# Virginia Beach Coastal Storm Risk Management (CSRM) Feasibility Study Update

City Council Briefing

LJ Hansen | April 21, 2026

# Agenda

- Stormwater Overview& Purpose of Briefing
- Background & Study Evolution
- New USACE Requirements
- Early Actionable Element Recommendation
  - *Candidate Options*
  - *Staff Recommendation*
  - *Element Benefits*
- Funding Overview
- Timeline
- Next Steps

# Stormwater Elements Overview

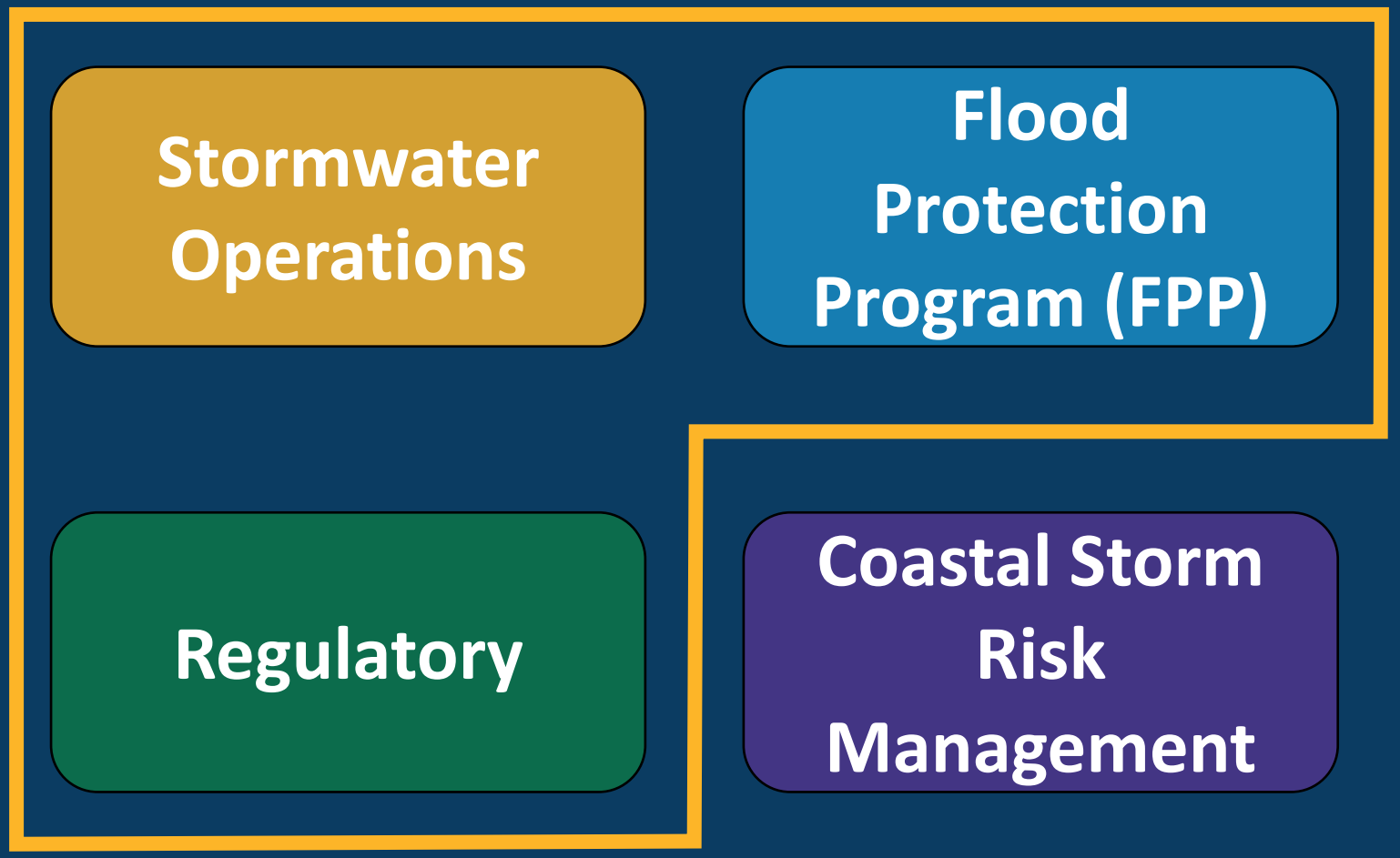
Stormwater Operations

Flood Protection Program (FPP)

