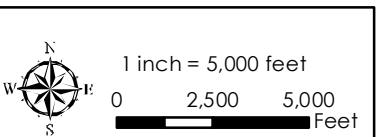




#### LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT



NOTES:  
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).  
2. County and municipal boundaries obtained from New Jersey Geographic Information Network (NJGIN).

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

#### A-1 STUDY AREA

SHORELINE STRATEGIC PLAN  
TOWNSHIP OF LITTLE EGG HARBOR  
& BOROUGH OF TUCKERON  
OCEAN COUNTY, NEW JERSEY

**Legend**

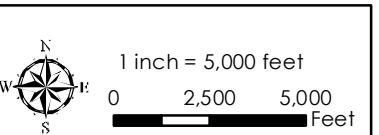
- Study Area (Red line)
- County Boundary (White line)
- Municipal Boundary (White line)



LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT



NOTES:  
1. 1930's aerial imagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).  
2. County and municipal boundaries obtained from New Jersey Geographic Information Network (NJJGIN).

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

**A-2  
1930'S AERIAL IMAGERY**  
SHORELINE STRATEGIC PLAN  
TOWNSHIP OF LITTLE EGG HARBOR  
& BOROUGH OF TUCKERON  
OCEAN COUNTY, NEW JERSEY

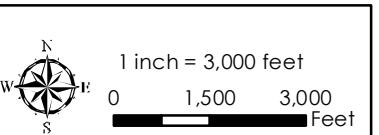
**Legend**  
2016 County Boundary  
2016 Municipal Boundary



LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT

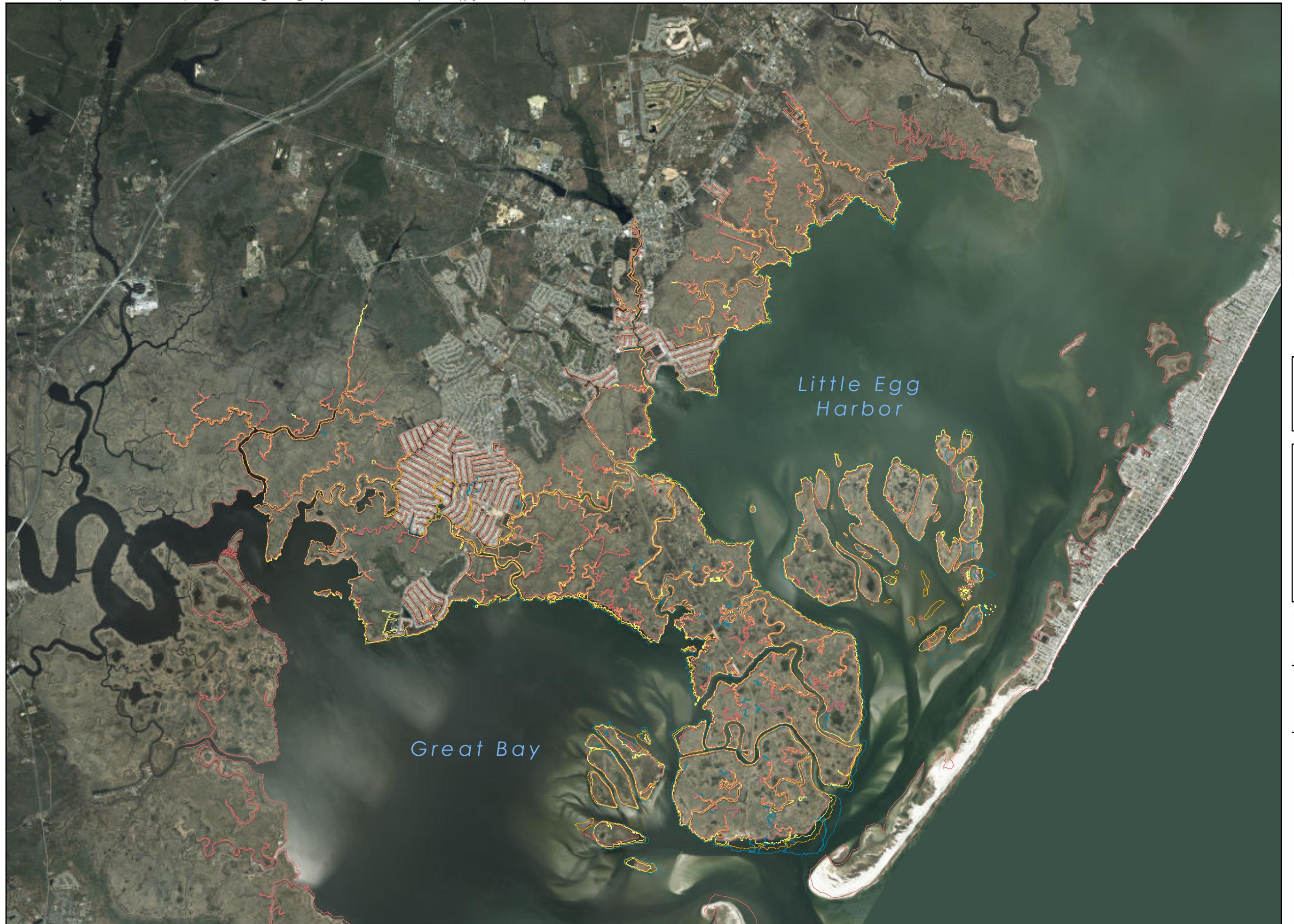


NOTES:  
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).  
2. County and municipal boundaries obtained from New Jersey Geographic Information Network (NJGIN).

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

<b>A-3</b> <b>LAGOON COMMUNITIES</b>	
SHORELINE STRATEGIC PLAN TOWNSHIP OF LITTLE EGG HARBOR & BOROUGH OF TUCKERON OCEAN COUNTY, NEW JERSEY	

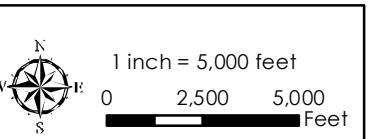
<b>Legend</b>	
County Boundary	
Municipal Boundary	



#### LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT



**NOTES:**  
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).  
2. 1930s, 1970, and 2012 shorelines delineated using imagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).  
3. 1956 shoreline delineated using imagery obtained from Nationwide Environmental Title Research, LLC (NETR).

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

#### A-4 SHORELINE CHANGE

SHORELINE STRATEGIC PLAN  
TOWNSHIP OF LITTLE EGG HARBOR  
& BOROUGH OF TUCKERON  
OCEAN COUNTY, NEW JERSEY

#### Legend

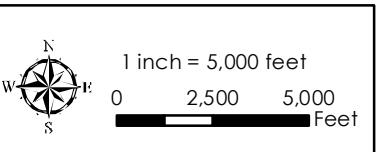
- 2012 Shoreline
- 1970 Shoreline
- 1956 Shoreline
- 1930 Shoreline



#### LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT



NOTES:  
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).  
2. 1930 and 2012 shorelines delineated using imagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).  
3. Net Shoreline Migration calculated using the United States Geological Survey's (USGS) Digital Shoreline Analysis System (DSAS).

