
**PLAN FORMULATION
APPENDIX**

**NEW JERSEY BACK BAYS
COASTAL STORM RISK MANAGEMENT
FEASIBILITY STUDY**

PHILADELPHIA, PENNSYLVANIA

APPENDIX A

March 2019

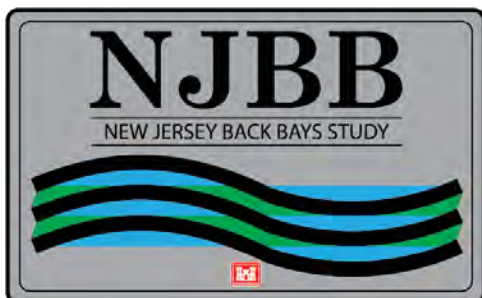


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A-1) EXISTING CSRM STUDIES, REPORTS, PROJECTS, ACTIONS AND PROGRAMS

Coastal storm risk is managed along the Atlantic Ocean coast of New Jersey by a number of Federal CSRM projects. However, the NJBB study area is presently exposed to significant coastal/tidal flood risk, due to the scattered number of constructed Federal (Figure 1 and 2, Table 1 2 and 3) and State (Figure 3; Table 4 and 5) coastal storm risk management projects thus resulting in non-comprehensive coastal flooding risk management.

Federal Efforts

The U.S. Department of the Interior received \$360 million in appropriations for mitigation actions to restore and rebuild national parks, national wildlife refuges, and other Federal public assets through resilient coastal habitat and infrastructure. The full list of funded projects can be found at <http://www.nfwf.org/hurricanesandy/Documents/doi-projects.pdf>.

In August 2013, the Department of the Interior (DOI) announced that USFWS and the National Fish and Wildlife Foundation (NFWF) would assist in administering the Hurricane Sandy Coastal Resiliency Competitive Grants Program, which will support projects that reduce communities' vulnerability to the growing risks from coastal storms, SLC, flooding, erosion, and associated threats through strengthening natural ecosystems that also benefit fish and wildlife (NFWF 2013). The Hurricane Sandy.

Coastal Resiliency Competitive Grants Program will provide approximately \$100 million in grants for over 50 proposals to those states that were affected by Hurricane Sandy. States affected is defined as those states with disaster declarations as a result of the storm event. The grants range from \$100,000 to over \$5 million and were announced on June 16, 2014. More information on the program can be found at www.nfwf.org/HurricaneSandy.

In 2018, the National Fish and Wildlife Foundation and National Oceanic and Atmospheric Administration (NOAA) commenced a partnership that will restore, increase and strengthen natural infrastructure to protect coastal communities, while also enhancing habitats for fish and wildlife. This National Coastal Resilience Fund will invest up to \$30 million in the restoration or expansion of natural features such as coastal marshes and wetlands, dune and beach systems, oyster and coral reefs, mangroves, forests, coastal rivers, and barrier islands that help minimize the impacts of storms, rising sea levels and other extreme events on nearby communities and infrastructure.

More information is available at <https://www.nfwf.org/coastalresilience/Pages/home.aspx>.

HUD has allocated approximately \$13 billion for recovery actions, including Rebuild by Design, to rebuild areas affected by Hurricane Sandy through the Community Development Block Grant Program (CDBG), with an additional \$2.5 billion identified for future allocation upon approval of the amendments to the State and City Disaster Recovery Plans. In the State of New Jersey, \$3.79 billion of CDBG funds were made available for areas affected by Hurricane Sandy, with an additional \$881 million identified for future allocation upon approval of the amendment to the State and City Disaster Recovery Plans. More information is available at www.hud.gov/sandy.

State Efforts

The New Jersey Department of Environmental Protection Division of Coastal Engineering (the non-Federal Sponsor) administers the NJ Shore Protection Program. New Jersey's Shore Protection Program was created through state legislation, to provide for the protection of life and property along the coast, preserve the vital coastal resources of New Jersey, and maintain safe and navigable waterways throughout the state. The Division of Coastal Engineering is responsible for administering this program throughout the state using the \$25,000,000 annual appropriation from the Shore Protection Fund. Approximately \$20 million of the \$25 million per year is dedicated to cost-share matches for federal USACE projects and state/Local shore protection projects.

The NJ Office of Emergency Management has produced the State of New Jersey Hazard Mitigation Plan (State of New Jersey 2012) that details the risk to population and infrastructure from flooding, coastal storm damage, sea level change, and other factors. The localities have also produced similar plans, which are regularly updated. The New Jersey Department of Environmental Protection is the state's primary point of contact for CSRMs and flood risk management laws and programs for the State of New Jersey.

The New Jersey Department of Community Affairs (NJDCAs) Action Plan/NJ Community Development Block Grant (CDBG) Disaster Recovery Plan (NJDCAs, 2014) is part of the process to allocate HUD CDBG Disaster Recovery funds to rebuild areas affected by Hurricane Sandy. This plan quantifies the level of damage known thus far based on current data and describes New Jersey's plan for spending the \$3,290,000,000 Community Disaster Block Grant Disaster Recovery (CDBG-DR) funds, which HUD allocated to New Jersey as part of its initial \$5,400,000,000 fund allocation. To address New Jersey's housing needs, the state will undertake a number of initiatives including: (1) Providing funding assistance for reconstruction and rehabilitation programs that focus primarily, but not exclusively, on low and moderate income households; (2) developing adequate, storm-resistant housing that will meet building standards and incorporate mitigation measures, including green technologies, where feasible and/or housing elevations, which may require construction to FEMA's Advisory Base Flood Elevation maps; (3) providing resettlement and re-occupancy incentives to homeowners contemplating selling or abandoning their homes post-storm; (4) developing affordable rental housing across household income levels, with a focus on serving low and moderate income households and priority given to the nine counties identified by HUD as most impacted by the storm.

Several State of New Jersey universities were tasked with analyzing vulnerable storm affected regions in order to identify structural, non-structural, and natural flood mitigation solutions and strategies. Broad applicability to other regions of the state with similar risk profiles is also being considered in these evaluations. Final reports of these studies are still under development. Draft reports made available in May 2014 are summarized below.

The beneficial use of dredged material to identify and restore wetlands for coastal flood mitigation in Barnegat Bay was analyzed by Richard Stockton College (Stockton College, 2014). This report discusses that there is a need to beneficially reuse dredged material since existing capacity at placement sites is limited and many state channels are shoaled as a result of Hurricane Sandy. As a result, there is a sufficient amount of dredged material for marsh edge restoration projects within Barnegat Bay that has the potential to reduce coastal storm surge and wave damage to communities along the Barnegat Bay shoreline.

Rutgers also identified flood risk reduction strategies for Barnegat Bay (Rutgers, 2014). Existing strategic solutions are reviewed, and new strategic solutions are presented which can be further applied to areas with similar field conditions. These solutions include new and enhanced bulkheads and concrete flood walls with movable panels/parts to increase structure height, levees with culvert/pipe with check valve, elevation of residences and roadways as well as consideration of sluice gates, flood gates and pump stations. A Framework for Coastal Flood Risk Reduction is also provided which addresses both short-term as well as more regional long-term solutions. These efforts are considered for five municipalities including Point Pleasant Borough, Brick Township, Toms River Township, Stafford Township and Little Egg Harbor Township.

The Rutgers Climate Change Adaptation Alliance developed a report titled “Resilience: Preparing New Jersey for Climate Change,” which identifies steps to be taken towards the goal of developing policy recommendations to enhance climate change preparedness.

The New Jersey Living Shorelines Program has been developed to encourage and effectively implement New Jersey-appropriate living shorelines and related natural and nature-based infrastructure methodologies and policies tailored to New Jersey’s coastal environment. The program addresses (1) excessive shoreline erosion and SLC causing the loss of beneficial natural areas and related habitat and (2) the adverse impacts of traditional “hard” structural-only stabilization in order to protect/enhance natural systems that will provide resilient ecological and economic protection/mitigation for the expected changes due to future coastal shoreline impacts.

Non-Governmental Organization Efforts

The Barnegat Bay Partnership (BBP) continues to advance the principles of the Delaware Estuary Living Shoreline Initiative by inventorying living shoreline opportunities towards building coastal wetland resilience for Barnegat Bay (PDE, 2013). The BBP also discusses restoration and recovery principles for coastal resilience in Barnegat Bay in a document titled ‘Building a Resilient Barnegat Bay’ (<http://bbp.ocean.edu/>).

Structures of Coastal Resilience (SCR) is a Rockefeller Foundation supported project dedicated to studying and proposing resilient designs for urban coastal environments in the North Atlantic region. The Princeton team favors an approach to resilience that considers non-structural strategies, including elevating houses and infrastructure, which anticipates rising sea levels and calibrates wetland migration to create a livable future in the back bay of Atlantic City.



