Adapting to Climate Change at the Port Authority: Preparing and Progressing Strategies

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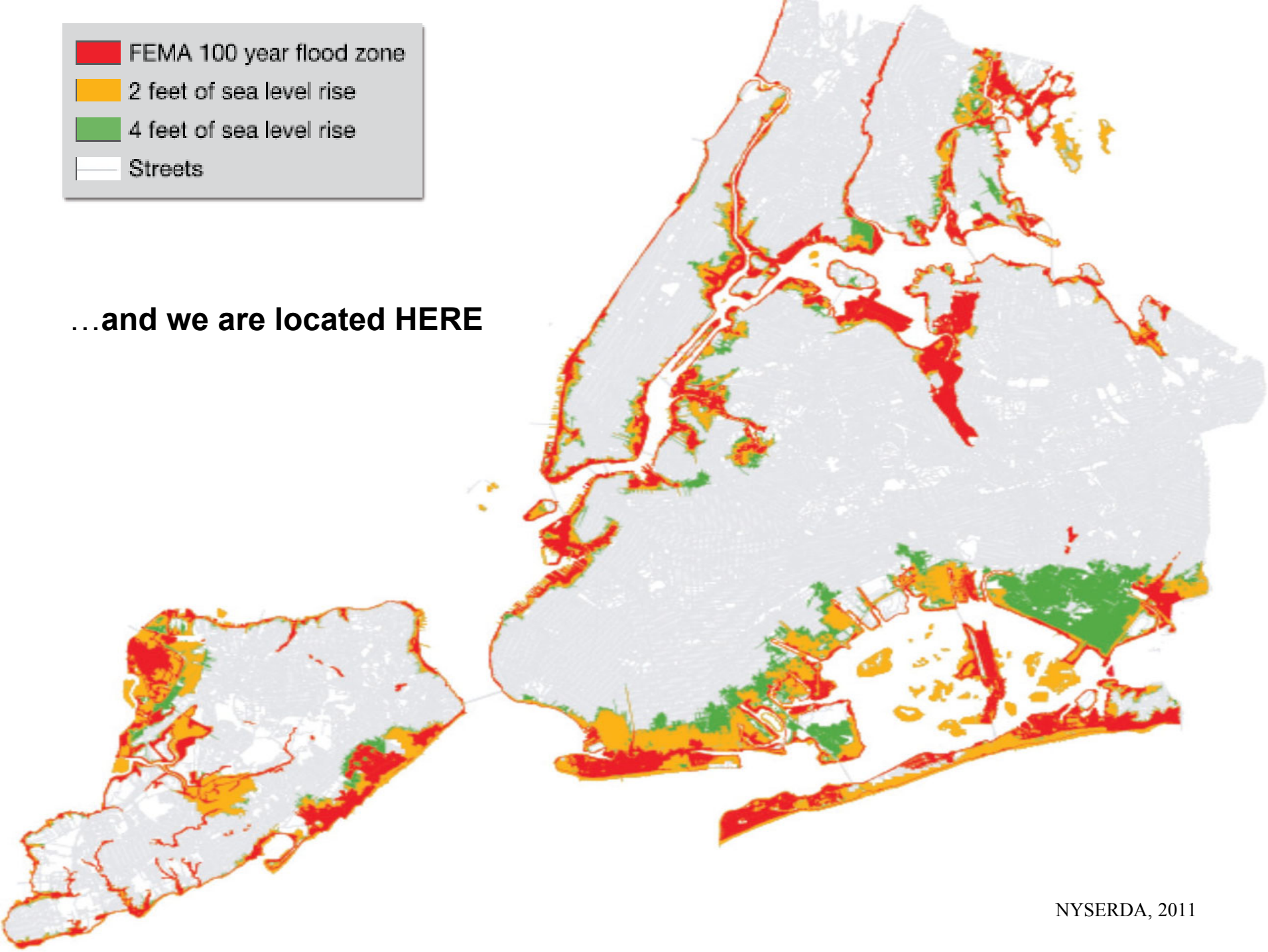
THE PORT AUTHORITY
OF NEW YORK & NEW JERSEY

Introduction
Port Authority of New York and New Jersey

- **1921 Act of Congress**
  - Bi-State Compact to promote regional transportation and commerce between New York and New Jersey
- **Financially self-sufficient**
  - 2012: $3.66 Billion in capital projects
- **Growth (Demand) Projections: 2005-2020**
  - Airports: 40% growth in air passengers and a 70% growth in cargo
  - Port facilities: 100% growth in cargo

We are BIG and GROWING….



