



Bow Creek Stormwater park

HRPDC Presentation

July 2, 2020

Michael Mundy, PE

City of Virginia Beach Stormwater

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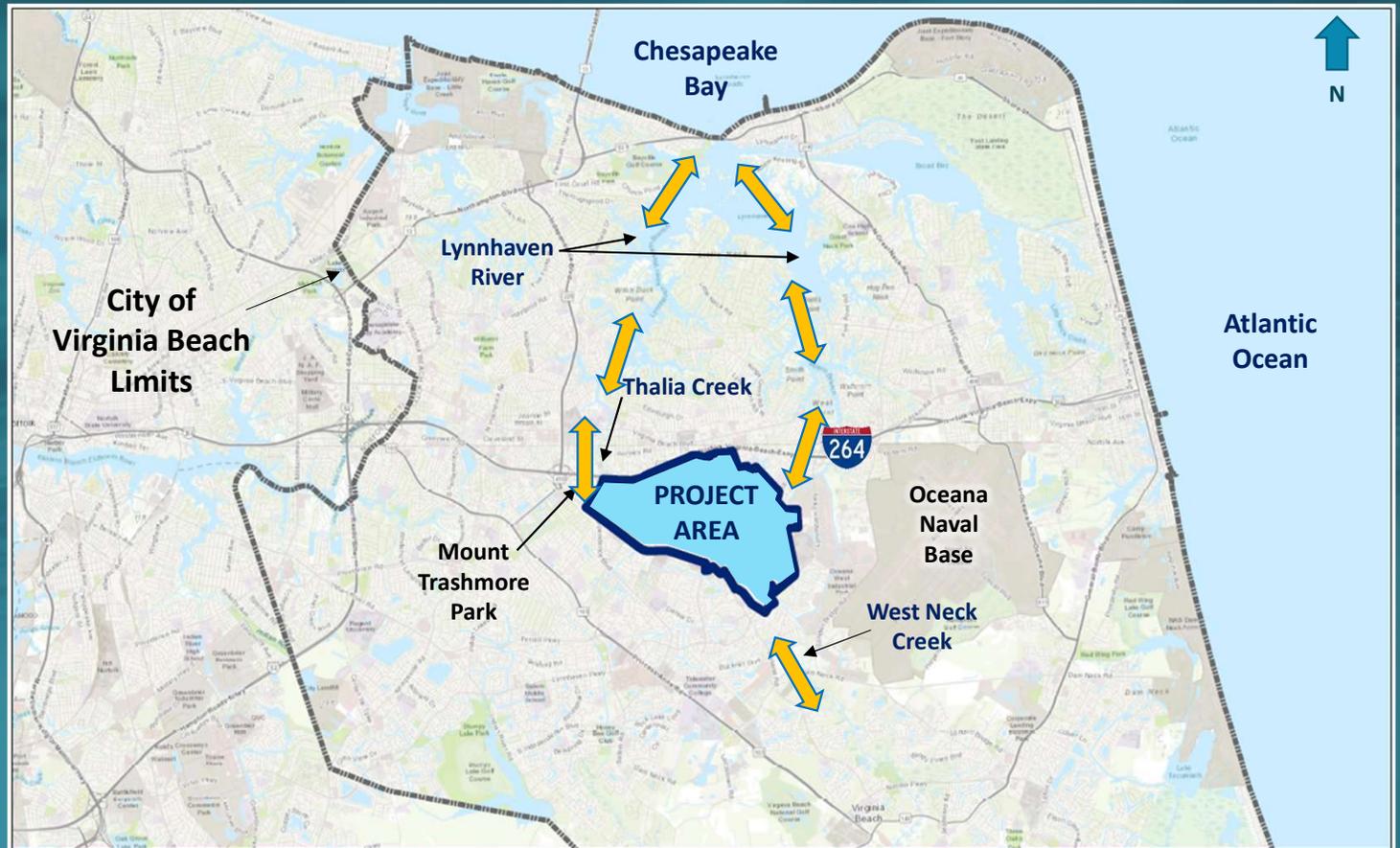
Presentation Outline

- Project Location
- Problem Identification
- Proposed Improvements
- Bow Creek SW Park



