maximum Inundation (ft)

- <=1
- 2
- 4
- 6
- 8
- 10



## Consequences Trig

- Whipper Street Low Point**  
Asset: Low Point / Outfall  
Consequence: This low point would be flooding on Whipple Street and if there here, transportation, steam lines, and e could all be impacted.  
Recovery: Short
- Naval Base Gate 2**  
Asset: Gate 2 Access  
Consequence: Flooding or strong wind cause the gate to be inaccessible and i  
Recovery: Short
- Gate 1**  
Asset: Fences  
Consequence: These fences could be l scenarios.  
Recovery: Short
- Perry Road Low Point**  
Asset: Low Point in Road  
Consequence: Flooding here causes ev access to travel North before heading t access up over the North bridge. This p the historic portion of the base and Nav  
Recovery: Short
- Gate 1**  
Asset: Base Gate 1 (Main Gate)  
Consequence: This currently functions a gate, being closes to Coasters Harbor I downtown Newport.  
Recovery: Short
- Gate 1**  
Asset: Generator 1389  
Consequence: Flooding here could im that supplies Gate 1 operation. Gate 1 gate and essential to Coasters Harbor I  
Recovery: Short
- Coasters Harbor Island Pedestrian Brid**  
Asset: Pedestrian Access and Utilities  
Consequence: Damage here by water c make the bridge impassible and poten steam line.  
Recovery: Short
- Bishop Point Brownfield**  
Asset: Brownfield Contaminated Soil

# Moving Forward in Partnership



- **Use dashboard** for real time response. **Integrate** with RIEMA. **Identify funds/process** to ensure it stays effective.
- **Build upon findings** and take advantage of new community connections.
- **Explore REPI and OLDCC funding** to advance island-wide resilience. DCIP to address flood risks at the City WWTF.
- **Explore/install oyster reef to support shoreline protection** for vulnerable Navy assets, in collaboration with RWU.
- **Explore use of tools** - other installations and/or training applications.



# Joint Land Use Study Implementation in Hampton Roads

ADC Installation Innovation Forum  
October 31, 2022

Benjamin J. McFarlane, Senior Regional Planner  
Hampton Roads Planning District Commission



