

# Economic Analysis of the Delaware Bay Shoreline Management Alternatives



September 16, 2011



# Approach

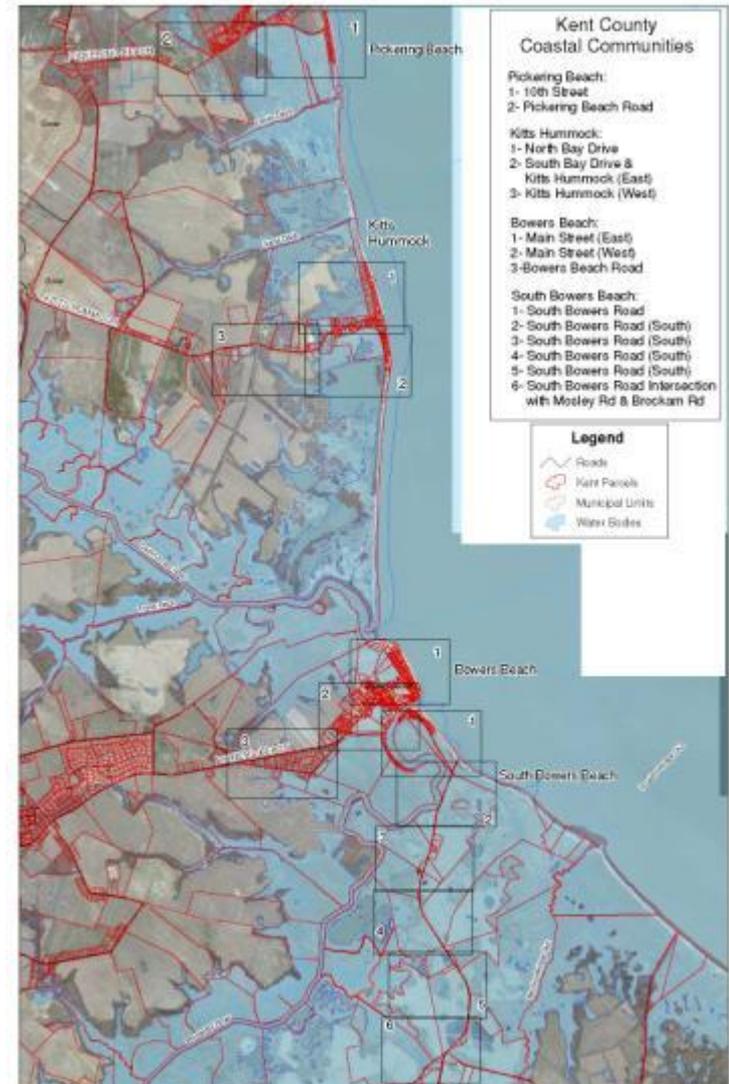
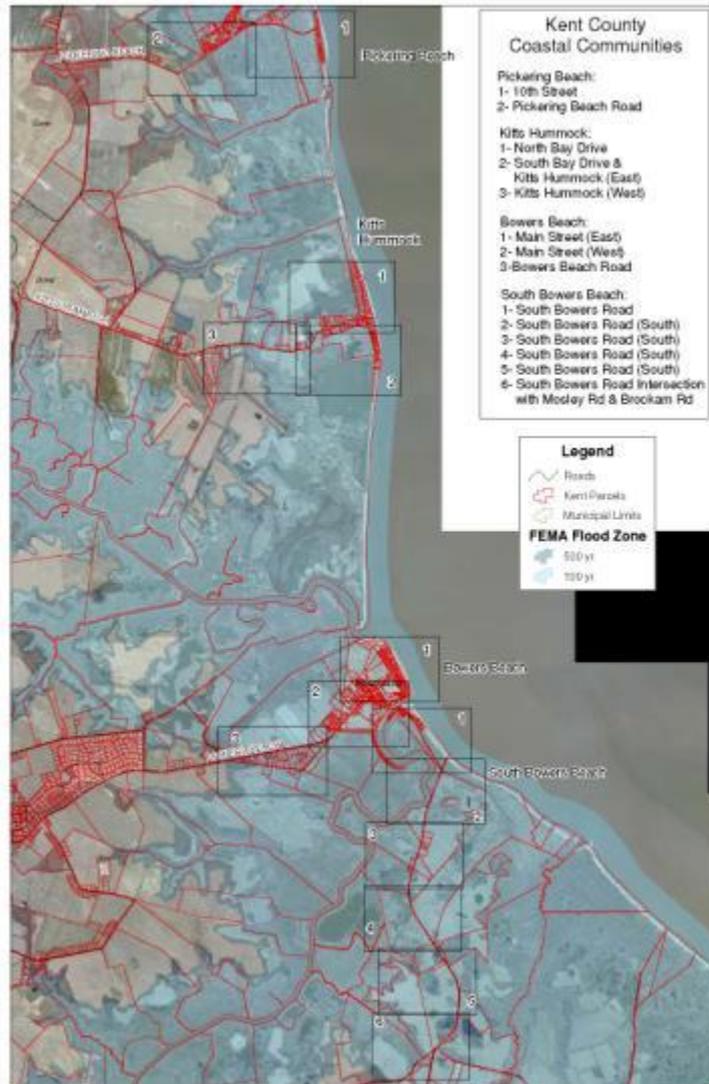
## OVERVIEW -AGENDA

- Refresher on Approach
- DNREC Actions Since Last Workgroup Meeting
- Next Steps
- Discussion

# Study Area/Communities



# Study Area/Communities



# Approach

## OVERVIEW

- Developing Strategy with DNREC – Integrated Partner Throughout
- Determine desired range of outcomes and economic assessments
- Collect Data in support of selected scenarios and economic assessments
- Complete coastal engineering modeling and alternative protection concept development and model scenarios
- Complete economic models
- Develop presentation materials for policy makers, agencies and public