…**and we are located HERE**

NYSERDA, 2011

Introduction
Port Authority of New York and New Jersey

31 major facilities

- **Airports**
- Marine Ports
- Bridges and Tunnels
- Real Estate
- Commuter Rail
- Bus Terminals

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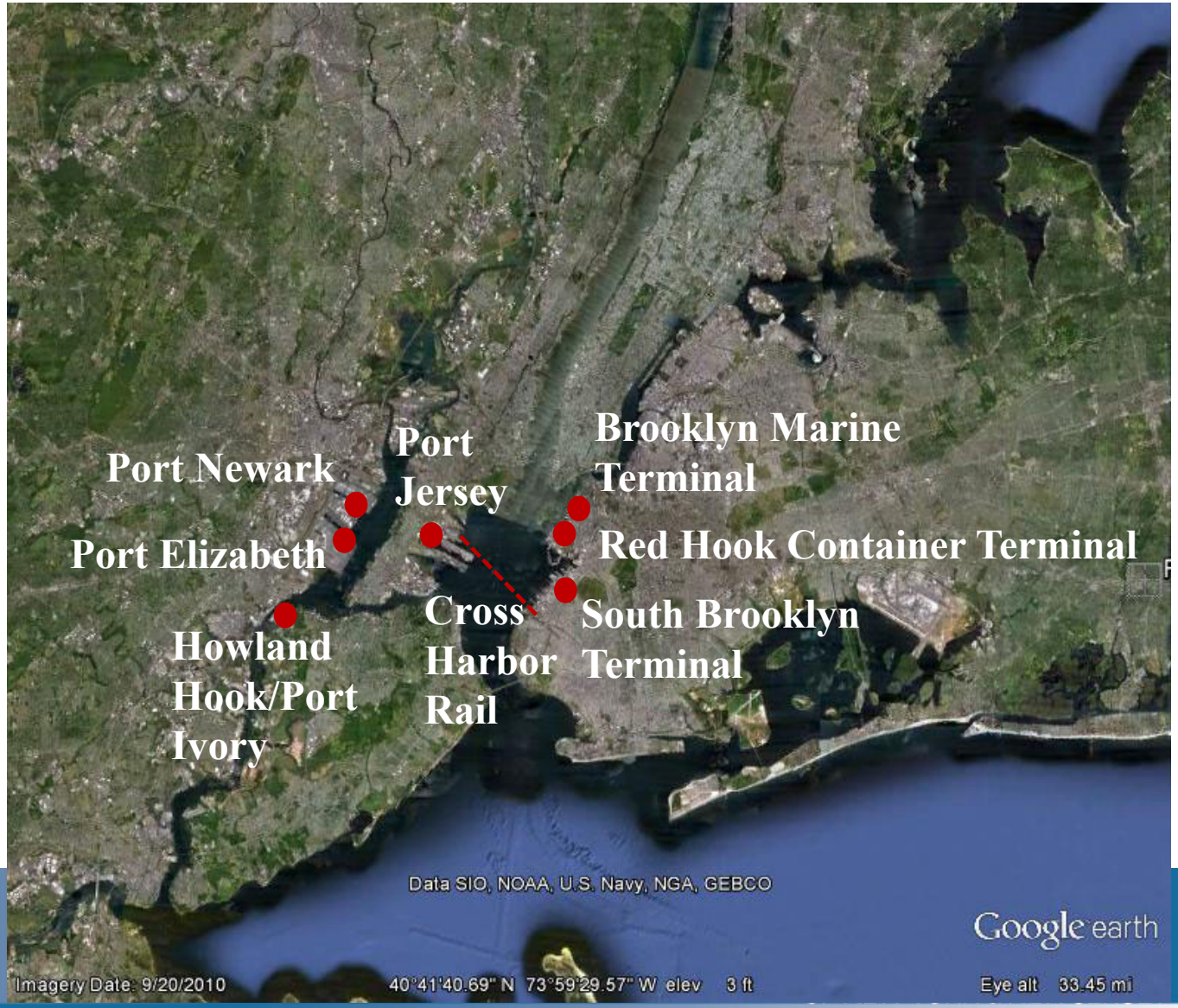

