Building **Resilient Beach Protection** with Citywide Planning and Utilizing **Nature-Based Solutions** in the City of Myrtle Beach

CITY OF MYRTLE BEACH SOUTH CAROLINA

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AN ARDURRA COMPANY

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Stormwater management in Myrtle Beach requires a complex balancing act among multiple competing objectives

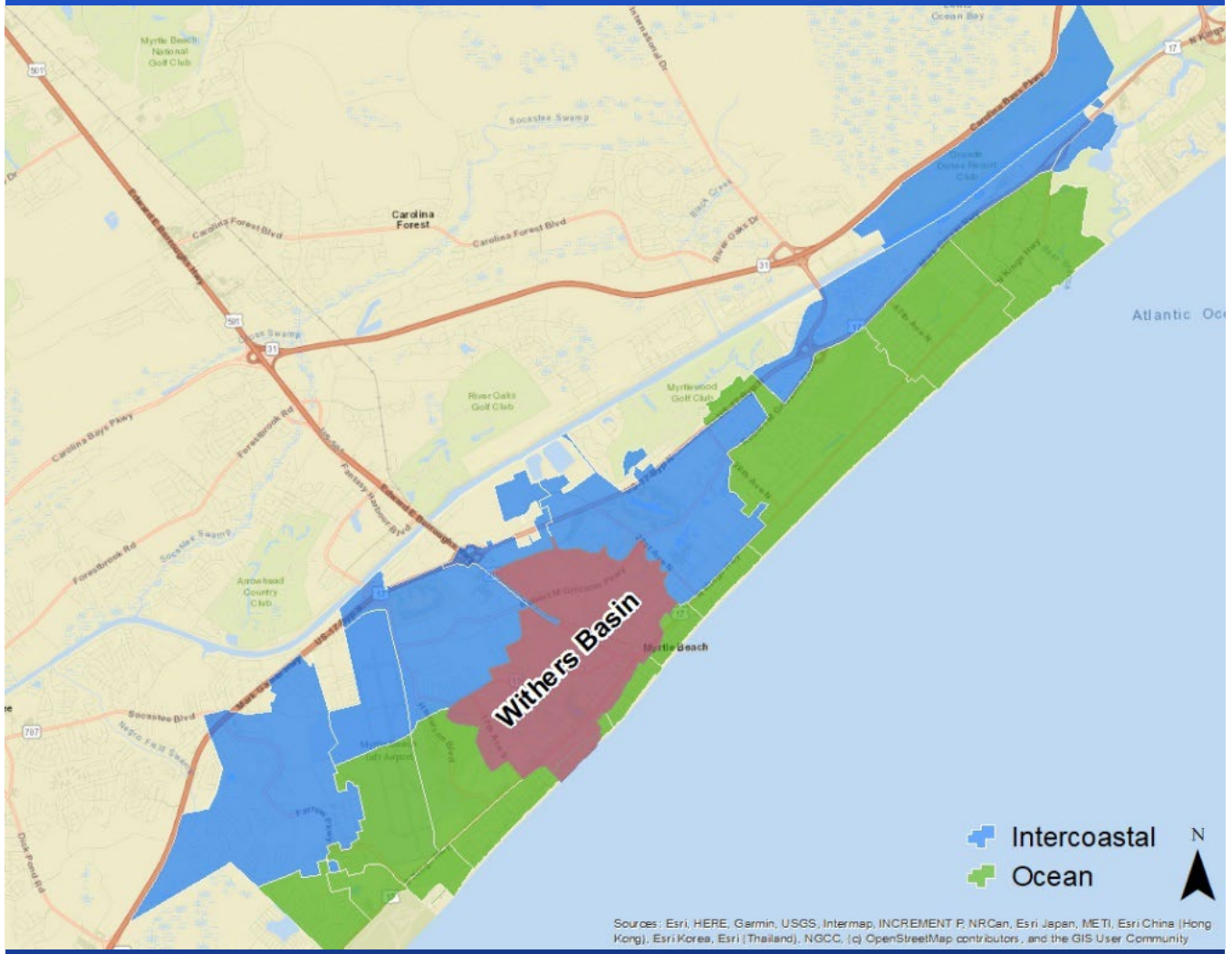
- Economic development and tourism
- Natural resource preservation
- Water quality improvement
- Flood control