Project Location

Virginia Beach, VA

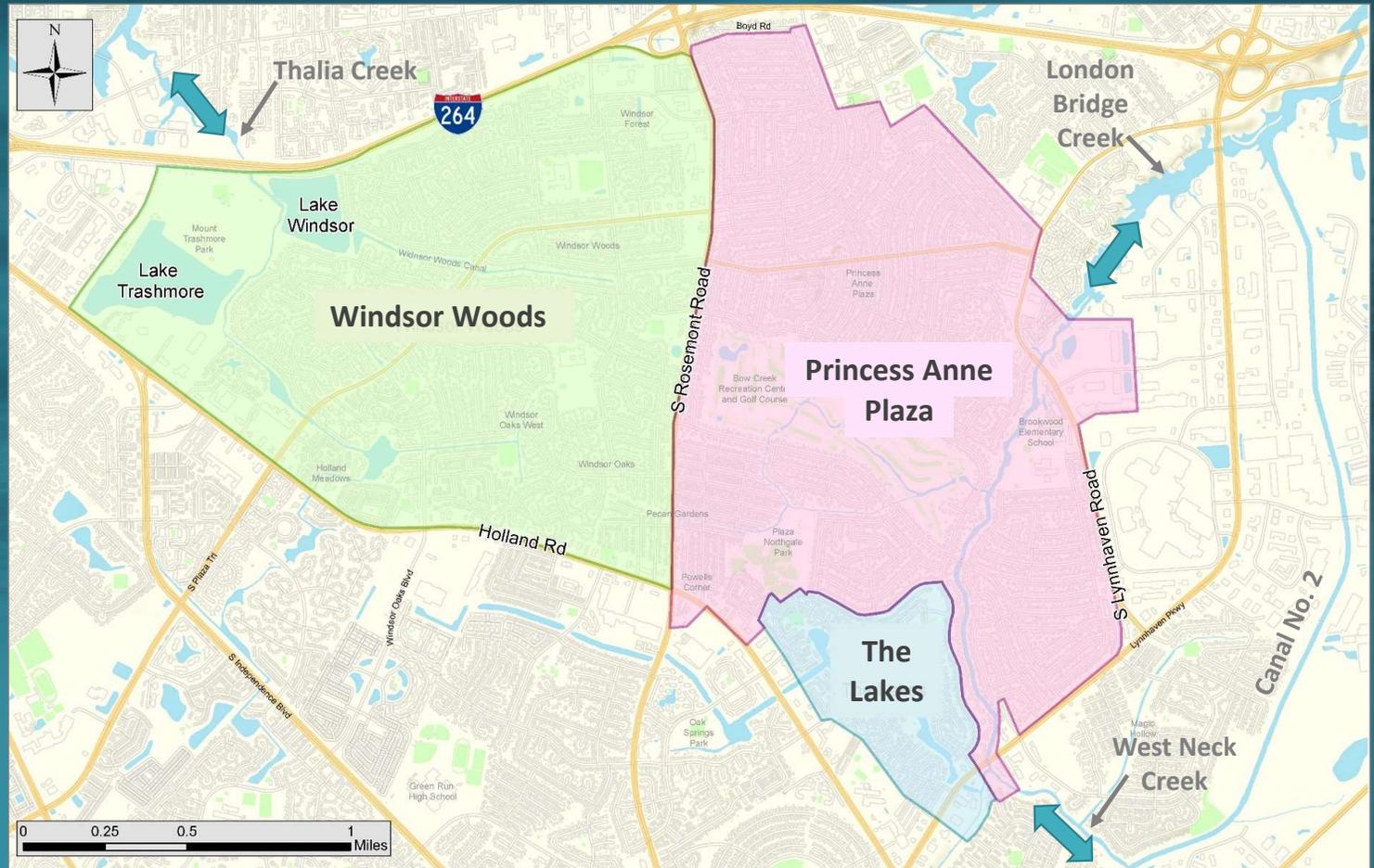




Project Location

Total Area – 2,600 Acres (8,500 Parcels)

Total Assessed Value – \$2B





Problem Identification

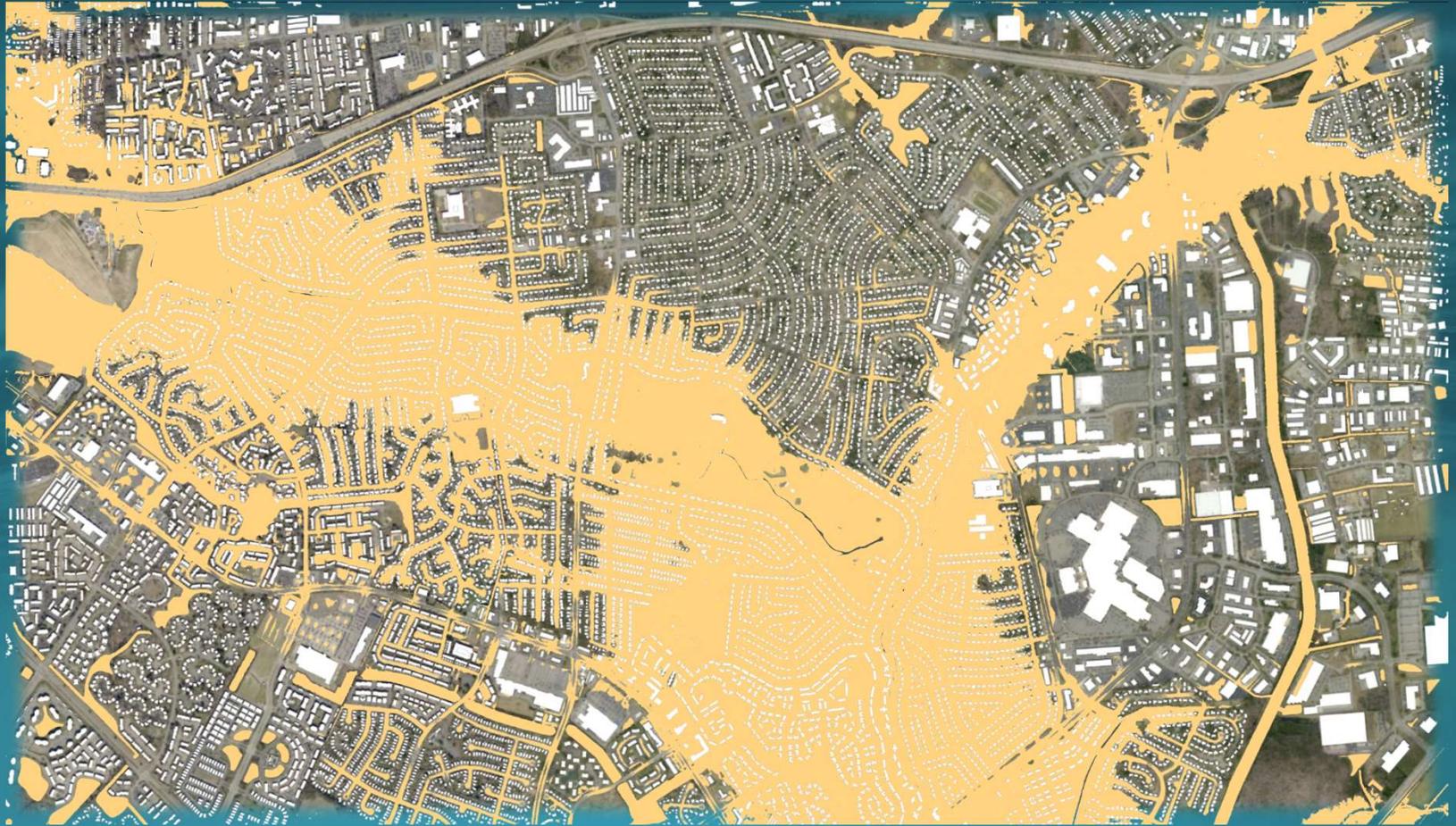
- Elevations in the area are low
- Infrastructure is \pm 50 years old (Built in 1960's)
- Area is Fully-Developed
- Existing storm drains are inadequate or non-existent
- Lack of storage
- Area is tidally influenced
- Frequency & severity of storms is increasing