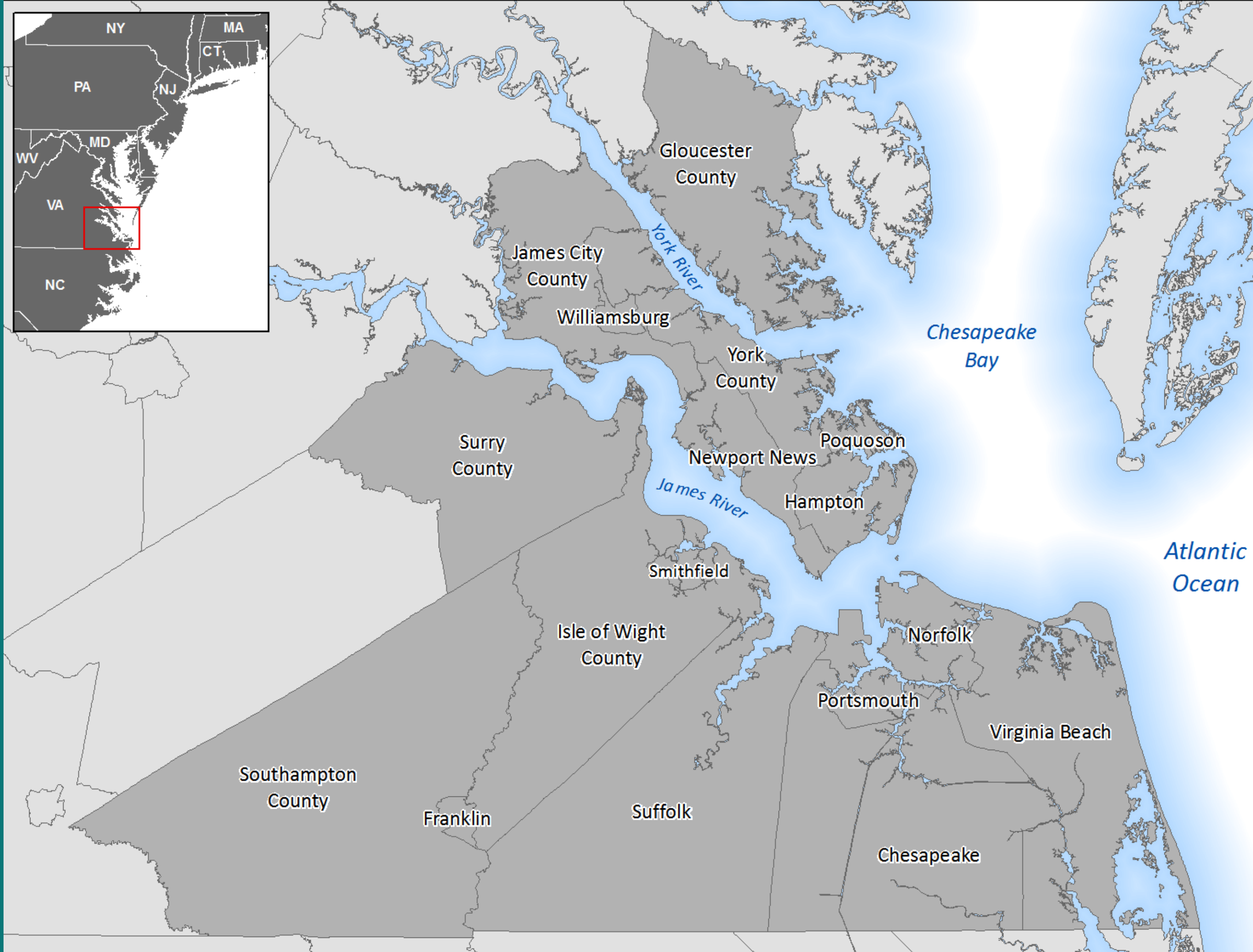


# Hampton Roads

17 member localities  
in HRPDC

- 10 cities
- 6 counties
- 1 town

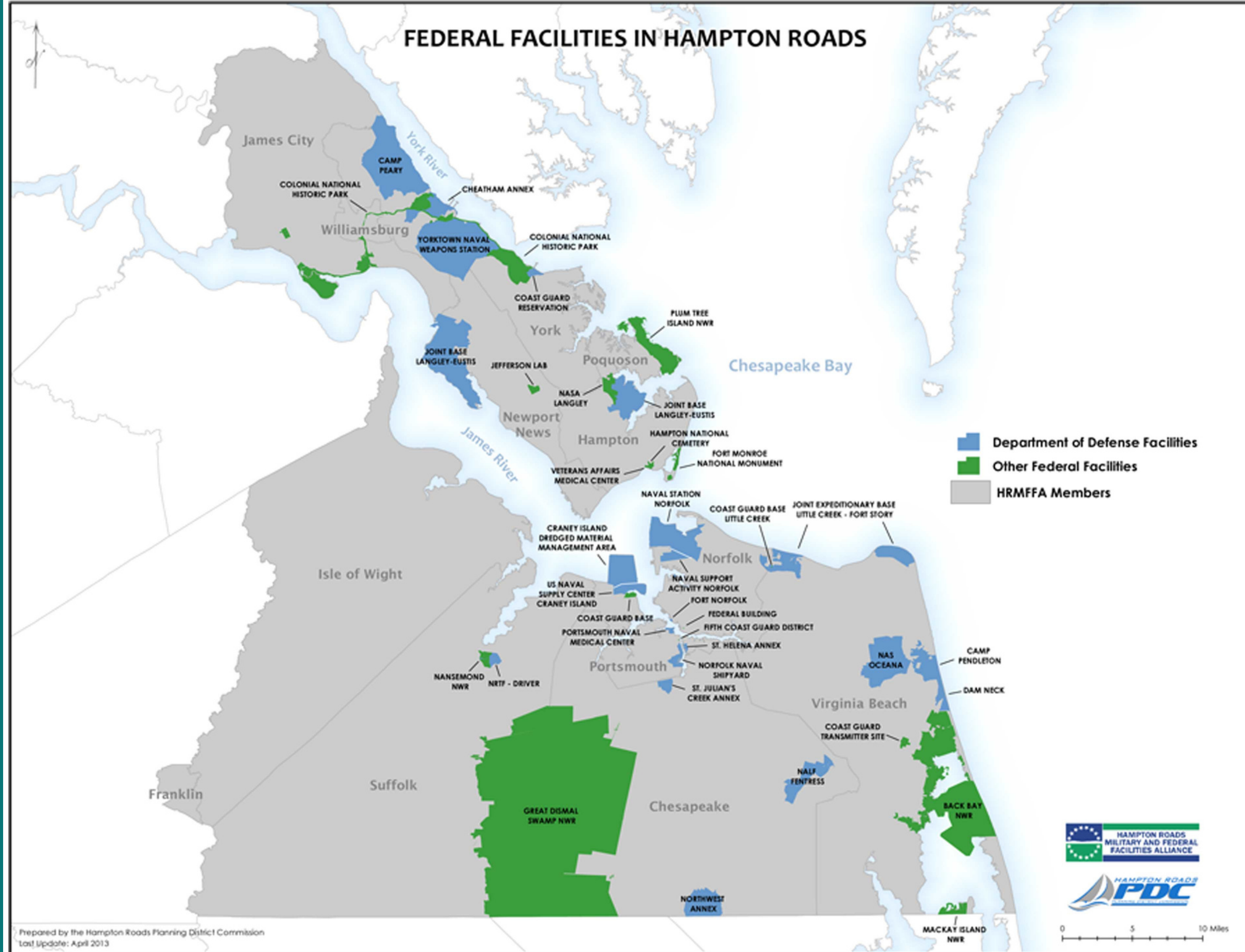
1.7 million people



# Hampton Roads

High concentration of federal facilities from many agencies

- Air Force
- Army
- Coast Guard
- Navy
- NASA
- National Park Service
- U.S. Fish and Wildlife Service
- Veterans Affairs