Master Plan Goals

- **Create a watershed-based planning document**
- **Evaluate existing conveyance system - modeling**
- **Recommend potential projects to mitigate flooding and improve water quality**

Citywide Stormwater Masterplan

- Total area: 24 sq mi
- Identifies opportunities for:
  - Improving water quality
  - Reducing flood risks
  - Incorporating resiliency
- Completed in 2023



City Drainage Infrastructure

- 4 Swashes
- 4 Deep Ocean Outfalls
- 40 Beachfront Pipes
- 11,000 Drainage Structures
- 188 miles of Drainage Pipe
- 68 miles of Ditches/Open Channels

Cane Patch Swash at 68th Ave N

Identified Concerns

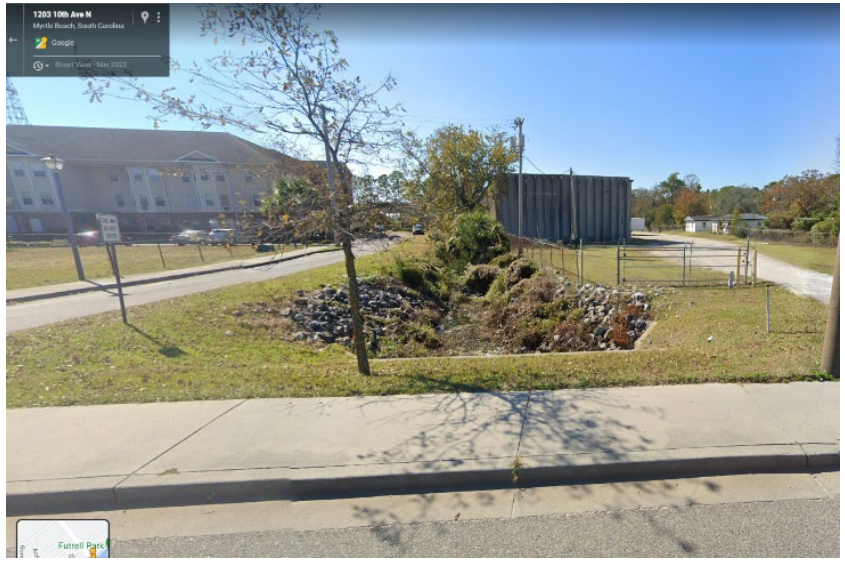
Beach outfalls (surface)

Pipes under structures

Localized flooding

Identified Concerns

Sediment deposits



Limited vegetative buffers and direct connections

Animal waste (pets and waterfowl)

Stormwater Management Solutions

Non-structural strategies

Infrastructure upgrades

Integration with redevelopment

Infiltration

Nature-based solutions

Ocean outfalls

Non-Structural Strategies

- Pet waste clean-up
- Enhance stream and pond buffers
- Modify design guidelines for ponds and wetlands
- Maintenance of ponds, wetlands, and infrastructure