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

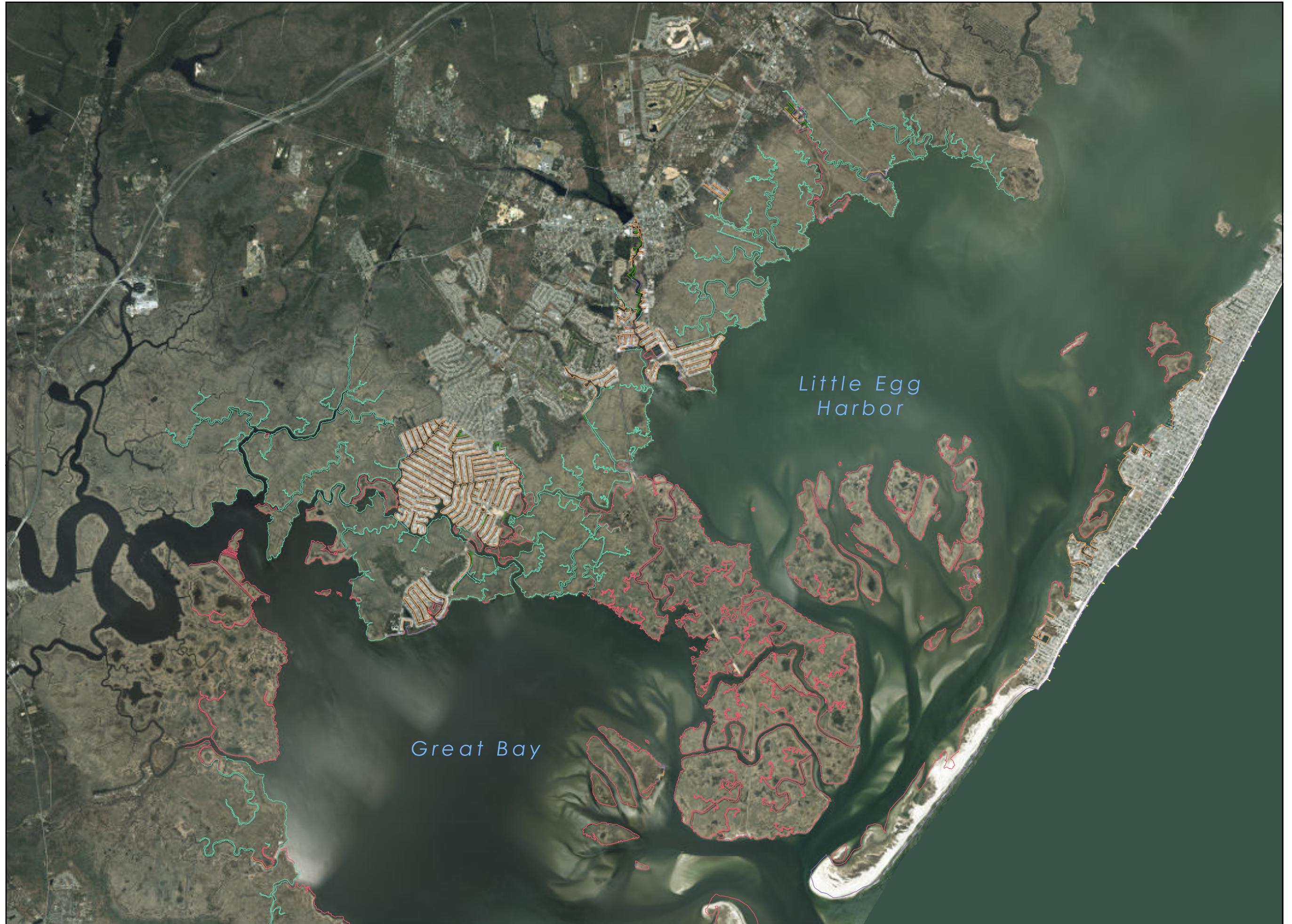
#### A-5 NET SHORELINE MIGRATION 1930 TO 2012

SHORELINE STRATEGIC PLAN  
TOWNSHIP OF LITTLE EGG HARBOR  
& BOROUGH OF TUCKERON  
OCEAN COUNTY, NEW JERSEY

#### Legend

##### Net Shoreline Migration (Meters)

< -200	0 - 100
-200 - -100	100 - 200
-100 - -50	200 - 300
-49 - 0	> 300



#### LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT

1 inch = 5,000 feet  
0 2,500 5,000 Feet

NOTES:  
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).  
2. Shoreline typology based off Environmental Sensitivity Index (ESI) Maps obtained from the National Oceanic and Atmospheric Administration (NOAA) and refined to a finer scale using 2015 orthoimagery.