# Approach

## General Scope Outline

**Data Collection/Assessment – Strategy Development (PHASE 1)**

**Economic Analyses following FEMA/USACE standard protocols (PHASE 1)**

**Flood Damage Assessment**

**Affected Property Inventories – Surveys (PHASE 1A)**

**Coastal Hazard Modeling – Flood/Surge Elevations (PHASE 1B)**

**Shoreline Adaptation Alternatives Development (PHASE 1C)**

**Storm Damage Reduction**

**Cost Estimates**

**FEMA BCA models (PHASE 1D)**

**Economic Analyses determining regional benefits from proposed actions (PHASE 2)**

**Tourism/Recreation**

**Property Valuation**

**Ecosystem Benefits – Natural Resources Valuation**

**Public Outreach/Education/Expert Testimony (PHASE 3 - throughout)**

**General Public**

**Stakeholder Coordination**

**Delaware Bay Shore Task Force**

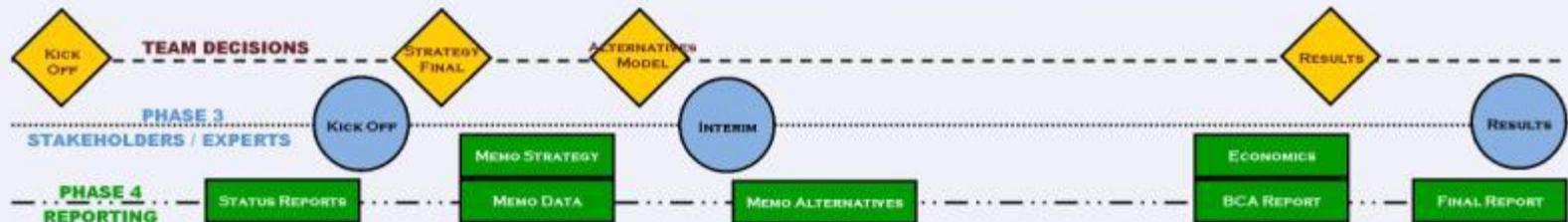
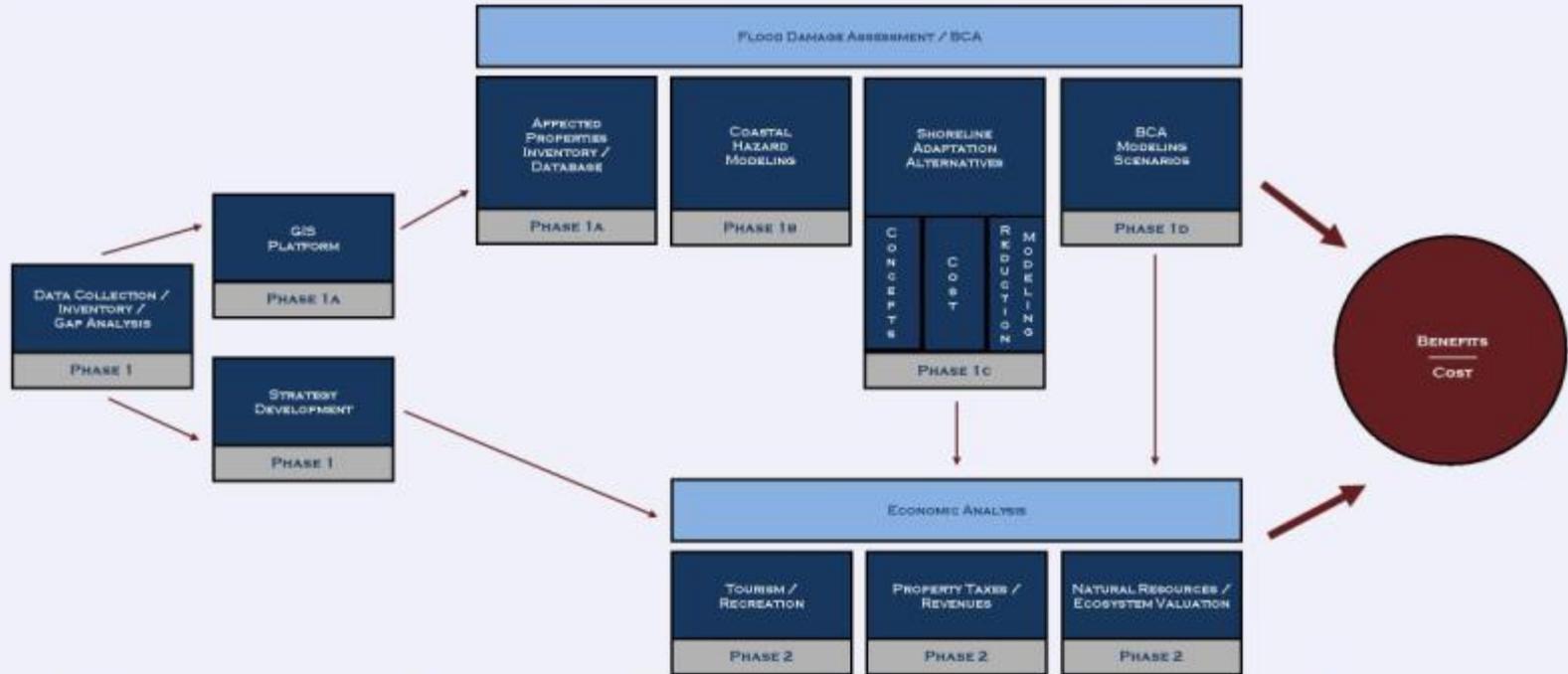
**Affected Communities**

**Documentation/Reporting (PHASE 4 – throughout)**

# Approach/Status

ECONOMIC ANALYSIS OF DELAWARE BAY SHORELINE ADAPTATION ALTERNATIVES

PROJECT APPROACH SUMMARY



# Database

Attributes of DE\_Bay\_Bldgs

OBJECTID	SHAPE *	JMTID	ParcelID_PIN	St_Address	City	County	Community
981	Polygon Z	BK1759	235-3.12-26.00	6 NEW MEXICO AV	BROADKILL BEACH	Sussex County	Broadkill Beach
1840	Polygon Z	BK1796	235-3.12-103.00	3 MISSISSIPPI AV	BROADKILL BEACH	Sussex County	Broadkill Beach
992	Polygon Z	BK1881	235-8.00-134.00	IVY CT	BROADKILL BEACH	Sussex County	Broadkill Beach
991	Polygon Z	BK1880	235-8.00-139.00	IVY CT	BROADKILL BEACH	Sussex County	Broadkill Beach
990	Polygon Z	BK1879	235-8.00-138.00	IVY CT	BROADKILL BEACH	Sussex County	Broadkill Beach
989	Polygon Z	BK1878	235-8.00-136.00	IVY CT	BROADKILL BEACH	Sussex County	Broadkill Beach
988	Polygon Z	BK1768	235-3.12-10.01	1402 N BAY SHORE DR	BROADKILL BEACH	Sussex County	Broadkill Beach
987	Polygon Z	BK1767	235-3.12-67.00	2 TEXAS AV	BROADKILL BEACH	Sussex County	Broadkill Beach
986	Polygon Z	BK1765	235-3.12-30.00	7 ARIZONA AV	BROADKILL BEACH	Sussex County	Broadkill Beach
994	Polygon Z	BK1883	235-8.00-132.00	IVY CT	BROADKILL BEACH	Sussex County	Broadkill Beach
983	Polygon Z	BK1762	235-3.12-11.00	12 ARIZONA AV	BROADKILL BEACH	Sussex County	Broadkill Beach
1008	Polygon Z	BK286	235-9.00-28.00	TURKLE POND	BROADKILL BEACH	Sussex County	Broadkill Beach
980	Polygon Z	BK1758	235-3.12-29.01	5 ARIZONA AV	BROADKILL BEACH	Sussex County	Broadkill Beach
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976	Polygon Z	BK1754	235-3.12-23.00	1 ARIZONA AV	BROADKILL BEACH	Sussex County	Broadkill Beach
975	Polygon Z	BK1751	235-3.12-12.00	9 CALIFORNIA AV	BROADKILL BEACH	Sussex County	Broadkill Beach
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1056	Polygon Z	BK336	235-10.00-38.00	2821 S BAY SHORE DR	BROADKILL BEACH	Sussex County	Broadkill Beach
1055	Polygon Z	BK335	235-10.00-13.00	2806 S BAY SHORE DR	BROADKILL BEACH	Sussex County	Broadkill Beach
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# Database