TIDAL IMPACTS



Inundation Areas
Between Elevations:

0 to 10 Feet
NAVD 88



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Hurricane Matthew

October 2016

- Approx. 12" rainfall
- 800 Reported Damage (Modeling shows 1,400)
- Streets Impassable
- Insurance Rates ↑
- Prompted Flood Study



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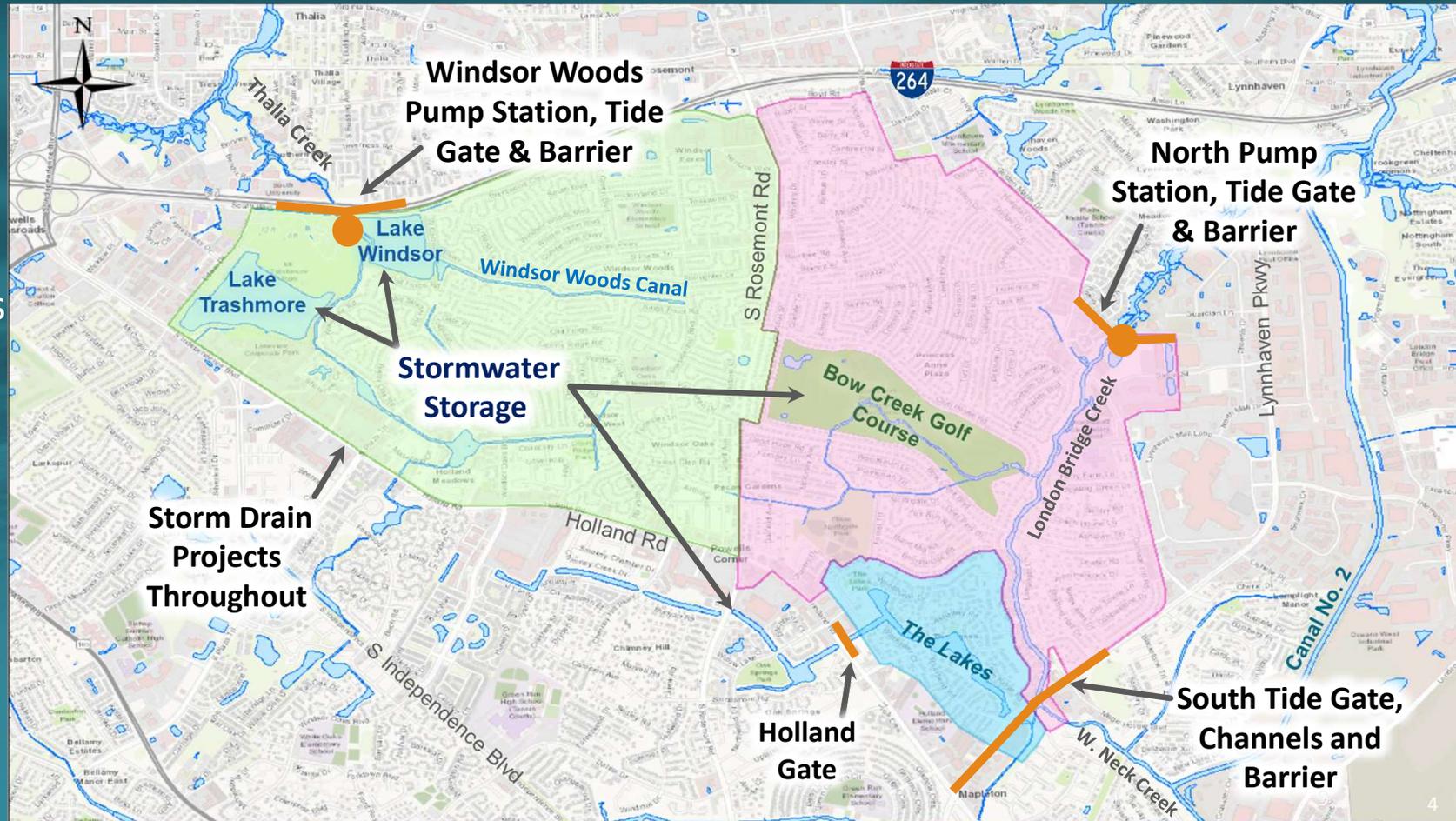
Infrastructure Improvements





Infrastructure Improvements

- 3 Tide Gates
- 2 Pump Stations
- Storage
- Storm Drains





NW Pump Station and Tide Gate

- 750 cfs Capacity
- 6 – 54" Discharge Pipes



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Windsor Woods Tide Gate

- 4 – 10' gate bays
- 60' total span



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NE Pump Station and Tide Gate