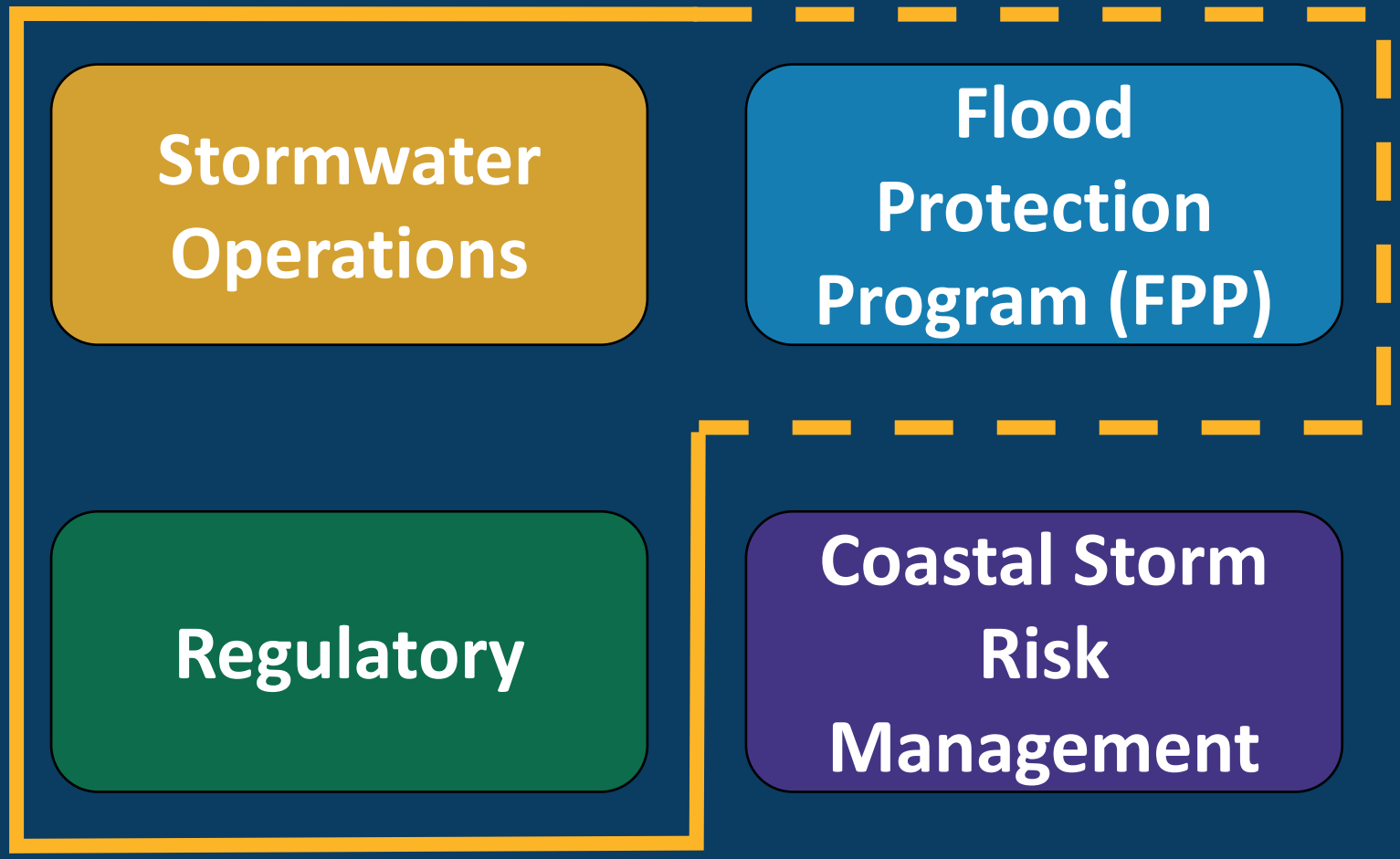
Regulatory

Coastal Storm Risk Management

# Stormwater Fund (ERU)



# 2.5¢ Real Estate Dedication (Stormwater Lockbox)



# 4.1¢ Real Estate Dedication (Flood Protection Lockbox)

Stormwater Operations

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# Coastal Storm Risk Management (CSRM)

Stormwater Operations

Flood Protection Program (FPP)

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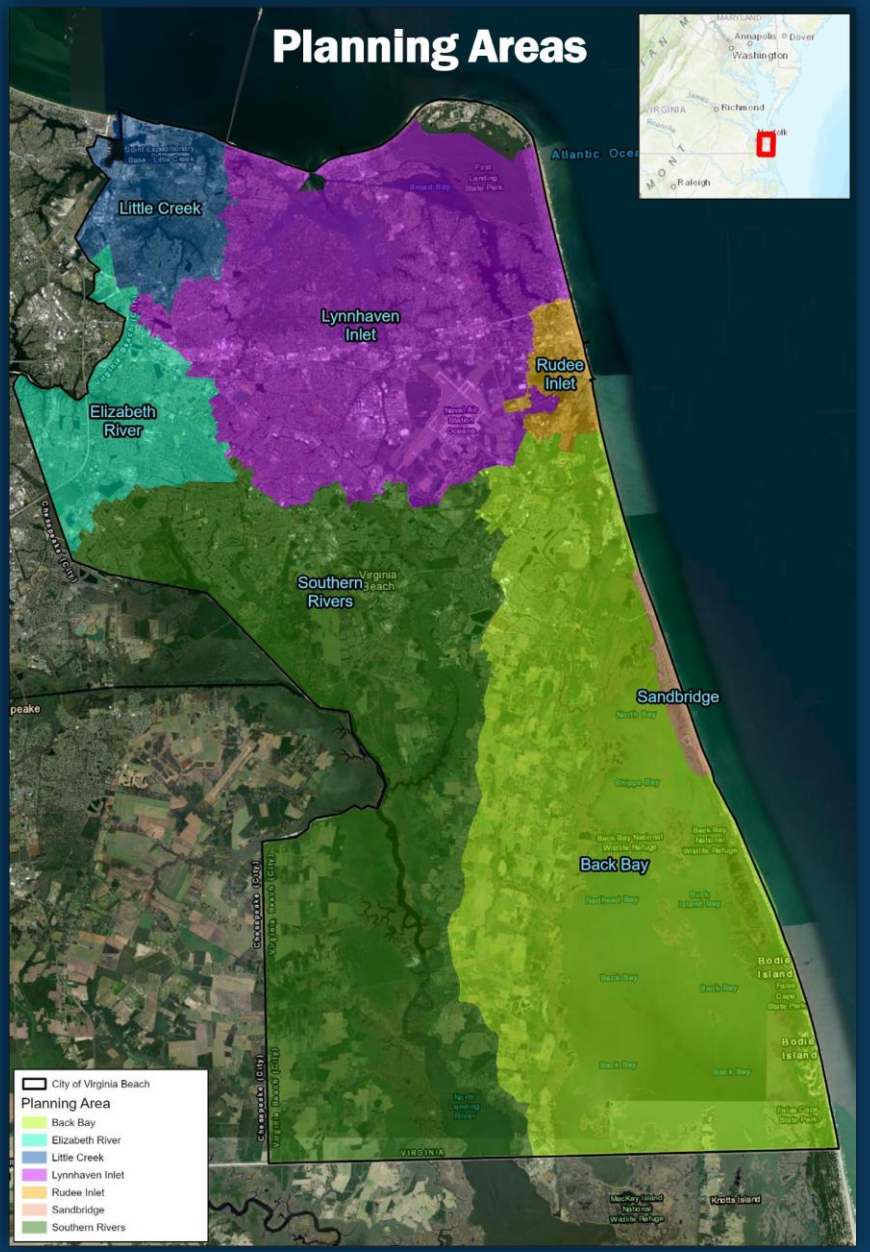
Coastal Storm Risk Management

# Purpose of Briefing

- Update City Council on CSRM Study status and new USACE requirements
- Explain the need to select one **Early Actionable Element** to maintain study schedule
- Present staff's recommended Early Actionable Element
- **Request City Council concurrence to advance the recommended element.**

# Background

- Study is the first step to getting federal funding assistance – “New Start”
- Study focuses exclusively on coastal storm inundation – not recurrent rainfall (Flood Protection Program)
- Evaluates long-term coastal storm risks across 6 Planning Areas
- Develops strategies for protecting life and property over a 50-year horizon
- Incorporates sea level rise and storm surge modeling



# Study Evolution

- 2022 (July): Study launched under USACE “SMART” framework:
  - 3-year limit
  - $3M cap ($1.5M City Share)
  - 3 levels of Corps engagement throughout (District, Division, & Headquarters)
  - Chief’s Report signed at ~10% design
- 2023 (Jan): Reclassified as “Complex” due to interconnected flooding
  - Budget increased to $5.5M, schedule extended to Spring 2026
- 2023 (Jun): Revised Headquarters Direction
  - More Robust modeling, geotechnical work, and Class 3 cost estimate
  - Total cost now $13.5M (6.67M City Share), completion extended to Spring 2028