# South Hampton Roads JLUS Projects

## Norfolk-Virginia Beach JLUS - August 2019

Joint Expeditionary Base Little Creek-Fort Story

Naval Air Station Oceana

Naval Station Norfolk

Naval Support Activity Hampton Roads

## Portsmouth-Chesapeake JLUS - August 2021

Norfolk Naval Shipyard

Naval Station Norfolk - Craney Island Fuel Depot

Naval Support Activity Hampton Roads - Naval Medical Center Portsmouth

# Key Issues



**Access**



**Community  
Assets**



**Coordination &  
Communication**



**Development**



**Flooding**



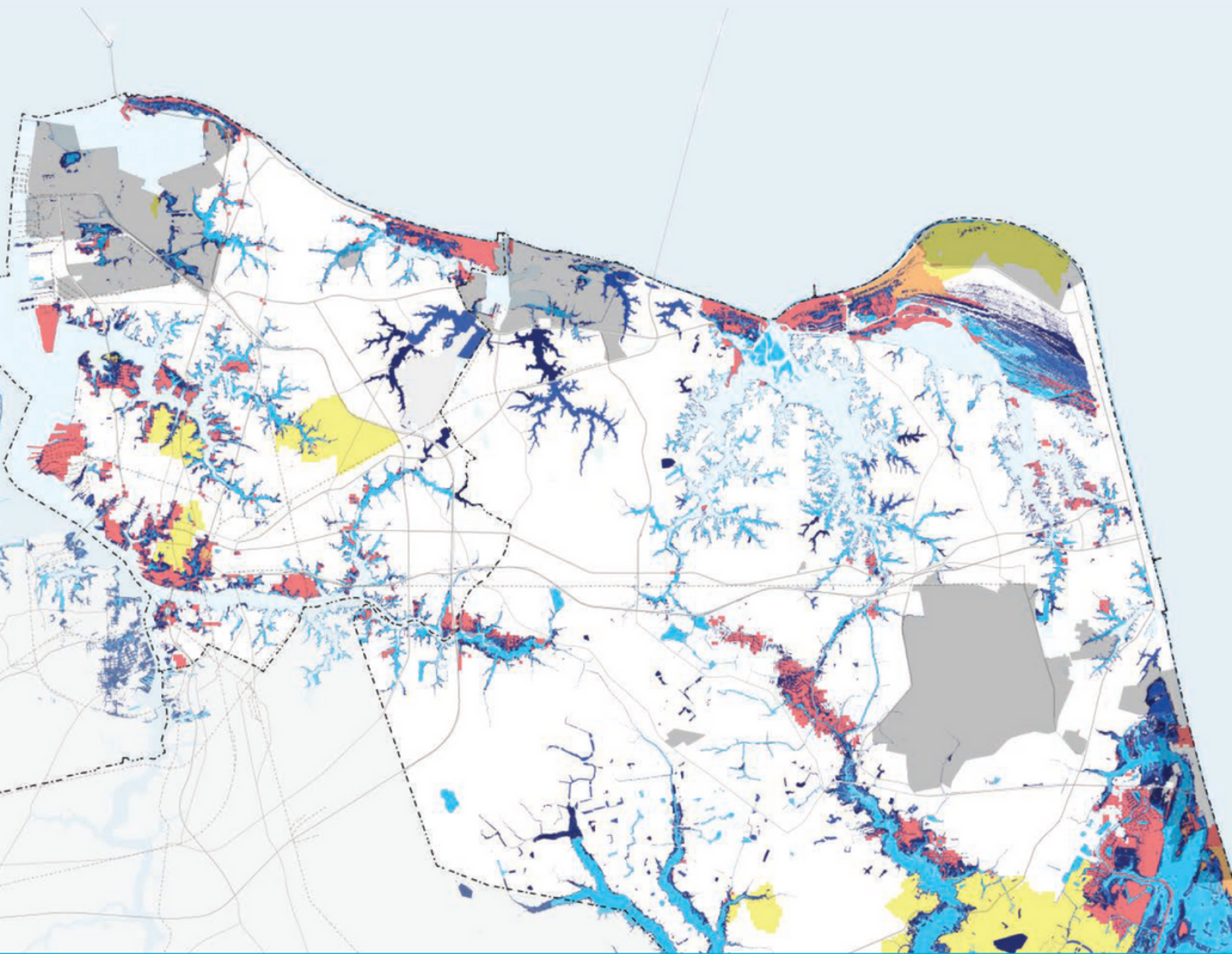
**Mobility**



**Parking**

**NORFOLK AND  
VIRGINIA BEACH**

**JOINT LAND  
USE STUDY**



# Study Goals

**Reliable and resilient access routes for DoD personnel**

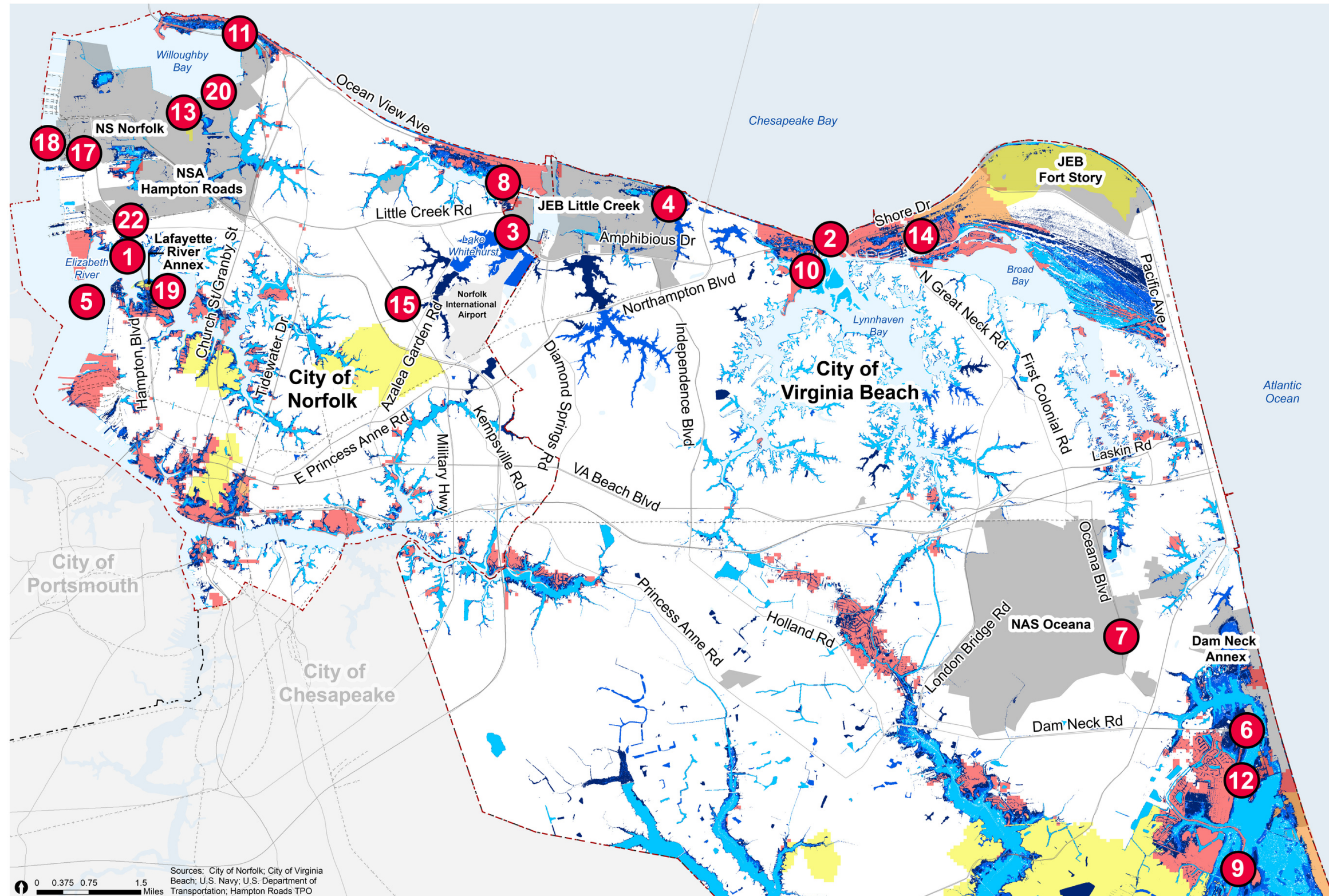
**Adequate and well-maintained stormwater management systems**