Attributes of DE\_Bay\_Bldgs

JMT_Classific	Res_Bldg_Type	NRes_Bld	NRes_Bldg_Name	Constr_Type	FoundationType	Kent Fo	FF_SQFT	Bldg_SQFT	Kent S
Residential	Two or More Stories without Basement	<Null>	<Null>	Engineered	Pile	<Null>	1423.8307	2847.661479	<Null>
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# Database

Attributes of DE\_Bay\_Bldgs

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# Database

Attributes of DE\_Bay\_Bldgs

Latitude	Longitude	FE_5YR	FE_10YR	FE_25YR	FE_50YR	FE_100YR	BCR_Alt1	BCR_Alt2	BCR_Alt3	GIS_Comments
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# Baker Mobile LiDAR Truck



# LiDAR Point Clouds



# LiDAR Point Clouds

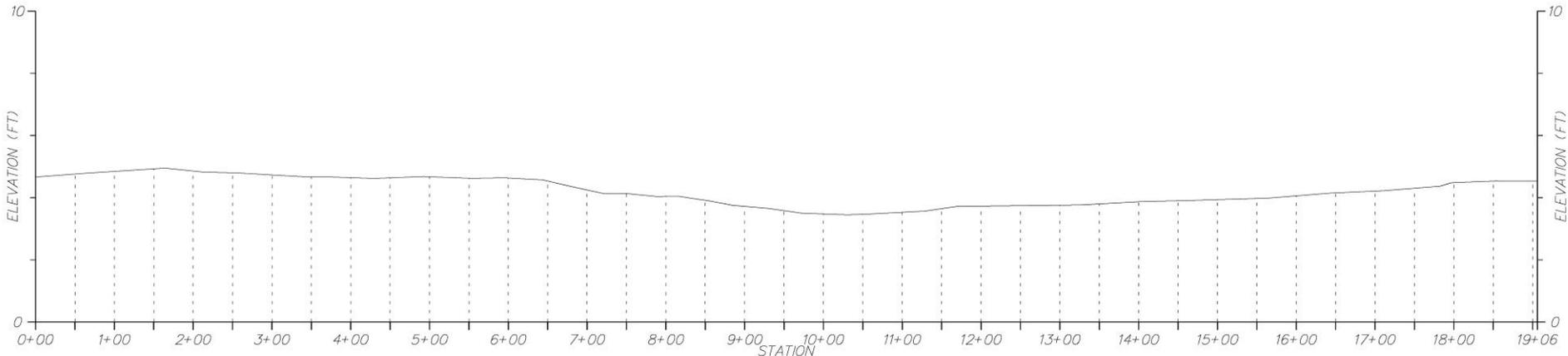