SMART – Specific, Measurable, Attainable, Risk-Informed, Timely

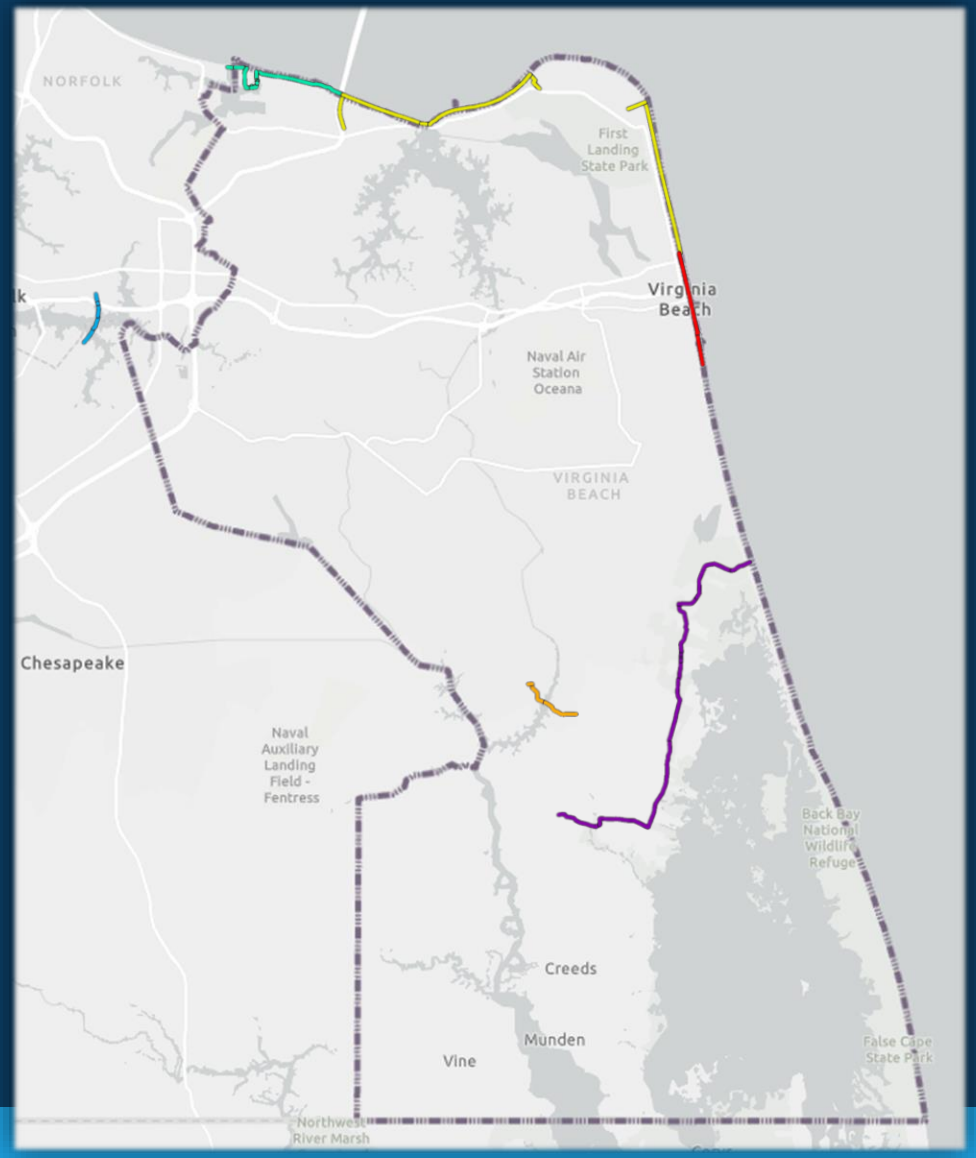
# New USACE Requirements

- *Early Actionable Element Requirement*
  - 35% design maturity required before the Chief's Report can be signed
  - Must include Class 3 cost estimate
  - Only one structural measure in a planning area can advance initially
- *What This Means for Virginia Beach*
  - USACE Norfolk District cannot advance all structural options simultaneously
  - City must identify one **Early Actionable Element** to keep the CSRM Feasibility Study on schedule
  - All remaining options remain part of the comprehensive plan for advancement in later phases under existing authority

# Early Actionable Element – Candidate Options

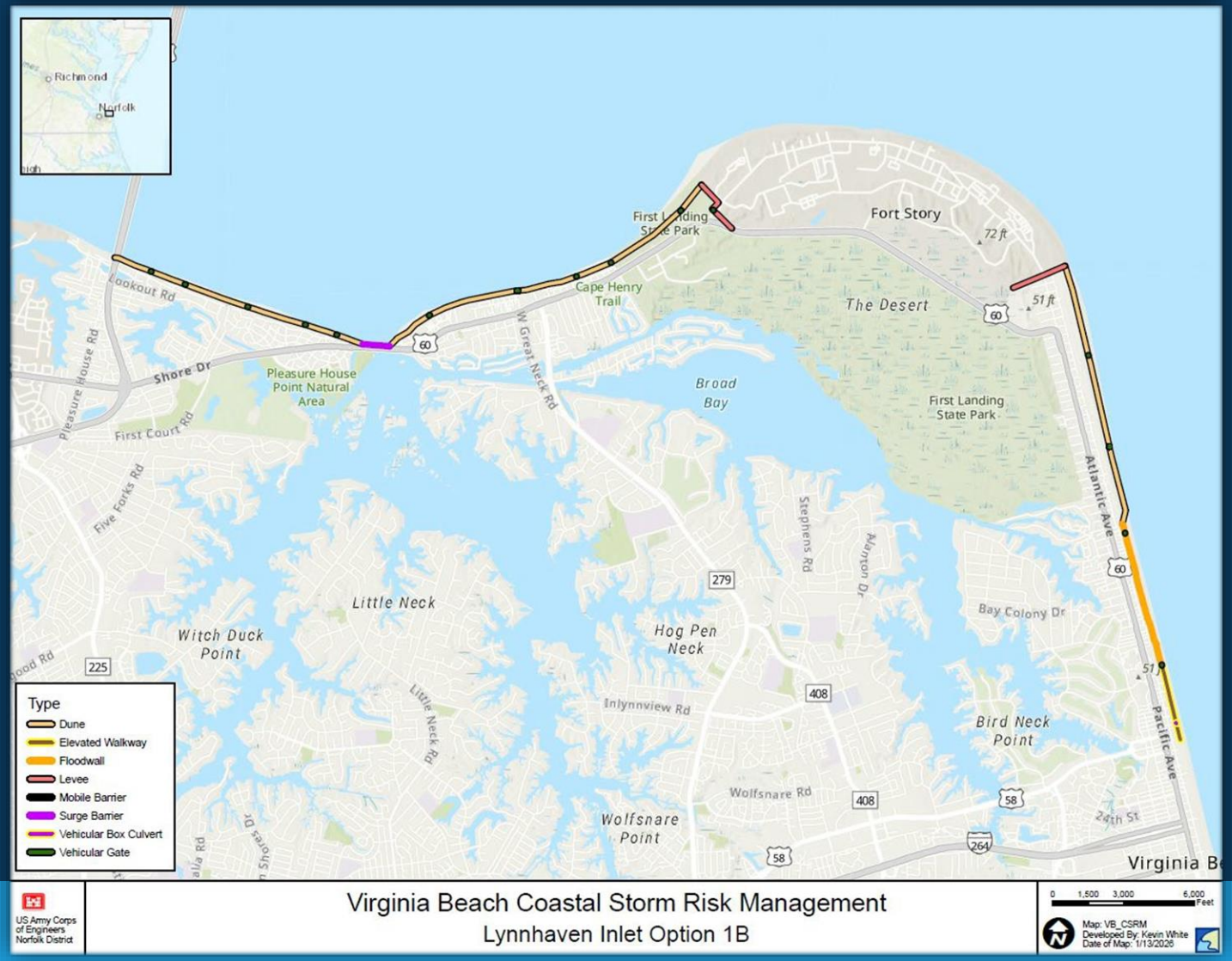
Six Candidate Planning Area Locations:

- Back Bay
- Elizabeth River
- Little Creek
- Lynnhaven Inlet
- Rudee Inlet + Oceanfront Floodwall
- West Neck Creek



# Staff Recommendation

## Recommended Early Actionable Element: Lynnhaven Inlet Surge Barrier




**Recommendation based on:**

- Lynnhaven inlet and connected waterways affects a large area with a significant population, experiencing some of the greatest impacts from flooding
- A surge barrier here would have the potential to afford immediate benefit and protection

# Staff Recommendation

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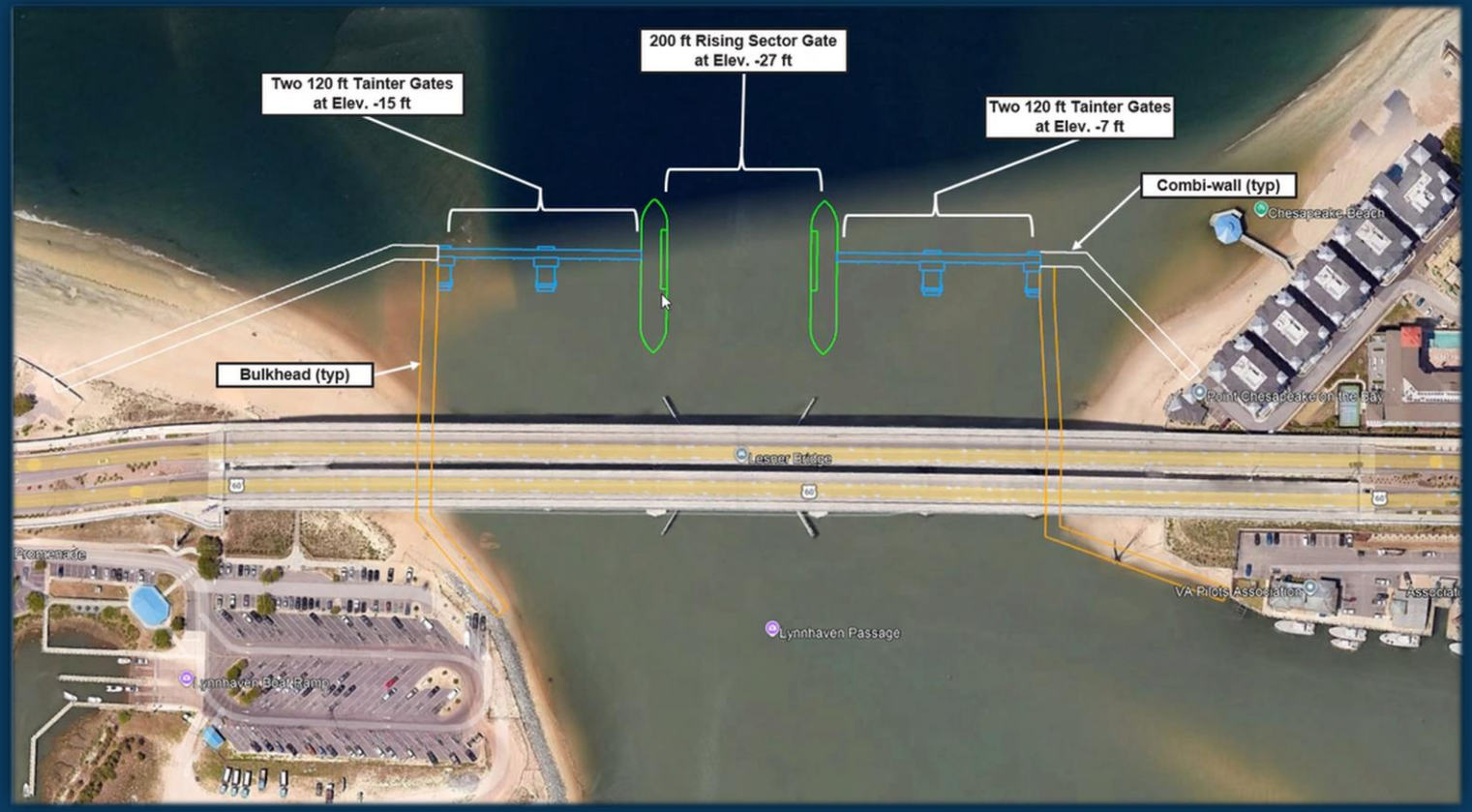


*Lynnhaven Inlet Storm Surge Barrier Concept*

- Surge barrier across Lynnhaven Inlet with a rising sector gate and Tainter gates
- Floodwalls and fortified dunes along bay and ocean sides
- Ultimately creates continuous Chesapeake Bay → Fort Story protection line

