

# Mitigating Environmental Impacts of the Indian River Inlet Bridge

## Introduction



- Delaware Department of Transportation
- Justin Reel Rummel, Klepper & Kahl., LLP

- Indian River Inlet Bridge Replacement Project
  - Construction Components
  - Environmental Effects
  - Mitigation Efforts



# **Background**





# **Roadway Components**



### Roadway – Hot Mix Pavement

- SR 1 Bridge Approaches approximately 8,700 lf
  - 2 lane roadway with shoulders + bike lane in each direction
- Park Access Roads -approximately 9,800 lf
  - 2 lane roadway with shoulders

#### Embankment Construction

- Wick drains partially augured
- Maximum 48' embankment, includes surcharge to achieve an estimated 60" of settlement in 8 months

Park Components



#### **Components** Park



#### **Promenade**

- Approximately 2000 If colored concrete walkway with concrete paver accents, site furnishing and amenities

#### Commercial Park Building Construction

- Mini-Park Office
   Laundry Facility

- Contact Stations
  Shower Facility
  Laundry Building
  Bus Shelter

#### New Campground Facilities

- Approximately 90 RV campsites and 40 additional tent campsites
- Parking Lots
  - Construction of approximately 8.5 acres of parking lots
- **Specialty Park Signage**
- 2 Playgrounds
- Kiosk





## Environmental Effects

## **Environmental Impacts**



- Impacts to ACOE Jurisdictional Resources
  - 3.5 acres of wetland impact
  - 0.5 acres of other waters of the US impact (tidal open water)
- Impacts to DNREC Jurisdictional Resources
  - 2.7 acres of wetland impact
  - 0.1 acres of subaqueous lands impact
- Potential Impacts to Non-Jurisdictional Resources
  - Diamondback Terrapin nesting habitat
  - Other upland habitat

## Mitigation Package



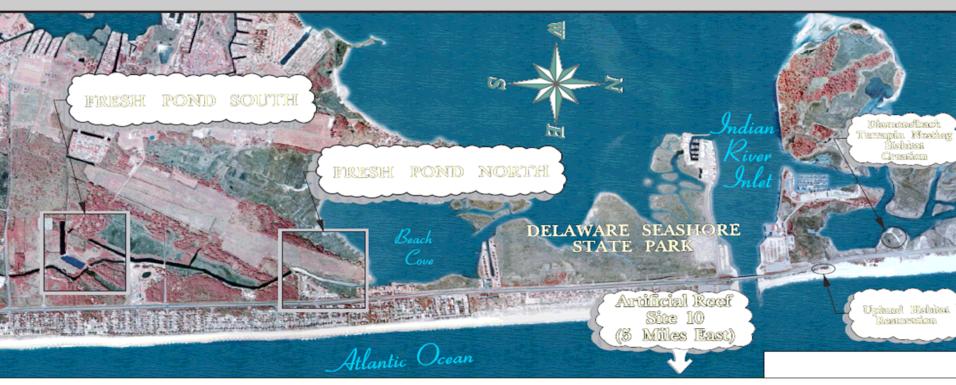
- Wetland Creation, Restoration and Enhancement
- Terrapin Nesting Area Creation
- Dune Restoration
- Artificial Reef Creation
- Invasive Species (Japanese Black Pine)
- Terrapin Protection Measures
- Terrapin Eco-passages



# **Environmental Mitigation**



## Mitigation Locations

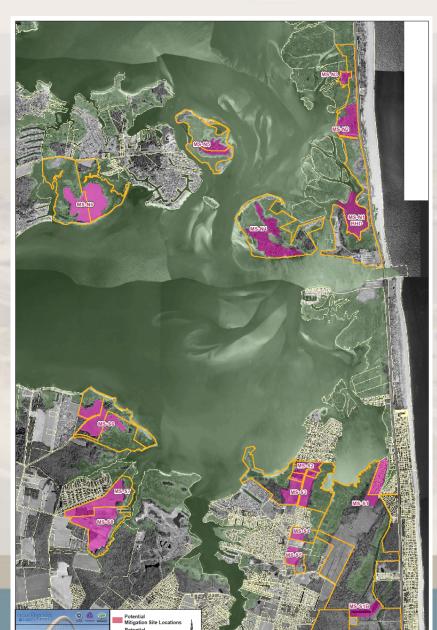


PROJECT LOCATION MAP

# Wetland Mitigation



- Site Search
  - Off site locations
  - Tidal mitigation
  - Paper search identified 13Sites
- Site Selection
  - Agency coordination
  - Field investigations
  - Water quality studies
  - 2 sites identified



## Wetland Mitigation



- Fresh Ponds North
  - Salt marsh (low marsh)
  - 2.9 acres creation
  - 3.0 acres enhancement
  - Spartina alterniflora
  - Cultural resources
     limited the size of this
     site