New Jersey Back Bays Study Federal (USACE) Projects

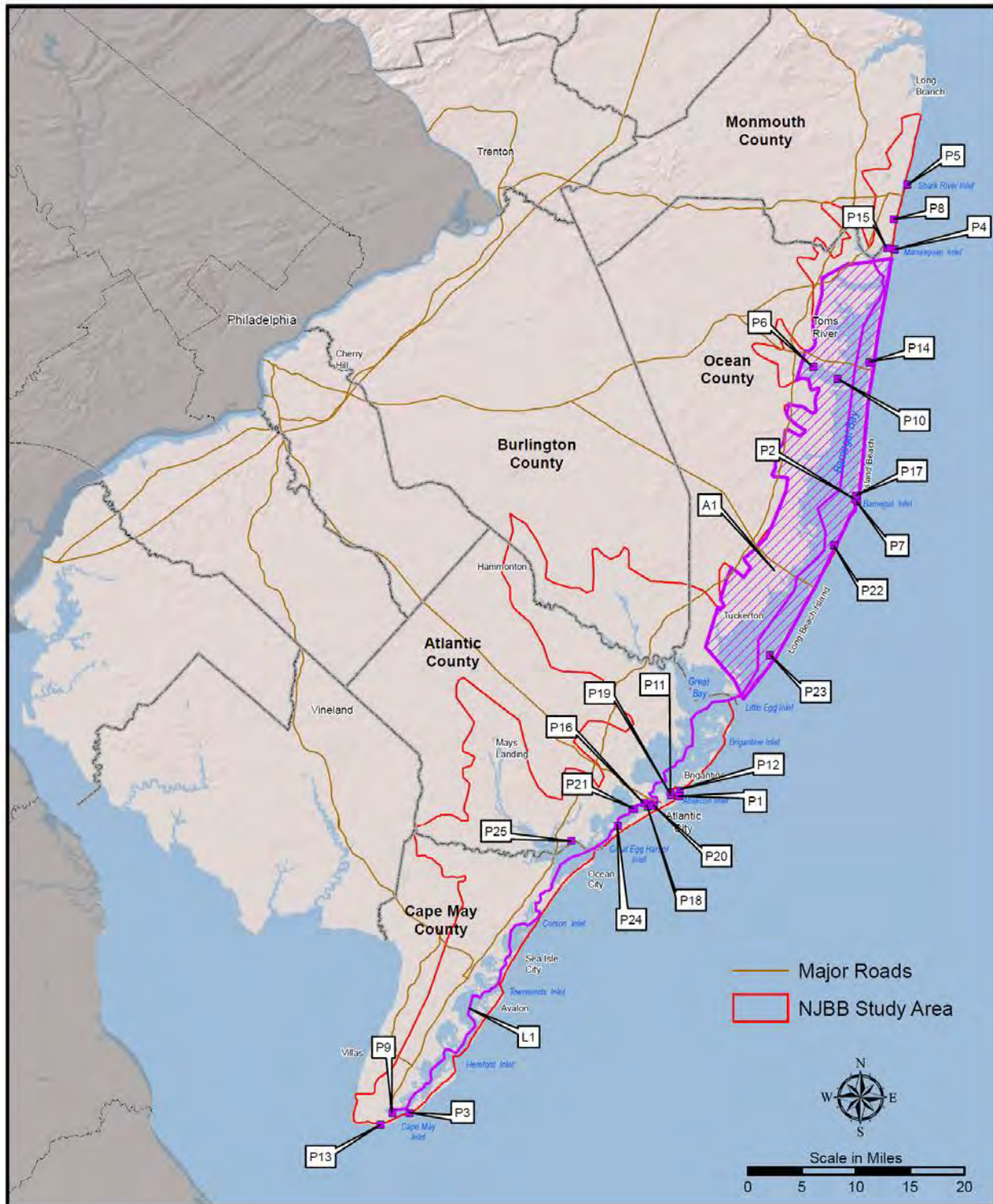


Figure 1. NJBB Study Area, USACE Projects

Table 1: NJBB Study Area, USACE Projects

USACE Projects and Studies in NJBB Study Area			
Project Type	Map ID	Project Name	Phase
Existing USACE Projects			
NV	P1	Absecon Inlet	N
NV	P2	Barnegat Inlet	N
NV	P3	Cold Spring (Cape May) Inlet	N
NV	P4	Manasquan Inlet	N
NV	L1	New Jersey Intracoastal Waterway	N
NV	P5	Shark River Inlet	N
NV	P6	Toms River	N
General Investigations Studies			
NV/CSR/MS	P7	Barnegat Inlet Regional Sediment Management	S
ER	A1	Barnegat Bay Watershed Study	S
ER/MS	L1	New Jersey Intracoastal Waterway Feasibility Study	S
ER/CSR	P8	Wreck Pond Watershed, Monmouth County, NJ	S
Continuing Authorities Program Projects and Studies			
CSR	P9	Cape May City , NJ, Del Ave (Sec14)	S
CSR	P10	Ocean Gate, NJ (Sec 14)	C
CSR	P11	Snug Harbor, Atlantic City, NJ (Sec 14)	S
CSR	P12	Brigantine Island, Southern End, NJ (Sec 103)	S
CSR	P13	Cape May City , NJ, Seawall (Sec103)	S
CSR	P14	Seaside Park, NJ (Sec 103)	S
NV	P15	Wills Hole Thorofare, Ocean County, NJ (Sec 107)	
ER/MS	P16	New Jersey Intracoastal Waterway Dredged Hole 34 Restoration (Sec 204)	S
CSR/MS	P17	Sedge Island Protection, Ocean County, NJ (Sec 204)	C
CSR	P18	Chelsea Heights, Atlantic City, NJ, (Sec 205)	S
CSR	P19	Massachusetts Avenue, Flood Risk Mgmt. , Atlantic City, NJ (Sec 205)	S
CSR	P20	Sunset Avenue, Atlantic City, NJ, (Sec 205)	S
CSR	P21	Ventnor, NJ, Back Bay Bulkheads, (Sec 205)	S
ER/MS	P22	Environmental Restoration of Dredged Hole #6 (Sec 1135)	C
ER/MS	P23	Mordecai Island (Sec 1135)	S
CSR	P24	Margate City, NJ	S
CSR	P25	Somers Point City, NJ	S
Initiatives			
ER/CSR		Systems Approach to Geomorphic Engineering (SAGE): Barnegat Bay	S
Project Type		Phase	
CSR = Coastal Storm Risk Management ER = Ecosystem Restoration NV = Navigation RSM = Regional Sediment Management		C = Initial Construction Completed N = Navigation Maintenance S = Study	

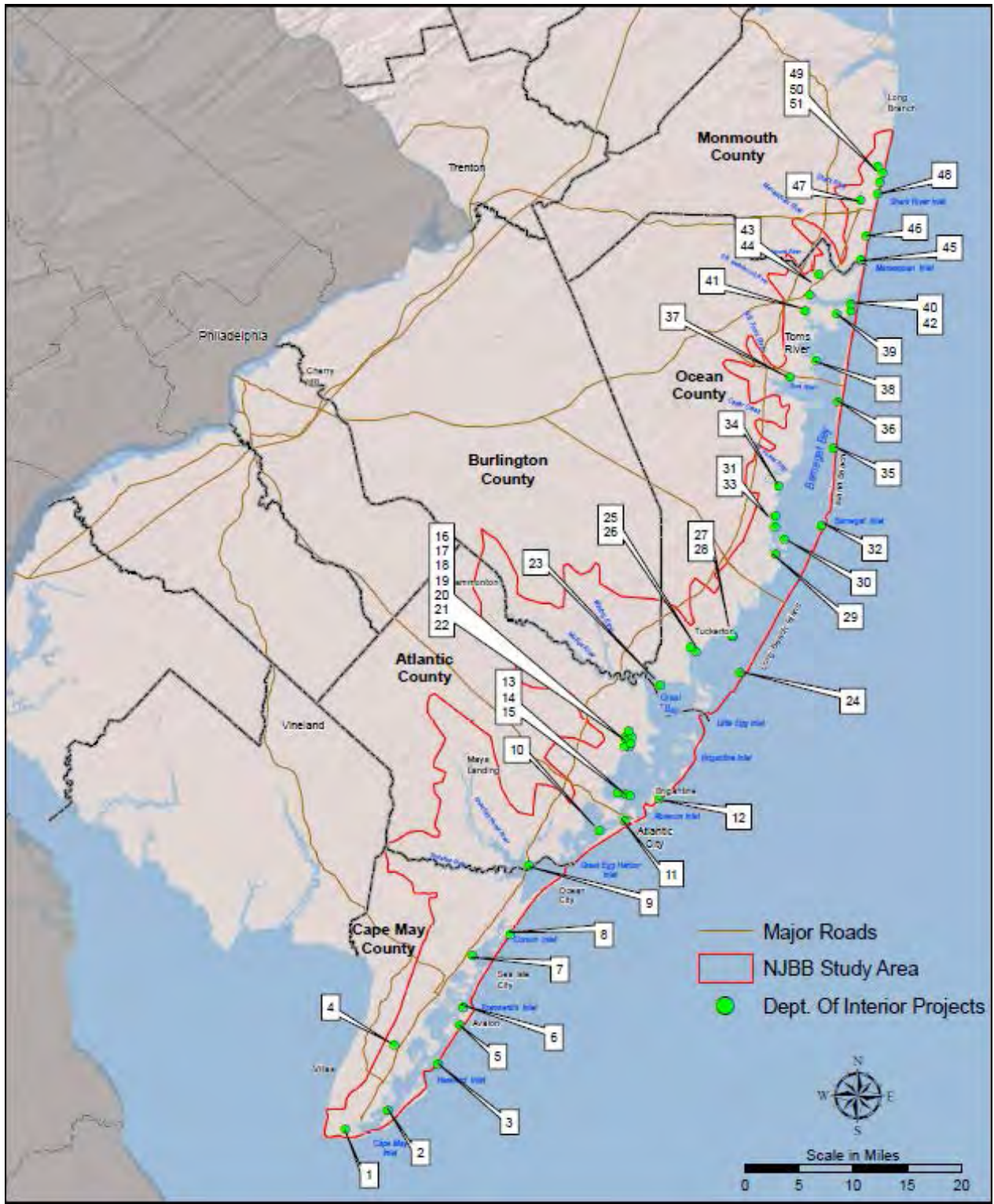


Figure 2: NJBB Study Area, Department of Interior Projects

Table 2: NJBB Study Area, Department of Interior Projects to Accompany Figure 2

MAP-ID	AGENCY	PROJECT
1	NJDEP - Office of Nat. Resc. Restoration	Higbee Beach Wildlife Management Area Restoration Project
2	Environmental Law Institute	Local Government Implementation of Coastal Resilience Tools
3	New Jersey Audubon Society	Beach Restoration at Southern Seven Mile Island, New Jersey
4	Conserve Wildlife Foundation of NJ, Inc.	Enhancing and Protecting Vernal Pools in New Jersey
5	NJDEP - Office of Nat. Resc. Restoration	Beneficial Reuse of Dredge Material to Restore Salt Marshes
6	The Nature Conservancy	Regional assessment of natural infrastructure projects
7	University of Massachusetts	Initiative for Climate Extremes
8	Rutgers University	Regional Vulnerability Assessment
9	City of Ocean City, NJ 08226	Restore Damaged Wetlands on Islands in Great Egg Harbor Bay
10	Princeton University	Ventnor NJ Wetland & Comm. Coastal Resiliency Assessment
11	The Nature Conservancy, New York	Northeastern Marsh Elevation Monitoring Cooperative
12	City of Brigantine, New Jersey	Brigantine Island Sand Back-Passing
13	Princeton	Atlantic City NJ Strategies and Design
14	Princeton	Atlantic City NJ Hurricane Storm Surge Hazards Assessment
15	Princeton	Atlantic City NJ Local Sea Level Rise Projections
16	The Richard Stockton College of NJ	Beach Replenishment Effects on Downdrift Habitats
17	Polistes Foundation, Inc.	Chemical Contaminants in Piping Plover Eggs and Prey (NJ)
18	University of Louisiana at Lafayette	Prioritizing Reforestation Efforts in Maritime Forests
19	Rutgers, The State University of NJ	A reference site to assess resilience of salt marsh restoration
20	NJDEP	NJ Tidal Wetlands: Resilient and Sustainable into the Future
21	Rutgers, The State University of NJ	Develop a Protocol, Monitor & Assess Bay Shoreline Changes
22	University of Delaware	Assessing coastal restoration for black duck resiliency
23	NJ Dept. of Environmental Protection	Mullica River/Great Bay Oyster Enhancement and Restoration
24	Mordecai Land Trust	The Mordecai Island Coastal Wetlands Restoration Project
25	NJDEP	Improve Estuarine Water-Quality and Ecological Resiliency
26	Little Egg Harbor Township	Marsh Restoration and Replenishment, Little Egg Harbor NJ
27	NJ Dept. of Environmental Protection	Barnegat Bay Shellfish Resource Restoration Education.
28	NERACOOS	Improving Access and Usability of Storm-Related Data
29	Barnegat Bay Partnership	Resiliency assessment of sea nettle blooms in Barnegat Bay.
30	Drexel University	Lessons from Hurricane Sandy:
31	The Leatherback Trust	Impact of Hurricane Sandy on Barnegat Bay, New Jersey
32	NJDEP	Building Ecological Solutions to Coastal Community Hazards
33	Partnership for the Delaware Estuary, Inc.	Living Shorelines & Marsh Futures for Coastal Resilience
34	Clean Ocean Action	Regional Dredged Material Mgmt. Plan for Barnegat Bay
35	University of Massachusetts, Amherst	Enhancing Resiliency of Streams and Transportation Systems
36	The Nature Conservancy	Building a More Resilient Northeast Coast to Reduce Risk
37	Barnegat Bay Partnership	Long Swamp Creek (NJ) â€™ Flood Mitigation Assessment

38	New Jersey Institute of Technology	Living With Water: Resiliency Assessments/Designs/Projects
39	Township of Middletown	Monmouth-Ocean Storm Resiliency(New Jersey)
40	The Trust for Public Land	Converting a Marina to Natural Buffer at Mantoloking Bridge
41	Township of Brick	Township of Brick Cherry Quay Pond Restoration Project
42	Montclair State University	Developing Resilience in SAV Habitats through Restoration
43	Brick Township Municipal Utilities Authority	Building the Resiliency of a Coastal New Jersey Water Supply
44	Township of Brick	Township of Brick Coastal Resiliency Assessment & Plan
45	Borough of Manasquan	Deep Creek Salt Marsh Restoration Project
46	NJDEP	Wreck Pond Berm and Living Shoreline to Enhance Resiliency
47	Neptune Township	Shark River Living Shoreline
48	Borough of Bradley Beach	Fletcher and Sylvan Lakes Habitat Resiliency Restoration
49	Ocean Grove Camp Meeting Association	Ocean Grove Dune Restoration Project
50	HUD	Coastal Commercial Resiliency Financing - Asbury Park
51	Deal Lake Commission	Deal Lake Tributary Stream Restoration and Resiliency Plan

Table 3: NJBB Study Area, Department of Interior Projects

Other (non-USACE) Federal Projects and Studies in NJBB Study Area			
Project Type	Project Name	Partner Agency/Organization	Phase
Department of Interior – Hurricane Sandy Coastal Resiliency Grant Projects			
CSR/ER	Atlantic City Living Shoreline Project	NJDEP –Office of Coastal Land Use and Planning	S
CSR/ER	Brigantine City Living Shoreline Project	NJDEP –Office of Coastal Land Use and Planning	S
CSR/ER	Upper Township Living Shoreline Project	NJDEP –Office of Coastal Land Use and Planning	S
CSR/ER	Avalon-Stone Harbor Living Shoreline Project	NJDEP –Office of Coastal Land Use and Planning	C
CSR/ER	Somers Point City Living Shoreline Project	NJDEP –Office of Coastal Land Use and Planning	S
CSR/ER	Margate City Living Shoreline Project	NJDEP –Office of Coastal Land Use and Planning	S
CSR/ER	Beneficial Reuse of Dredge Material to Restore Salt Marshes	NJDEP - Office of Natural Resource Restoration	U
CSR/ER	Restoring Over One Hundred Wetland Acres in Great Egg Harbor Bay (NJ)	City of Ocean City, NJ 08226	S
CSR/ER	Replenishing Little Egg Harbor’s Marshes and Wetlands (NJ)	Little Egg Harbor Township	S
CSR	Improving Access and Usability of Storm-Related Data	Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS)	S
Other Department of Interior Projects			
CSR/ER	Regional assessment of natural infrastructure projects	The Nature Conservancy	Un
CSR	Initiative for Climate Extremes	University of Massachusetts	Un
CSR	Regional Vulnerability Assessment	Rutgers University	Un
CSR	Ventnor NJ Wetland & Community Coastal Resiliency Assessment	Princeton University	Un
CSR	Northeastern Marsh Elevation Monitoring Cooperative	The Nature Conservancy, New York	Un
CSR	Brigantine Island Sand Back-Passing	City of Brigantine, New Jersey	Un
CSR	Atlantic City NJ Strategies and Design	Princeton	Un
CSR	Atlantic City NJ Hurricane Storm Surge Hazards Assessment	Princeton	Un
CSR	Atlantic City NJ Local Sea Level Rise Projections	Princeton	Un
CSR/ER	Beach Replenishment Effects on Downdrift Habitats	The Richard Stockton College of New Jersey	Un
ER	Chemical Contaminants in Piping Plover Eggs and Prey (NJ)	Polistes Foundation, Inc.	Un
ER	Prioritizing Reforestation Efforts in Maritime Forests	University of Louisiana at Lafayette	Un
ER	A reference site to assess resilience of salt marsh restoration	Rutgers, The State University of New Jersey	Un
ER	NJ Tidal Wetlands: Resilient and Sustainable into the Future	NJDEP	Un