**Reliable and resilient utility networks**

**Effective and institutionalized coordination, cooperation, and collaboration at multiple scales**

**A regional prioritization mechanism for resiliency initiatives**

# Norfolk- Virginia Beach JLUS Recommended Actions



**Legend**

- Jurisdictional Boundary
- Navy Installation
- Roadways
- Minor Tidal Flooding, 0' SLR
- Minor Tidal Flooding, 1.5' SLR
- Minor Tidal Flooding, 3' SLR
- Blocked Access
- Blocked or Indirect Access (2 or More Assets)
- Blocked or Indirect Access (Less than 2 Assets)

- |  |  |   |  |
|--|--|---|--|
| <ul style="list-style-type: none"> <li><b>1</b> Hampton Boulevard Comprehensive Flood Mitigation and Stormwater Management Strategy</li> <li><b>2</b> Shore Drive Comprehensive Flood Mitigation and Stormwater Management Strategy</li> <li><b>3</b> JEB Little Creek Gate 1 - Amphibious Drive - Shore Drive Flooding Study</li> <li><b>4</b> East Amphibious Drive, Chubb Lake, and Lake Bradford Flood Mitigation and Stormwater Management Strategy</li> <li><b>5</b> Lafayette River Outer Surge Barrier (USACE)</li> <li><b>6</b> Dam Neck Gate Flood Impact Study</li> </ul> | <ul style="list-style-type: none"> <li><b>7</b> Oceana Boulevard/Bells Road Drainage Study</li> <li><b>8</b> Pretty Lake Storm Surge Barrier (USACE)</li> <li><b>9</b> Nimmo Parkway Extension, Flood Mitigation, and Stormwater Management Improvements, Phases VII-A and VII-B</li> <li><b>10</b> Pleasure House Point Flood Mitigation Strategy</li> <li><b>11</b> Willoughby Spit Flood Mitigation Strategy</li> <li><b>12</b> Lake Tecumseh and Lake Redwing Management Strategy</li> <li><b>13</b> Willoughby Bay Shoreline Floodwall Options</li> </ul> | <ul style="list-style-type: none"> <li><b>14</b> Fire Station 1/EMS 22 First Landing Vulnerability Assessment</li> <li><b>15</b> Norview Avenue Drainage Study</li> <li><b>17</b> Elizabeth River Trail Extension</li> <li><b>18</b> Ferry Service Feasibility Study</li> <li><b>19</b> Lafayette River Annex Vulnerability Study</li> <li><b>20</b> Mason Creek Flood Mitigation Strategy</li> <li><b>22</b> Terminal Boulevard Rail and Roadway Grade Separation</li> </ul> | <p><b>Not Shown on Map</b></p> <ul style="list-style-type: none"> <li><b>16</b> Resilient Underpass Pump System Study</li> <li><b>21</b> Wastewater Treatment Plant Vulnerability Assessments</li> </ul> |
|--|--|---|--|