- 1,400 cfs
- 10 – 10' gate bays
- 120' total span





SE Tide Gate & Channelization

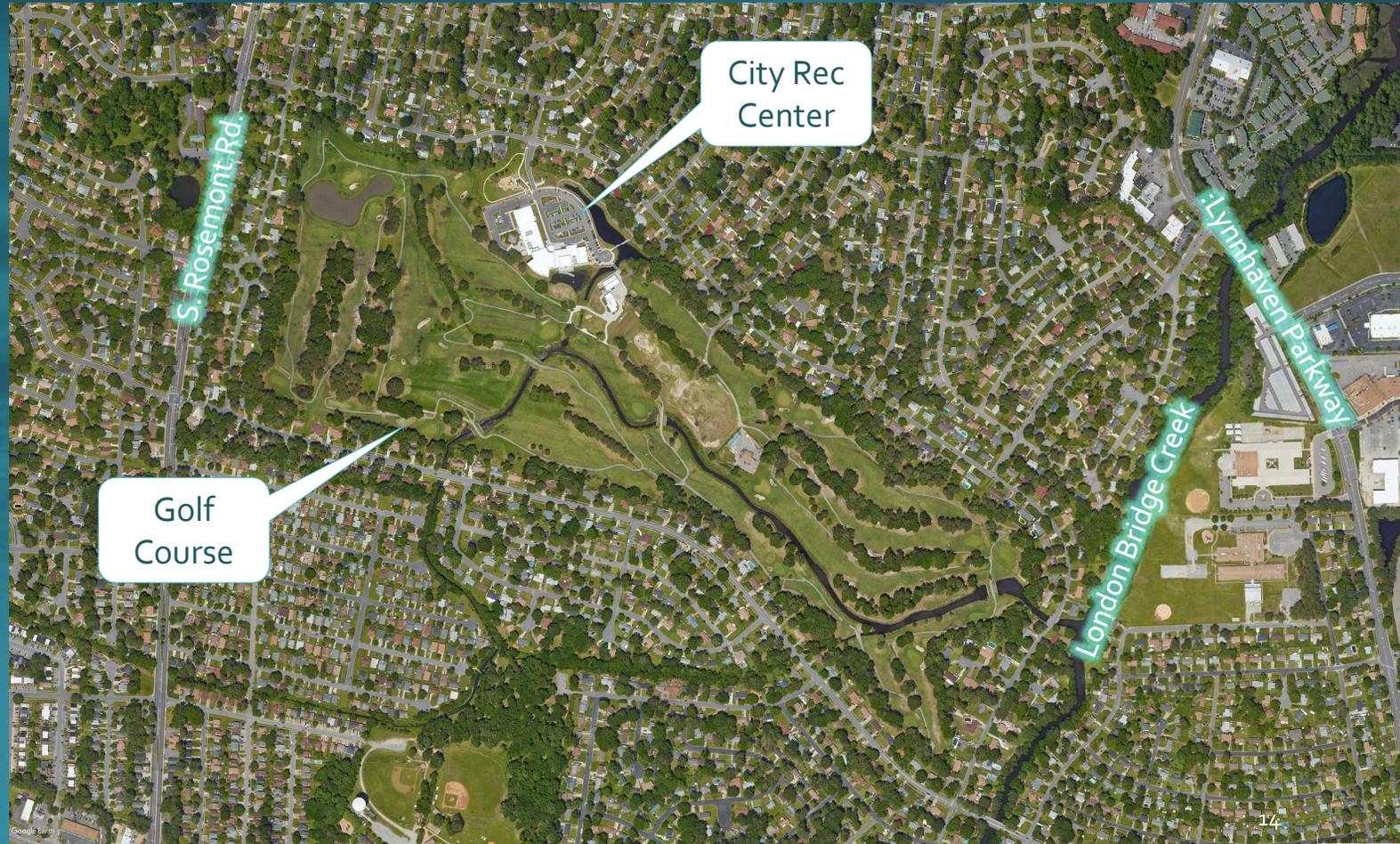
- 5 – 10' gate bays
- 70' total span
- Separate Flows





Storage Creation

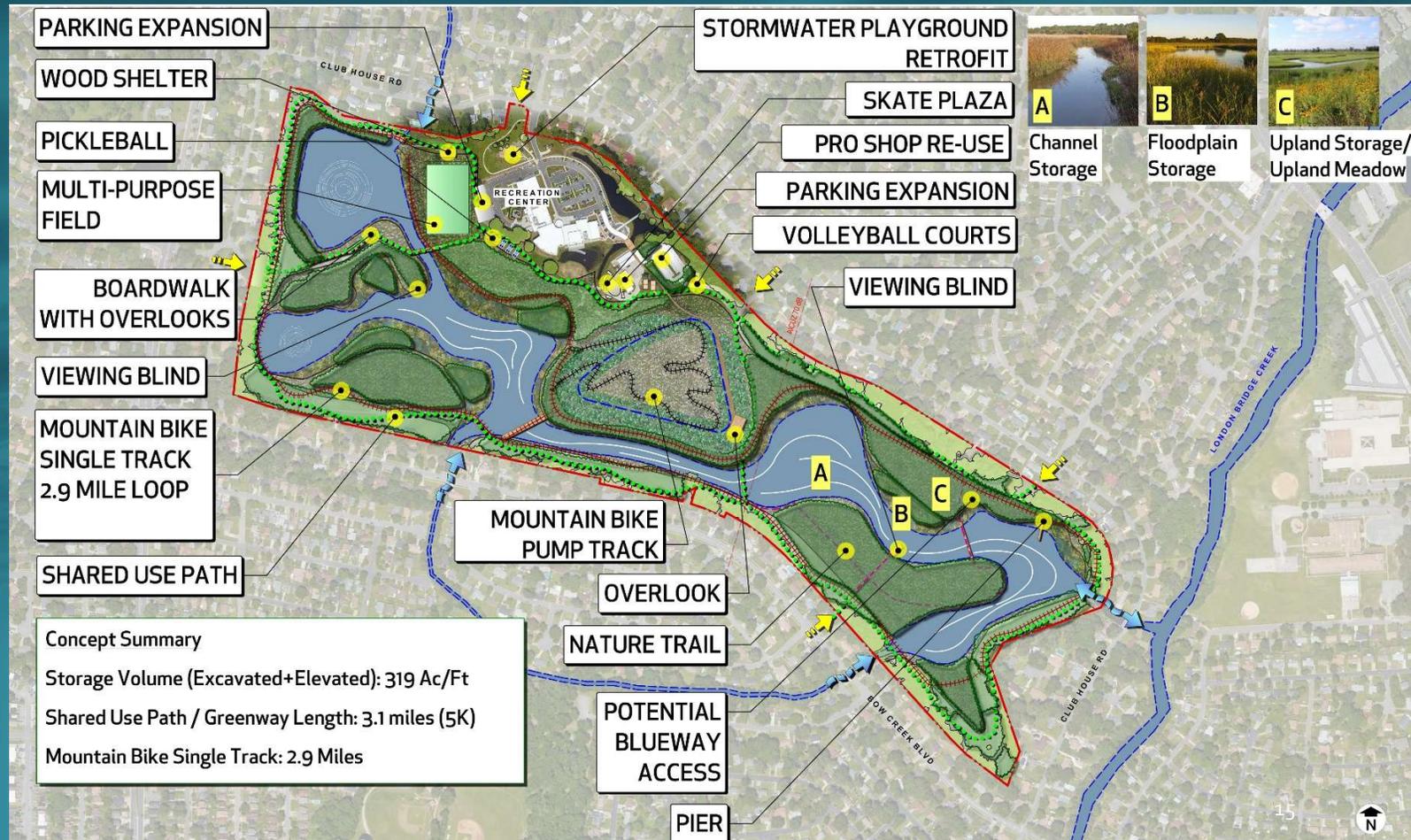
- City-owned
- Underutilized
- Low Area
- 130 Acres