# High-risk Interior Neighborhoods

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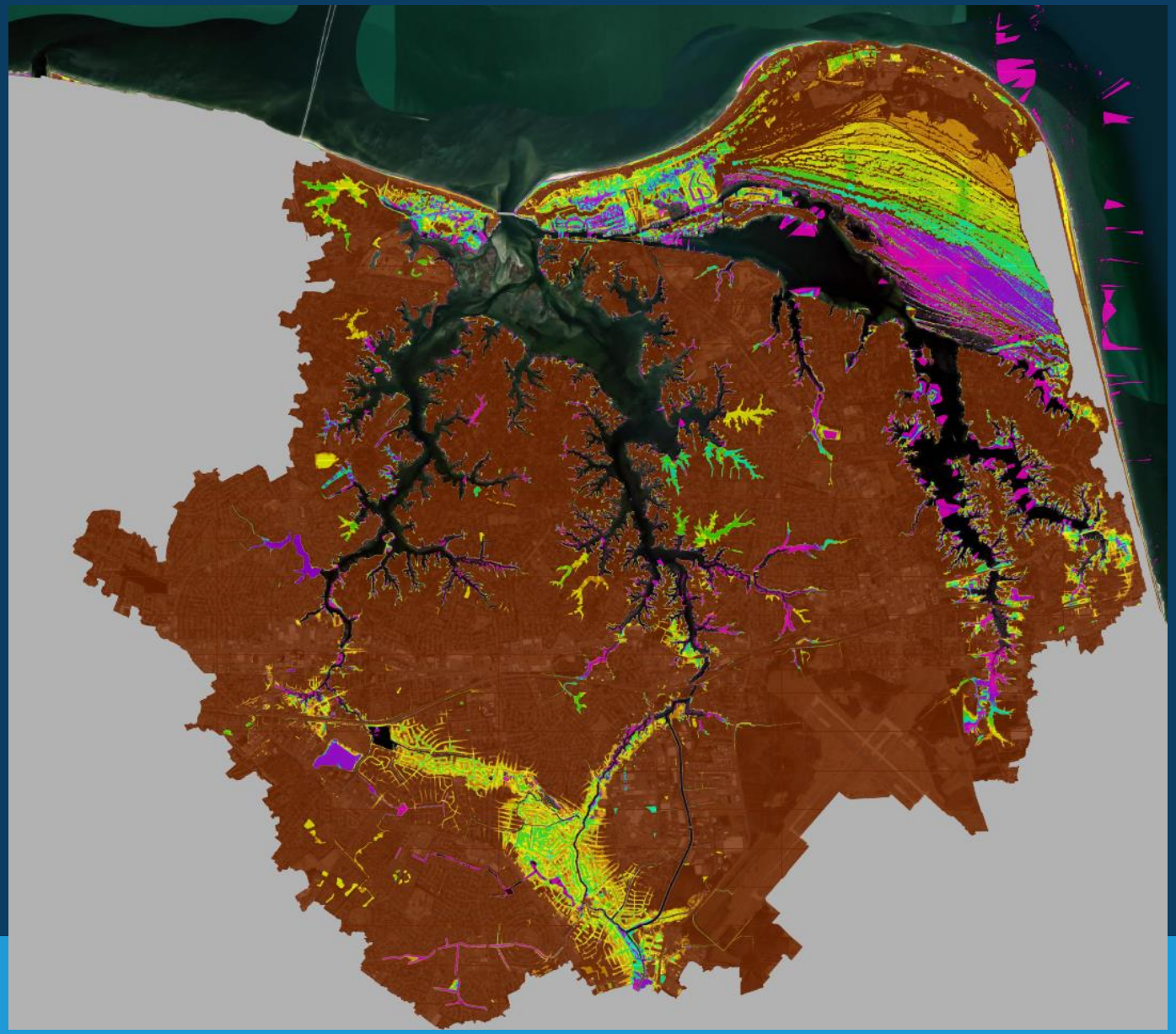


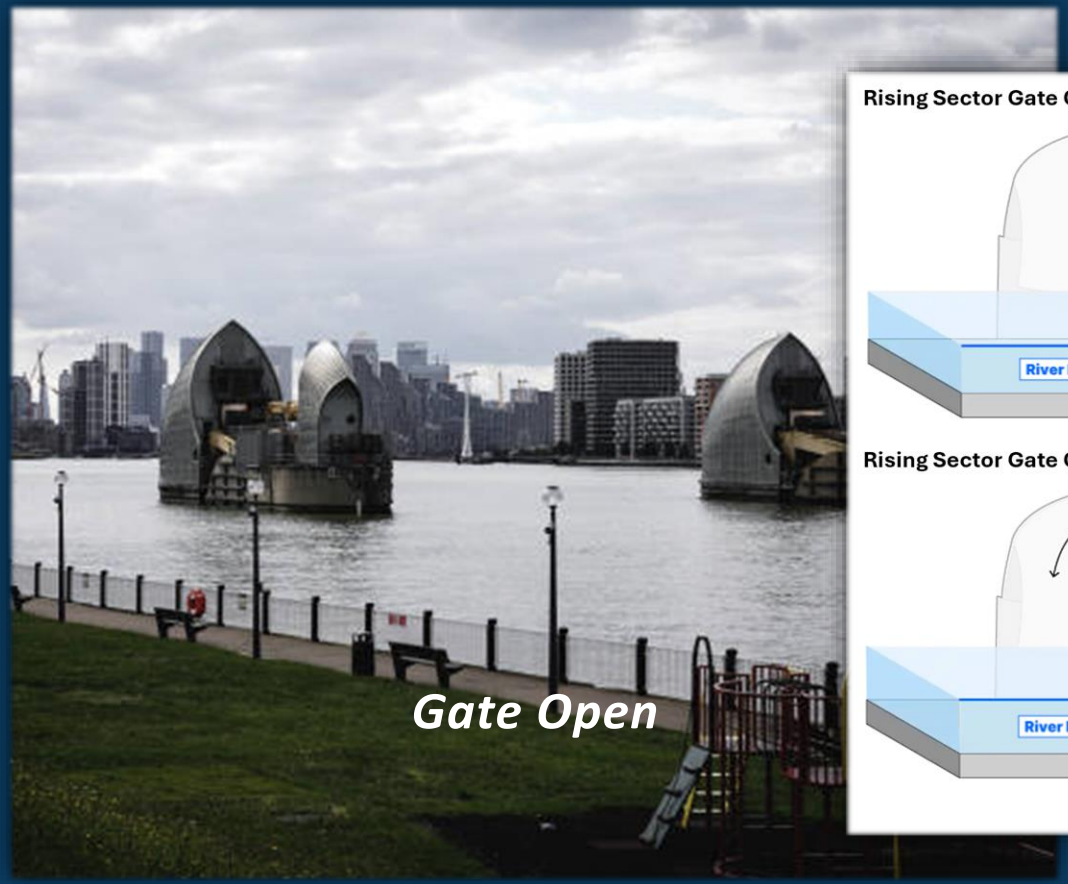
- Lynnhaven Inlet is the source of tidal flooding for much of the City
- Affecting tidal levels in:
  - Central Resort
  - Bay Colony
  - Great Neck
  - Town Center
  - Windsor Woods/Princess Anne Plaza