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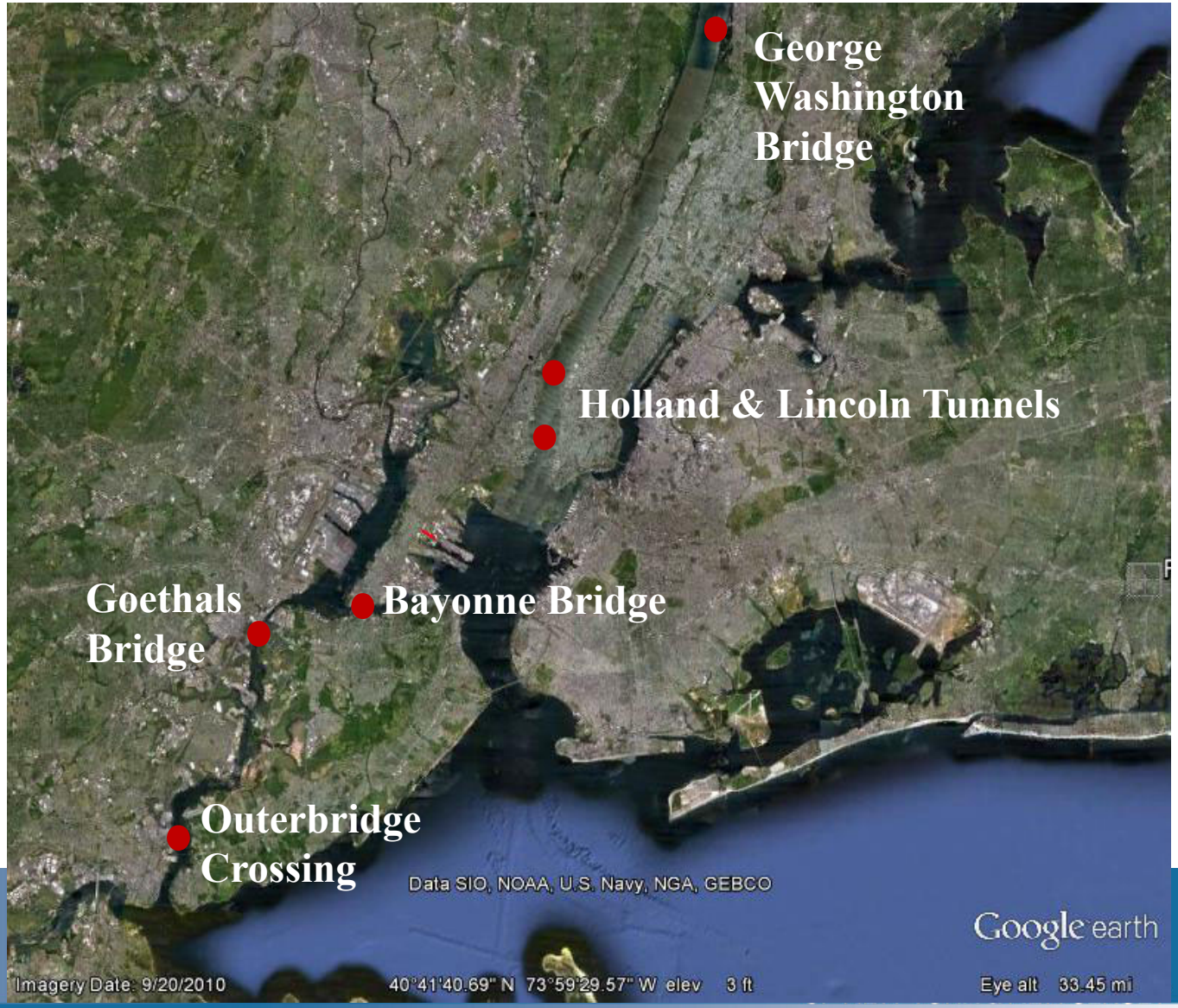

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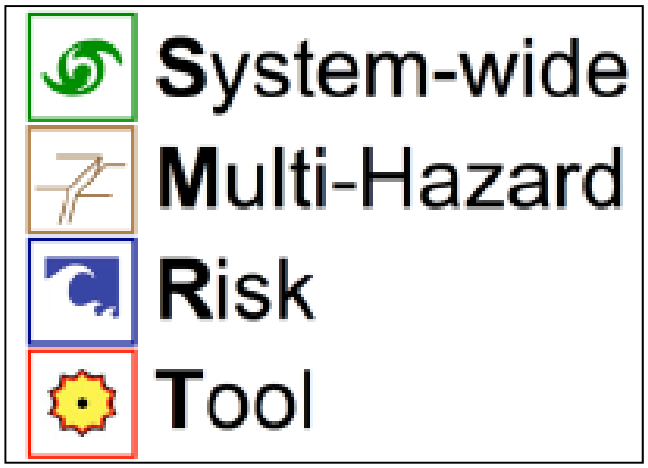
PANYNJ Adaptation Program
Why Plan