Storage Creation

- Stormwater Park
- 320 ac-feet
- Park amenities
- Perimeter buffer
- Stormwater Management
- Collaborative Effort



FLOOD STORAGE FREQUENCY



CHANNEL STORAGE

The "Channel Storage Zone" will accommodate tidal influences and smaller storm events.

Water elevation here fluctuates between 1 and 2 feet daily.



FLOODPLAIN STORAGE

The "Floodplain Storage Zone" will vary graded shallow between 50 and 100 feet horizontally from the top of bank and will accommodate larger storm events.

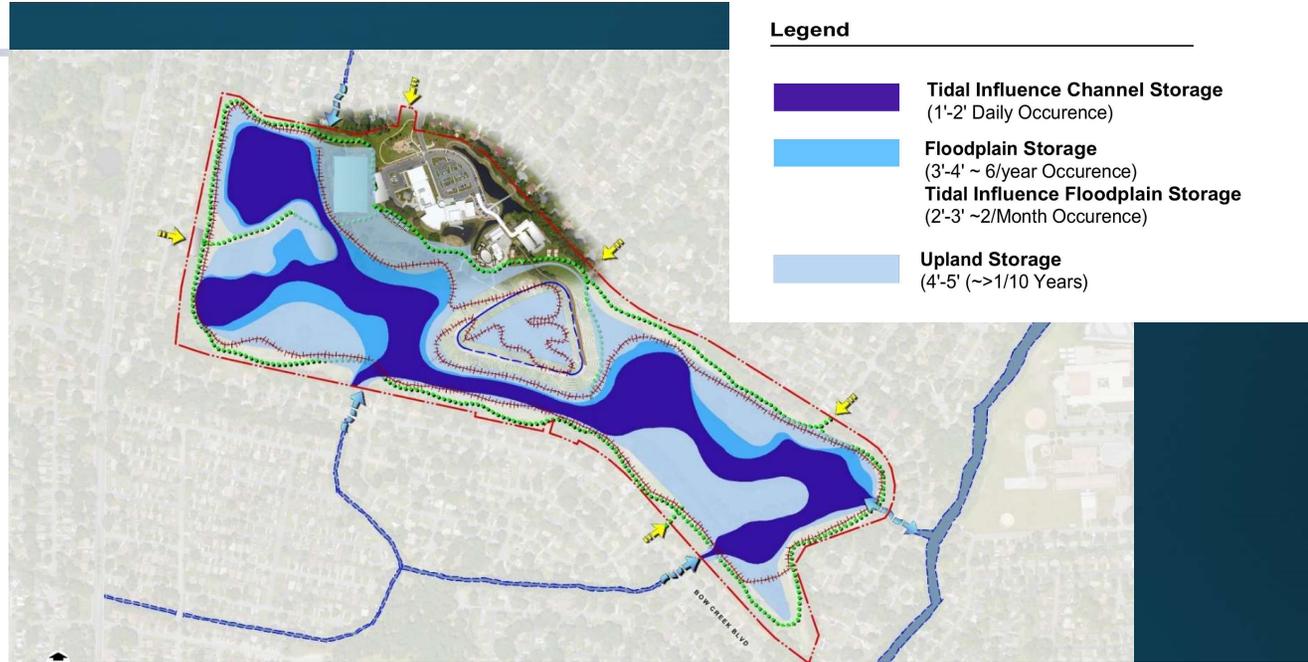
Water elevation here may reach up to 2 - 4 feet bi-monthly.



UPLAND STORAGE

The "Upland Storage Zone" is intended to remain dry a majority of the time. A combination of elevated natural surface trails and structures (boardwalks, puncheons, etc.) are suggested here. Because the area does not remain saturated with water within the perimeter are

Water elevation to 4 - 5 feet



Legend

- Tidal Influence Channel Storage (1'-2' Daily Occurrence)
- Floodplain Storage (3'-4' ~ 6/year Occurrence)
- Tidal Influence Floodplain Storage (2'-3' ~ 2/Month Occurrence)
- Upland Storage (4'-5' (~>1/10 Years))

Upland Storage: 4'-5' (~ >1/10 years)