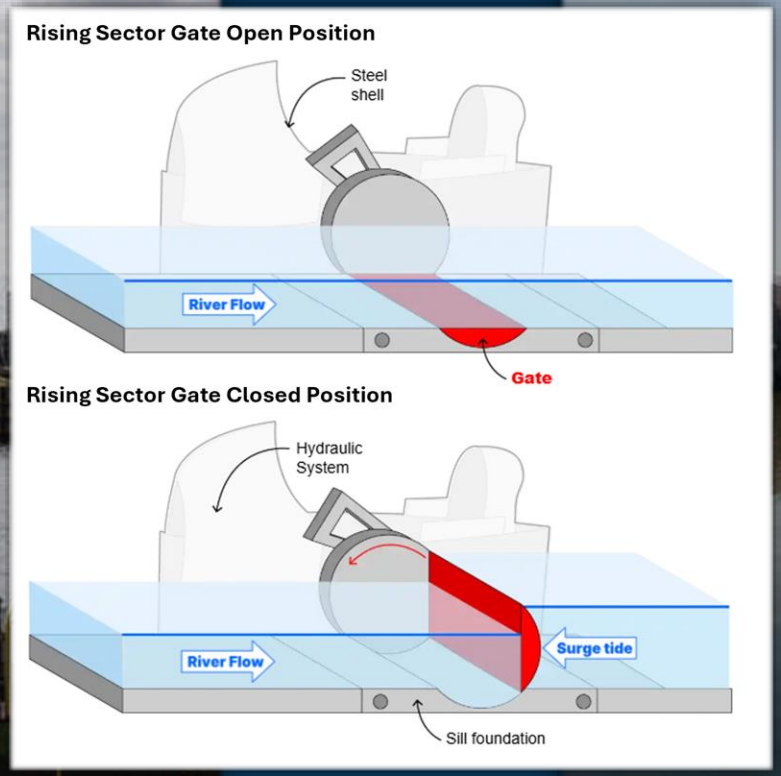
# Lynnhaven Inlet Storm Surge Barrier Concept

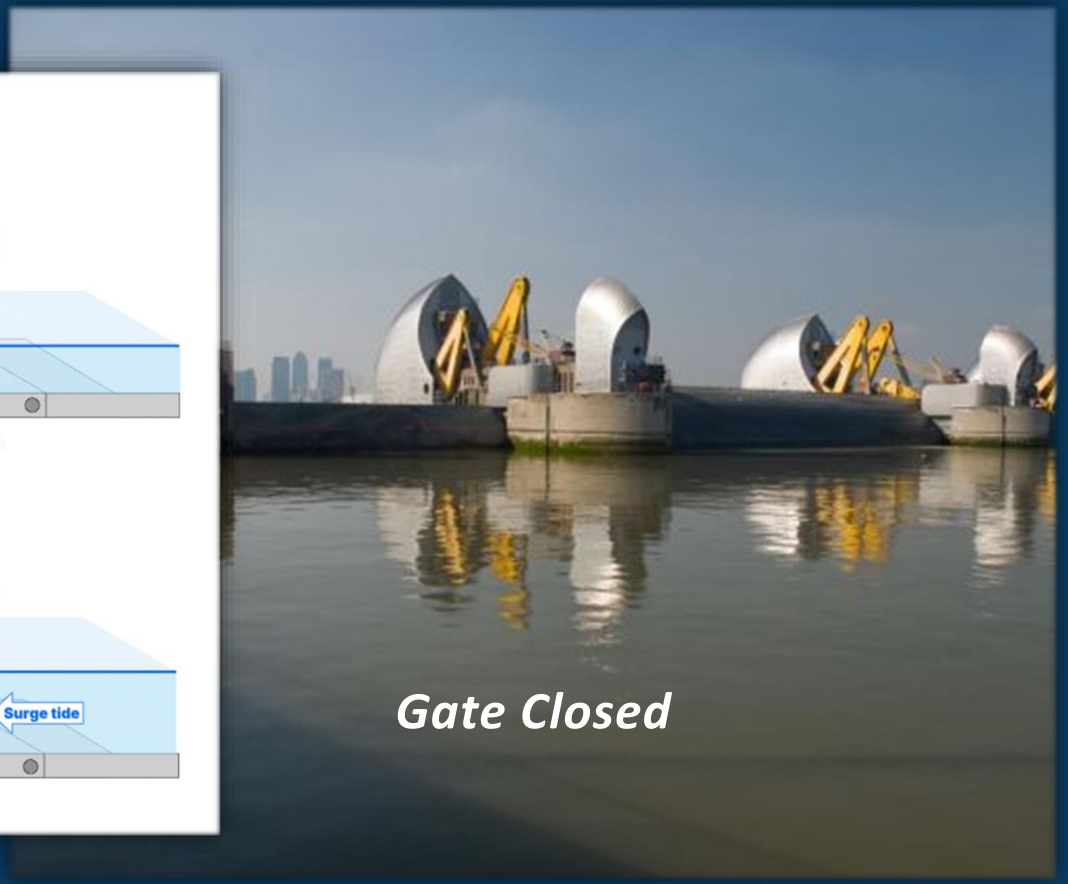


*Example of Tainter gates – Fox Point Hurricane Barrier, Providence, Rhode Island*

# Lynnhaven Inlet Storm Surge Barrier Concept




*Example of rising sector gates – Thames Barrier in London*

# How the Gates Might Be Utilized – Very Preliminary

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## PRELIMINARY CLOSURE INFORMATION

**Closure Threshold** is the forecasted water level for which operation of a storm surge barrier is authorized:

– 4 feet NAVD88 (preliminary)