- **PANYNJ infrastructure**
  - Coastal
  - Connects islands
- **Assets**
  - Public and Goods Movement Transportation System
  - Infrastructure and Financing
    - Bond Obligations
    - User financing

PANYNJ Adaptation Program
Internal Planning

- **Sustainability Policy**
  - Reduce GHG 80% by 2050 (2006 Baseline)
  - Plan for climate change
- **Comprehensive Risk Management**
  - SMRT
  - Across Disciplines and Facilities
  - Prioritize Funding



- **NY City Mayor's Office of Long Term Planning and Sustainability Study**

PANYNJ Adaptation Program
Internal Planning

NPCC Climate Projections *(Rosenzweig, C. & Solecki, W. 2010)*					
		Baseline (1971-2000)	**2020s**	**2050s**	**2080s**
Air Temperature		12.8 ºC (annual mean)	+ 0.8 – 1.7 ºC	+ 1.7 – 2.8 ºC	+ 2.7 – 4.2 ºC
Precipitation		118.1 cm (annual mean)	+ 0 – 5%	+ 0 – 10%	+ 5 – 10%
Sea Level Rise		NA	+ 5.1 – 12.7 cm	+ 17.8 – 30.5 cm	+ 30.5 – 58.4 cm
Coastal Storms	**1-in-100 yr Flood to recur**	≈ once every 100 years	≈ once every 65 to 80 years	≈ once every 35 to 55 years	≈ once every 15 to 35 years
	1-in-500 yr Flood to recur	≈ once every 500 years	≈ once every 380 to 450 years	≈ once every 250 to 330 years	≈ once every 120 to 250 years
Rapid Ice-Melt Sea Level Rise Projections *(Not considered in PANYNJ Infrastructure Assessment)*					
Sea Level Rise		NA	+ 12.7 – 25.4 cm	+ 48.3 – 73.7 cm	+ 104.1 – 139.7 cm

PANYNJ Adaptation Program

Internal Planning

SAMPLE INVENTORY OF AT-RISK INFRASTRUCTURE			
Classes of Infrastructure	**Specific Infrastructure Locations or Sub-classes of Infrastructure**	**Climate Variable**	**Description of Climate Change Impact**
Berth & Roadway	Piers, Slips and Roadways at Port Newark, Elizabeth Port Authority Marine Terminal, Howland Hook, Brooklyn, Hoboken Waterfront	Extreme events and storm surge with sea level rise	Increased flooding risk due to nor'easters and hurricanes
Rail	PATH Stations and open/subsurface Track - PATH Tunnels	Extreme events and storm surge with sea level rise	Increased flooding risk due to nor'easters and hurricanes
Airfield	John F. Kennedy International Airport, LaGuardia Airport - Runways and Taxiways	Extreme events and storm surge with sea level rise	Increased flooding risk due to nor'easters and hurricanes
Tunnel	Holland Tunnel	Extreme events and storm surge with sea level rise	Increased flooding risk due to nor'easters and hurricanes
Bridge	Bayonne	Sea level rise	Sea level rise will lower existing bridge clearances
Building	Terminal Buildings at John F. Kennedy International Airport & LaGuardia Airport	Rising temperatures/ heat waves	Increased risk for power failures shutting down baggage handling systems