Other (non-USACE) Federal Projects and Studies in NJBB Study Area			
Project Type	Project Name	Partner Agency/Organization	Phase
CSRM	Develop a Protocol, Monitor & Assess Bay Shoreline Changes	Rutgers, The State University of New Jersey	Un
ER	Assessing coastal restoration for black duck resiliency	University of Delaware	Un
ER	Mullica River/Great Bay Oyster Enhancement and Restoration	NJ Department of Environmental Protection	Un
ER	The Mordecai Island Coastal Wetlands Restoration Project	Mordecai Land Trust	Un
ER	Improve Estuarine Water-Quality and Ecological Resiliency	NJDEP	Un
CSRM/ER	Marsh Restoration and Replenishment, Little Egg Harbor NJ	Little Egg Harbor Township	Un
ER	Barnegat Bay Shellfish Resource Restoration Education.	NJ Department of Environmental Protection	Un
ER	Resiliency assessment of sea nettle blooms in Barnegat Bay.	Barnegat Bay Partnership	Un
CSRM	Lessons from Hurricane Sandy:	Drexel University	Un
ER	Impact of Hurricane Sandy on Barnegat Bay, New Jersey	The Leatherback Trust	Un
CSRM/ER	Living Shorelines & Marsh Futures for Coastal Resilience	Partnership for the Delaware Estuary, Inc.	Un
CSRM/ER	Regional Dredged Material Management Plan for Barnegat Bay	Clean Ocean Action	Un
CSRM	Enhancing Resiliency of Streams and Transportation Systems	University of Massachusetts, Amherst	Un
CSRM	Building a More Resilient Northeast Coast to Reduce Risk	The Nature Conservancy	Un
CSRM	Long Swamp Creek (NJ) Flood Mitigation Assessment	Barnegat Bay Partnership	Un
CSRM	Living With Water: Resiliency Assessments/Designs/Projects	New Jersey Institute of Technology	Un
CSRM	Monmouth-Ocean Storm Resiliency(New Jersey)	Township of Middletown	Un
CSRM/ER	Converting a Marina to Natural Buffer at Mantoloking Bridge	The Trust for Public Land	Un
CSRM/ER	Township of Brick Cherry Quay Pond Restoration Project	Township of Brick	Un
CSRM/ER	Developing Resilience in SAV Habitats through Restoration	Montclair State University	Un
CSRM	Building the Resiliency of a Coastal New Jersey Water Supply	Brick Township Municipal Utilities Authority	Un
CSRM	Township of Brick Coastal Resiliency Assessment & Plan	Township of Brick	Un
CSRM/ER	Deep Creek Salt Marsh Restoration Project	Borough of Manasquan	Un
CSRM/ER	Wreck Pond Berm and Living Shoreline to Enhance Resiliency	NJDEP	Un
CSRM/ER	Shark River Living Shoreline	Neptune Township	Un
ER	Fletcher and Sylvan Lakes Habitat Resiliency Restoration	Borough of Bradley Beach	Un
CSRM	Coastal Commercial Resiliency Financing - Asbury Park	HUD	Un

Other (non-USACE) Federal Projects and Studies in NJBB Study Area			
Project Type	Project Name	Partner Agency/Organization	Phase
CSR/ER	Deal Lake Tributary Stream Restoration and Resiliency Plan	Deal Lake Commission	Un
National Oceanic and Atmospheric Administration			
	Activity 1: Maintain water level stations and collect water level and ellipsoidal data in NY, NJ, CT, and RI to refine datum models to support hydro and shoreline surveys from Rhode Island to New Jersey (CO-OPS). Activity 2: Establish global positioning system observations for determining geodetic to ellipsoid relationships at historic tidal gauge sites (NGS).	N/A	C
	Contract topometric-bathymetric LiDAR data collection of the shoreline in the highest impact areas (primarily NY/NJ).	N/A	Un
	Hurricane Sandy caused extensive damage to the seawater system (part of the lab building) and building 74. Site is part of the National Park Service (NPS) Gateway National Recreation Area. The state of NJ has leases with the NPS and leases the NPS Building 74 and NJ-owned lab. Annex site is proposed on former lab site (burned down in 1985 from arson).	N/A	Un
Project Type		Phase	
CSR = Coastal Storm Risk Management ER = Ecosystem Restoration NV = Navigation RSM = Regional Sediment Management		C = Initial Construction Completed U = Under Construction N = Navigation Maintenance S = Study Un = Unknown	



New Jersey Back Bays Study

State Projects



ID	TOWN	PROJECT TYPE
1	Wildwood	SHORE PROTECTION
2	Wildwood Crest	SHORE PROTECTION
3	Middle	SHORE PROTECTION
4	Galloway	SHORE PROTECTION
5	Port Republic	SHORE PROTECTION
6	Berkeley	SHORE PROTECTION
7	Manasquan	SHORE PROTECTION
8	Belmar	NAVIGATION
9	Berkley Island	CSRM/ER
10	Little Egg Harbor	CSRM/ER
11	Sedge Island Wildlife Area	CSRM/ER
12	Atlantic City	NAVIGATION
13	Egg Harbor	CSRM

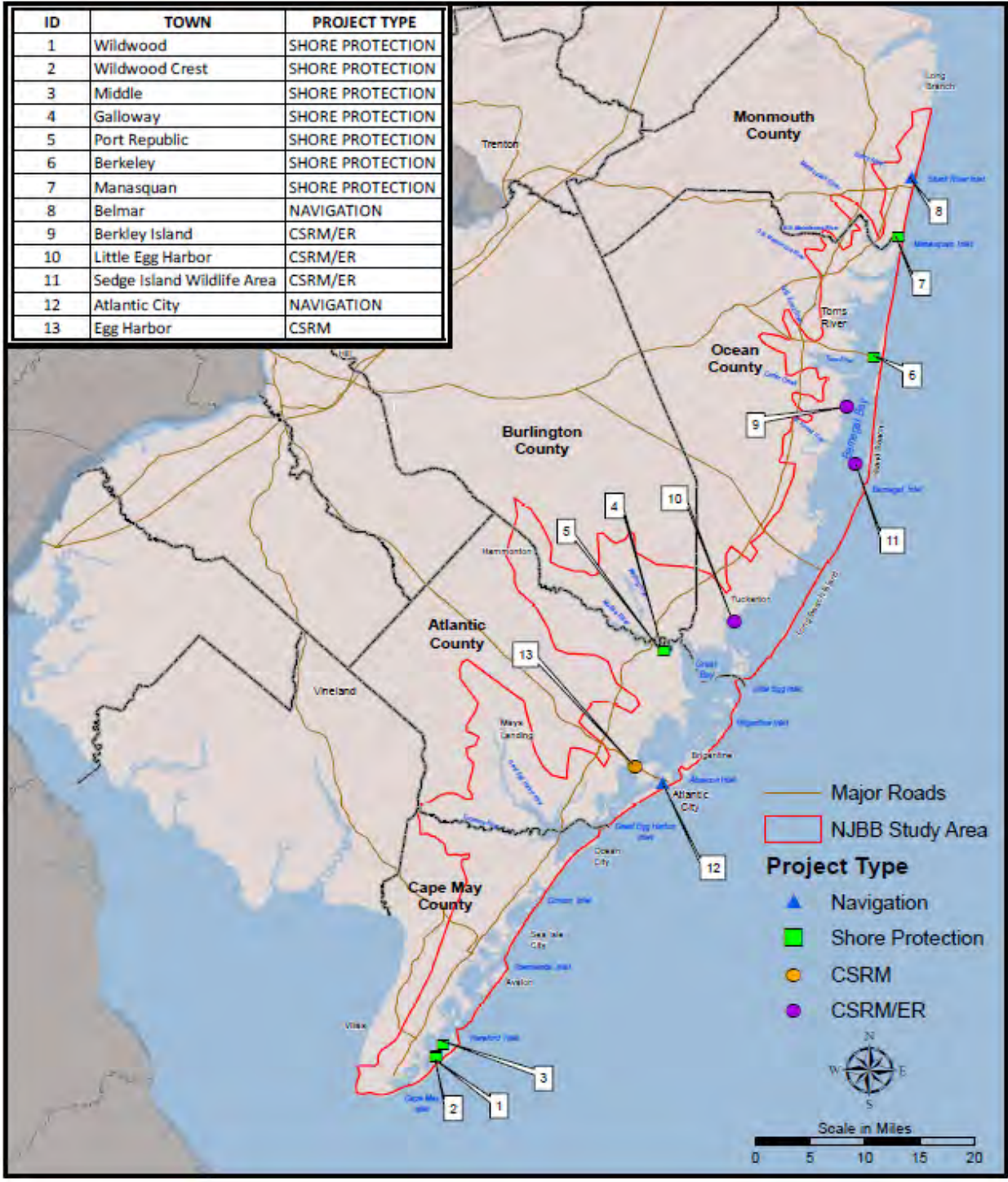


Figure 3; NJBB Study Area, State Projects

Table 4; NJBB Study Area, State Projects

State Projects and Studies in the NJBB Study Area			
Project Type	Map ID	Project Name	Phase
New Jersey Department of Environmental Protection			
CSRM	1	Wildwood	C
CSRM	2	Wildwood Crest	C
CSRM	3	Middle	C
CSRM	4	Galloway	C
CSRM	5	Port Republic	C
CSRM	6	Berkeley	C
CSRM	7	Manasquan	C
NV	8	Belmar	C
CSRM		Coastal Vulnerability Index Mapping	S
CSRM/ER	9	Berkley Island County Park Living Shorelines Project	S
CSRM/ER	10	Little Egg Harbor Blvd Living Shorelines Project	S
CSRM/ER	11	Sedge Island Living Shorelines Project	S
Other State Agencies			
CSRM	12	Route 40 Drainage Improvements, Egg Harbor Township, NJ (New Jersey Department of Transportation)	S
NV	13	Atlantic City Intracoastal Waterway Relocation Feasibility Study (South Jersey Transportation Authority)	S
Project Type		Phase	
CSRM = Coastal Storm Risk Management		C = Initial Construction Completed	
ER = Ecosystem Restoration		U = Under Construction	
NV = Navigation		N = Navigation Maintenance	
RSM = Regional Sediment Management		S = Study	
		Un = Unknown	

Table 5: NJBB Study Area, Local, NGO, and Academic Projects

Local, NGO, and Academic Projects and Studies in the NJBB Study Area		
Project Type	Project Name	Phase
Municipalities		
CSRM	Road Elevations at Seaview Meadows, Snake Road, and South Drive, Brick Township	S
CSRM	Flood Risk Study, Manasquan	S
CSRM	Flood Valves in Silver Lake, Belmar	S
CSRM	Ocean Outfalls with Tide Valve Controls in Lake Como, Belmar	S
CSRM	Tide Surge Gate on Shark River, Belmar	S
CSRM	Bayside Wave Dissipating Wall, Reduction of Outfalls, Installing Tide Flux Valves at Outfalls, Seaside Park	S
CSRM	Installation of Tideflex Valves on Outfalls, Neptune Township	C
CSRM	Replacement of Cape Island Creek Tidegate (Cape May)	C
CSRM	Elevation of Sea Isle Blvd, Middle Township	U
CSRM	Additional bulk heading along S. Riverside Drive and upgrading outfalls, installing new bulkheads, installing tideflex valves, and elevating portions of S. Concourse, Neptune Township	S
Non-Governmental Organizations and Academic Institutions		
CSRM	Structures of Coastal Resilience Study, Chelsea Heights, Atlantic City, NJ (Rockefeller Foundation)	S
CSRM	Economic Vulnerability and Adaptation to Climate Hazards and Climate Change: Building Resilience in the Barnegat Bay Region (Barnegat Bay Partnership and Rutgers University)	S
CSRM/ER	Tuckerton Living Shorelines Project (American Littoral Society (ALS))	S
CSRM/ER	Tuckerton Living Shorelines Project (The Nature Conservancy)	S
CSRM/ER	Cattus Island Living Shoreline Project (Barnegat Bay Partnership (BBP))	S
CSRM/ER	Good Luck Point Living Shoreline Project (American Littoral Society)	S
ER	Barnegat Bay Shellfish Restoration Project – Good Luck Point Reef (ALS, BBP, Rutgers Institute of Marine and Coastal Sciences, ReClam the Bay, NJDEP, Restore America’s Estuaries, Rutgers Cooperative Research and Extension of Ocean County)	C
ER	Little Egg Harbor Eelgrass Restoration (USFWS, BBP, Jacques Cousteau National Estuarine Research Reserve, Forsythe National Wildlife Refuge, Rutgers University Marine Field Station)	C
ER/CSRM/RSM	Beneficial Use of Dredged Material to Restore Wetlands for Coastal Flood Mitigation, Barnegat Bay, New Jersey. (Stockton University)	S
CSRM	Storm Surge Reduction Alternatives for Barnegat Bay (Stevens Institute of Technology)	S
CSRM	Strategies for Flood Risk Reduction for Vulnerable Coastal Populations around Barnegat Bay. (Rutgers University)	S
Project Type		Phase
CSRM = Coastal Storm Risk Management ER = Ecosystem Restoration NV = Navigation RSM = Regional Sediment Management		C = Initial Construction Completed U = Under Construction N = Navigation Maintenance S = Study Un = Unknown