# Study Goals

Mitigate flooding impacts to the transportation network

Strengthen military installation resilience

Maintain and expand access to Navy installations

Enhance neighborhoods that surround Navy installations

Redevelop and reuse land to improve the local economy

Adopt policies and regulations to manage growth and prevent conflicts

Strengthen relationships between Navy installations and localities



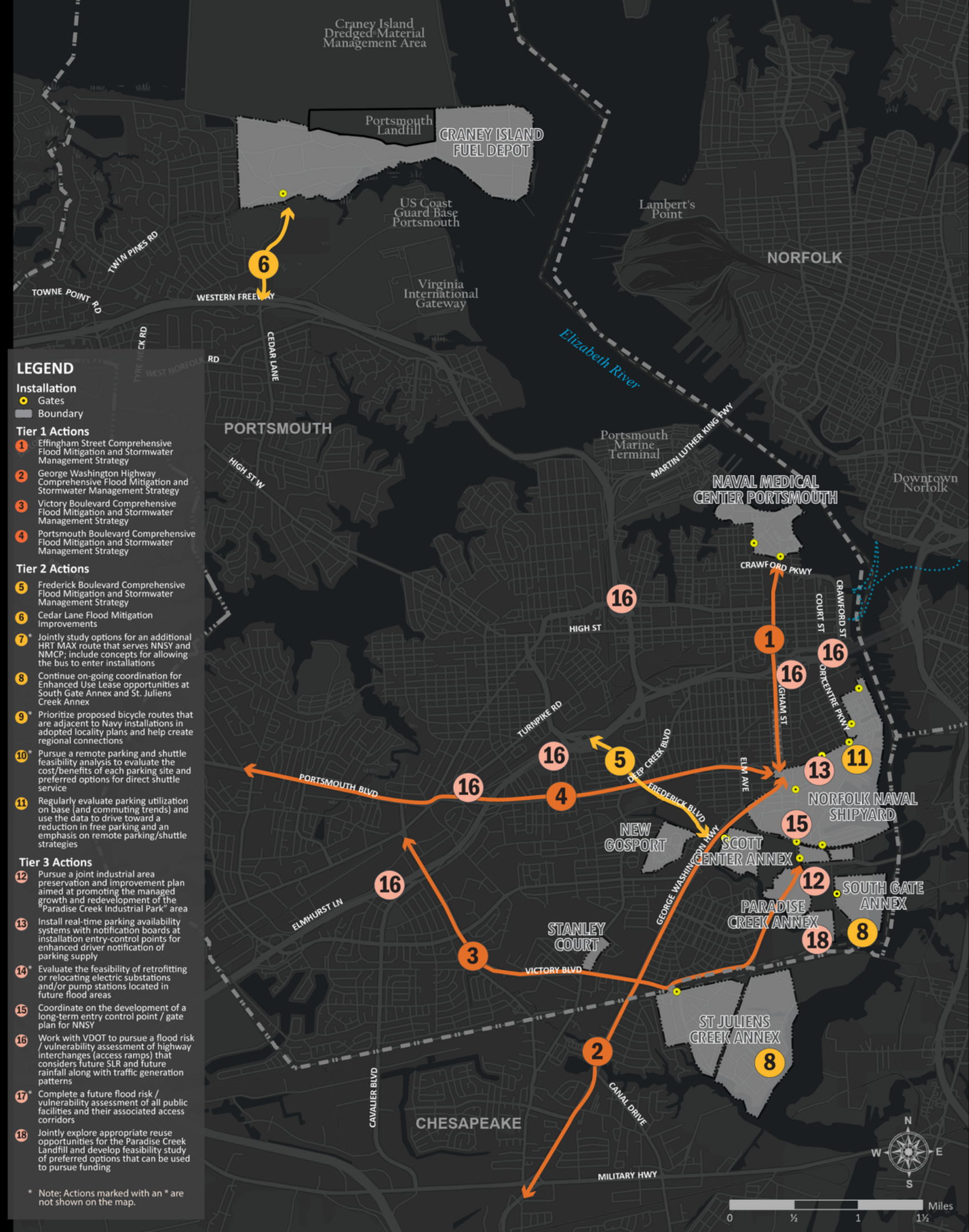
PORTSMOUTH & CHESAPEAKE

## JOINT LAND USE STUDY

Hampton Roads Planning District Commission

Final Report  
August 2021

# Portsmouth-Chesapeake JLUS Recommended Actions





# From Studies to Results

Local staff implementation committees (Chesapeake, Norfolk, Portsmouth, and Virginia Beach) established with HRPDC support.

Implementation committees will support:

- Maintaining communication between localities and installations
- Implementation of study recommendations through grant applications and other efforts
- Sharing of information between localities

# Opportunities for Collaboration

## *Data*

Stormwater Infrastructure Data  
LiDAR

## *Planning and Analysis*

Coastal Storm Risk Management Plans  
Hydraulic and Hydrologic Models  
Watershed Master Plans

## *Project Construction*

Flood Protection Projects  
Stormwater BMPs

## *Operations and Maintenance*

Roads  
Stormwater Infrastructure



Image: U.S. Navy (Victoria Granado)

# Funding for Collaboration

## *Local*

General Funds  
Bond revenue  
Enterprise Funds

## *State*

Legislative Appropriations

Grants

- Community Flood Preparedness Fund
- Stormwater Local Assistance Fund
- Virginia Military Community Infrastructure Grant Program and Fund

## *Federal*

Defense Community Infrastructure Program

Defense Access Roads

NOAA Coastal Resilience Program

JLUS/CUS Implementation

USACE Civil Works



Image: City of Chesapeake

# Maintaining Access

## Hampton Boulevard

- Norfolk is seeking DCIP and OLDCC funding to help adapt Hampton Blvd., which provides access to NS Norfolk and NSA Hampton Roads, to sea level rise and stormwater flooding.

## Nimmo Parkway

- During flood events Sandbridge residents must evacuate through Dam Neck Annex.
- Virginia Beach is using local CIP funds to extend Nimmo Parkway, which will provide additional, more resilient access to the neighborhood.