# LiDAR Point Clouds



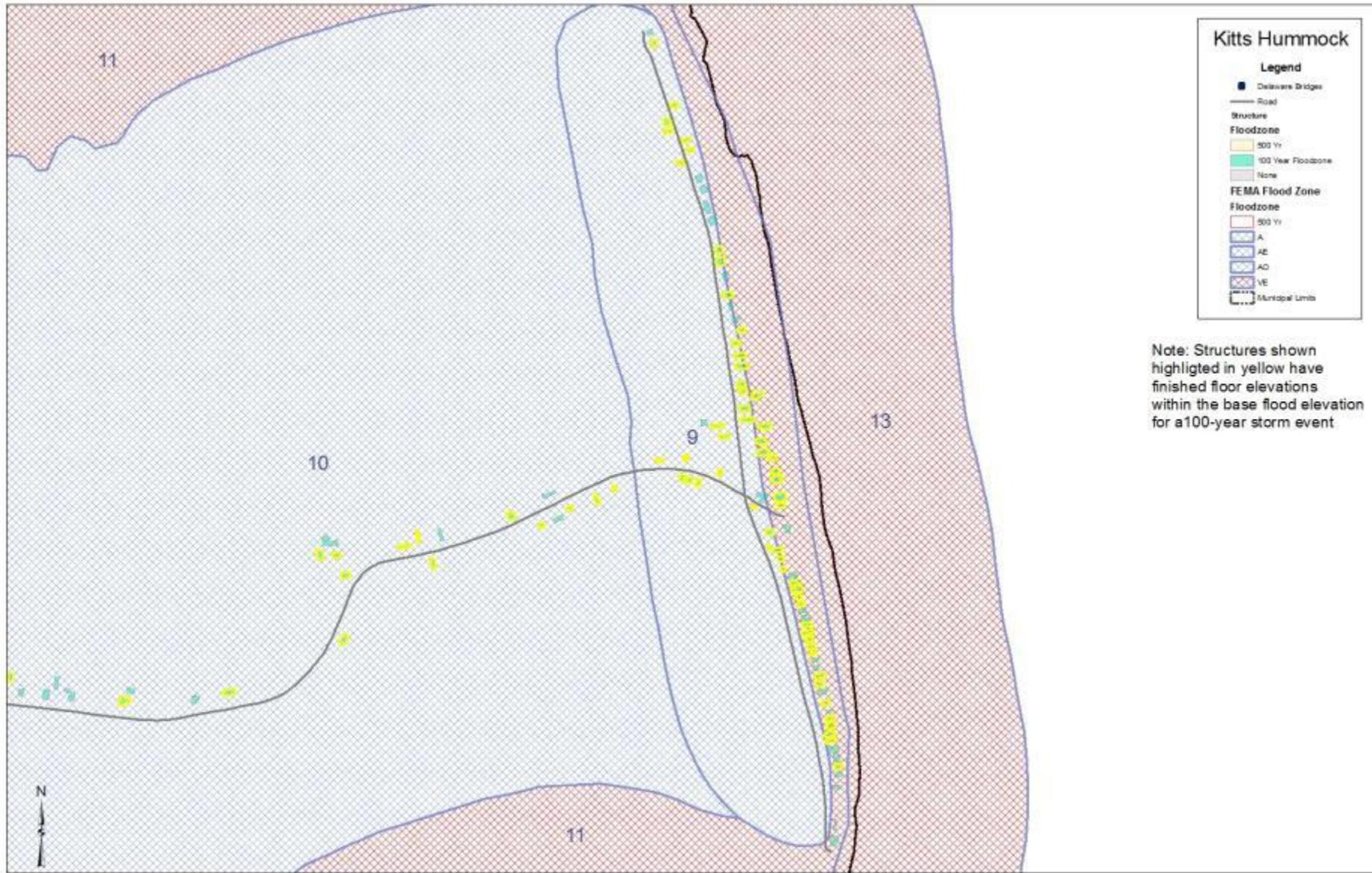
# Kitts Hummock LiDAR Coverage Map





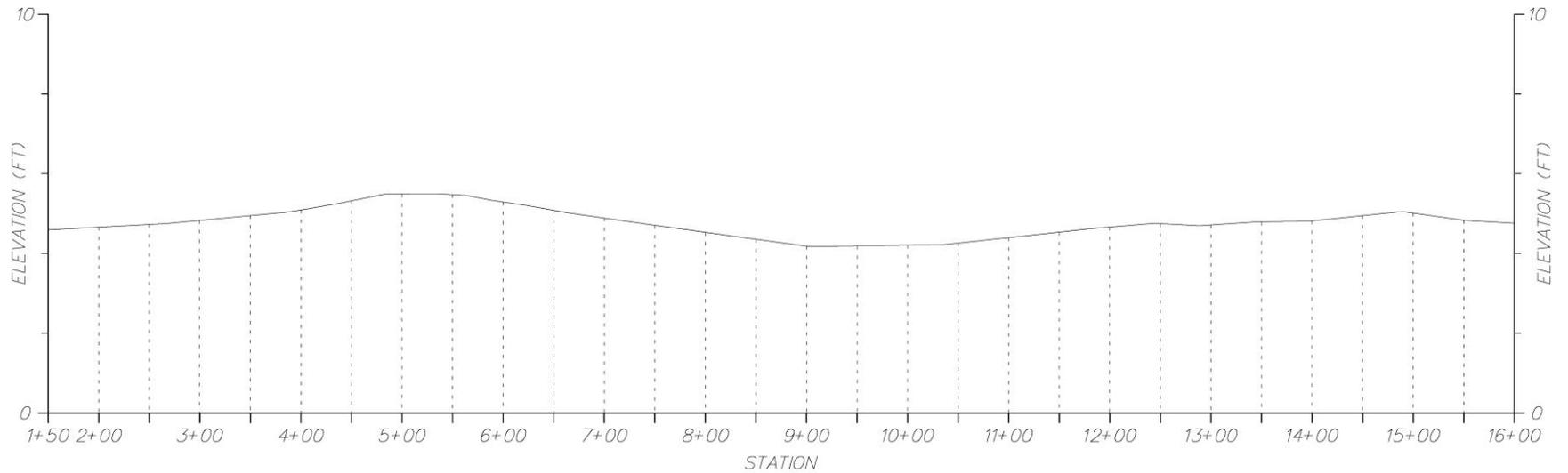
**KITTS HUMMOCK ROAD**

# Kitts Hummock Floodzone Map



# Pickering Beach LiDAR Coverage





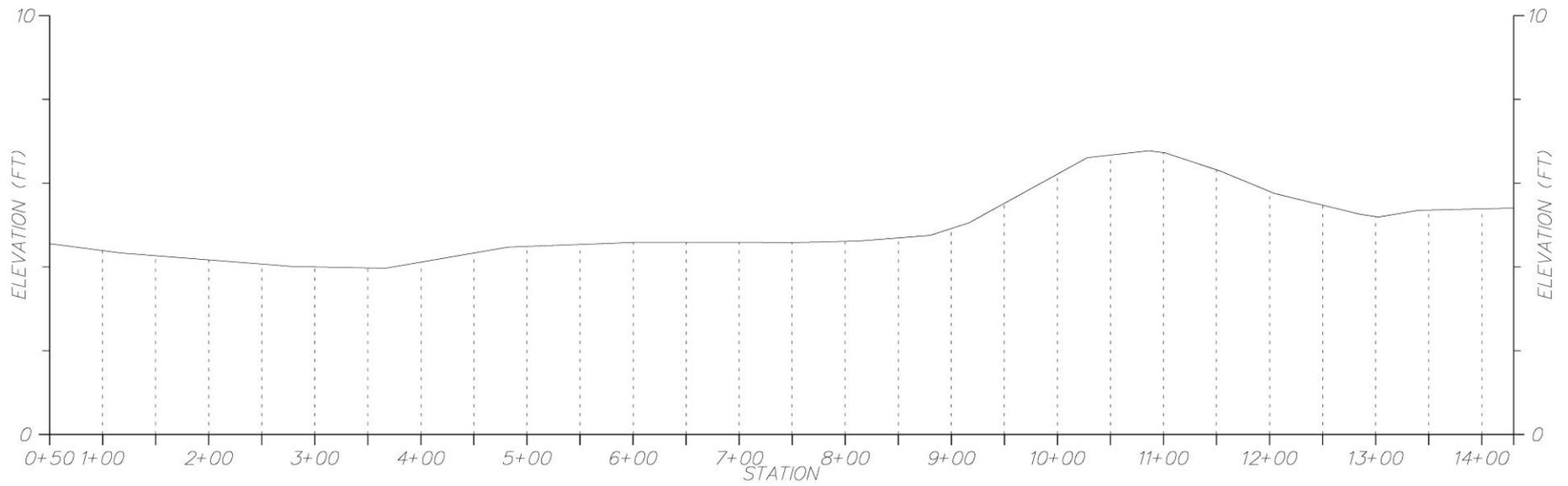
**PICKERING BEACH ROAD**

# Pickering Beach Floodzone Map



# Bowers Beach LiDAR Coverage Map





**BOWERS BEACH ROAD**

# Bowers Beach Floodzone Map



## Bowers Beach

### Legend

- Municipal Limits
- Road
- Deleted Bridges
- Structure
- Floodzone
  - 500 Yr
  - 100 Year Floodzone
  - None
- FEMA Flood Zone
  - 500 Yr
  - A
  - AC
  - AD
  - VE