Redevelopment Opportunities

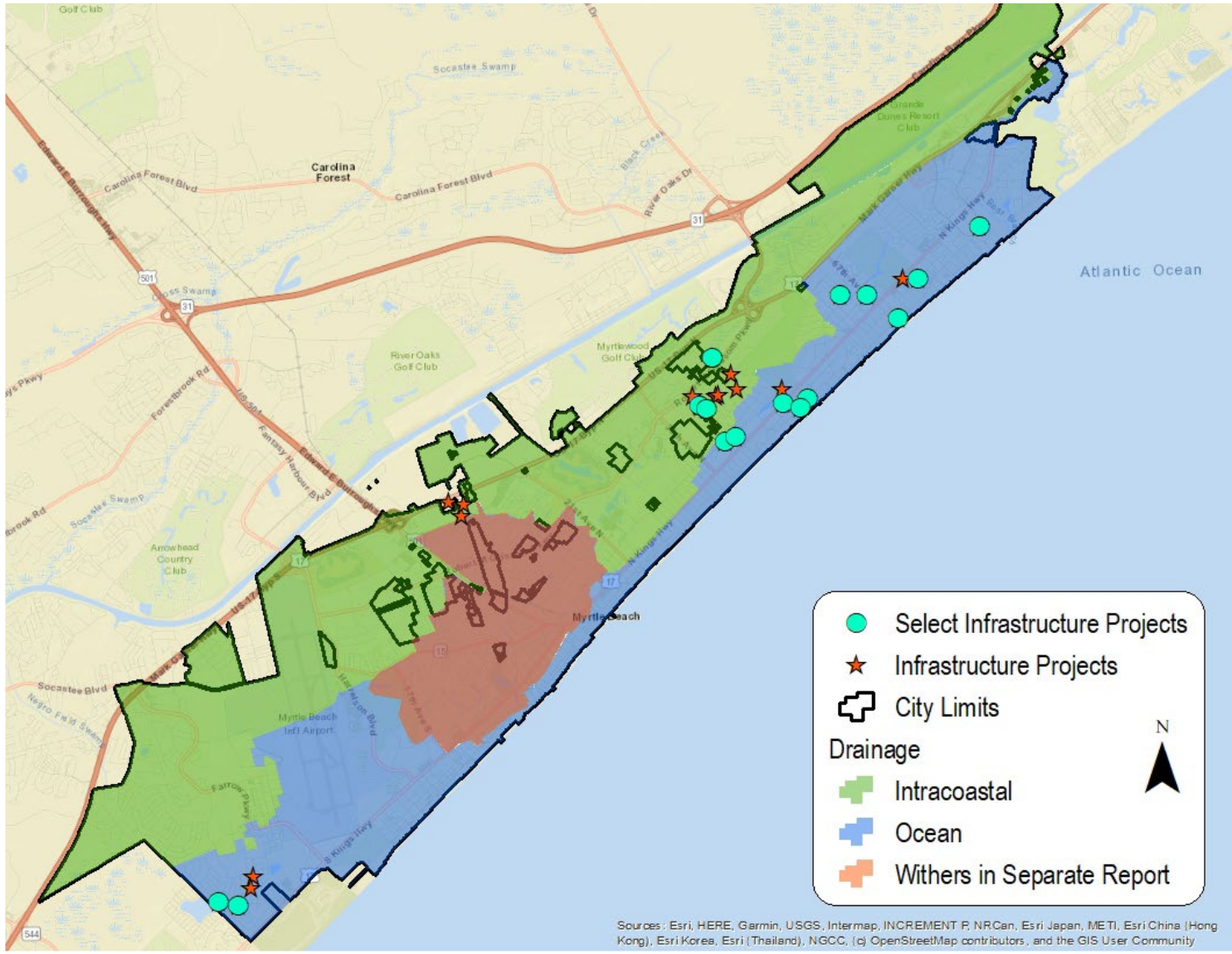
Design integration

- Incorporate green infrastructure with other projects
- Arts and innovation district

Infrastructure Upgrades

- Project Components
  - Increase capacity
    - Pipe/culvert upgrades
    - New ponds
    - Re-grading open channels
  - Re-routing stormwater runoff

- Implementation Considerations
  - Construction by city crews
  - Repair needs
  - Redevelopment