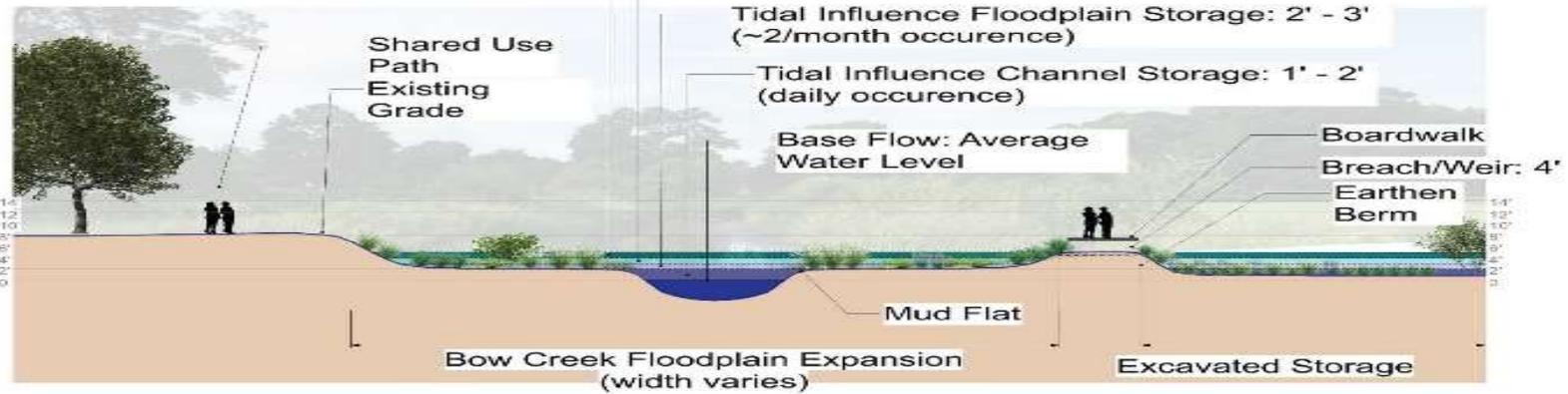
Floodplain Storage: 3'-4' (~6/year occurrence)

Tidal Influence Floodplain Storage: 2' - 3' (~2/month occurrence)

Tidal Influence Channel Storage: 1' - 2' (daily occurrence)

Base Flow: Average Water Level

Boardwalk
Breach/Weir: 4'
Earthen Berm



Storage Levels



Concept Characteristics

- Excavated Storage
- Greenway/Buffer
- Nature/interpretive trails
- Multi-purpose playing field
- Mountain bike trails
- Skatepark
- Pickleball courts
- Sand volleyball
- Overlooks/wildlife viewing
- Interpretive stormwater playground
- Shade shelter

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Active Recreation

SKATE PLAZA



SHARED USE PATH/GREENWAY



MOUNTAIN BIKE FACILITY



NATURE TRAILS



COURTS AND FIELDS





Passive Recreation

OVERLOOKS



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BLINDS AND VIEWING STATIONS



SHELTERS



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Landscape Buffers

SITE LANDFORMS



CASE STUDY: HUDSON LONG DOCK PARK
(BEACON, NEW YORK)



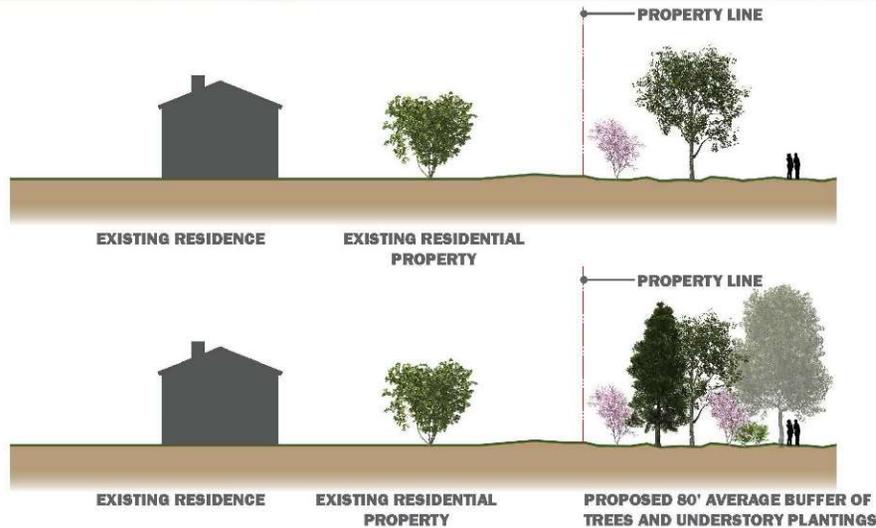
CASE STUDY: HUNTER POINT OVERLOOK
(QUEENS, NEW YORK)



CASE STUDY: CHICAGO BOTANICAL GARDENS
(CHICAGO, ILLINOIS)

- Landscape berms define waterways, delineate space, and create visual interest along trails and within use areas
- Differences in elevation offer variety to mountain bikers

LANDSCAPE BUFFER ENHANCEMENTS



- Existing landscape buffer between residences and park will be enhanced with additional plantings.