Note: Structures shown highlighted in yellow have finished floor elevations within the base flood elevation for a 100-year storm event

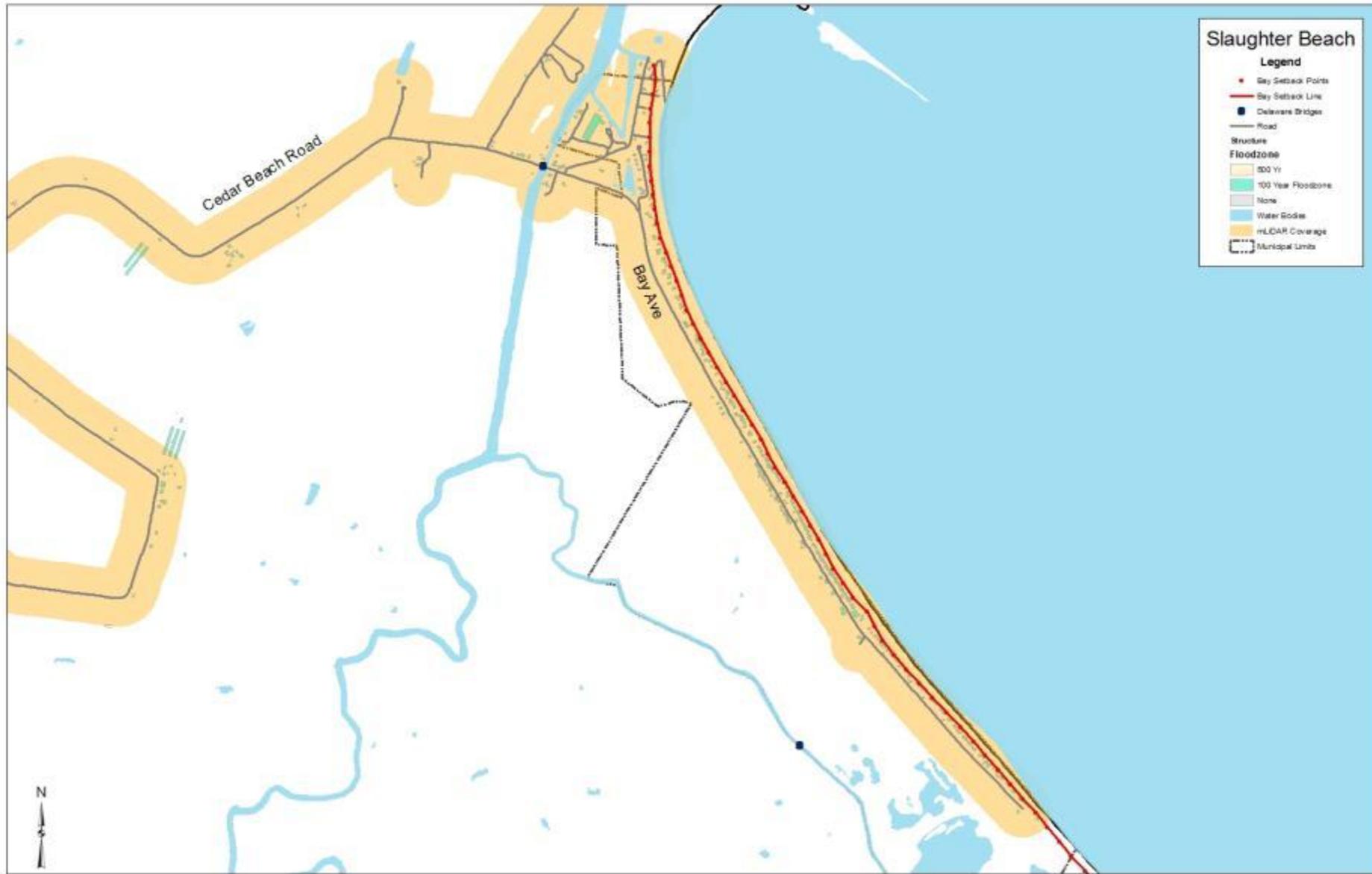
# South Bowers Beach LiDAR Coverage

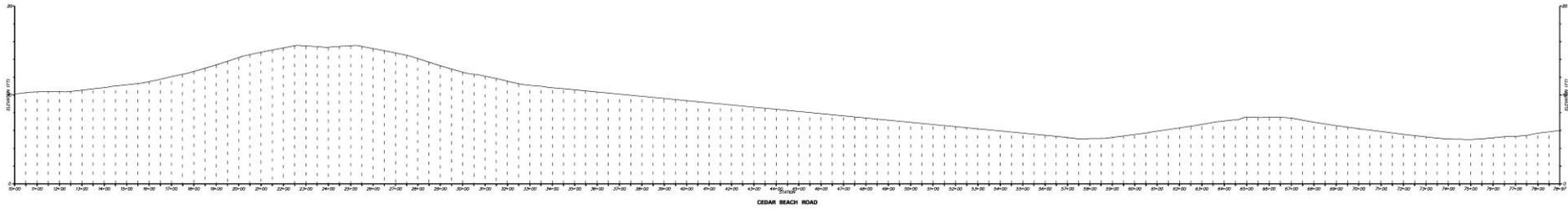


# South Bowers Beach Floodzone Map

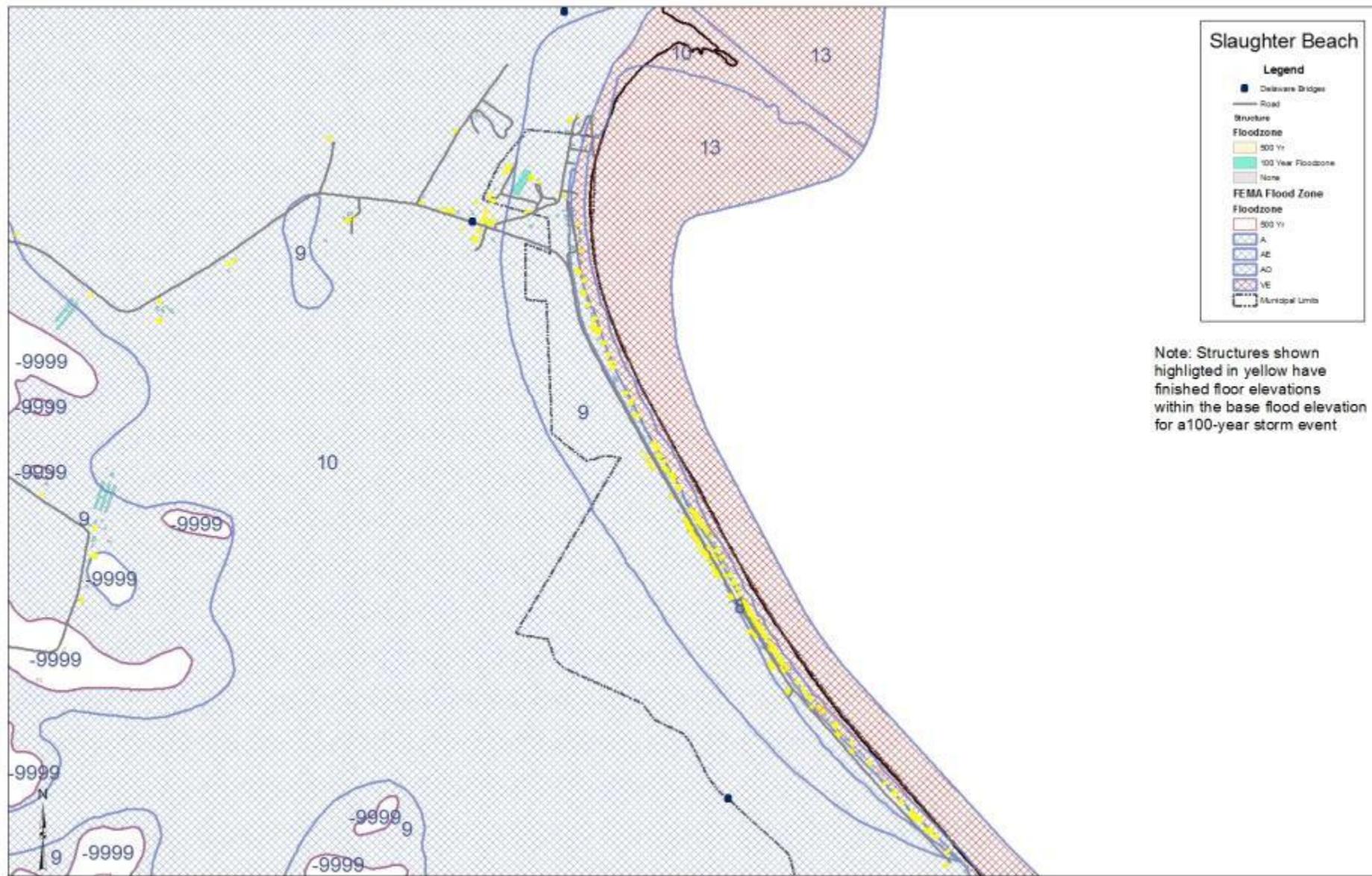


# Slaughter Beach LiDAR Coverage



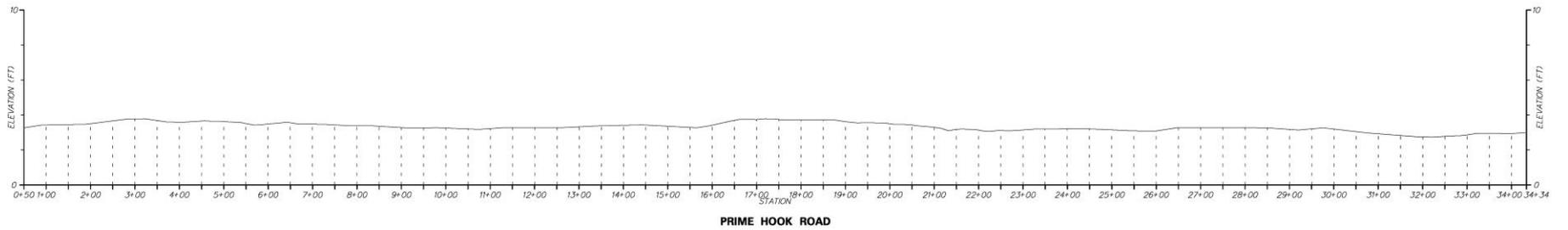


# Slaughter Beach Floodzone Map



# Prime Hook LiDAR Coverage

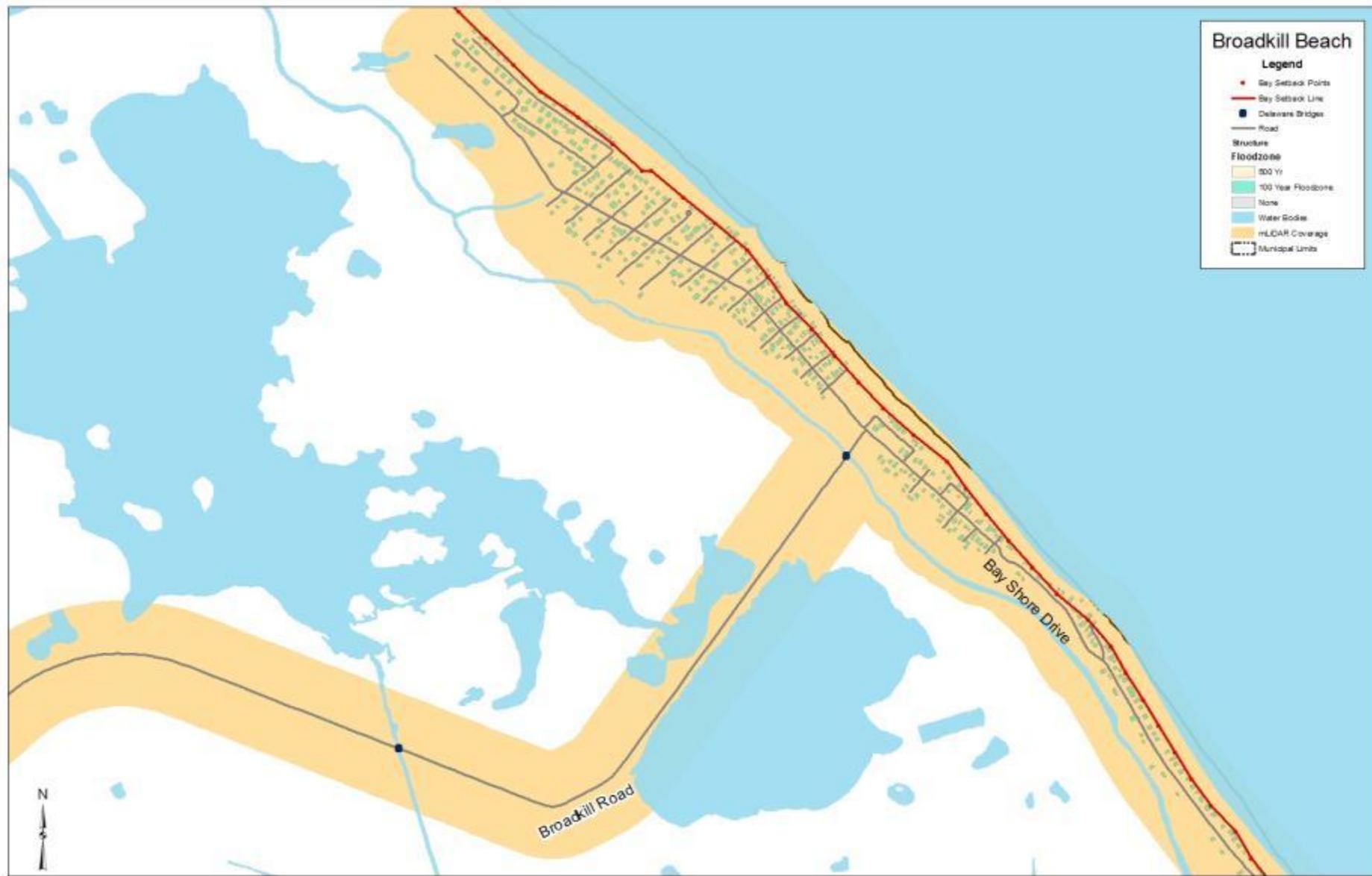


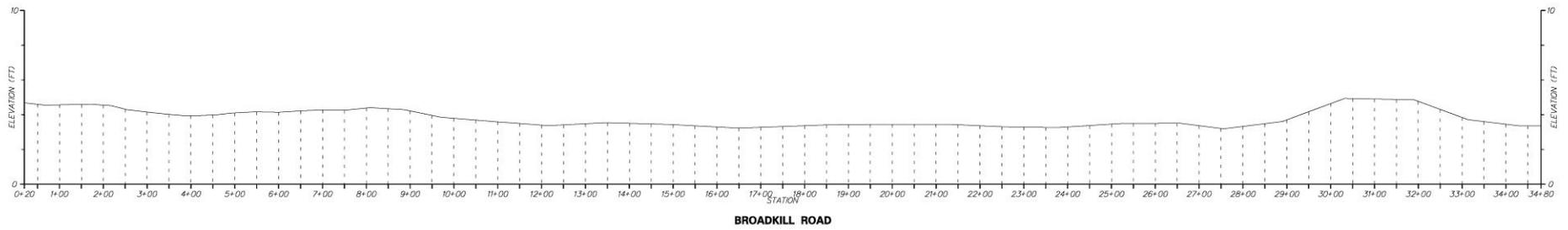


# Prime Hook Floodzone Map

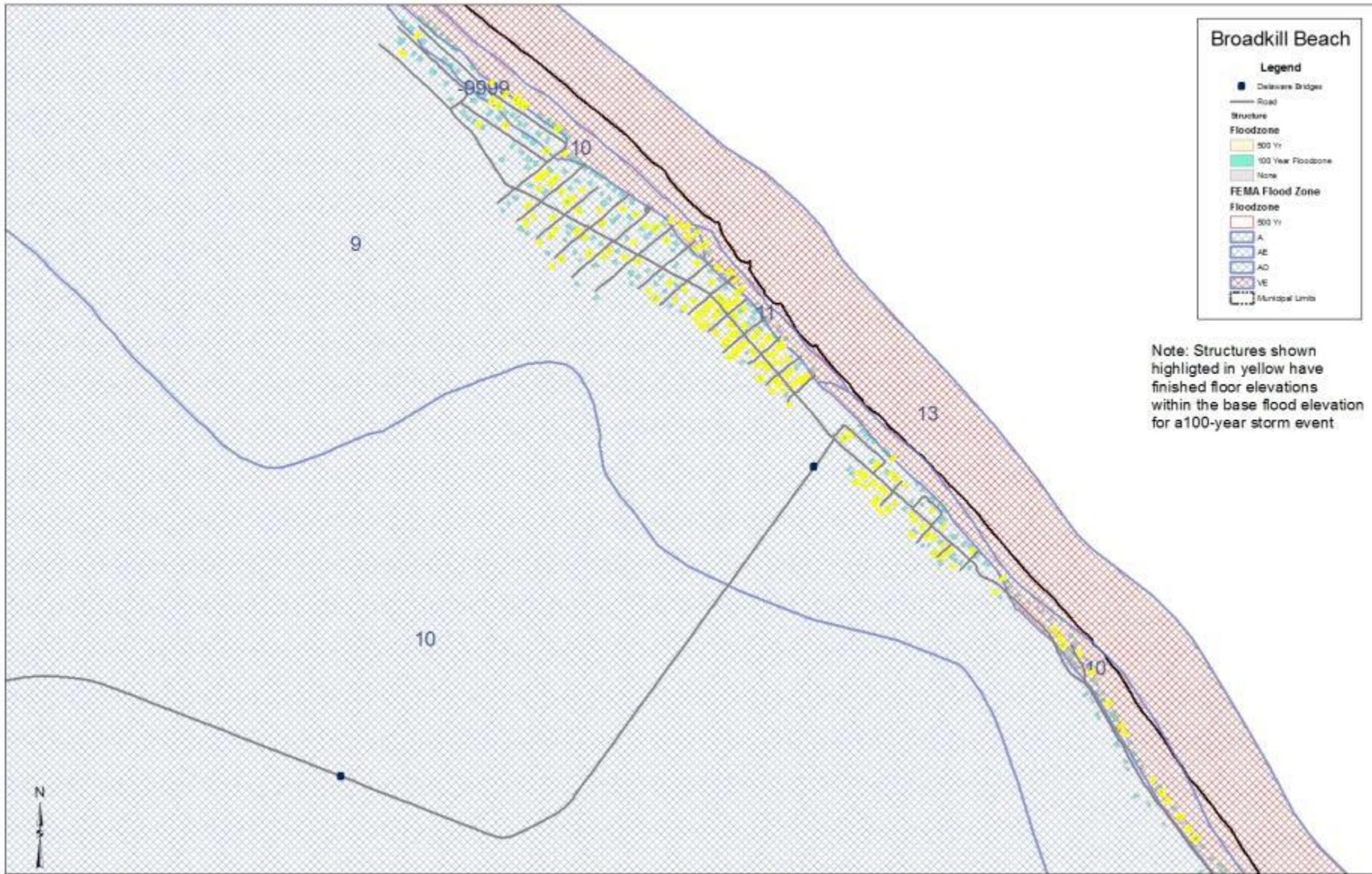


# Broadkill Beach LiDAR Coverage





# Broadkill Beach Floodzone Map



# Approach

## ECONOMIC ANALYSES - INTEGRATED

- FEMA / USACE BCA/Risk Assessment – traditional flood damage reductions



- Natural Resource Value Capital



- Tourism / Tax Base – Land Use Projections