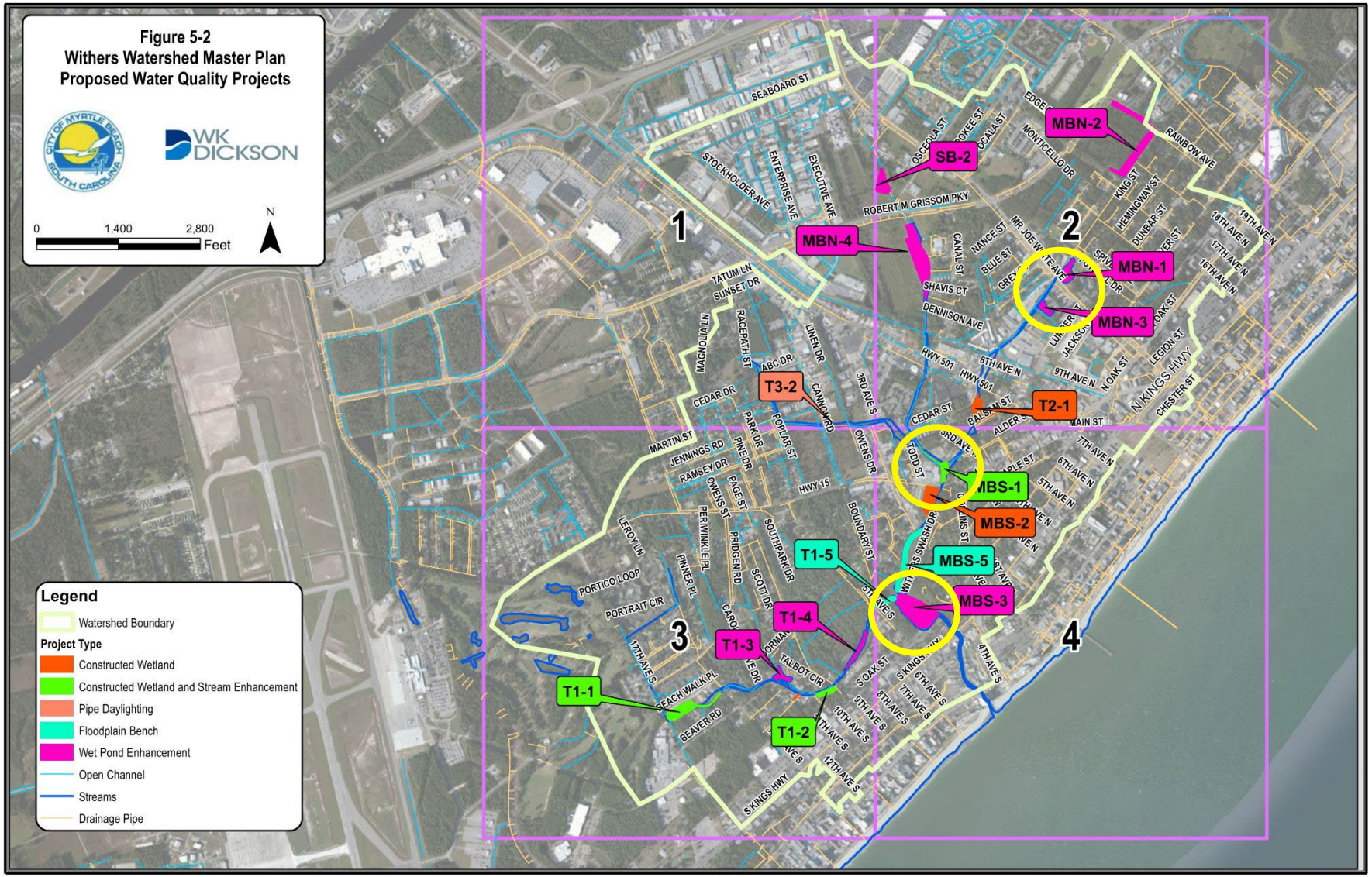
Infiltration and Ocean Outfalls

Nature-Based Solutions for Managing Stormwater

- Enhancement of existing facilities to improve resiliency and increase water quality treatment effectiveness
- Sediment removal
- Wetland enhancement
- Floodplain protection

Withers Watershed Treatment Train

- Cumulative benefits
- Varied removal mechanisms
  - Infiltration
  - Sedimentation
  - Plant uptake
  - UV Radiation
- Improved resiliency