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

#### A-6 SHORELINE TYPOLOGY

SHORELINE STRATEGIC PLAN  
TOWNSHIP OF LITTLE EGG HARBOR  
& BOROUGH OF TUCKERON  
OCEAN COUNTY, NEW JERSEY

##### Legend

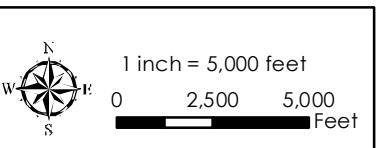
- Beach
- Boat Ramp
- Bulkhead
- Disturbed/Roadside Vegetation
- Emergent Wetlands; Ditch Influenced
- Emergent Wetlands; Not Ditch Influenced
- Rip-Rap; Exposed
- Rip-Rap; Sheltered
- Scrub/Shrub Upland
- Unarmored Lawn



#### LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT



**NOTES:**

1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).
2. County and municipal boundaries obtained from New Jersey Geographic Information Network (NJGIN).
3. 1930s wetlands delineated using 1930s aerial imagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS) and compared to wetlands (2012 Land Use/Land Cover) obtained from NJDEP GIS website: [www.state.nj.us/dep/gis/](http://www.state.nj.us/dep/gis/)

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

#### A-7 WETLAND CHANGE

SHORELINE STRATEGIC PLAN  
TOWNSHIP OF LITTLE EGG HARBOR  
& BOROUGH OF TUCKERON  
OCEAN COUNTY, NEW JERSEY

#### Legend

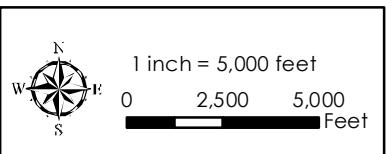
- County Boundary
- Municipal Boundary
- Additional Wetlands Since 1930
- Loss of Wetlands Since 1930



#### LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT



**NOTES:**  
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGS).  
2. Wave exposure modeled using the Integrated Valuation of Ecosystem Services and Tradeoffs tool (InVEST) version 3.2.0 coastal vulnerability model. Model inputs include:  
a. Shoreline typology, derived from Environmental Sensitivity Index (ESI) Maps obtained NOAA and refined using 2015 orthoimagery.  
b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: [www.state.nj.us/dep/gis/](http://www.state.nj.us/dep/gis/)  
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI).  
d. Climatic data obtained NOAA WAVEWATCH III wave model.  
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

**A-8**  
**RELATIVE**  
**WAVE EXPOSURE**

SHORELINE STRATEGIC PLAN  
TOWNSHIP OF LITTLE EGG HARBOR  
& BOROUGH OF TUCKERON  
OCEAN COUNTY, NEW JERSEY

**Legend**

**Relative Wave**

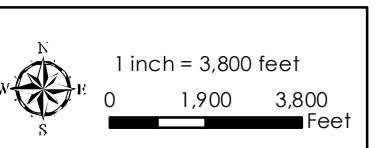
- 0 - 20 Percentile
- 21 - 40 Percentile
- 41 - 60 Percentile
- 61 - 80 Percentile
- 81 - 100 Percentile



#### LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT

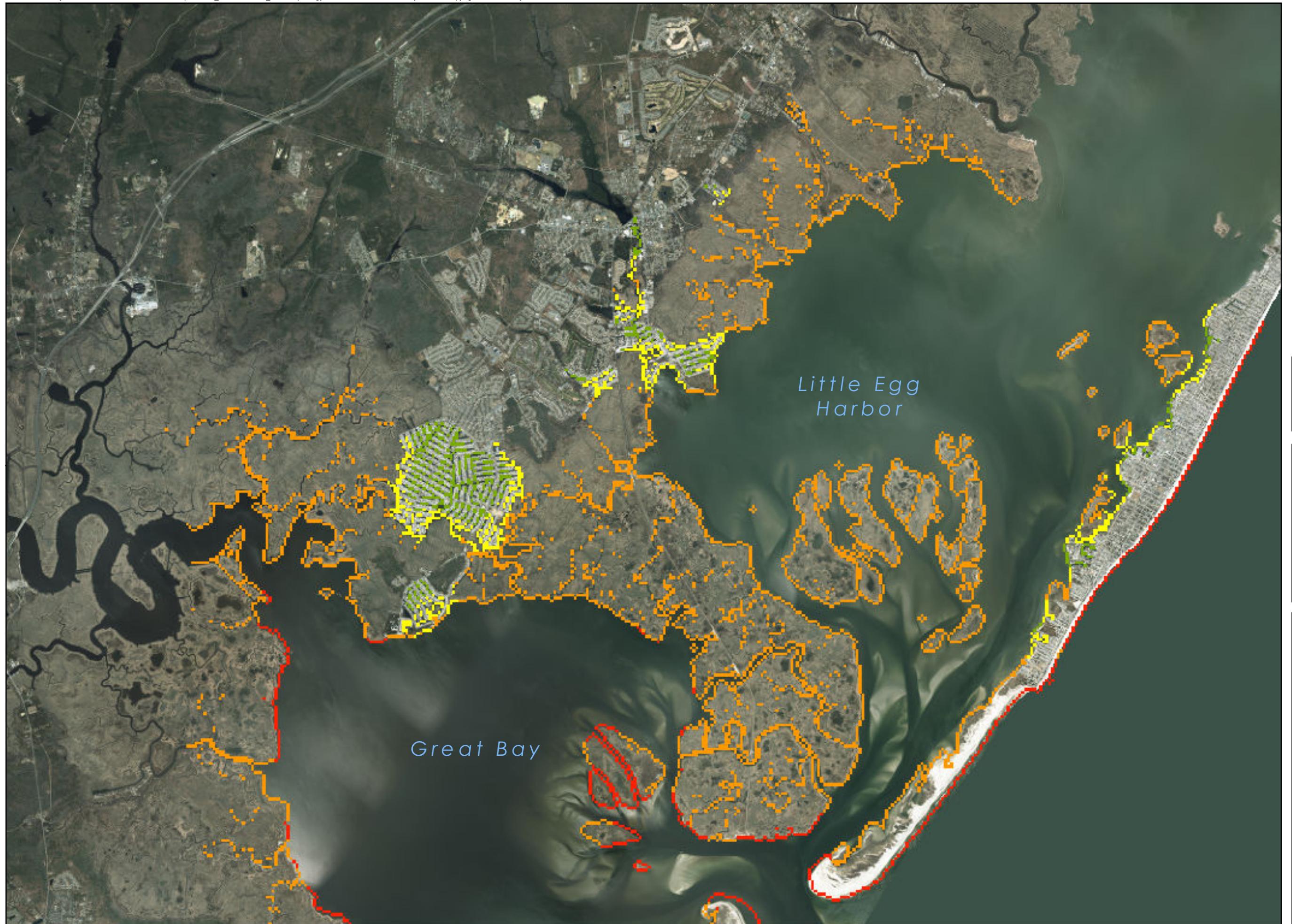


NOTES:  
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOT), Office of Geographic Information Systems (OGIS).

Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

A-9 FIELD SURVEY SITE LOCATIONS	
SHORELINE STRATEGIC PLAN TOWNSHIP OF LITTLE EGG HARBOR & BOROUGH OF TUCKERTON OCEAN COUNTY, NEW JERSEY	

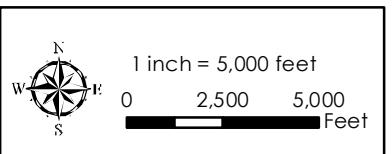
**Legend**  
— Site Location



#### LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT



NOTES:  
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGS).  
2. Wave exposure modeled using the Integrated Valuation of Ecosystem Services and Tradeoffs tool (InVEST) version 3.0 coastal vulnerability model. Model inputs include:  
a. Shoreline typology, derived from Environmental Sensitivity Index (ESI) Maps obtained NOAA and refined using 2015 orthoimagery.  
b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: [www.state.nj.us/dep/gis/](http://www.state.nj.us/dep/gis/)  
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI).  
d. Climatic data obtained NOAA WAVEWATCH III wave model.  
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