Community / Benefactor Identification

# Approach

## ECONOMIC ANALYSES -

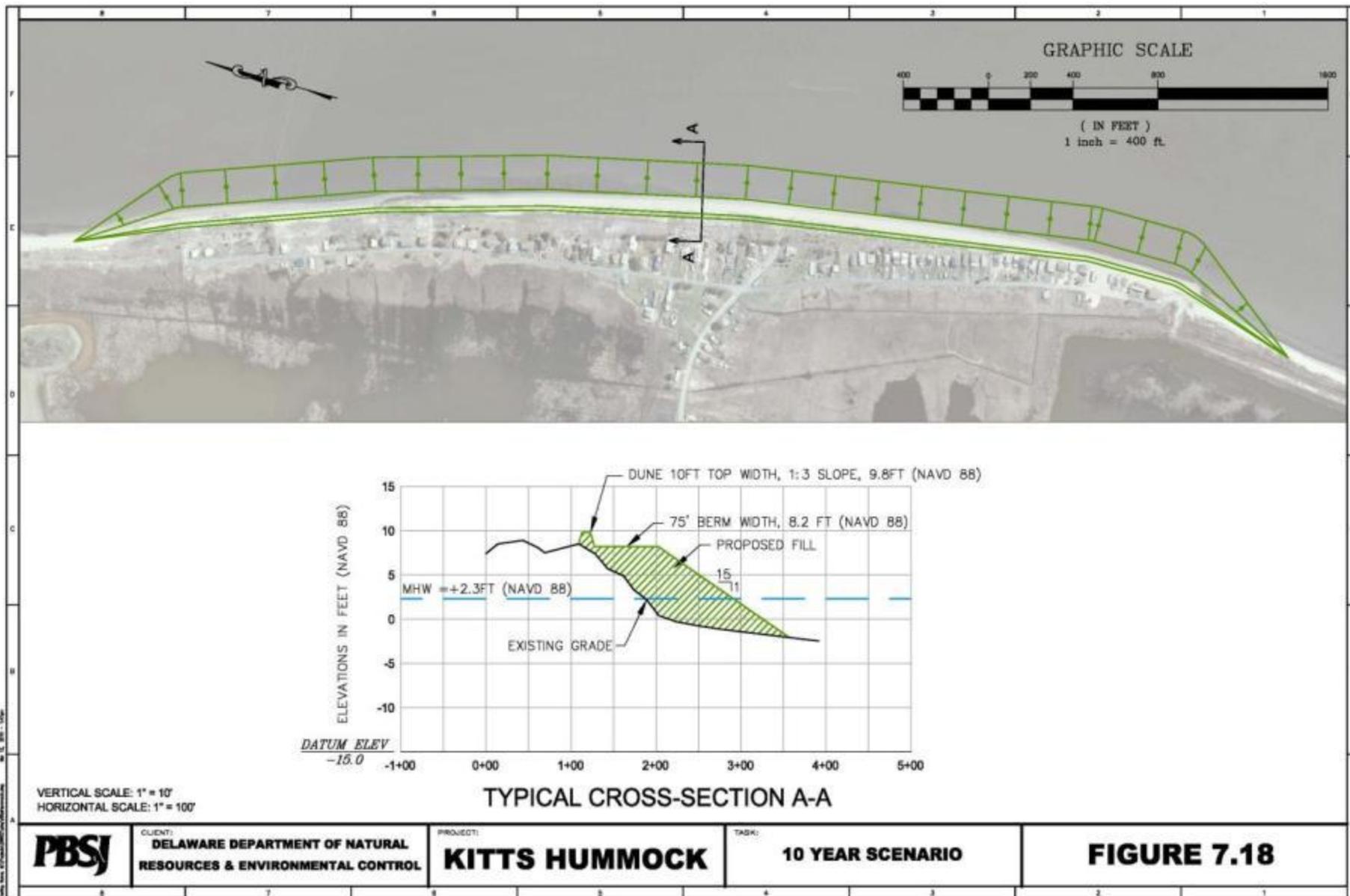
- Categories of Economic Effects to be Analyzed
  - Structures/Assets Damages
  - Tourism Revenues
  - Recreation
  - Property values
  - Local/Statewide business revenues
  - Population demographics – shifts
  - Natural Resource Capital Valuation  
Wetlands, Wildlife, Fisheries, Etc.
  - Others

# Approach

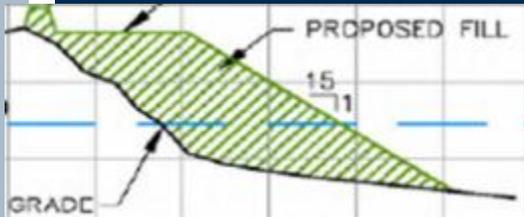
## ECONOMIC ANALYSES -

- Review Economists Matrix

# Beach Nourishment - Defined



# Enhanced Retreat - Defined



Initially remove structure to allow a beach/dune width equal to the recommended beach nourishment templates for each community.

As additional erosion/shoreline migration occurs, additional structures are removed to maintain this beach width