A-2) REGION SPECIFIC PLANNING PROBLEMS

The New Jersey Back Bays study area has been divided into five regions with relative hydraulic independence. However, within each region all of the inlets are interdependent, with project performance requiring the closure of all inlets to maintain a reasonable level of stage height reduction during coastal storm events. Region-specific planning problems and opportunities have been identified and used to develop potential measures and alternative plans appropriate to each area. An overview of the similarities and differences between the regions is presented in the following paragraphs.

Coastal Lakes Region

This region includes two discontinuous segments separated by the Shark River Region, which is discussed in the following paragraph. The Coastal Lakes region is almost entirely urbanized and includes all or portions of fifteen municipalities and eight coastal lakes in Monmouth County. None of the lakes is presently connected to the Atlantic Ocean via a tidal inlet; however, 19th Century mapping shows that the lakes at the time were in fact small tidal estuaries, with each inlet subsequently closed by natural or human actions. Most of the lakes have some form of water level management that allows high lake levels to be reduced by discharge to the ocean. For example, Lake Takanassee drains to the Atlantic Ocean under “normal” tidal conditions through a buried culvert that is controlled by a tide gate. Because there are no tidal inlets connected to these lakes, they are subject to a different type of flood risk and will consequently require an alternate method of analysis. Potential flood pathways for these lakes include fluvial (precipitation) flooding, ocean wave and storm surge overtopping of the barrier beach, and ocean storm surge flooding that “backs up” from the ocean into the lake through the underground drainage conduits.

Shark River Region

The Shark River Region includes the Shark River estuary and all or portions of seven highly urbanized municipalities in Monmouth County. This region experienced some of the highest storm surge elevations within the study area during Hurricane Sandy. The storm flooding problem is principally related to the ability of elevated ocean water levels to pass through Shark River Inlet and inundate the adjoining land areas. Under ordinary tidal conditions, this is an isolated hydraulic reach; there is no tidal connection between the Shark River estuary and the Manasquan Inlet estuary to the south.

North Region

The north region of the New Jersey Back Bays Study Area extends from Manasquan Inlet and the Manasquan River Estuary south to Little Egg Harbor Inlet and the Mullica River/Great Bay estuary. This is the largest region established for the New Jersey Back Bays analyses. It covers about 510 square miles and includes all or portions of 45 municipalities in Ocean, Burlington, and Atlantic Counties.

The boundaries of the North Region were chosen to reflect the relatively lower 1 percent AEP flood elevations within this zone compared to areas north and south of it. The lower flood elevations are due to the fact that there are only three inlets – Manasquan, Barnegat, and Little Egg – along a 45-mile long segment of the NJ coast. These three inlets are the only connections between the Atlantic Ocean and the large shallow back bays that include Barnegat Bay, Manahawkin Bay, Little Egg Harbor, and Great Bay. This contrasts with the much closer average spacing between inlets in the Central and Southern regions discussed in subsequent paragraphs.

The shorelines on the east side of the back bays, along the barrier spit extending from Manasquan Inlet to Barnegat Inlet and along Long Beach Island, are fully developed. The two exceptions to this generalization include the nine mile-long reach occupied by Island Beach State Park and the three mile-long Holgate Spit at the southwest end of Long Beach Island. Both of these areas are either State or Federal protected land and are unlikely to ever be developed.

In contrast to the eastern shoreline of the back bays, the western shoreline, which is attached to the mainland of New Jersey, is much more heterogeneous. This area is characterized by medium density single family homes surrounded by back bay wetlands. There are numerous “finger canal” communities, many of which were developed in the period following World War II by bulkheading, dredging, and filling in what were previously tidal wetlands. One example is Beach Haven West in Stafford Township, Ocean County. This community has about 50 miles of bulkheaded residential shoreline and about 5,000 residential structures. In between the finger canal communities are more extensive reaches of back bay shoreline with little or no development. These areas typically consist of intertidal marsh/wetlands.

Central Region

The Central Region extends from Little Egg Inlet south to Corson Inlet, with an area of about 300 square miles and all or portions of 21 municipalities in Atlantic and Cape May Counties. The ocean shoreline length of this region is about 27 miles and includes five tidal inlets: Little Egg, Brigantine, Absecon, Great Egg, and Corson. The relatively shorter distance between inlets compared to those of the North Region makes the back bays of this reach susceptible to relatively higher 1% AEP storm surge elevations.

As in the North Region, the back bay shorelines of the barrier islands are essentially fully developed with medium density residential and business infrastructure. However, the western (mainland) shorelines of the Central Region are significantly less densely developed than is the case in the North Region.

South Region

The South Region extends from Corson Inlet south and west around Cape May Point to the west end of the Cape May Canal, with an area of about 140 square miles. All or portions of 16 municipalities are included in the region, all of which are part of Cape May County. There are five inlets that connect this region to the Atlantic Ocean and Delaware Bay. They include Corson, Townsends, Hereford, and Cape May Inlets and the western entrance to the Cape May Canal on Delaware Bay. The South Region is similar to the Central region in that the most extensive and dense development is along the west (back bay) side of the barrier islands, with relatively less dense development on the mainland side of the back bays. The 1% AEP storm surge elevations

in the South Region are comparable to those in the Central Region, and larger than those in the North Region.

A-3) ALTERNATIVE PLAN SCREENING MATRIX AND MAPS

This section includes the screening matrix which shows the results of the alternative plan screening process discussed in Chapter 10. Plan Formulation Process of the Main Report (Table 6). An iterative screening of each of the 51 alternatives was performed for this draft report based on the NED, OSE and EQ systems of accounts as identified in ER 1105-2-100. Pass/Fail and Ranking for the NED and the EQ systems of accounts are provided, with summary values in the rightmost columns. Alternatives are screened for the Shark River, North, Central and South regions of the study area.

Table 6: Alternative Screening Matrix

KEY																	
Screened out for further consideration due to negative AANB or Environmental Issues																	
Alternative with Highest AANB (NED Maximized)																	
Alternative with Lowest Environmental Impact (EQ Maximized)																	
Alternative with lowest Residual Risk																	
Alternative Screening Matrix	System of Accounts											Summary Ranks					
	National Economic Development (NED)							Environmental Quality				Other Social Effects (OSE)				Screened NED Rank	EQ Rank
	Initial Construction	Average Annual Net Benefits	BCR	Residual Damages	NED Rank	NED Pass/Fail	EQ Index Score	EQ Rank	EQ Pass/Fail	Cultural Resources	Nuisance Flooding	Social Risk and Vulnerability	Infrastructure Exposure	Community Cohesion			
All Regions																	
1B	All Perimeter	\$5,229,000,000	\$457,000,000	2.6	53%	1	Pass	2.9	2	Pass	Unknown	Floodwalls and Levees would reduce inundation during higher frequency events	No coastal storm risk management is provided to vulnerable communities on the mainland	Exposure of critical infrastructure and evacuation routes is lessened on the barrier islands	Potential for reduction in bayside views and access by floodwalls. Real estate easements required to construct walls.	1	2
1A	All Non-Structural	\$7,075,000,000	\$190,000,000	1.7	71%	4	Pass	4.2	1	Pass	Unknown	No reduction in inundation during higher frequency events	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency	No reduction of exposure of critical infrastructure and evacuation routes	Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	2	1
0	No Action	\$0	\$0	N/A	100%	N/A	N/A	4.3	N/A	N/A	N/A	No reduction in inundation during higher frequency events	No coastal storm risk management is provided to vulnerable communities in the study area	No reduction of exposure of critical infrastructure and evacuation routes	Continued Sea Level Rise will increase the damages from coastal storms in the future putting people and property at risk.	N/A	N/A
1C	All Closed	\$21,485,000,000	\$146,000,000	1.1	6%	5	Pass	1.3	4	Fail	Unknown	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events.	Exposure of critical infrastructure and evacuation routes is lessened during low frequency events.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed.	N/A	4
1D	All Closed Less One	\$15,457,000,000	\$276,000,000	1.3	22%	3	Pass	1.8	3	Fail	Unknown	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events.	Exposure of critical infrastructure and evacuation routes is lessened during low frequency events.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed.	N/A	3
Shark River																	
2A	All Non-Structural	\$23,000,000	\$286,000	1.3	88%	1	Pass	4.2	1	Pass	Unknown	No reduction in inundation during higher frequency events	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency	No reduction of exposure of critical infrastructure and evacuation routes	Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	1	1
2B	All Perimeter	\$512,000,000	-\$22,000,000	0.1	62%	2	Fail	3.8	2	Pass	Unknown	Floodwalls and Levees would reduce inundation during higher frequency events	No coastal storm risk management is provided to vulnerable communities on the mainland	Exposure of critical infrastructure and evacuation routes is lessened	Potential for reduction in bayside views and access by floodwalls. Real estate easements required to construct walls.	N/A	2
2C	All Closed	\$591,000,000	-\$27,000,000	0.2	37%	3	Fail	2.3	3	Pass	Unknown	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events.	Exposure of critical infrastructure and evacuation routes is lessened during low frequency events.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed.	N/A	3

North Region (Manasquan to Little Egg Inlet)

3E.2	All Closed Less Little Egg + Non-Structural	\$3,838,000,000	\$160,000,000	1.8	34%	1	Pass	1.8	5	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Manasquan and Barnegat inlets, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders around Tuckerton. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Manasquan and Barnegat inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable in the southern vicinity of Tuckerton where non-structural measures will be implemented.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	1	5
3E.1	All Closed Less Little Egg	\$2,549,000,000	\$154,000,000	2.0	44%	2	Pass	1.8	5	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Manasquan and Barnegat inlets, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. No coastal storm risk management is implemented in the vicinity of Tuckerton.	Exposure of critical infrastructure and evacuation routes is lessened around Manasquan and Barnegat inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable in the southern vicinity of Tuckerton.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. The omission of coastal storm risk management in the vicinity of Tuckerton could have a negative impact on this community in the future.	2	5
3E.3	All Closed Less Little Egg + Non-Structural + LBI Perimeter	\$4,776,000,000	\$136,000,000	1.5	27%	3	Pass	1.8	6	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Manasquan and Barnegat inlets, but will not address the risk to communities from higher frequency events. Southern LBI will experience less nuisance flooding due to the construction of a floodwall.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events, except in southern LBI where a floodwall will be constructed. There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders around Tuckerton. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Manasquan and Barnegat inlets during low frequency events when the storm surge barrier is closed and in LBI due to the presence of a floodwall. However, infrastructure is vulnerable in the southern vicinity of Tuckerton where non-structural measures will be implemented.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements. In southern LBI, there is potential for reduction in bayside views and access by floodwalls. There will also likely be difficulties in obtaining real estate easements required to construct walls.	3	6
3A	All Non-Structural	\$3,629,000,000	\$69,000,000	1.5	63%	5	Pass	4.2	1	Pass	Unknown	No reduction in inundation during higher frequency events	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	No reduction of exposure of critical infrastructure and evacuation routes.	Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	4	1
3D	All Perimeter Less Island Beach + Non - Structural	\$3,899,000,000	\$65,000,000	1.4	61%	7	Pass	2.9	2	Pass	Unknown	No reduction in inundation during higher frequency events, except along the Manasquan North floodwall.	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	No reduction of exposure of critical infrastructure and evacuation routes, except along the Manasquan North Floodwall.	Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements. Along the Manasquan North floodwall, there is potential for reduction in bayside views and access by floodwalls. There will also likely be difficulties in obtaining real estate easements required to construct walls.	5	2
3C	All Perimeter Less LBI/ Island Beach	\$462,000,000	\$3,500,000	1.2	95%	8	Pass	2.9	2	Pass	Unknown	No reduction in inundation during higher frequency events, except along the Manasquan North floodwall.	No coastal storm risk management is provided to vulnerable communities south of the Manasquan North Floodwall	No reduction of exposure of critical infrastructure and evacuation routes, except along the Manasquan North Floodwall.	Potential for reduction in bayside views and access by floodwalls. Real estate easements required to construct walls.	6	2
3B	All Perimeter	\$6,726,000,000	-\$161,000,000	0.6	50%	10	Fail	3.2	3	Pass	Unknown	Floodwalls and Levees would reduce inundation during higher frequency events	No coastal storm risk management is provided to vulnerable communities on the mainland	Exposure of critical infrastructure and evacuation routes is lessened on the barrier islands	Along the Manasquan North floodwall, there is potential for reduction in bayside views and access by floodwalls. There will also likely be difficulties in obtaining real estate easements required to construct walls.	N/A	3
3F.1	All Closed Less Little Egg + Holgate Closure	\$5,925,000,000	\$67,000,000	1.2	21%	6	Pass	1.2	7	Fail	Unknown	Storm surge barriers will manage risk from low frequency storms, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. No coastal storm risk management is implemented south of the Holgate Bay Closure. However, there is minimal social vulnerability and exposure in this area.	Exposure of critical infrastructure and evacuation routes is lessened during low frequency events when the storm surge barrier is closed.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed.	N/A	7
3F.2	3F+ (1) No Action or (2) Non-Structural	\$6,355,000,000	\$73,000,000	1.2	17%	4	Pass	1.2	7	Fail	Unknown	Storm surge barriers will manage risk from low frequency storms, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. There is risk that elevating structures south of the Holgate Bay Closure might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened during low frequency events when the storm surge barriers are closed.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities directly south of the Holgate Bay closure. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	N/A	7