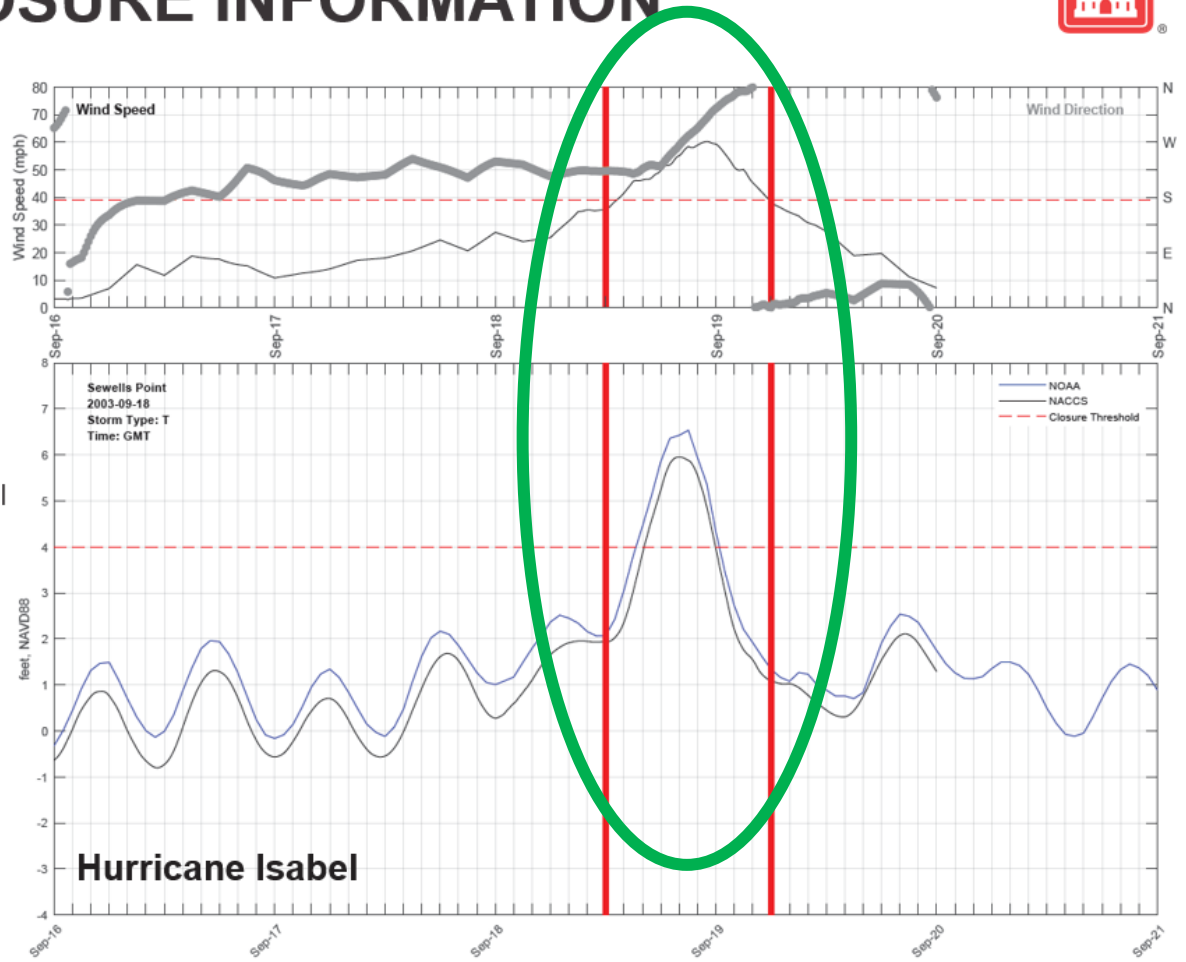
### Closure Timing

– Gates will remain open until navigation has cleared or until the following conditions are met:

- Gates will begin closing 2 hours before water level are forecasted to exceed closure threshold.
- Gates will close if the site experiences tropical storm force winds (39 mph).
- Gates will close at the lowest water surface elevation practicable to increase the storage capacity of the basin.

### Reopening Timing

– Gates will reopen after the storm passes on falling tide when the head difference on the gates is < 1 foot.

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# Hurricane vs Nor’easter

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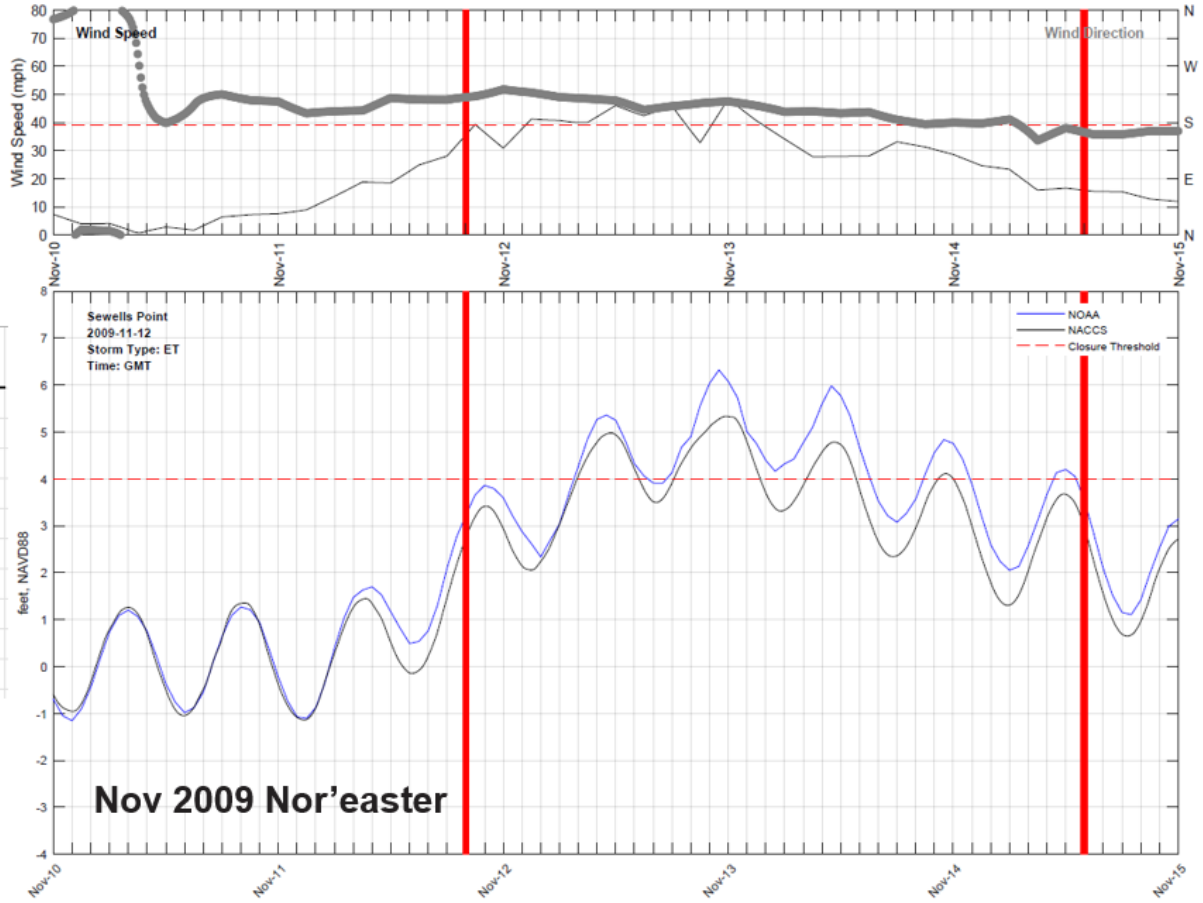
## HISTORICAL STORMS - CLOSURES

5


| Top Ten | Date | Type | feet, NAVD88 | Closure Duration (Hours) |
|---|---|---|---|---|
| 1 | 8/23/1933 | Hurricane | 6.41 | 14 |
| 2 | 9/18/2003 | Hurricane | 6.28 | 18 |
| 3 | 11/12/2009 | Nor'easter | 6.12 | 66 |
| 4 | 8/28/2011 | Hurricane | 5.95 | 26 |
| 5 | 3/7/1962 | Nor'easter | 5.61 | 44 |
| 6 | 10/29/2012 | Hurricane | 5.19 | 54 |
| 7 | 9/18/1936 | Hurricane | 5.11 | 20 |
| 8 | 11/22/2006 | Nor'easter | 5.02 | 14 |
| 9 | 2/5/1998 | Nor'easter | 4.97 | 52 |
| 10 | 10/7/2006 | Nor'easter | 4.91 | 50 |

Closure Duration (Hours)

| Storm Type | Average | Min | Max |
|---|---|---|---|
| Hurricane | 26.4 | 14 | 54 |
| Nor'easter | 45.2 | 14 | 66 |

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# Closure Frequency – Very Preliminary

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## CLOSURE FREQUENCY – HISTORICAL DATA