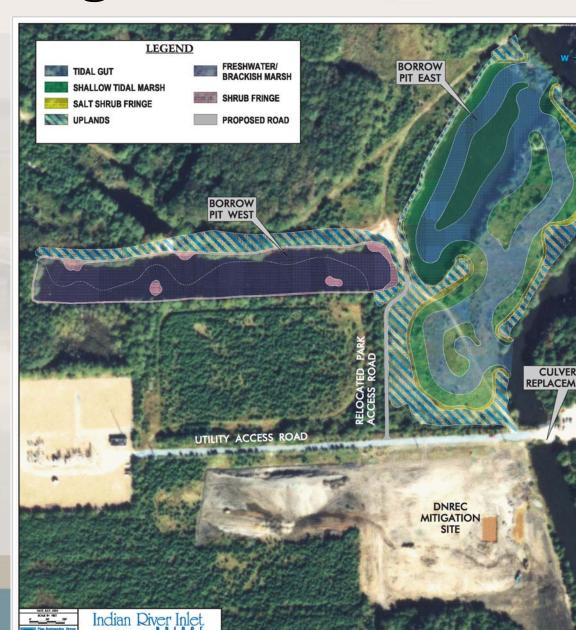


# Wetland Mitigation



#### Fresh Ponds South

- Salt and BrackishMarsh
- 3.6 acres creation
- 6.4 acresenhancement
- Borrow Pit Removal (safety issues)
- Tidal FlushingEnhancement

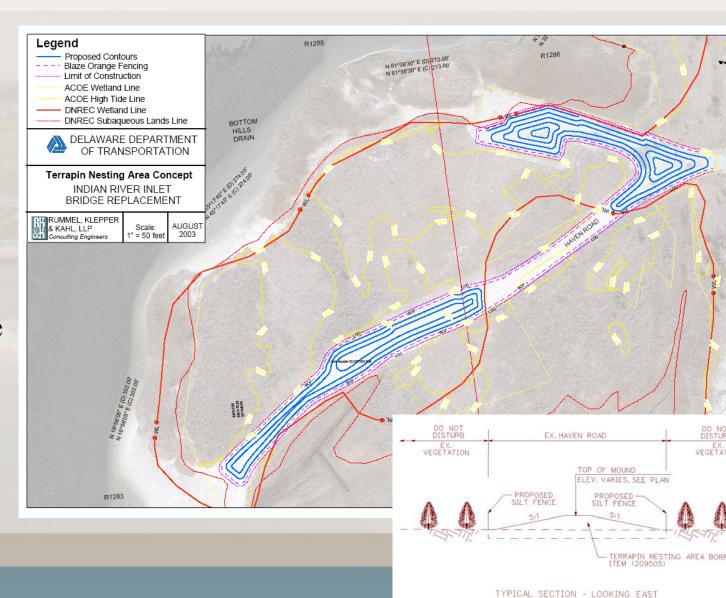


# Terrapin Nesting Area



## Haven Road Primitive Use Area

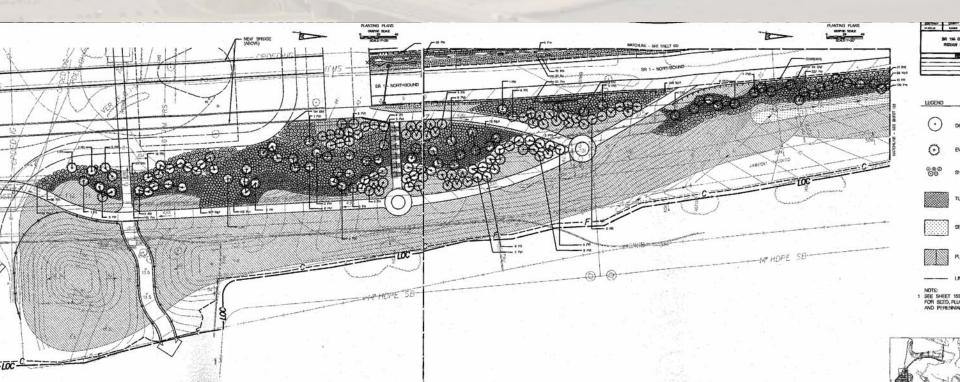
- Nestingmounds atelevation 4 –5 feet
- "Beach" type sand
- Preserve existing vegetation



## **Dune Restoration**



- Existing Northern Roadway Embankment
  - Remove existing pavement
  - Establish dune plant community
  - Includes pedestrian access



## **Artificial Reef Creation**



### DNREC Reef Site # 10

- Non-toxic durable material from existing bridge
- Barge placement, 5.5 miles out
- Site permitted by DNREC
- Blue Mussel community
- Sea bass, tautog, scup,
   weakfish, bluefish



## **Invasive Species Efforts**



- Japanese Black Pine Eradication
  - North of the inlet and east of SR1
  - Cutting and removal specified
  - Herbicide injection used
  - Remaining dead trees provide habitat complexity



## **Terrapin Efforts**



- Terrapin Fencing
  - Prevent roadway mortality
  - Temporary fencing western edge of project area
  - Permanent fencing at conclusion of job
- Terrapin Eco-passages
  - Three oversize culverts
  - Fencing to encourage use





# **Questions?**