Moving Towards Implementation

Interconnected Ponds at Robert Shelley Park

In Construction

Broadway Wetland

Construction Complete

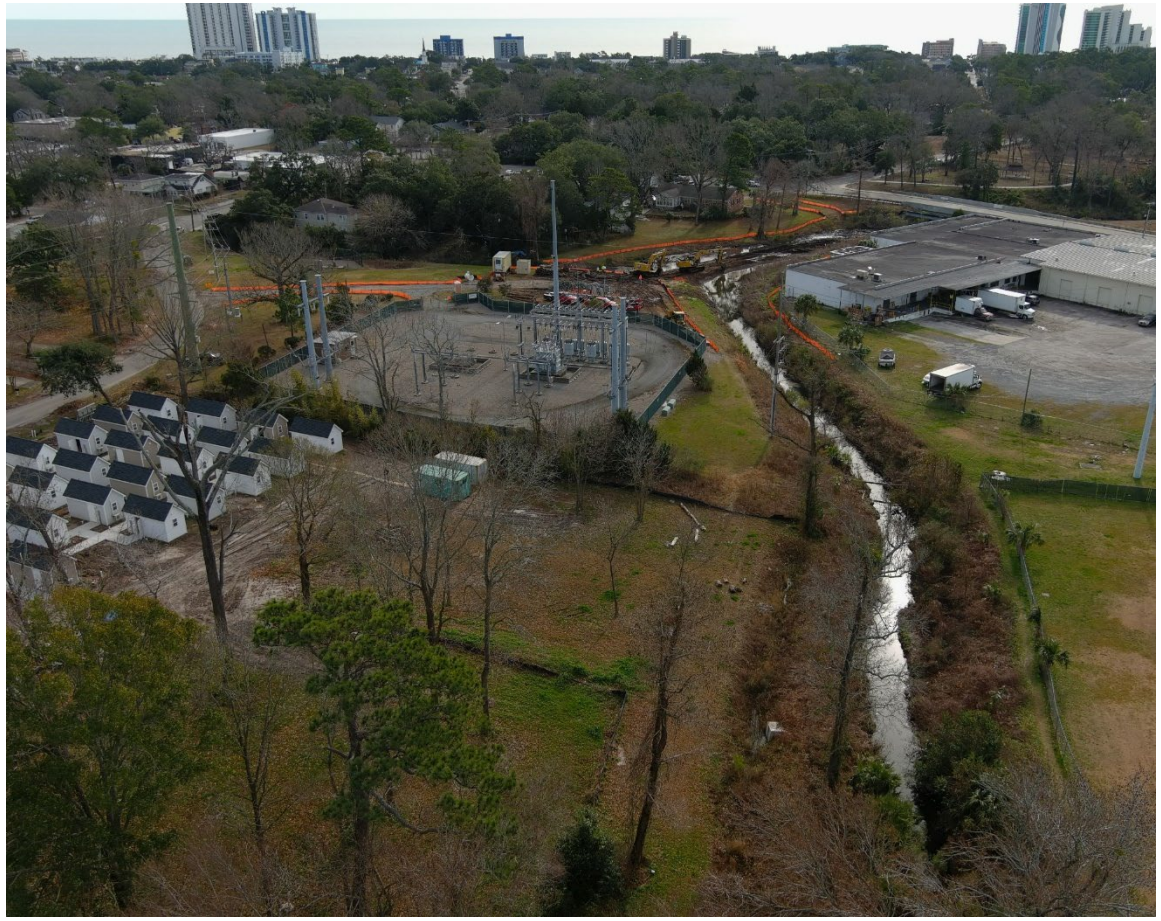
Withers Pond Watershed Outlet

Upcoming

Broadway Wetland Background

- Existing 0.7-acre open water area
  - Filled with sediment
  - Invasive plant species
  - Limited maintenance access
  - Tidal influence
- Proposed 0.9-acre wetland enhancement
  - Sediment forebays
  - Low flow stream
  - Interior wetland island
  - Resilient plantings for multiple flow regimes

Broadway Wetland Design Considerations



- Narrow stream corridor
  - Maintenance access
  - Vegetative corridor
- Private property impacts
  - Residential
  - Santee Cooper
- High sediment loads
  - Instream erosion
  - Overland erosion
  - Treatment train

Broadway Permitting Considerations

- NWP 43
  - Supported by historical aerial photography
- SCDHEC
  - 401 Certification
  - Coastal Zone Consistency (CZC)
  - NPDES
- FEMA
  - No-rise
  - LOMR

Broadway Wetland Construction

- Contractor qualifications
- Sediment deeper than anticipated
- Concrete pad under bridge controlled upstream elevation resulting in shallower channels
- Listen to nature
  - Storm event allowed modifications to design
  - Altered stream alignment
  - Log sills for wetland island protection
- Forebay configuration modified to allow for flexibility in maintenance equipment