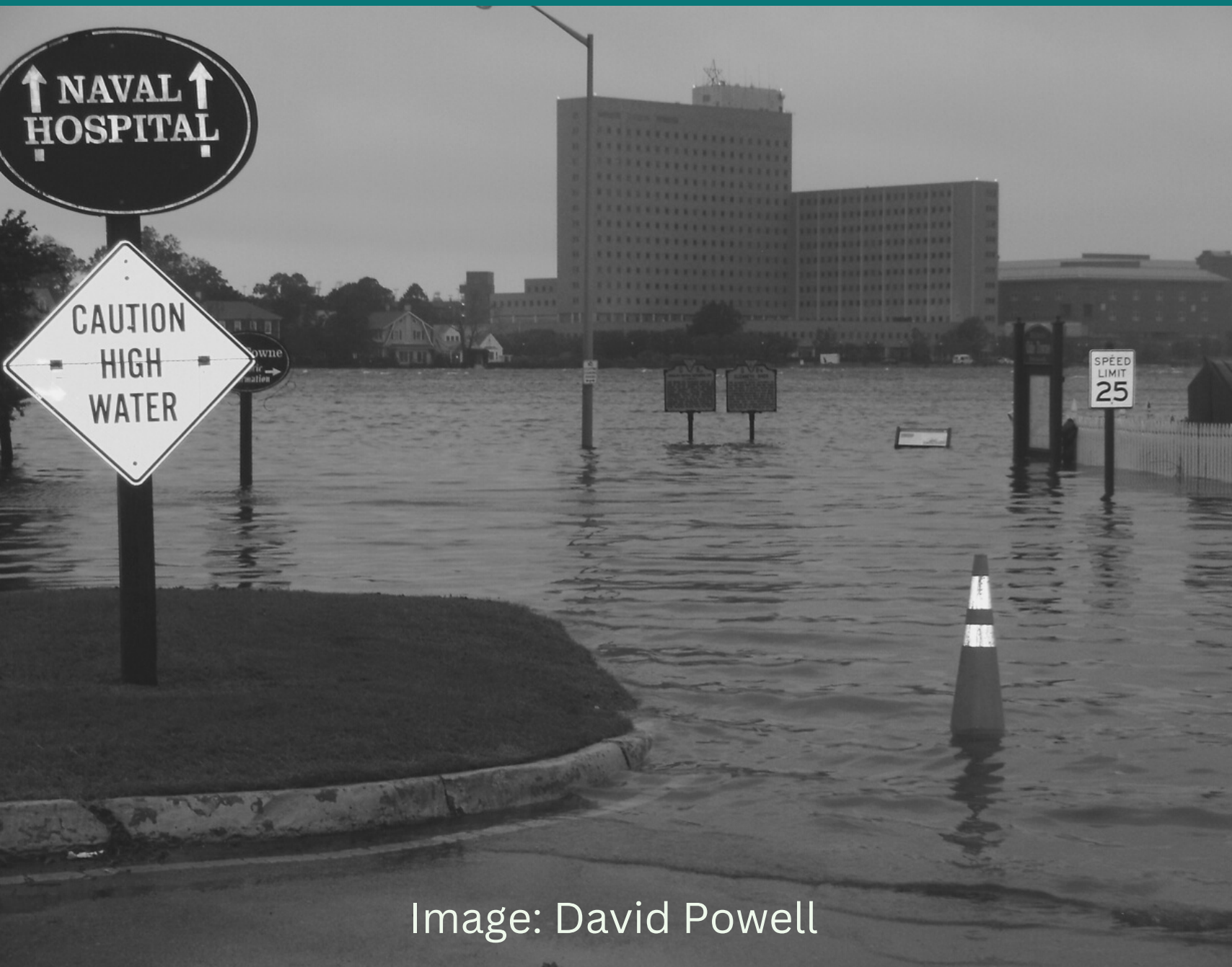


Image: David Powell

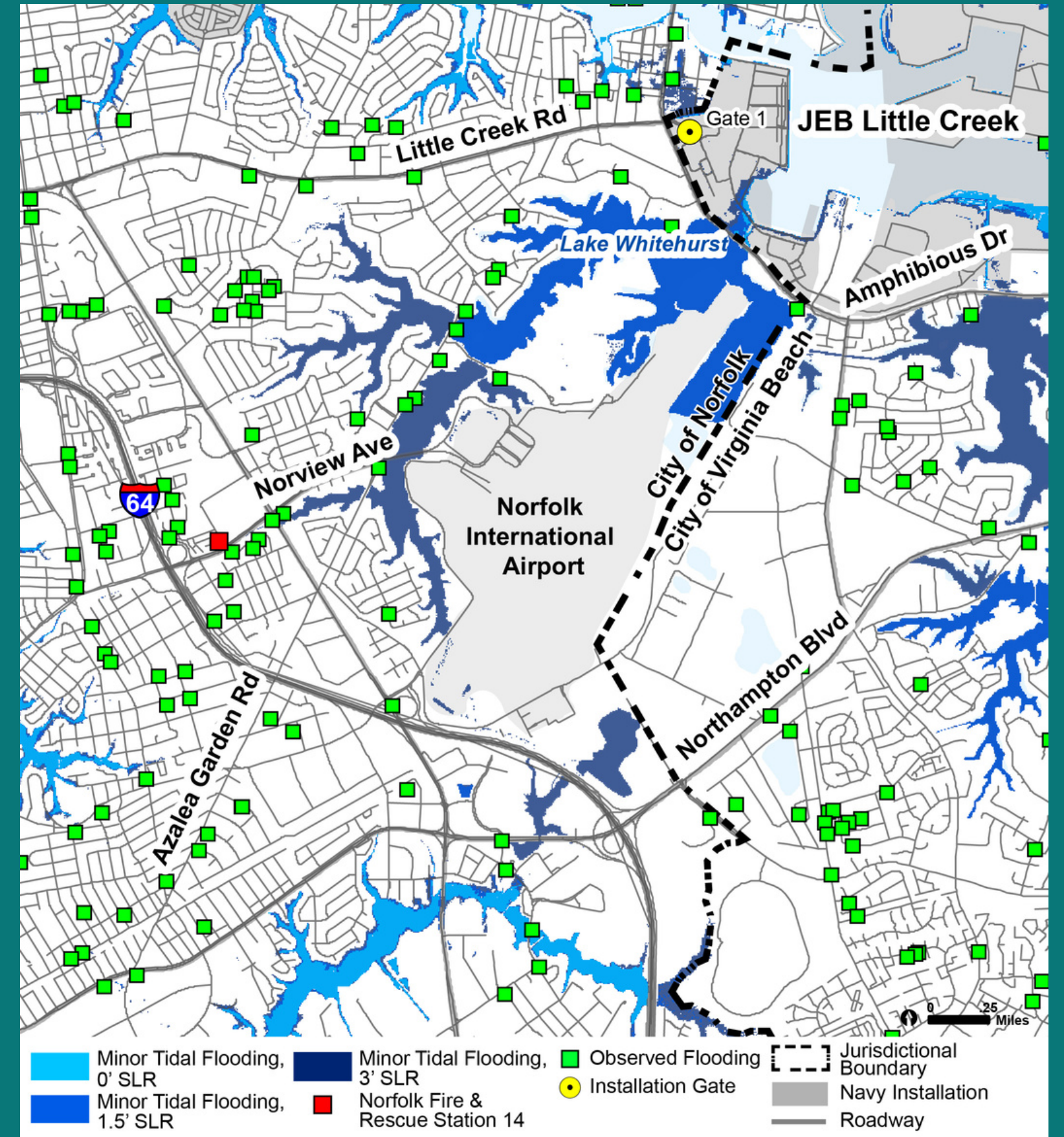
# NORFOLK

## Lake Whitehurst Study

Norfolk is using state funding from the Community Flood Preparedness Fund to support a hydrologic and hydraulic study of the Lake Whitehurst watershed, which contributes to flooding on JEB Little Creek.

## Navy-Norfolk IGSA

In August 2022, Commander, Navy Region Mid-Atlantic, and the City of Norfolk executed an Intergovernmental Support Agreement, creating potential opportunities for collaboration on