Central Region (Brigantine to Corsons Inlet)

4D	All Perimeter Less Brigantine non-Structural	\$3,337,000,000	\$378,000,000	3.1	21%	1	Pass	2.9	2	Pass	Unknown	Floodwalls and Levees would reduce inundation in barrier island (except Brigantine Island) communities during higher frequency events.	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders in Brigantine, Somers Point, Linwood, Northfield, Pleasantville, and Absecon. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened on the barrier islands, except for Brigantine. Infrastructure and evacuation routes remain vulnerable on the mainland and Brigantine.	Potential for reduction in bayside views and access by floodwalls in Ocean City and Absecon Island. Real estate easements required to construct walls could be difficult to obtain. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities in Brigantine, Somers Point, Linwood, Northfield, Pleasantville, and Absecon. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	1	2
4D2	All Perimeter + Non-Structural	\$3,822,000,000	\$368,000,000	2.8	18%	2	Pass	2.9	2	Pass	Unknown	Floodwalls and Levees would reduce inundation in barrier island communities during higher frequency events.	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders in Somers Point, Linwood, Northfield, Pleasantville, and Absecon. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened on the barrier islands. Infrastructure and evacuation routes remain vulnerable on the mainland.	Potential for reduction in bayside views and access by floodwalls in Ocean City, Absecon Island, and Brigantine. Real estate easements required to construct walls could be difficult to obtain. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities in Somers Point, Linwood, Northfield, Pleasantville, and Absecon. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	2	2
4C	All Perimeter Less Brigantine	\$2,905,000,000	\$367,000,000	3.2	24%	3	Pass	2.9	2	Pass	Unknown	Floodwalls and Levees would reduce inundation in barrier island communities during higher frequency events.	No coastal storm risk management is provided to vulnerable communities on Brigantine Island and the mainland such as Somers Point, Linwood, Northfield, Pleasantville, and Absecon.	Exposure of critical infrastructure and evacuation routes is lessened on the barrier islands, except for Brigantine. Infrastructure and evacuation routes remain vulnerable on the mainland and Brigantine.	Potential for reduction in bayside views and access by floodwalls in Ocean City and Absecon Island. Real estate easements required to construct walls could be difficult to obtain. No coastal storm risk management in Brigantine, Somers Point, Linwood, Northfield, Pleasantville, and Absecon could negatively impact those communities.	3	2
4B	All Perimeter	\$3,620,000,000	\$361,000,000	2.8	20%	4	Pass	2.9	2	Pass	Unknown	Floodwalls and Levees would reduce inundation in barrier island communities during higher frequency events.	No coastal storm risk management is provided to vulnerable communities on the mainland such as Somers Point, Linwood, Northfield, Pleasantville, and Absecon.	Exposure of critical infrastructure and evacuation routes is lessened on the barrier islands. Infrastructure and evacuation routes remain vulnerable on the mainland.	Potential for reduction in bayside views and access by floodwalls in Ocean City, Absecon Island, and Brigantine Island. Real estate easements required to construct walls could be difficult to obtain. No coastal storm risk management in Somers Point, Linwood, Northfield, Pleasantville, and Absecon could negatively impact those communities.	4	2
4G.8	4G5 + South Ocean City Bay Closure	\$5,554,000,000	\$303,000,000	1.9	9%	5	Pass	1.8	5	Pass	Unknown	Storm surge barriers and bay closures will manage risk from low frequency storms in the area of influence around Great Egg Harbor, but will not address the risk to communities from higher frequency events. Non-structural measures to the north of the Absecon Bay Blvd will reduce risk to structures from nuisance flooding, but will not impact other critical infrastructure such as roads.	Storm surge barriers and bay closures will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. There is risk that elevating structures north of the Absecon Bay Blvd closure might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Inlet and south of the Absecon Blvd bay closure during low frequency events when the storm surge barrier and bay closures are closed. However, infrastructure is vulnerable when the storm surge barriers are open. The construction of the Absecon Blvd bay closure will elevate Absecon Blvd, which will reduce exposure of the evacuation route to coastal storm risk. North of the bay closure, there is no risk reduction to critical infrastructure or evacuation routes. Modeling would need to be completed to confirm that the bay closure doesn't induce flooding north of the structure from Little Egg Inlet.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities such as Somers Point, Linwood, and Northfield during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities north of the Absecon Blvd bay closure.	5	5
4G.7	4G5 + Non-structural and Perimeter in Southern Ocean City	\$5,574,000,000	\$303,000,000	1.9	10%	6	Pass	1.8	4	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor, but will not address the risk to communities from higher frequency events. Non-structural measures to the north of the Absecon Bay Blvd and around Corsons Inlet will reduce risk to structures from nuisance flooding, but will not impact other critical infrastructure such as roads. The floodwall in Southern Ocean City will reduce inundation from higher frequency events.	Storm surge barriers and bay closures will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. There is risk that elevating structures north of the Absecon Bay Blvd closure and around Corsons Inlet might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Inlet and south of the Absecon Blvd bay closure during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The construction of the bay closure will elevate Absecon Blvd, which will reduce exposure of the evacuation route to coastal storm risk. The floodwall in Southern Ocean City could improve risk management for critical infrastructure in this area. North of the bay closure and around Corsons Inlet, there is no risk reduction to critical infrastructure or evacuation routes. Modeling would need to be completed to confirm that the bay closure doesn't induce flooding north of the structure from Little Egg Inlet.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities such as Somers Point, Linwood, and Northfield during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities north of the Absecon Blvd bay closure and around Corsons Inlet. There is potential for reduction in bayside views and access by floodwalls in Southern Ocean City. Real estate easements required to construct walls could be difficult to obtain.	6	4
4G.6	4G5 + Non-structural in Southern Ocean City	\$5,521,000,000	\$302,000,000	1.9	11%	7	Pass	1.8	4	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor, but will not address the risk to communities from higher frequency events. Non-structural measures to the north of the Absecon Bay Blvd and around Corsons Inlet will reduce risk to structures from nuisance flooding, but will not impact other critical infrastructure such as roads.	Storm surge barriers and bay closures will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. There is risk that elevating structures north of the Absecon Bay Blvd closure and around Corsons Inlet might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Inlet and south of the Absecon Blvd bay closure during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The construction of the bay closure will elevate Absecon Blvd, which will reduce exposure of the evacuation route to coastal storm risk. North of the bay closure and around Corsons Inlet, there is no risk reduction to critical infrastructure or evacuation routes. Modeling would need to be completed to confirm that the bay closure doesn't induce flooding north of the structure from Little Egg Inlet.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities such as Somers Point, Linwood, and Northfield during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities north of the Absecon Blvd bay closure and around Corsons Inlet.	7	4

4G.5	All Closed Less Corson/Little Egg/Absecon + Absecon Blvd + Non-structural in Brigantine and Absecon	\$5,132,000,000	\$301,000,000	2.0	13%	8	Pass	1.8	4	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor, but will not address the risk to communities from higher frequency events. Non-structural measures to the north of the Absecon Bay Blvd will reduce risk to structures from nuisance flooding, but will not impact other critical infrastructure such as roads. No coastal storm risk management is provided to communities around Corsons Inlet.	Storm surge barriers and bay closures will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, communities around Corsons Inlet remain vulnerable as this inlet will not be closed. There is risk that elevating structures north of the Absecon Bay Blvd closure might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Inlet and south of the Absecon Blvd bay closure during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The construction of the bay closure will elevate Absecon Blvd, which will reduce exposure of the evacuation route to coastal storm risk. North of the bay closure and around Corsons Inlet, there is no risk reduction to critical infrastructure or evacuation routes. Modeling would need to be completed to confirm that the bay closure doesn't induce flooding north of the structure from Little Egg Inlet.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities such as Somers Point, Linwood, and Northfield during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities north of the Absecon Blvd bay closure. No coastal storm risk management on around Corsons Inlet can have negative impacts on these communities.	8	4
4G.12G9 + South Ocean City Bay Closure		\$6,035,000,000	\$299,000,000	1.8	6%	9	pass	1.8	5	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor, but will not address the risk to communities from higher frequency events. Non-structural measures to the north of the Absecon Bay Blvd on the mainland will reduce risk to structures from nuisance flooding, but will not impact other critical infrastructure such as roads. The floodwall around Brigantine will reduce inundation from higher frequency events.	Storm surge barriers and bay closures will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. There is risk that elevating structures on the mainland north of the Absecon Bay Blvd closure might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Inlet and south of the Absecon Blvd bay closure during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The construction of the Absecon Blvd bay closure will elevate Absecon Blvd, which will reduce exposure of the evacuation route to coastal storm risk. The floodwall around Brigantine could improve risk management for critical infrastructure in this area. On the mainland north of the Absecon Blvd bay closure there is no risk reduction to critical infrastructure or evacuation routes. Modeling would need to be completed to confirm that the bay closure doesn't induce flooding north of the structure from Little Egg Inlet.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities such as Somers Point, Linwood, and Northfield during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities on the mainland north of the Absecon Blvd bay closure. There is potential for reduction in bayside views and access by floodwalls in Brigantine. Real estate easements required to construct walls could be difficult to obtain.	9	5
4G.11	4G9 + Non-structural and Perimeter in Southern Ocean City	\$6,059,000,000	\$299,000,000	1.8	6%	10	Pass	2.0	4	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor, but will not address the risk to communities from higher frequency events. Non-structural measures to the north of the Absecon Bay Blvd on the mainland and around Corsons Inlet to the south will reduce risk to structures from nuisance flooding, but will not impact other critical infrastructure such as roads. The floodwalls around Brigantine and southern Ocean City will reduce inundation from higher frequency events.	Storm surge barriers and bay closures will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. There is risk that elevating structures on the mainland north of the Absecon Bay Blvd closure and to the south around Corsons Inlet might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Inlet and south of the Absecon Blvd bay closure during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The construction of the bay closure will elevate Absecon Blvd, which will reduce exposure of the evacuation route to coastal storm risk. The floodwalls around Brigantine and southern Ocean City could improve risk management for critical infrastructure in this area. On the mainland north of the Absecon Blvd bay closure and around Corsons Inlet, there is no risk reduction to critical infrastructure or evacuation routes. Modeling would need to be completed to confirm that the bay closure doesn't induce flooding north of the structure from Little Egg Inlet.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities such as Somers Point, Linwood, and Northfield during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities on the mainland north of the Absecon Blvd bay closure and to the south around Corsons Inlet. There is potential for reduction in bayside views and access by floodwalls in Brigantine and southern Ocean City. Real estate easements required to construct walls could be difficult to obtain.	10	4
4G.10	4G9 + Non-structural in Southern Ocean City	\$6,006,000,000	\$297,000,000	1.8	7%	11	Pass	1.8	4	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor, but will not address the risk to communities from higher frequency events. Non-structural measures to the north of the Absecon Bay Blvd on the mainland and around Corsons Inlet to the south will reduce risk to structures from nuisance flooding, but will not impact other critical infrastructure such as roads. The floodwall around Brigantine will reduce inundation from higher frequency events.	Storm surge barriers and bay closures will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. There is risk that elevating structures on the mainland north of the Absecon Bay Blvd closure and to the south around Corsons Inlet might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Inlet and south of the Absecon Blvd bay closure during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The construction of the bay closure will elevate Absecon Blvd, which will reduce exposure of the evacuation route to coastal storm risk. The floodwall around Brigantine could improve risk management for critical infrastructure in this area. On the mainland north of the Absecon Blvd bay closure and around Corsons Inlet, there is no risk reduction to critical infrastructure or evacuation routes. Modeling would need to be completed to confirm that the bay closure doesn't induce flooding north of the structure from Little Egg Inlet.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities such as Somers Point, Linwood, and Northfield during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities on the mainland north of the Absecon Blvd bay closure and to the south around Corsons Inlet. There is potential for reduction in bayside views and access by floodwalls in Brigantine. Real estate easements required to construct walls could be difficult to obtain.	11	4
4G.9	All Closed Less Corson/Little Egg/Absecon + Absecon Blvd + Brigantine Perimeter+ Non-structural in Absecon	\$5,617,000,000	\$296,000,000	1.9	10%	12	Pass	1.8	4	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor, but will not address the risk to communities from higher frequency events. Non-structural measures to the north of the Absecon Bay Blvd on the mainland will reduce risk to structures from nuisance flooding, but will not impact other critical infrastructure such as roads. The floodwall around Brigantine will reduce inundation from higher frequency events. No coastal storm risk management is provided to communities around Corsons Inlet.	Storm surge barriers and bay closures will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, communities around Corsons Inlet remain vulnerable as this inlet will not be closed. There is risk that elevating structures on the mainland north of the Absecon Bay Blvd closure might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Inlet and south of the Absecon Blvd bay closure during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The construction of the bay closure will elevate Absecon Blvd, which will reduce exposure of the evacuation route to coastal storm risk. The floodwall around Brigantine could improve risk management for critical infrastructure in this area. On the mainland north of the Absecon Blvd bay closure and around Corsons Inlet, there is no risk reduction to critical infrastructure or evacuation routes. Modeling would need to be completed to confirm that the bay closure doesn't induce flooding north of the structure from Little Egg Inlet.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities such as Somers Point, Linwood, and Northfield during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities on the mainland north of the Absecon Blvd bay closure. There is potential for reduction in bayside views and access by floodwalls in Brigantine. Real estate easements required to construct walls could be difficult to obtain. No coastal storm risk management on around Corsons Inlet can have negative impacts on these communities.	12	4