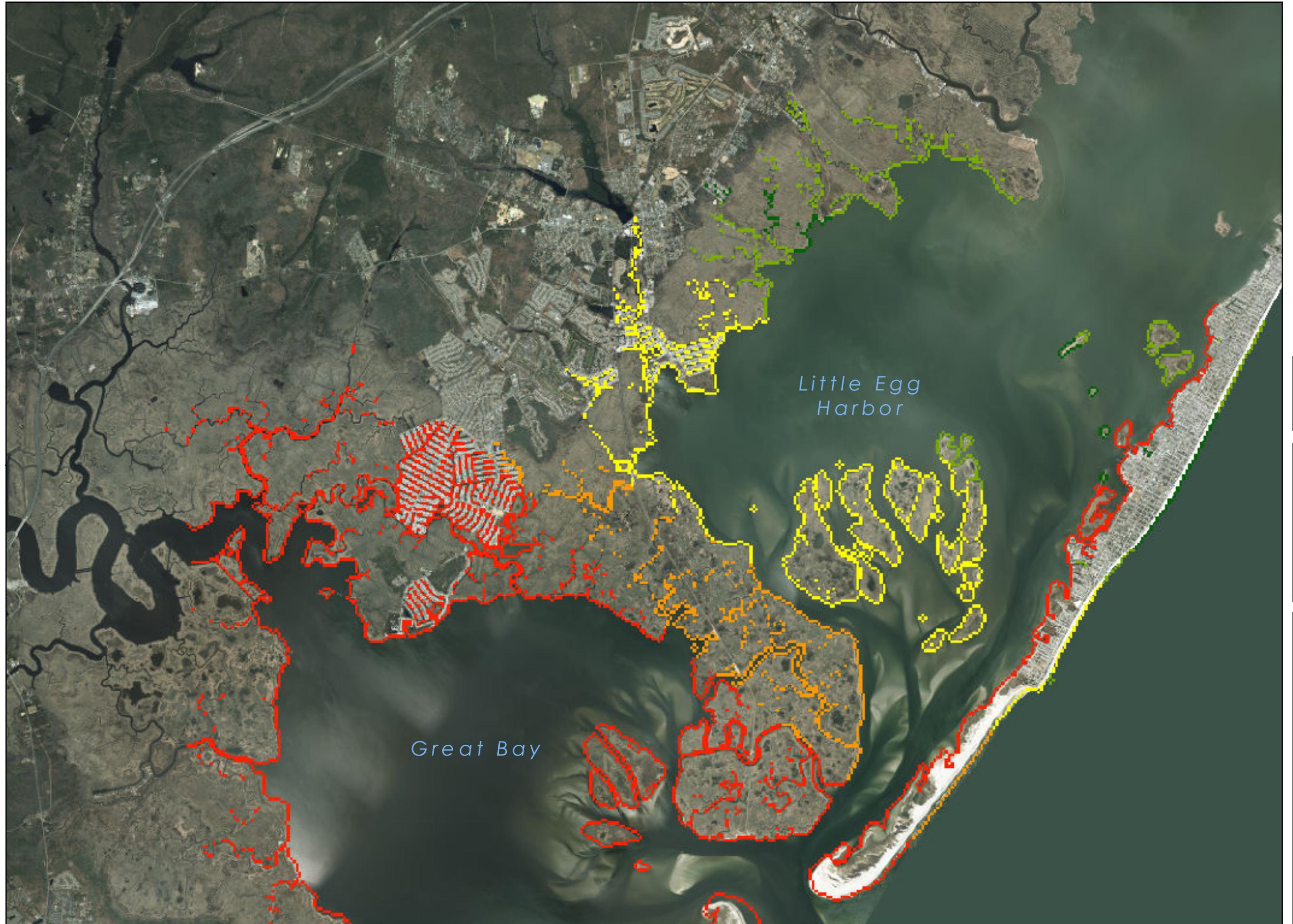
**A-10  
GEOMORPHOLOGY**

SHORELINE STRATEGIC PLAN  
TOWNSHIP OF LITTLE EGG HARBOR  
& BOROUGH OF TUCKERON  
OCEAN COUNTY, NEW JERSEY

**Legend**

**Geomorphology**

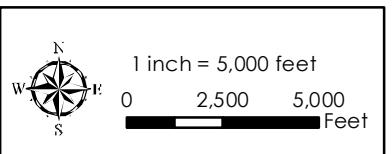
- Low Vulnerability (Green)
- Moderate Vulnerability (Yellow)
- High Vulnerability (Orange)
- Very High Vulnerability (Red)



#### LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT



NOTES:  
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGS).  
2. Wave exposure modeled using the Integrated Valuation of Ecosystem Services and Tradeoffs tool (InVEST) version 3.2.0 coastal vulnerability model. Model inputs include:  
a. Shoreline typology, derived from Environmental Sensitivity Index (ESI) Maps obtained NOAA and refined using 2015 orthoimagery.  
b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: [www.state.nj.us/dep/gis/](http://www.state.nj.us/dep/gis/)  
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI).  
d. Climatic data obtained NOAA WAVEWATCH III wave model.  
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

**A-11**  
**RELATIVE**  
**SURGE POTENTIAL**

SHORELINE STRATEGIC PLAN  
TOWNSHIP OF LITTLE EGG HARBOR  
& BOROUGH OF TUCKERON  
OCEAN COUNTY, NEW JERSEY

**Legend**

**Relative Surge**

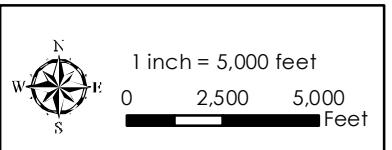
- 0 - 20 Percentile
- 21 - 40 Percentile
- 41 - 60 Percentile
- 61 - 80 Percentile
- 81 - 100 Percentile



#### LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT



**NOTES:**  
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGS).  
2. Wave exposure modeled using the Integrated Valuation of Ecosystem Services and Tradeoffs tool (InVEST) version 3.2.0 coastal vulnerability model. Model inputs include:  
a. Shoreline typology, derived from Environmental Sensitivity Index (ESI) Maps obtained NOAA and refined using 2015 orthoimagery.  
b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: [www.state.nj.us/dep/gis/](http://www.state.nj.us/dep/gis/)  
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI).  
d. Climatic data obtained NOAA WAVEWATCH III wave model.  
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

**A-12  
RELATIVE  
WIND EXPOSURE**  
SHORELINE STRATEGIC PLAN  
TOWNSHIP OF LITTLE EGG HARBOR  
& BOROUGH OF TUCKERON  
OCEAN COUNTY, NEW JERSEY

**Legend**  
**Relative Wind**

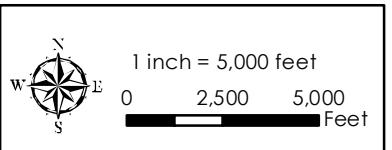
0 - 20 Percentile
21 - 40 Percentile
41 - 60 Percentile
61 - 80 Percentile
81 - 100 Percentile



#### LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT



**NOTES:**  
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS).  
2. Wave exposure modeled using the Integrated Valuation of Ecosystem Services and Tradeoffs tool (InVEST) version 3.2.0 coastal vulnerability model. Model inputs include:  
a. Shoreline typology, derived from Environmental Sensitivity Index (ESI) Maps obtained NOAA and refined using 2015 orthoimagery.  
b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: [www.state.nj.us/dep/gis/](http://www.state.nj.us/dep/gis/)  
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI).  
d. Climatic data obtained NOAA WAVEWATCH III wave model.  
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

**A-13**  
**RELATIVE ERODIBILITY**  
  
SHORELINE STRATEGIC PLAN  
TOWNSHIP OF LITTLE EGG HARBOR  
& BOROUGH OF TUCKERON  
OCEAN COUNTY, NEW JERSEY

**Legend**  
**Relative Erodibility**

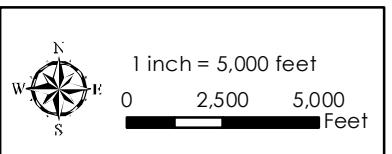
<span style="background-color: darkgreen; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Very Low Relative Erodibility
<span style="background-color: green; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Low Relative Erodibility
<span style="background-color: yellow; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Moderate Relative Erodibility
<span style="background-color: orange; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	High Relative Erodibility
<span style="background-color: red; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	Very High Relative Erodibility



#### LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT



**NOTES:**  
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGS).  
2. Wave exposure modeled using the Integrated Valuation of Ecosystem Services and Tradeoffs tool (InVEST) version 3.0 coastal vulnerability model. Model inputs include:  
a. Shoreline typology, derived from Environmental Sensitivity Index (ESI) Maps obtained NOAA and refined using 2015 orthoimagery.  
b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: [www.state.nj.us/dep/gis/](http://www.state.nj.us/dep/gis/)  
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI).  
d. Climatic data obtained NOAA WAVEWATCH III wave model.  
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

#### A-14 RELATIVE RELIEF

SHORELINE STRATEGIC PLAN  
TOWNSHIP OF LITTLE EGG HARBOR  
& BOROUGH OF TUCKERON  
OCEAN COUNTY, NEW JERSEY

#### Legend

##### Relative

- 0 - 20 Percentile
- 21 - 40 Percentile
- 41 - 60 Percentile
- 61 - 80 Percentile
- 81 - 100 Percentile

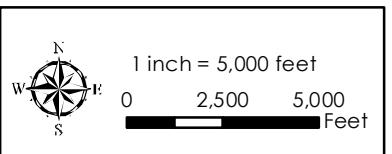




#### LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT



**NOTES:**  
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGS).  
2. Wave exposure modeled using the Integrated Valuation of Ecosystem Services and Tradeoffs tool (InVEST) version 3.2.0 coastal vulnerability model. Model inputs include:  
a. Shoreline typology, derived from Environmental Sensitivity Index (ESI) Maps obtained NOAA and refined using 2015 orthoimagery.  
b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: [www.state.nj.us/dep/gis/](http://www.state.nj.us/dep/gis/)  
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI).  
d. Climatic data obtained NOAA WAVEWATCH III wave model.  
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

**A-16**  
**RELATIVE**  
**COASTAL EXPOSURE**

SHORELINE STRATEGIC PLAN  
TOWNSHIP OF LITTLE EGG HARBOR  
& BOROUGH OF TUCKERON  
OCEAN COUNTY, NEW JERSEY

**Legend**

**Relative Coastal Exposure**

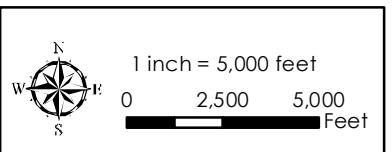
- Low Relative Exposure (Green)
- Moderate Relative Exposure (Yellow)
- High Relative Exposure (Orange)
- Very High Relative Exposure (Red)



#### LOCATION MAP



**PRINCETON HYDRO, LLC.**  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551  
with offices in NJ, PA and CT



**NOTES:**  
1. 2015 orthoimagery obtained from NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGS).  
2. Wave exposure modeled using the Integrated Valuation of Ecosystem Services and Tradeoffs tool (InVEST) version 3.0 coastal vulnerability model. Model inputs include:  
a. Shoreline typology, derived from Environmental Sensitivity Index (ESI) Maps obtained NOAA and refined using 2015 orthoimagery.  
b. Natural habitat cover derived from 2012 Land Use/Land Cover boundary obtained from NJDEP GIS website: [www.state.nj.us/dep/gis/](http://www.state.nj.us/dep/gis/)  
c. 2012 post Hurricane Sandy elevation data obtained from NOAA's National Centers for Environmental Information (NCEI).  
d. Climatic data obtained NOAA WAVEWATCH III wave model.  
Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet

**A-17**  
**RELATIVE COASTAL EXPOSURE**  
**NO HABITATS**

SHORELINE STRATEGIC PLAN  
TOWNSHIP OF LITTLE EGG HARBOR  
& BOROUGH OF TUCKERON  
OCEAN COUNTY, NEW JERSEY

**Legend**

**Relative Coastal Exposure; No Habitats**

- Low Relative Exposure (green)
- Moderate Relative Exposure (yellow)
- High Relative Exposure (orange)
- Very High Relative Exposure (red)