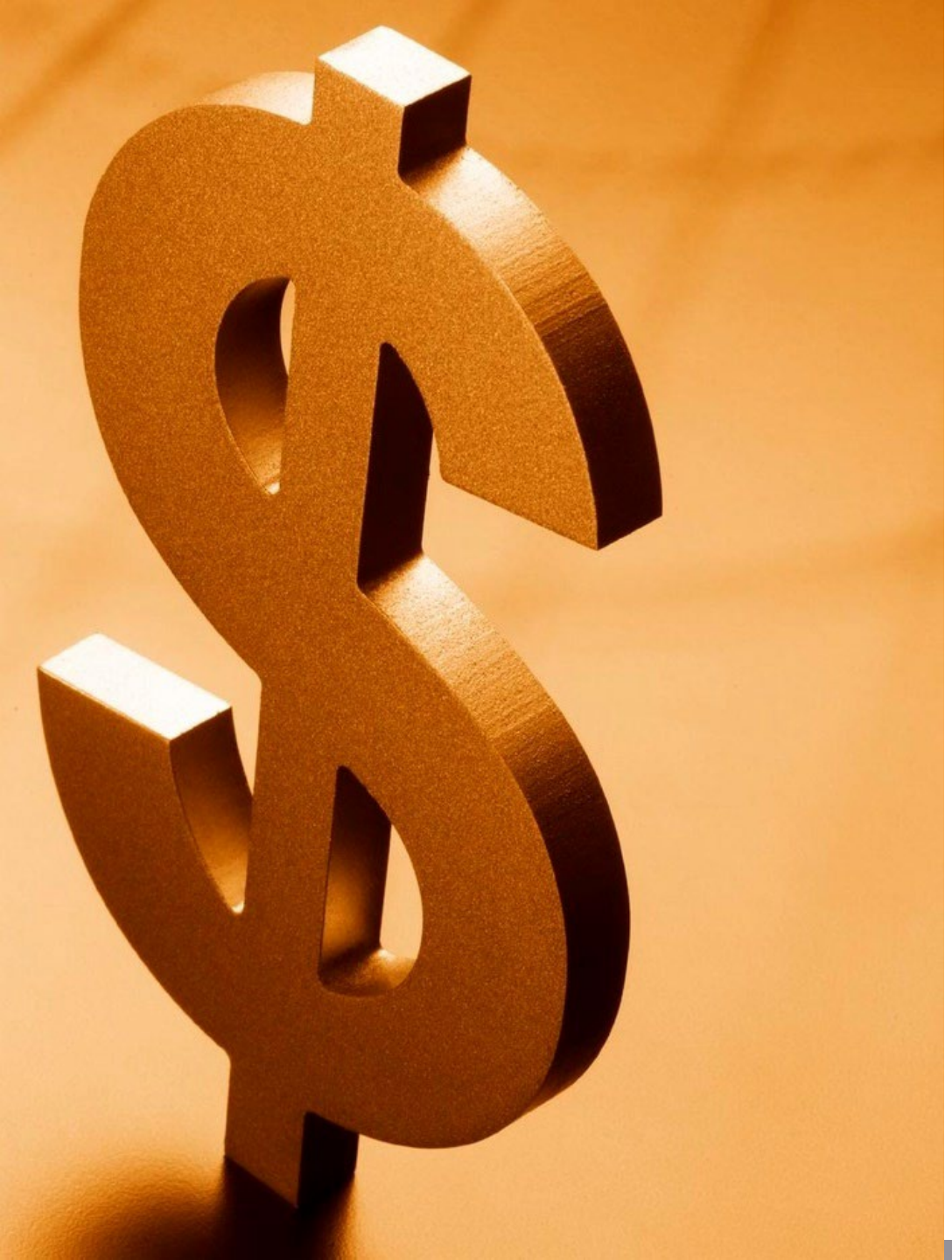
Plantings and Maintenance

- Native planting plan
  - Grasses and sedges in wetland island that can withstand temporary inundation and fluctuating water levels
  - Shrubs and woody vegetation along stream banks for stabilization
- Educational signage demonstrating benefits of project
- Long term maintenance to include sediment removal

Continuing the Treatment Train

- New Town Park
  - Immediately downstream of Broadway
  - Floodplain connection and wetland creation
  - Currently unfunded

- Withers Pond
  - Sediment removal
  - Wetland enhancement
  - Floodplain connection
  - Recreational components



Strategic Funding

- Incorporate into other City infrastructure projects – Arts & Innovation District
- Leverage external grants and loans
  - HMGP – Interconnected ponds at Robert Shelley Park
  - CWSRF loan – Broadway wetland
- Stormwater utility revenue bonds to advance design and construction – Withers Pond

Future Challenges and Opportunities

- Maintenance
  - Access
  - Staffing
- Vegetative buffers
- Development pressure
- Land availability
- Dune infiltration