4G.3	4G1 + Perimeter and non-structural in Southern Ocean City	\$5,326,000,000	\$296,000,000	1.9	12%	13	Pass	1.8	4	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor, but will not address the risk to communities from higher frequency events. The floodwall in Southern Ocean City will reduce inundation from higher frequency events. Non-structural measures on the mainland around Corsons Inlet will reduce risk to structures from nuisance flooding, but will not impact other critical infrastructure such as roads. No coastal storm risk management is provided to communities north of the Absecon Blvd bay closure.	Storm surge barriers and bay closures will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, communities on the mainland around Corsons Inlet remain vulnerable as this inlet will not be closed. Communities north of the Absecon Blvd Bay closure will be vulnerable to coastal storm damages from Little Egg Inlet to the north. There is risk that elevating structures on the mainland around Corsons Inlet might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Inlet and south of the Absecon Blvd bay closure during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The construction of the bay closure will elevate Absecon Blvd, which will reduce exposure of the evacuation route to coastal storm risk. The floodwall in Southern Ocean City could improve risk management for critical infrastructure in this area. North of the bay closure and on the mainland around Corsons Inlet, there is no risk reduction to critical infrastructure or evacuation routes. Modeling would need to be completed to confirm that the bay closure doesn't induce flooding north of the structure from Little Egg Inlet.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities such as Somers Point, Linwood, and Northfield during low frequency events when the barrier is closed. No coastal storm risk management on north of the Absecon Bay Blvd closure can have negative impacts on these communities. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities on the mainland around Corsons Inlet. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements. There is potential for reduction in bayside views and access by floodwalls in Southern Ocean City. Real estate easements required to construct walls could be difficult to obtain.	13	4
4G.2	4G1 + Non-structural in Southern Ocean City	\$5,273,000,000	\$294,000,000	1.9	13%	14	Pass	1.8	4	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor, but will not address the risk to communities from higher frequency events. Non-structural measures around Corsons Inlet will reduce risk to structures from nuisance flooding, but will not impact other critical infrastructure such as roads. No coastal storm risk management is provided to communities north of the Absecon Blvd bay closure.	Storm surge barriers and bay closures will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, communities around Corsons Inlet remain vulnerable as this inlet will not be closed. Communities north of the Absecon Blvd Bay closure will be vulnerable to coastal storm damages from Little Egg Inlet to the north. There is risk that elevating structures around Corsons Inlet might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Inlet and south of the Absecon Blvd bay closure during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The construction of the bay closure will elevate Absecon Blvd, which will reduce exposure of the evacuation route to coastal storm risk. North of the bay closure and around Corsons Inlet, there is no risk reduction to critical infrastructure or evacuation routes. Modeling would need to be completed to confirm that the bay closure doesn't induce flooding north of the structure from Little Egg Inlet.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities such as Somers Point, Linwood, and Northfield during low frequency events when the barrier is closed. No coastal storm risk management on north of the Absecon Bay Blvd closure can have negative impacts on these communities. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities around Corsons Inlet. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	14	4
4G.1	All Closed Less Corson/Little Egg/Absecon + Absecon Blvd	\$4,884,000,000	\$293,000,000	2.0	15%	15	Pass	1.8	4	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor, but will not address the risk to communities from higher frequency events. No coastal storm risk management is provided to communities north of Absecon Inlet or around Corsons Inlet.	Storm surge barriers and bay closures will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, communities around Corsons Inlet remain vulnerable as this inlet will not be closed. Communities north of the Absecon Blvd Bay closure will be vulnerable to coastal storm damages from Little Egg Inlet to the north.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Inlet and south of the Absecon Blvd bay closure during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The construction of the bay closure will elevate Absecon Blvd, which will reduce exposure of the evacuation route to coastal storm risk. North of the bay closure and around Corsons Inlet, there is no risk reduction to critical infrastructure or evacuation routes. Modeling would need to be completed to confirm that the bay closure doesn't induce flooding north of the structure from Little Egg Inlet.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities such as Somers Point, Linwood, and Northfield during low frequency events when the barrier is closed. No coastal storm risk management on the mainland adjacent to Corsons Inlet and north of the Absecon Bay Blvd closure can have negative impacts on these communities.	15	4
4G.4	4G1+ South Ocean City Bay Closure	\$4,884,000,000	\$293,000,000	2.0	15%	16	Pass	1.8	5	Pass	Unknown	Storm surge barriers and the bay closures will manage risk from low frequency storms in the area of influence around Great Egg Harbor when closed, but will not address the risk to communities from higher frequency events. No coastal storm risk management is provided to communities north of Absecon Inlet.	Storm surge barriers and bay closures will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Communities north of the Absecon Blvd Bay closure will be vulnerable to coastal storm damages from Little Egg Inlet to the north.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Inlet and south of the Absecon Blvd bay closure during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The construction of the bay closure will elevate Absecon Blvd, which will reduce exposure of the evacuation route to coastal storm risk. North of the Absecon Blvd bay closure, there is no risk reduction to critical infrastructure or evacuation routes. Modeling would need to be completed to confirm that the bay closure doesn't induce flooding north of the structure from Little Egg Inlet.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities such as Somers Point, Linwood, and Northfield during low frequency events when the barrier is closed. No coastal storm risk management north of the Absecon Bay Blvd closure can have negative impacts on these communities.	16	5
4E.2	4E1+ Non-Structural	\$7,141,000,000	\$160,000,000	1.4	17%	17	Pass	1.8	3	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor and Absecon Inlets, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, communities on the mainland Little Egg Inlet remain vulnerable as these inlets will not be closed. There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders in mainland communities adjacent to Little Egg Inlet.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Harbor and Absecon Inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities in Southern Ocean City and Absecon. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	17	3

4E.4	4E1 + Southern Ocean City Bay Closure + Non-structural	\$7,174,000,000	\$146,000,000	1.3	15%	18	Pass	1.8	4	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor and Absecon Inlets, but will not address the risk to communities from higher frequency events. The floodwall in Southern Ocean City will reduce inundation from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, communities on the mainland around Corsous Inlet and Little Egg Inlet remain vulnerable as these inlets will not be closed. There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders in mainland communities adjacent to Little Egg Inlet and Corsous Inlet. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg and Absecon Inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The floodwall in Southern Ocean City could improve risk management for critical infrastructure in this area.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities on the mainland adjacent to Little Egg Inlet. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	18	4
4E.3	4E2 + Southern Ocean City Perimeter	\$7,194,000,000	\$146,000,000	1.3	16%	19	Pass	1.8	3	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor and Absecon Inlets, but will not address the risk to communities from higher frequency events. The floodwall in Southern Ocean City will reduce inundation from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, communities on the mainland around Corsous Inlet and Little Egg Inlet remain vulnerable as these inlets will not be closed. There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders in mainland communities adjacent to Little Egg Inlet and Corsous Inlet. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Manasquan and Barnegat Inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The floodwall in Southern Ocean City could improve risk management for critical infrastructure in this area.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities on the mainland adjacent to Corsous and Little Egg Inlet. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements. Potential for reduction in bayside views and access by floodwalls in Southern Ocean City. Real estate easements required to construct walls could be difficult to obtain.	19	3
4E.1	All Closed Less Corson/Little Egg	\$6,734,000,000	\$145,000,000	1.3	19%	20	Pass	1.8	3	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor and Absecon Inlets, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, southern Ocean City and communities on the mainland around Corsous Inlet and Little Egg Inlet remain vulnerable as these inlets will not be closed.	Exposure of critical infrastructure and evacuation routes is lessened around Manasquan and Barnegat Inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area.	20	3
4A	All Non-Structural	\$1,955,000,000	\$77,000,000	2.1	79%	21	Pass	4.2	1	Pass	Unknown	No reduction in inundation during higher frequency events	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	No reduction of exposure of critical infrastructure and evacuation routes	Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	21	1
4F.3	4F2+ Perimeter in Southern Ocean City	\$10,274,000,000	\$34,000,000	1.1	4%	22	Pass	1.8	4	Fail	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor and Absecon Inlets, but will not address the risk to communities from higher frequency events. The floodwall in Southern Ocean City will reduce inundation from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, communities on the mainland around Corsous Inlet remain vulnerable as these inlets will not be closed. There is a risk that elevating structures adjacent to Corsous Inlet might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg and Absecon Inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The floodwall in Southern Ocean City could improve risk management for critical infrastructure in this area.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. No coastal storm risk management on the mainland adjacent to Corsous Inlet can have negative impacts on these communities. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities adjacent to Corsous Inlet. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements. Potential for reduction in bayside views and access by floodwalls in Southern Ocean City. Real estate easements required to construct walls could be difficult to obtain.	N/A	4
4F.2	4F1+ Non-structural in Southern Ocean City	\$10,220,000,000	\$32,000,000	1.1	5%	23	Pass	2.0	4	Fail	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor and Absecon Inlets, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, communities on the mainland around Corsous Inlet remain vulnerable as these inlets will not be closed. There is a risk that elevating structures adjacent to Corsous Inlet might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg and Absecon Inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. No coastal storm risk management on the mainland adjacent to Corsous Inlet can have negative impacts on these communities. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities adjacent to Corsous Inlet. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	N/A	4