PANYNJ Adaptation Program
Facility and Infrastructure Design

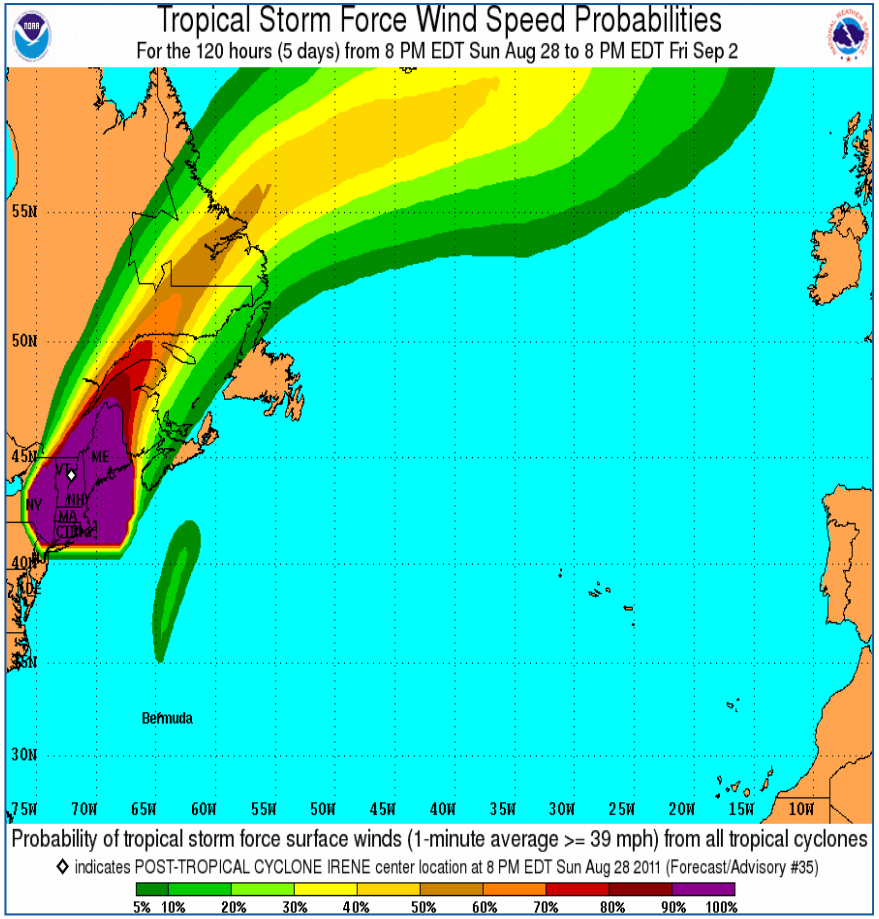
PANYNJ INTERIM DESIGN CRITERIA		
Climate Variable	**Baseline 1971-2000**	**2080's**
Air Temperature	12.8 ºC (annual mean)	3.33 ˚C increase over baseline
Precipitation	118.1 cm (annual mean)	10% increase over baseline
Sea level rise	Current Mean High Water (MHW)	45.7 cm increase over current MHW
Flood Elevation	45.7 cm increase over the current FEMA 100-year flood level plus 30.5 cm criteria (Current FEMA 100-year flood level plus 76.2 cm)	
Where prohibiting factors preclude the application of these design criteria to all project elements, focus should be centered on critical project elements for which disruption of service would result in significant impacts to facility operations.		

PANYNJ Adaptation Program
Resiliency Planning

- **Renewable Energy**
  - Port Jersey Wind Farm
  - Solar
  - Waste to Energy
- **Demand Response Program**
- **Property Insurance**
  - Green Coverage Endorsement Program
- **Hudson-Raritan Estuary Resources Program**
  - $60M to preserve open space