services such as stormwater management, electrical services, and roadway maintenance.



Norfolk-Virginia Beach JLUS  
Sea Level Rise Scenarios and Historic Flooding Complaints

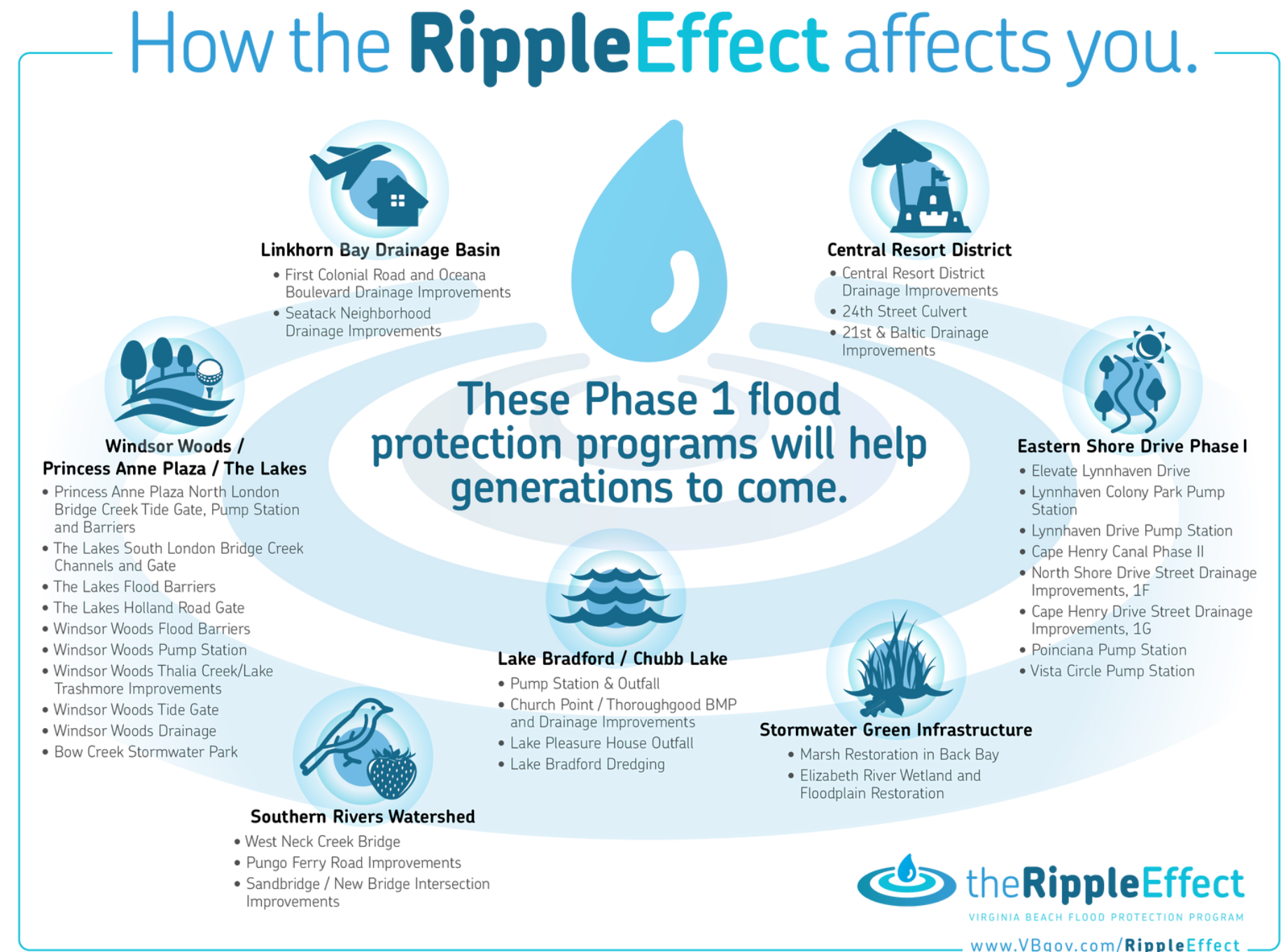
# Virginia Beach

## Stormwater Modeling

As part of a city-wide, locally funded initiative to develop stormwater models for each of the city's watersheds, Virginia Beach obtained stormwater infrastructure data from JEB Little Creek, incorporated it into the city stormwater model, and shared the model with the installation.