4F.4	4F1+ South Ocean City Bay Closure	\$9,831,000,000	\$30,000,000	1.0	7%	24	Pass	1.7	5	Fail	Unknown	Storm surge barriers and bay closures will manage risk from low frequency storms in the area of influence around Great Egg Harbor and Absecon Inlets, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg and Absecon Inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed.	N/A	5	
4F.1	All Closed Less Corson/Little Egg + North Point Bay Closure	\$9,831,000,000	\$30,000,000	1.0	7%	25	Pass	1.8	4	Fail	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor and Absecon Inlets, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, communities on the mainland around Corsons Inlet remain vulnerable as these inlets will not be closed.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg and Absecon Inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. No coastal storm risk management on the mainland adjacent to Corsons Inlet can have negative impacts on these communities.	N/A	4	
South Region (Strathmere to Cape May)																		
5D	All Perimeter Less Seven Miles/Strathmere non-structural	\$2,287,000,000	\$96,000,000	1.9	34%	1	Pass	3.3	2	Pass	Unknown	No reduction in inundation during higher frequency events in Strathmere and 7 Mile Island. Floodwalls and Levees would reduce inundation during higher frequency events in Cape May, the Wildwoods, and Sea Isle City.	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened in the Wildwoods, Cape May, and Sea Isle City. Exposure to critical infrastructure is not lessened in Strathmere and 7 Mile Island. Infrastructure and evacuation routes remain vulnerable on the mainland.	Residual risk to infrastructure and properties that don't qualify for elevation in Strathmere and 7 Mile Island could reduce the robustness of those coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements. Along the floodwalls in Sea Isle City, the Wildwoods, and Cape May, there is potential for reduction in bayside views and access by floodwalls. There will also likely be difficulties in obtaining real estate easements required to construct walls.	1	2	
5C	All Perimeter Less Seven Mile	\$1,863,000,000	\$87,000,000	1.9	42%	2	Pass	3.3	2	Pass	Unknown	No reduction in inundation during higher frequency events in Strathmere and 7 Mile Island. Floodwalls and Levees would reduce inundation during higher frequency events in Cape May, the Wildwoods, and Sea Isle City.	No coastal storm risk management is provided to vulnerable communities in Strathmere and 7 Mile Island.	Exposure of critical infrastructure and evacuation routes is lessened in the Wildwoods, Cape May, and Sea Isle City. Exposure to critical infrastructure is not lessened in Strathmere and 7 Mile Island. Infrastructure and evacuation routes remain vulnerable on the mainland.	Along the floodwalls in Sea Isle City, the Wildwoods, and Cape May, there is potential for reduction in bayside views and access by floodwalls. There will also likely be difficulties in obtaining real estate easements required to construct walls. Communities in Strathmere and 7 Mile Island may be more significantly impacted during future coastal storm events due to no project in these areas.	2	2	
5D2	All Perimeter Less Seven Mile + Non-structural	\$3,429,000,000	\$57,000,000	1.3	24%	3	Pass	3.3	2	Pass	Unknown	No reduction in inundation during higher frequency events in Strathmere. Floodwalls and Levees would reduce inundation during higher frequency events in Cape May, the Wildwoods, 7 Mile Island and Sea Isle City.	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders in Strathmere. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened in the Wildwoods, Cape May, 7 Mile Island and Sea Isle City. Exposure to critical infrastructure is not lessened in Strathmere. Infrastructure and evacuation routes remain vulnerable on the mainland.	Residual risk to infrastructure and properties that don't qualify for elevation in Strathmere could reduce the robustness of those coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements. Along the floodwalls in Sea Isle City, the Wildwoods, 7 Mile Island, and Cape May, there is potential for reduction in bayside views and access by floodwalls. There will also likely be difficulties in obtaining real estate easements required to construct walls.	3	2	
5B	All Perimeter	\$3,424,000,000	\$51,000,000	1.3	25%	4	Pass	3.3	2	Pass	Unknown	Floodwalls and Levees would reduce inundation during higher frequency events	No coastal storm risk management is provided to vulnerable communities on the mainland	Exposure of critical infrastructure and evacuation routes is lessened on the barrier islands. Infrastructure and evacuation routes remain vulnerable on the mainland.	Potential for reduction in bayside views and access by floodwalls. Real estate easements required to construct walls.	4	2	
5A	All Non-Structural	\$1,467,000,000	\$44,000,000	1.8	68%	5	Pass	4.2	1	Pass	Unknown	No reduction in inundation during higher frequency events	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency	No reduction of exposure of critical infrastructure and evacuation routes	Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	5	1	

5E.2	5E+ (1) No Action, OR (2) Non-Structural	\$4,681,000,000	\$17,000,000	1.1	6%	6	Pass	2.0	3	Fail	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Cape May Canal, Hereford and Townsends inlets, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders around Strathmere. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Cape May Canal, Hereford and Townsends inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable in Strathmere where non-structural measures will be implemented.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities in Strathmere. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	N/A	3
5E.1	All Closed less Corson	\$4,639,000,000	\$16,000,000	1.1	6%	7	Pass	2.0	3	Fail	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Cape May Canal, Hereford and Townsends inlets, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. No coastal storm risk management is implemented in the vicinity of Strathmere near Corson's Inlet.	Exposure of critical infrastructure and evacuation routes is lessened around Cape May Canal, Hereford and Townsends inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable in Strathmere near Corson's Inlet.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. The omission of coastal storm risk management in Strathmere near Corson's Inlet could have a negative impact on this community in the future.	N/A	3
5F	All Closed Less Corson Sea Isle Closure	\$5,266,000,000	-\$11,000,000	1.0	4%	8	Fail	2.0	3	Fail	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Cape May Canal, Hereford and Townsends inlets, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders around Strathmere. People sheltering in place could increase both their personal risk and the risk to emergency responders. Additionally, more modeling would need to occur to verify that the bay closure will not induce flooding in Strathmere.	Exposure of critical infrastructure and evacuation routes is lessened around Cape May Canal, Hereford and Townsends inlets during low frequency events when the storm surge barrier is closed. The Bay closure at Sea Isle City Blvd will reduce risk to that evacuation route. However, infrastructure is vulnerable in Strathmere where non-structural measures will be implemented.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closure are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities in Strathmere. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	N/A	3
5G	All Closed Less Corson+Sea Isle+Wildwood+Stone Harbor	\$5,924,000,000	-\$50,000,000	0.9	5%	9	Fail	2.0	3	Pass	Unknown	Storm surge barriers will manage risk from low frequency storms in the area of influence around Cape May Canal and Townsends inlets, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders around Strathmere. People sheltering in place could increase both their personal risk and the risk to emergency responders. Additionally, more modeling would need to occur to verify that the bay closures will not induce flooding in Strathmere.	Exposure of critical infrastructure and evacuation routes is lessened around Cape May Canal, Hereford and Townsends inlets during low frequency events when the storm surge barrier is closed. The Bay closures at Sea Isle City Blvd, Stone Harbor Blvd, and Wildwood Blvd will reduce risk to that evacuation route. However, infrastructure is vulnerable in Strathmere where non-structural measures will be implemented.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closure are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities in Strathmere. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.	N/A	3

A-5) FOCUSED ARRAY COMPARISON MATRIX

This section includes a comparison of the 16 alternative plans plus six permutations included in the focused array (Table 7). This table shows the detailed results associated with the screening of the 51 alternative plans discussed in Chapter 10. Plan Formulation Process of the Main Report. Results included in this table include the NED, OSE and EQ systems of accounts as well as the Planning Criteria identified in ER 1105-2-100. The focused array of alternatives are presented in this table by the Shark River, North, Central and South regions of the study area.

Table 7: Focused Array Comparison Matrix

NJBB TSP IPR Focused Array Comparison		Planning Criteria				System of Accounts											
		Effectiveness	Efficiency	Acceptability	Completeness	National Economic Development (NED)					Environmental Quality			Other Social Effects (OSE)			
						Initial Construction	Average Annual Net Benefits	BCR	Residual Damages	NED Rank	EQ Index Score	EQ Rank	Direct Impact Acres (all habitats)	Coastal Flooding	Social Risk and Vulnerability	Infrastructure Exposure	Community Easements
Shark River																	
2A	All Non-Structural	Pass - elevating structures will reduce damages to buildings, but do not reduce risk to other infrastructure	Pass (BCR>1)	Pass: There is risk due to uncertainty of implementability due to remaining questions about compliance with state and local laws.	Pass - Very high residual risk (71%)	\$23,000,000	\$286,000	1.3	88%	1	4.2	1	negligible	No reduction in inundation during higher frequency events	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	No reduction of exposure of critical infrastructure and evacuation routes	Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.
North Region (Manasquan to Little Egg Inlet)																	
3E.2	All Closed Less Little Egg + Non-Structural	Pass - Storm surge barriers will reduce coastal storm risk during low frequency events, but will not reduce risk from more frequent storm events. Elevating structures will reduce damages to buildings, but do not reduce risk to other infrastructure	Pass (BCR>1)	Pass: There is risk that the project may not be implementable due to environmental laws. This risk is based in the very high uncertainty of indirect impacts to water quality and circulation from Storm Surge Barriers. There is risk due to uncertainty of implementability due to remaining questions about compliance with state and local laws.	Pass: Provides CSRM benefits to both barrier islands and mainland communities, but only during low frequency events. Structure elevation will provide some CSRM to more vulnerable structures.	\$3,538,000,000	\$160,000,000	1.8	34%	1	1.8	3	31.6	Storm surge barriers will manage risk from low frequency storms in the area of influence around Manasquan and Barnegat inlets, but will not address the risk to communities from higher frequency events	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders around Tuckerton. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Manasquan and Barnegat inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable in the southern vicinity of Tuckerton where non-structural measures will be implemented.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.
3E.1	All Closed Less Little Egg	Pass - Storm surge barriers will reduce coastal storm risk during low frequency events, but will not reduce risk from more frequent storm events.	Pass (BCR>2)	Pass: There is risk that the project may not be implementable due to environmental laws. This risk is based in the very high uncertainty of indirect impacts to water quality and circulation from Storm Surge Barriers.	Pass: Provides CSRM benefits to both barrier islands and mainland communities, but only during low frequency events.	\$2,549,000,000	\$154,000,000	2.0	44%	2	1.8	3	31.6	Storm surge barriers will manage risk from low frequency storms in the area of influence around Manasquan and Barnegat inlets, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. No coastal storm risk management is implemented in the vicinity of Tuckerton.	Exposure of critical infrastructure and evacuation routes is lessened around Manasquan and Barnegat inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable in the southern vicinity of Tuckerton.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. The omission of coastal storm risk management in the vicinity of Tuckerton could have a negative impact on this community in the future.
3E.3	All Closed Less Little Egg + Non-Structural + LBI Perimeter	High - Storm surge barriers will reduce coastal storm risk during low frequency events, but will not reduce risk from more frequent storm events. Elevating structures will reduce damages to buildings, but do not reduce risk to other infrastructure on the mainland. In southern LBI, the floodwall will manage risk for both high and low frequency events	Pass (BCR>1)	Pass: There is risk that the project may not be implementable due to environmental laws. This risk is based in the very high uncertainty of indirect impacts to water quality and circulation from Storm Surge Barriers and high uncertainty whether the high direct impacts of a floodwall would be acceptable to resource agencies. There is also risk due to uncertainty of implementing non-structural measures due to remaining questions about compliance with state and local laws.	Pass: Lowest residual risk plan in this region. Provides CSRM to both mainland and barrier islands.	\$4,776,000,000	\$136,000,000	1.5	27%	3	1.8	4	165.3	Storm surge barriers will manage risk from low frequency storms in the area of influence around Manasquan and Barnegat inlets, but will not address the risk to communities from higher frequency events. Southern LBI will experience less nuisance flooding due to the construction of a floodwall.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events, except in southern LBI where a floodwall will be constructed. There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders around Tuckerton. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Manasquan and Barnegat inlets during low frequency events when the storm surge barrier is closed and in LBI due to the presence of a floodwall. However, infrastructure is vulnerable in the southern vicinity of Tuckerton where non-structural measures will be implemented.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements. In southern LBI, there is potential for reduction in bayside views and access by floodwalls. There will also likely be difficulties in obtaining real estate easements required to construct walls.
3A	All Non-Structural	Pass - elevating structures will reduce damages to buildings, but do not reduce risk to other infrastructure	Pass (BCR>1)	Pass: There is risk due to uncertainty of implementability of non-structural measures due to remaining questions about compliance with state and local laws.	Pass - High residual risk (71%). Provides CSRM to both mainland and barrier islands	\$3,629,000,000	\$69,000,000	1.5	63%	4	4.2	1	negligible	No reduction in inundation during higher frequency events	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	No reduction of exposure of critical infrastructure and evacuation routes	Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.
3D	All Perimeter Less Island Beach + Non - Structural	Pass - Elevating structures will reduce damages to buildings, but do not reduce risk to other infrastructure on the mainland. Behind the Manasquan North floodwall, the floodwall will manage risk for both high and low frequency events	Pass (BCR>1)	Pass: There is risk that the project may not be implementable due to environmental laws. This risk is based in the very high uncertainty whether the high direct impacts of a floodwall would be acceptable to resource agencies. There is also risk due to uncertainty of implementing non-structural measures due to remaining questions about compliance with state and local laws.	Pass - High residual risk (61%). Provides CSRM to both mainland and barrier islands	\$3,899,000,000	\$65,000,000	1.4	61%	5	2.9	2	37.2	No reduction in inundation during higher frequency events, except along the Manasquan North floodwall.	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	No reduction of exposure of critical infrastructure and evacuation routes, except along the Manasquan North Floodwall.	Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements. Along the Manasquan North floodwall, there is potential for reduction in bayside views and access by floodwalls. There will also likely be difficulties in obtaining real estate easements required to construct walls.
Central Region (Brigantine to Corsons Inlet)																	
4D	All Perimeter Less Brigantine non-Structural	Pass - Elevating structures will reduce damages to buildings, but do not reduce risk to other infrastructure on the mainland. In Ocean City and Absecon Island, the floodwalls will manage risk for both high and low frequency events.	Pass (BCR>2)	Pass: There is risk that the project may not be implementable due to environmental laws. This risk is based in the very high uncertainty whether the high direct impacts of a floodwall would be acceptable to resource agencies. There is also risk due to uncertainty of implementing non-structural measures due to remaining questions about compliance with state and local laws.	Pass: Provides CSRM benefits to both barrier islands (except Brigantine) and mainland communities. Elevating structures does not reduce risk to other critical infrastructure. Plan has low residual risk.	\$3,337,000,000	\$378,000,000	3.1	21%	1	2.9	2	237.6	Floodwalls and Levees would reduce inundation in barrier island (except Brigantine Island) communities during higher frequency events.	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders in Brigantine, Somers Point, Linwood, Northfield, Pleasantville, and Absecon. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened on the barrier islands, except for Brigantine. Infrastructure and evacuation routes remain vulnerable on the mainland and Brigantine.	Potential for reduction in bayside views and access by floodwalls in Ocean City and Absecon Island. Real estate easements required to construct walls could be difficult to obtain. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities in Brigantine, Somers Point, Linwood, Northfield, Pleasantville, and Absecon. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.
4D2	All Perimeter + Non-Structural	Pass - Elevating structures will reduce damages to buildings, but do not reduce risk to other infrastructure on the mainland. In Ocean City, Absecon Island, and Brigantine, the floodwalls will manage risk for both high and low frequency events.	Pass (BCR>2)	Pass: There is risk that the project may not be implementable due to environmental laws. This risk is based in the very high uncertainty whether the high direct impacts of a floodwall would be acceptable to resource agencies. There is also risk due to uncertainty of implementing non-structural measures due to remaining questions about compliance with state and local laws.	Pass: Provides CSRM benefits to both barrier islands and mainland communities. Elevating structures does not reduce risk to other critical infrastructure. Plan has low residual risk.	\$3,822,000,000	\$368,000,000	2.8	18%	2	2.9	2	287.7	Floodwalls and Levees would reduce inundation in barrier island communities during higher frequency events.	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders in Somers Point, Linwood, Northfield, Pleasantville, and Absecon. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened on the barrier islands. Infrastructure and evacuation routes remain vulnerable on the mainland.	Potential for reduction in bayside views and access by floodwalls in Ocean City, Absecon Island, and Brigantine. Real estate easements required to construct walls could be difficult to obtain. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities in Somers Point, Linwood, Northfield, Pleasantville, and Absecon. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.