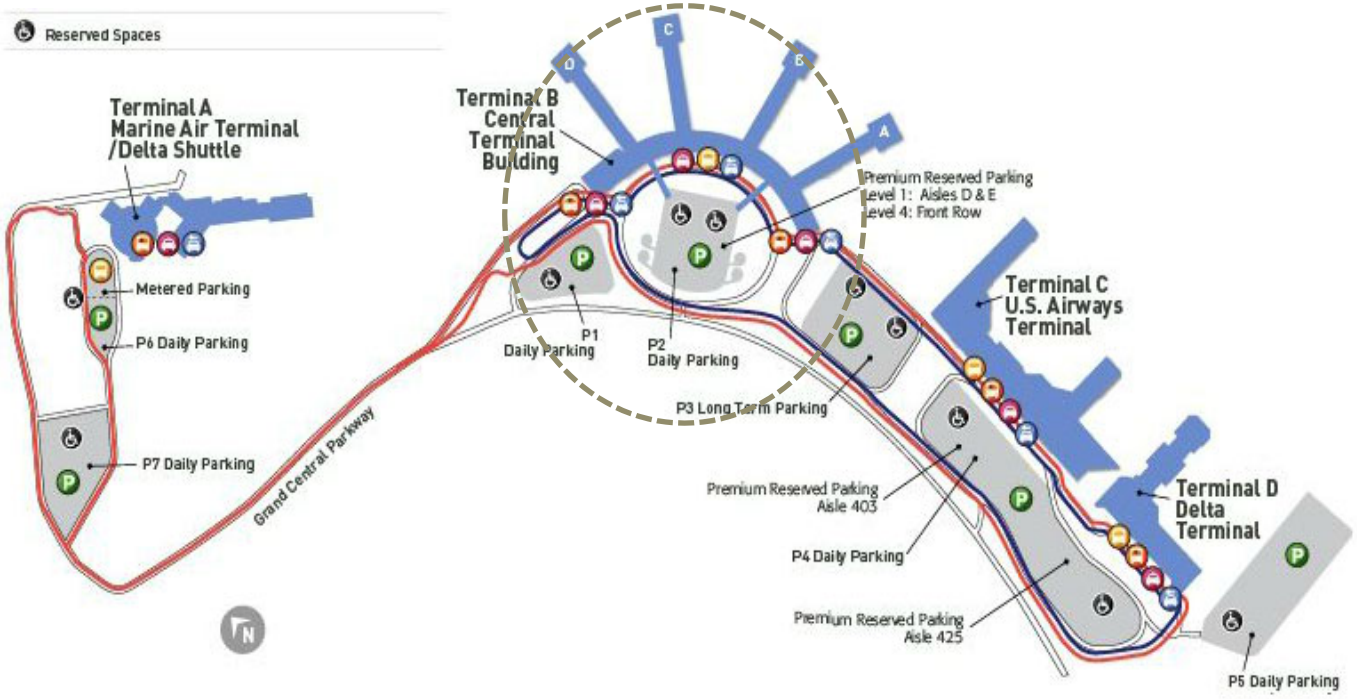
PANYNJ Adaptation Program
External Collaboration

- **Business Continuity Planning**
- **Research and Collaboration**
  - ClimAID
  - NYS Sea Level Rise Task Force
- **Hurricane Irene**
  - Preemptive Planning; Shut Down Facilities
  - Staff Expertise and External Collaboration
  - Track Costs



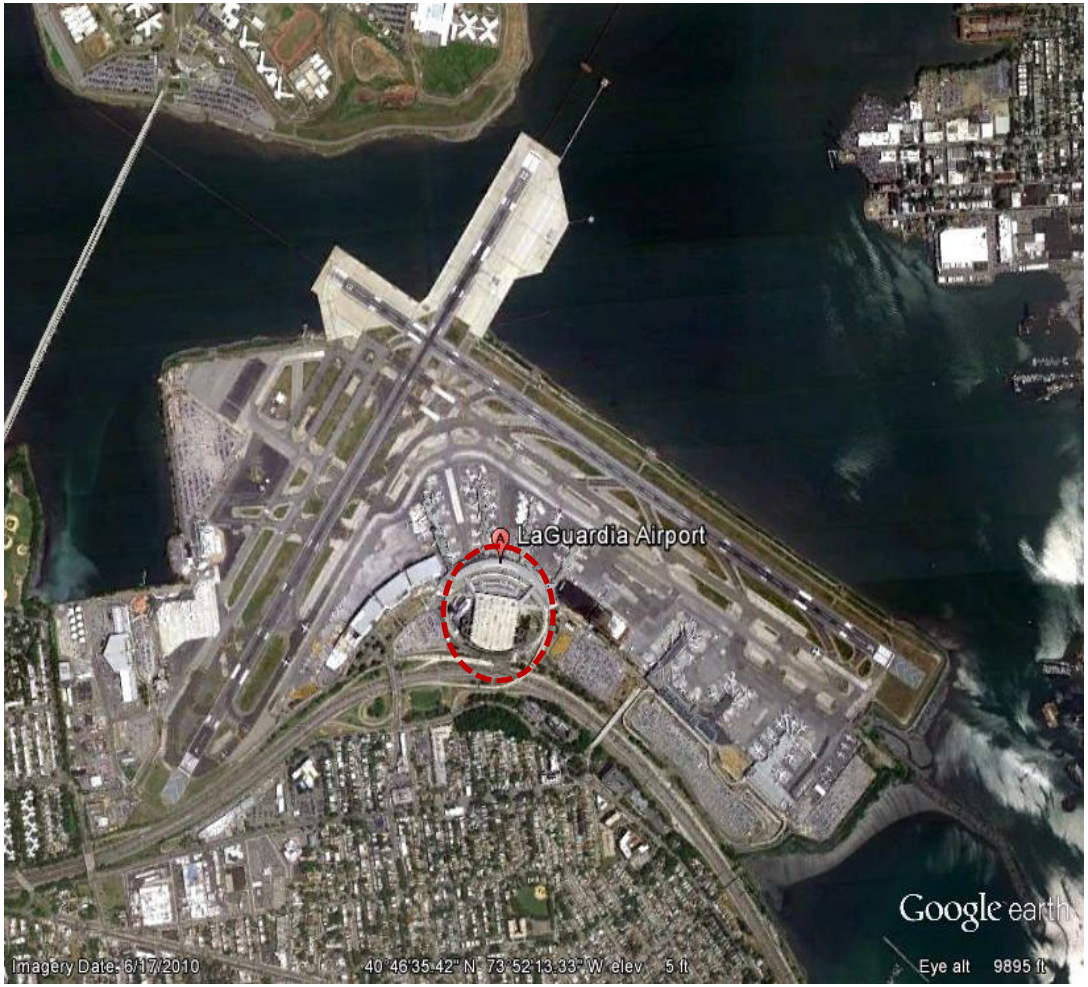
PANYNJ Adaptation Program
LaGuardia Airport