VIEW FROM COURSE OF HOME WHERE BUFFER ENHANCEMENT CAN OCCUR



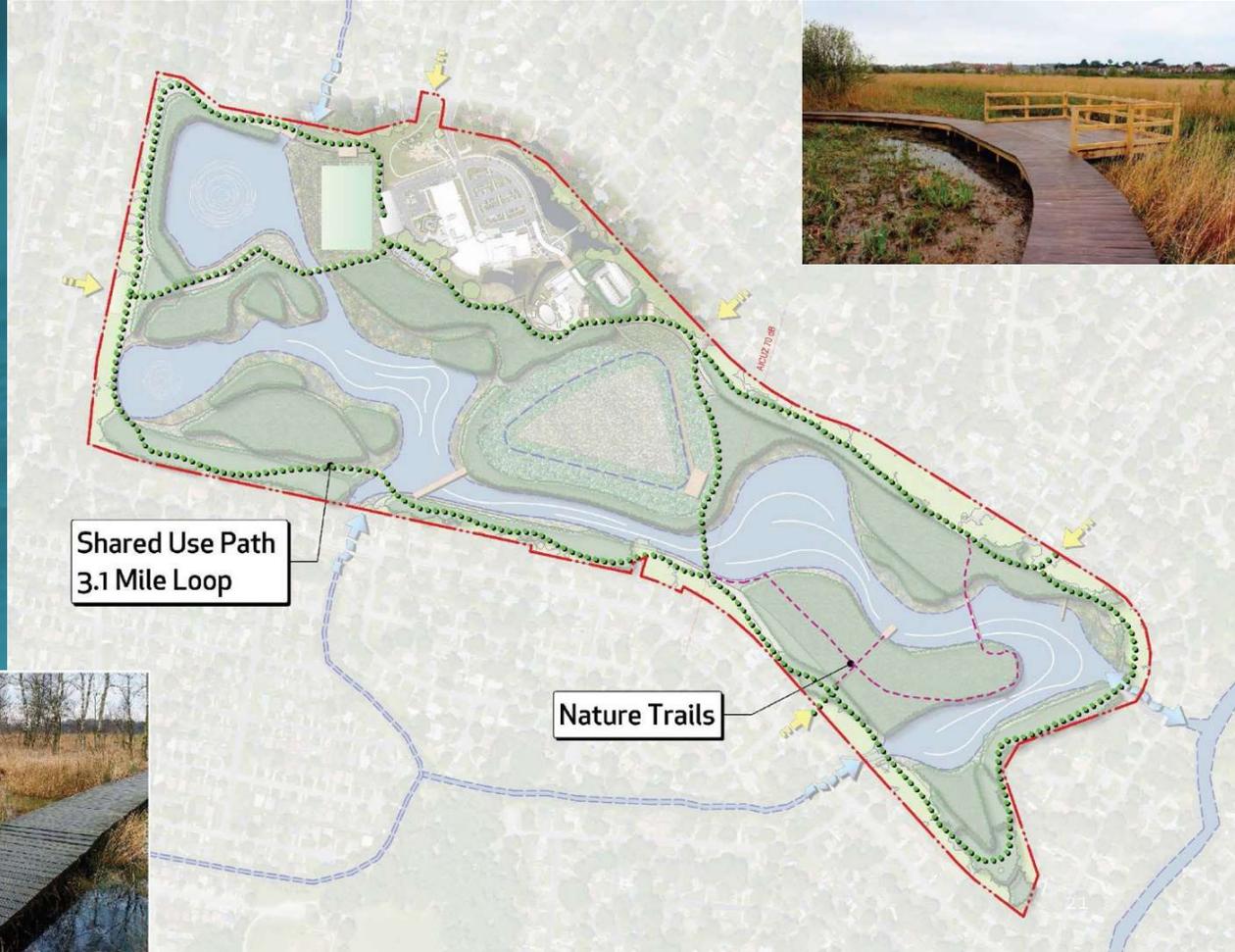
RENDERING OF VIEW AFTER PROPOSED BUFFER ESTABLISHMENT



Potential Shared Use Paths and Nature Trails



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Mountain Biking





Constructability

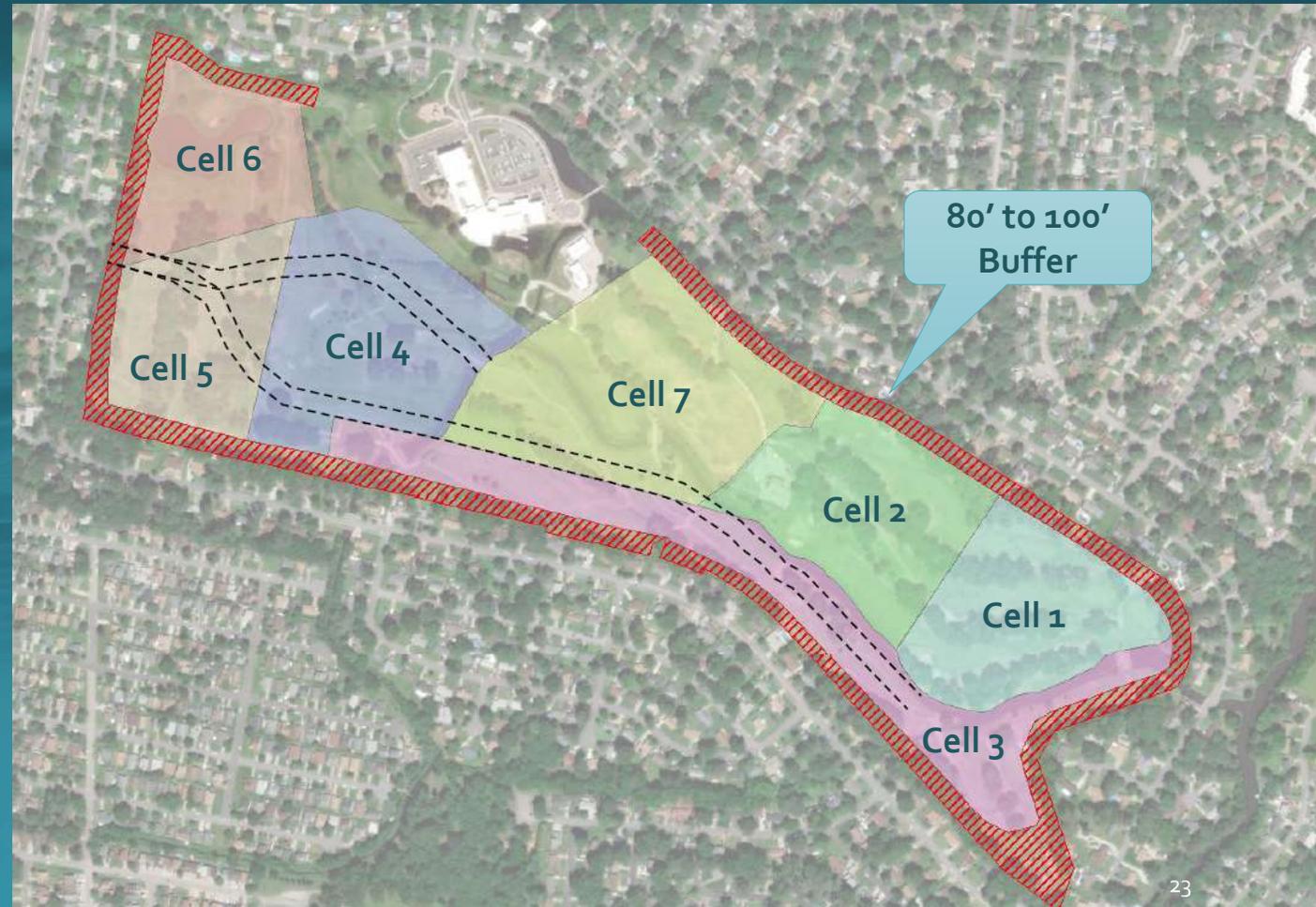
Challenges:

- Significant Construction (1 Million CY material)
- Residential Area
- Noise
- Dust
- Long-term Project

Considerations:

- Perimeter Buffer
- Phasing
- Interim Recreation/Use

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Phasing – Section I

Phasing Purpose:

- Minimize Impacts
- Manageable Work Area
- Flood Mitigation
- Partial Park Access
- Funding Constraints





Phasing – Section II

Sequence:

- Work East to West
- Restore Sections
- Construct Amenities

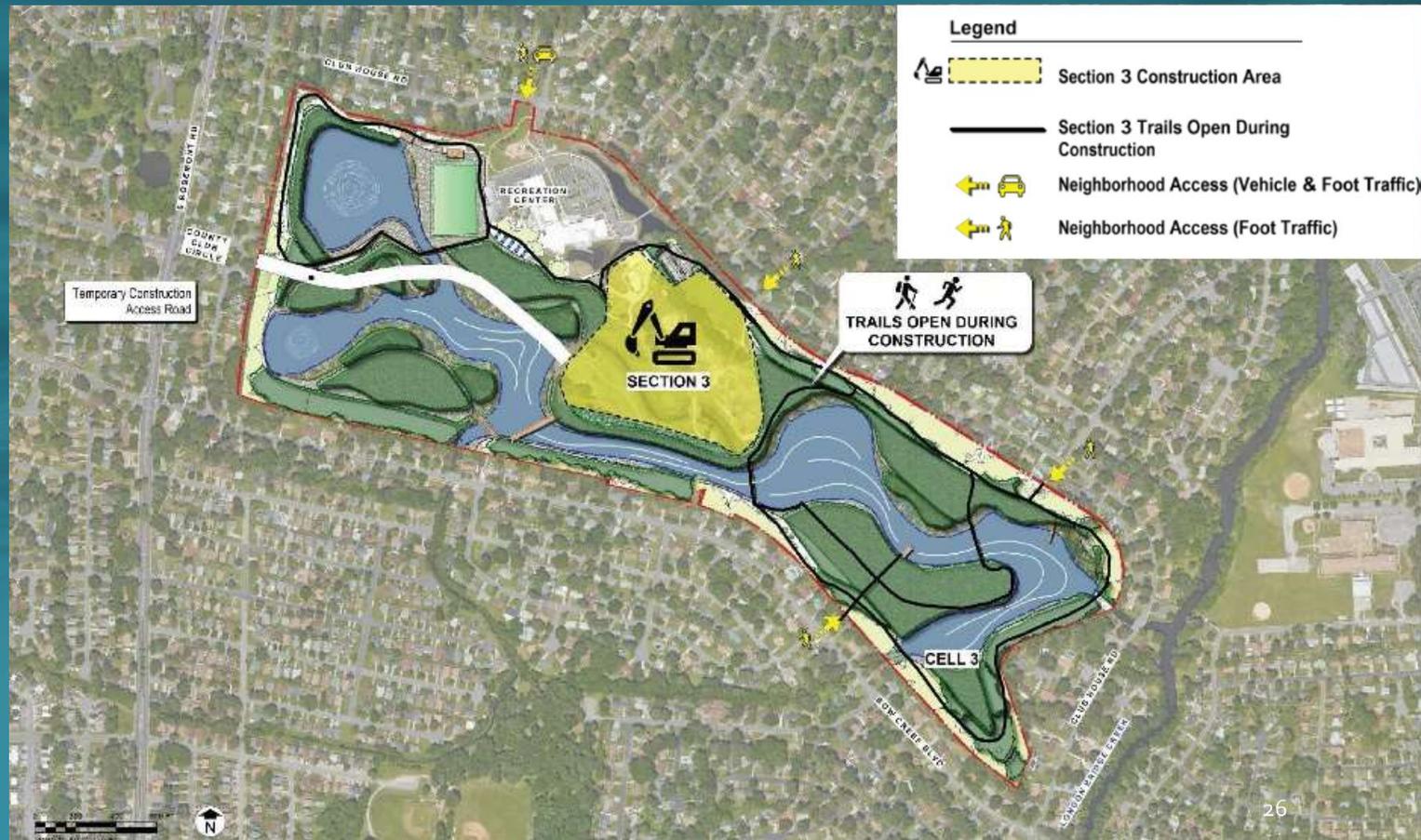




Phasing – Section III

Schedule/Budget

- 7 to 10 years
- \$80M
(Amenities \$20M)



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Other Key Program Elements

- Improvements Designed to meet FEMA Standards
- CLOMR/LOMRs to Reduce Insurance Rates
- Improvements Cannot Cause Adverse Impacts
- Proactive Public Outreach
 - Open House Meetings
 - Attend local Civic League Meetings
 - Comment Sheets and Surveys
 - Program Website
 - Quarterly Email Newsletter Updates
 - Brochures

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Bow Creek SW Park - Summary

- Repurpose golf course to provide flood mitigation and recreation
- Create stormwater storage areas to capture and maintain drainage/runoff
- Additional stormwater storage results in fewer flooded homes and streets
- Public open-space and park amenities for the community
- Provides a “Win-Win” for the community (flood mitigation and park facilities)



Before and After

Thank
you!



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