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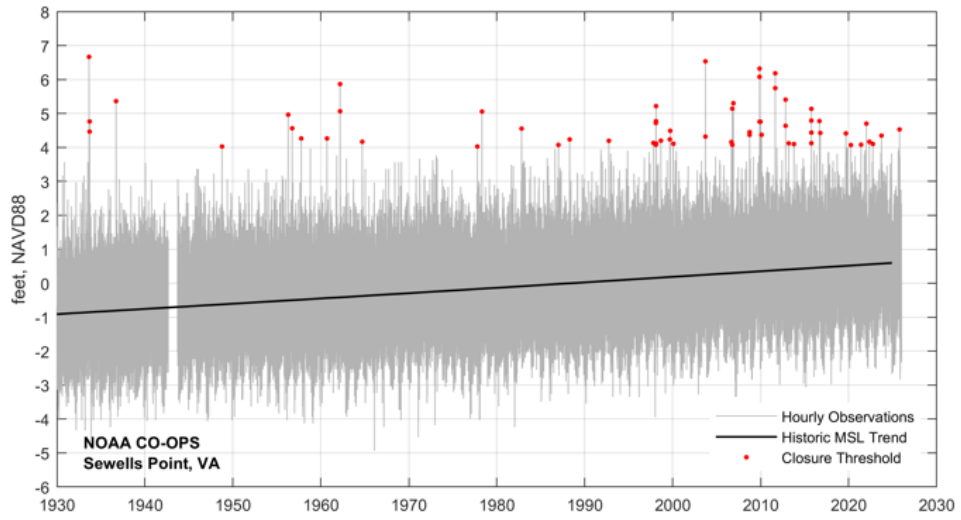
NOAA Tide Station at Sewells Point, VA

Closure Threshold = 4.0 ft NAVD88

- 60 closure days since 1930
- 33 closure days since 2000




| | Number of Closure Days per Decade | | |
|---|---|---|---|
| Decade | 4 ft NAVD88 | 5 ft NAVD88 | 6 ft NAVD88 |
| 1930s | 4 | 2 | 1 |
| 1940s | 1 | 0 | 0 |
| 1950s | 3 | 0 | 0 |
| 1960s | 4 | 2 | 0 |
| 1970s | 2 | 1 | 0 |
| 1980s | 3 | 0 | 0 |
| 1990s | 10 | 1 | 0 |
| 2000s | 13 | 5 | 3 |
| 2010s | 14 | 4 | 1 |
| 2020s | 7 | 0 | 0 |

*Slide Captured from USACOE Coordination Briefing*

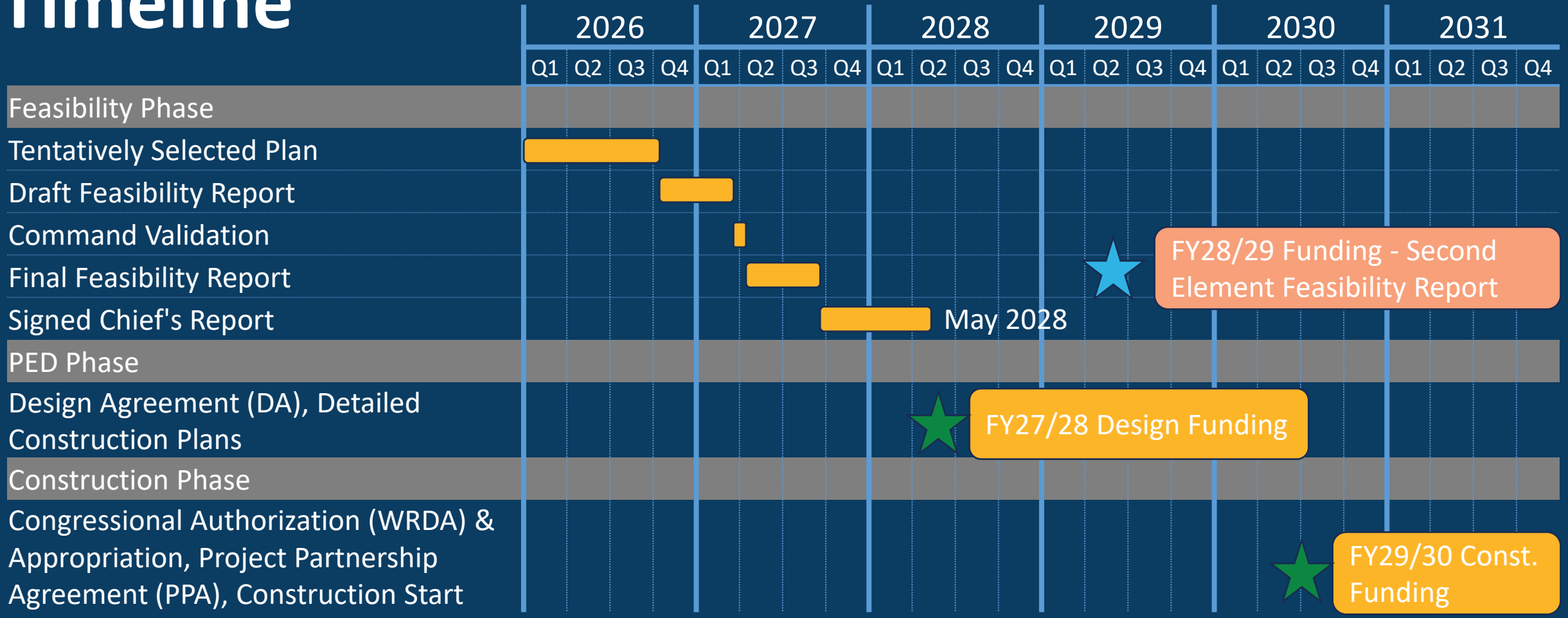
# Funding Overview

Total Study Cost: $13.5M, City Local Share: $6.67M (CIP 100512)

- $4.25M appropriated to date
- $2.4M programmed for FY27–FY28
- ***No additional City funding is needed right now*** to advance the Early Actionable Element

After the 35% design and Chief's Report, the project becomes eligible for congressional authorization—the step required for future federal appropriations for design and construction

# Timeline




PED – Preconstruction Engineering & Design
WRDA – Water Resources Development Act

35% City Funding Required

50% City Funding Required

# What We Seek from City Council Today

- Concurrence on the selection of the Lynnhaven Surge Barrier and associated infrastructure as the Early Actionable Element

OR..

- Provide Alternative Direction

# Next Steps – If Council Concurs

- Complete 35% design for the selected Early Actionable Element
- Plan and Program Local Matching Funds (65/35 Cost Share)
- Explore Feasibility of USACE Section 203 opportunities to advance additional measures, including:
  - Using City funding to complete 35% design on another measure
  - Submitting a Section 203 report to USACE for review and potential approval
  - Enabling a locally advanced measure to become federally authorized
  - Allowing progress on additional elements without waiting for the full CSRM study timeline.

# THANK YOU

QUESTIONS?