# Basic Retreat - Defined

Initially remove structures to allow a beach/dune width equal to the current widths in each community.

Where existing structures occupy the beach, initial removal occurs

As additional erosion/shoreline migration occurs, additional structures are removed to maintain this beach width



# Do Nothing - Defined

This alternative involves no action on the part of state shoreline managers. No beach fill or beach enhancement will occur, historic shoreline migration will cause increasing damage to structures. Houses will be destroyed or removed. Flood insurance is available, and generally covers damage and removal.



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This alternative involves no action on the part of state shoreline managers. No beach fill or beach enhancement will occur, historic shoreline migration will cause increasing damage to structures. Houses will be destroyed or removed. Flood insurance is available, and generally covers damage and removal.



Remnant foundations of structures removed after land purchase by PNPs 15 years ago

# Approach

## Schedule: 12 Months

- Refer to Flow Diagram
  - NTP – March 1, 2011
  - Flood Damage Assessment Inventory complete – April 15
  - Management alternatives/projections selected – May
  - Phase 1 Data collection complete – May
  - Initiate FEMA BCA tasks – May 1
  - Complete FEMA BCA evaluations – August 1 (**November 1**)
  - Complete GIS/Database Reports/Images – September 1
  - Initiate development of economic models – May 1
  - Complete economic models – November 1 (**February**)
  - Vette results with DNREC – November
  - Present results to Workgroup – December/January, 2012 (February considering holidays) (**March, 2012**)

# Questions



**JOHNSON, MIRMIRAN & THOMPSON**

*Engineering A Brighter Future*®