- **Central Terminal Redevelopment Plan** $3.6B
  - Interim Design Criteria
  - LEED Building



PANYNJ Adaptation Program
LaGuardia Airport

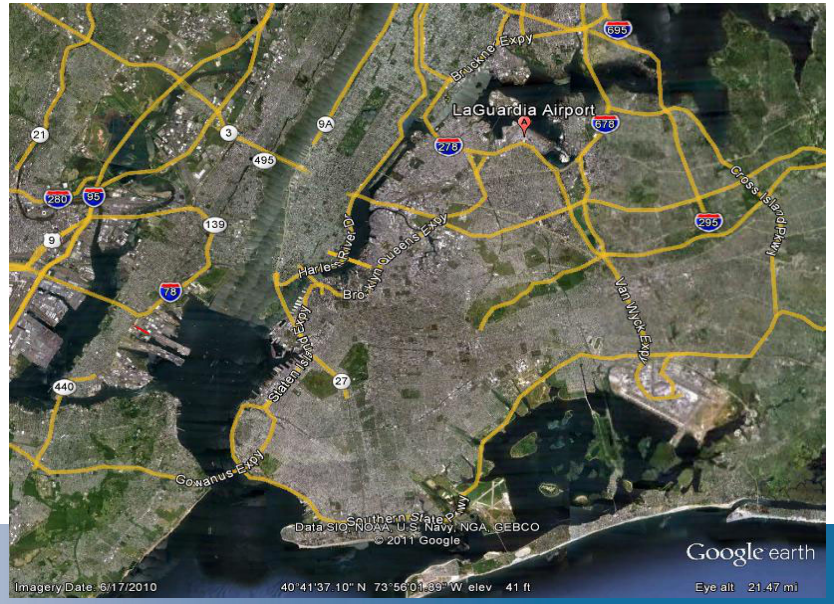
- **Issues**
  - Other Infrastructure
    - Runways
    - 3 Other Terminals
  - **Surrounded by**
    - **Water**
    - **Community**



PANYNJ Adaptation Program

LaGuardia Airport

- **Issues**
  - Connectivity
    - Roads
    - Subways/Trains
    - Bus



PANYNJ Adaptation Program
Challenges Towards Adaptive Management

- **Funding and Budgeting**
  - Capital Planning
  - Economic Realities
- **Standardized Guidance**
- **Immediate Problems**
  - Aging Infrastructure
  - Congestion and Growth
  - Economy
- **Geographical and Operational Boundaries**
  - Infrastructure Location
  - Transportation System–wide Planning
- **Technology and Research**
  - Hard Infrastructure Limitations
  - Costs and Benefits

PANYNJ Adaptation Program
Recommendations

- **Promote Research**
  - Region specific sea level rise projections
  - Regionalized flood severity trends
- **Standardized Climate Change Projections**
  - Sea level rise and storm surge
  - Precipitation rates
  - Temperature: extremes and averages
  - Wind?
- **Standardized System Level Guidance**
  - Adaptation strategies: comprehensive toolbox
  - Cost-benefit analyses
- **Funding**

Thank you