## Coastal Storm Risk Management Study

Virginia Beach recently began working with the U.S. Army Corps of Engineers on a Coastal Storm Risk Management Study. Navy Region Mid-Atlantic has also signed an agreement with USACE to fund additional work that would result in a combined study of the Navy's installations and the city.



# Regional

## *Roadway Flooding Sensors*

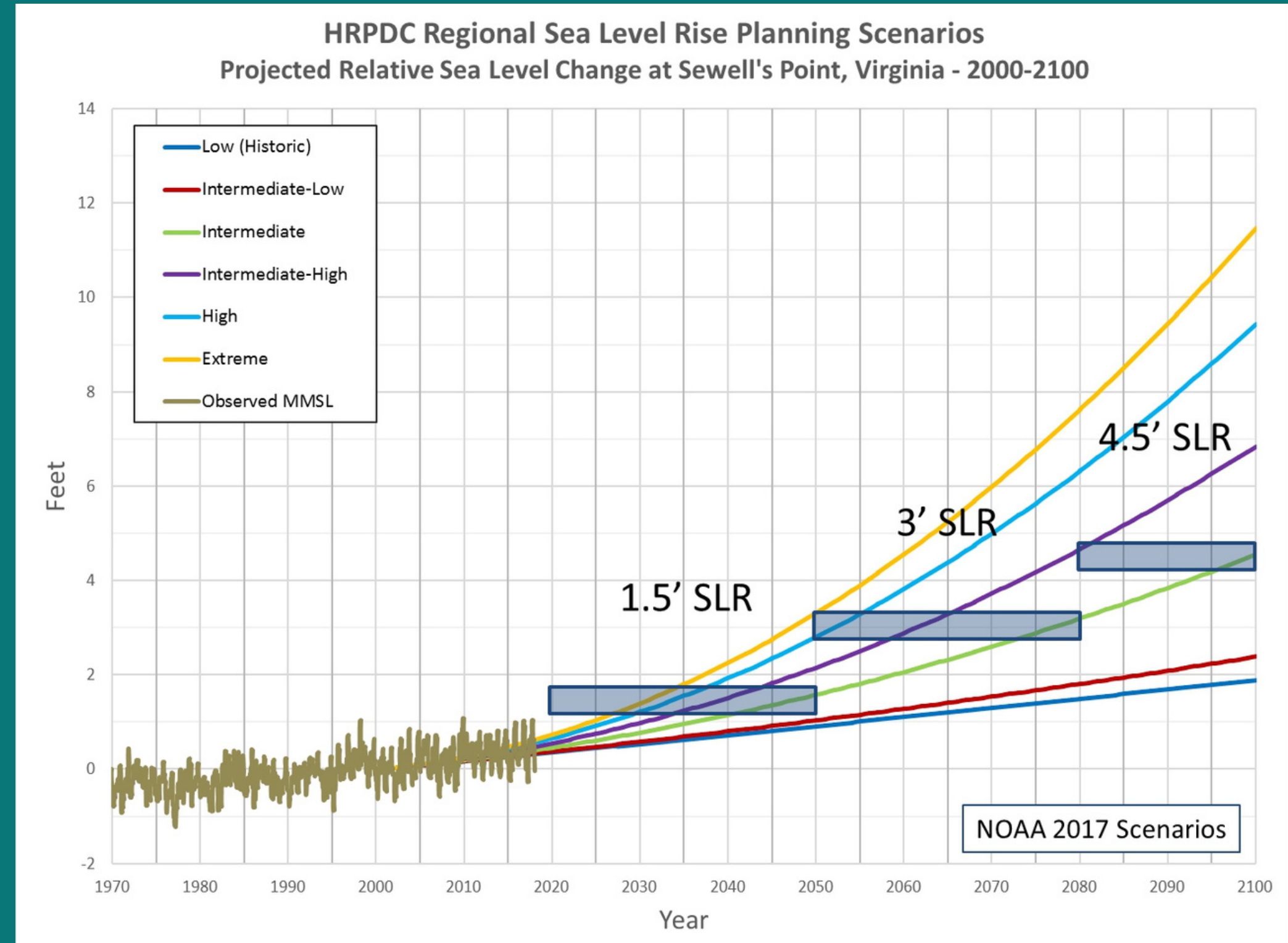
The HRPDC is using OLDCC resiliency grants and local funding to pilot a network of 20 roadway flooding sensors throughout Hampton Roads.

## *Resilient Design Guidelines*

The HRPDC is developing resilient stormwater management design guidelines using dedicated locality contributions and NOAA funding through the Virginia Coastal Zone Management Program.

## *HRSD Resilience Study*

The Hampton Roads Sanitation District is funding a resilience study looking at the exposure of the district's treatment plants, pump stations, and mains to current and future flooding.



# Questions

Ben McFarlane  
Senior Regional Planner  
[bmcfarlane@hrpdcva.gov](mailto:bmcfarlane@hrpdcva.gov)