4G.10	4G9+ Non-structural in Southern Ocean City	Pass - Storm surge barriers and bay closures will reduce coastal storm risk during low frequency events, but will not reduce risk from more frequent storm events. Non-structural measures such as building elevation north of the Absecon Blvd Bay and north of Corsons Inlet closure will manage risk to structures, but not other critical infrastructure. The floodwall along Brigantine will manage risk from both high and low frequency events.	Pass (BCR>1)	Pass: There is risk that the project may not be implementable due to environmental laws. This risk is based in the very high uncertainty of indirect impacts to water quality and circulation from Storm Surge Barriers and Bay Closures and very high uncertainty whether the high direct impacts of a floodwall would be acceptable to resource agencies. There is also risk due to uncertainty of implementing non-structural measures due to remaining questions about compliance with state and local laws.	Pass: Provides CSRM benefits to both barrier islands and mainland communities. Elevating structures does not reduce risk to other critical infrastructure. Very low residual risk.	\$6,006,000,000	\$297,000,000	1.8	7%	9	1.8	4	157.1	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor, but will not address the risk to communities from higher frequency events. Non-structural measures to the north of the Absecon Bay Blvd on the mainland and around Corsons Inlet to the south will reduce risk to structures from nuisance flooding, but will not impact other critical infrastructure such as roads. The floodwall around Brigantine will reduce inundation from higher frequency events.	Storm surge barriers and bay closures will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. There is risk that elevating structures on the mainland north of the Absecon Bay Blvd closure and to the south around Corsons Inlet might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Inlet and south of the Absecon Blvd bay closure during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The construction of the bay closure will elevate Absecon Blvd, which will reduce exposure of the evacuation route to coastal storm risk. The floodwall around Brigantine could improve risk management for critical infrastructure in this area. On the mainland north of the Absecon Blvd bay closure and around Corsons Inlet, there is no risk reduction to critical infrastructure or evacuation routes. Modeling would need to be completed to confirm that the bay closure doesn't induce flooding north of the structure from Little Egg Inlet.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities such as Somers Point, Linwood, and Northfield during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities on the mainland north of the Absecon Blvd bay closure and to the south around Corsons Inlet. There is potential for reduction in bay side views and access by floodwalls in Brigantine. Real estate easements required to construct walls could be difficult to obtain.
4G.9	All Closed Less Corson/Little Egg/Absecon + Absecon Blvd + Brigantine Perimeter + Non-structural in Absecon	Pass - Storm surge barriers and bay closures will reduce coastal storm risk during low frequency events, but will not reduce risk from more frequent storm events. Non-structural measures such as building elevation north of the Absecon Blvd Bay closure will manage risk to structures, but not other critical infrastructure. The floodwall along Brigantine will manage risk from both high and low frequency events.	Pass (BCR>1)	Pass: There is risk that the project may not be implementable due to environmental laws. This risk is based in the very high uncertainty of indirect impacts to water quality and circulation from Storm Surge Barriers and Bay Closures and very high uncertainty whether the high direct impacts of a floodwall would be acceptable to resource agencies. There is also risk due to uncertainty of implementing non-structural measures due to remaining questions about compliance with state and local laws.	Pass: Provides CSRM benefits to both barrier islands and mainland communities. Elevating structures does not reduce risk to other critical infrastructure. Very low residual risk.	\$5,617,000,000	\$296,000,000	1.9	10%	10	1.8	4	157.1	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor, but will not address the risk to communities from higher frequency events. Non-structural measures to the north of the Absecon Bay Blvd on the mainland will reduce risk to structures from nuisance flooding, but will not impact other critical infrastructure such as roads. The floodwall around Brigantine will reduce inundation from higher frequency events. No coastal storm risk management is provided to communities around Corsons Inlet.	Storm surge barriers and bay closures will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, communities around Corsons Inlet remain vulnerable as this inlet will not be closed. There is risk that elevating structures on the mainland north of the Absecon Bay Blvd closure might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Inlet and south of the Absecon Blvd bay closure during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The construction of the bay closure will elevate Absecon Blvd, which will reduce exposure of the evacuation route to coastal storm risk. The floodwall around Brigantine could improve risk management for critical infrastructure in this area. On the mainland north of the Absecon Blvd bay closure and around Corsons Inlet, there is no risk reduction to critical infrastructure or evacuation routes. Modeling would need to be completed to confirm that the bay closure doesn't induce flooding north of the structure from Little Egg Inlet.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities such as Somers Point, Linwood, and Northfield during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities on the mainland north of the Absecon Blvd bay closure. There is potential for reduction in bay side views and access by floodwalls in Brigantine. Real estate easements required to construct walls could be difficult to obtain. No coastal storm risk management on around Corsons Inlet can have negative impacts on these communities.
4E.2	4E1+ Non-Structural	Pass - Storm surge barriers will reduce coastal storm risk during low frequency events, but will not reduce risk from more frequent storm events. Elevating structures north of Corsons Inlet and in the vicinity of Absecon, will reduce damages to buildings, but do not reduce risk to other infrastructure.	Pass (BCR>1)	Pass: There is risk that the project may not be implementable due to environmental laws. This risk is based in the very high uncertainty of indirect impacts to water quality and circulation from Storm Surge Barriers. There is also risk due to uncertainty of implementing non-structural measures due to remaining questions about compliance with state and local laws.	Pass: Provides CSRM benefits to both barrier islands and mainland communities, but only during low frequency events.	\$7,141,000,000	\$160,000,000	1.4	17%	11	1.8	3	33	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor and Absecon Inlets, but will not address the risk to communities from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, communities on the mainland Little Egg Inlet remain vulnerable as these inlets will not be closed. There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders in mainland communities adjacent to Little Egg Inlet and Corsons Inlet. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg Harbor and Absecon Inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities in Southern Ocean City and Absecon. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.
4E.4	4E1 + Southern Ocean City Bay Closure + Non-structural	Pass - Storm surge barriers will reduce coastal storm risk during low frequency events, but will not reduce risk from more frequent storm events. Elevating structures north of Corsons Inlet and in the vicinity of Absecon, will reduce damages to buildings, but do not reduce risk to other infrastructure.	Pass (BCR>1)	Pass: There is risk that the project may not be implementable due to environmental laws. This risk is based in the very high uncertainty of indirect impacts to water quality and circulation from Storm Surge Barriers. There is also risk due to uncertainty of implementing non-structural measures due to remaining questions about compliance with state and local laws.	Pass: Provides CSRM benefits to both barrier islands and mainland communities, but only during low frequency events.	\$7,174,000,000	\$146,000,000	1.3	15%	12	1.8	4	57.8	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor and Absecon Inlets, but will not address the risk to communities from higher frequency events. The floodwall in Southern Ocean City will reduce inundation from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, communities on the mainland around Corsons Inlet and Little Egg Inlet remain vulnerable as these inlets will not be closed. There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders in mainland communities adjacent to Little Egg Inlet and Corsons Inlet. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Great Egg and Absecon Inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The floodwall in Southern Ocean City could improve risk management for critical infrastructure in this area.	As of now, the full extent of the indirect impacts of a storm surge barrier and bay closures are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities on the mainland adjacent to Little Egg Inlet. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.
4E.3	4E2 + Southern Ocean City Perimeter	Pass - Storm surge barriers will reduce coastal storm risk during low frequency events, but will not reduce risk from more frequent storm events. Elevating structures north of Corsons Inlet and in the vicinity of Absecon, will reduce damages to buildings, but do not reduce risk to other infrastructure. The floodwall in Southern Ocean City will manage risk from high and low frequency events.	Pass (BCR>1)	Pass: There is risk that the project may not be implementable due to environmental laws. This risk is based in the very high uncertainty of indirect impacts to water quality and circulation from Storm Surge Barriers and very high uncertainty whether the high direct impacts of a floodwall would be acceptable to resource agencies. There is also risk due to uncertainty of implementing non-structural measures due to remaining questions about compliance with state and local laws.	Pass: Provides CSRM benefits to both barrier islands and mainland communities, but only during low frequency events. The floodwall in Ocean City will provide CSRM during high frequency events. Non-structural measures will manage risk to structures, but not other infrastructure.	\$7,194,000,000	\$146,000,000	1.3	16%	13	1.8	3	83	Storm surge barriers will manage risk from low frequency storms in the area of influence around Great Egg Harbor and Absecon Inlets, but will not address the risk to communities from higher frequency events. The floodwall in Southern Ocean City will reduce inundation from higher frequency events.	Storm surge barriers will manage risk from low frequency coastal storms, but will not address the risk to communities from higher frequency events. Additionally, communities on the mainland around Corsons Inlet and Little Egg Inlet remain vulnerable as these inlets will not be closed. There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders in mainland communities adjacent to Little Egg Inlet and Corsons Inlet. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened around Manasquan and Barnegat Inlets during low frequency events when the storm surge barrier is closed. However, infrastructure is vulnerable when the storm surge barriers are open. The floodwall in Southern Ocean City could improve risk management for critical infrastructure in this area.	As of now, the full extent of the indirect impacts of a storm surge barrier are not understood. There is risk that these structures could result in environmental degradation, which can have negative impacts on the recreational and aquaculture industries in the study area. However, storm surge barriers will reduce coastal storm risk in mainland communities during low frequency events when the barrier is closed. Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities on the mainland adjacent to Corsons and Little Egg Inlet. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements. Potential for reduction in bay side views and access by floodwalls in Southern Ocean City. Real estate easements required to construct walls could be difficult to obtain.
4A	All Non-Structural	Pass - elevating structures will reduce damages to buildings, but do not reduce risk to other infrastructure.	Pass (BCR>2)	Pass: There is risk due to uncertainty of implementability of non-structural measures due to remaining questions about compliance with state and local laws.	Pass - High residual risk (79%). Provides CSRM to both mainland and barrier islands.	\$1,955,000,000	\$77,000,000	2.1	79%	14	4.2	1	negligible	No reduction in inundation during higher frequency events.	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	No reduction of exposure of critical infrastructure and evacuation routes.	Residual risk to infrastructure and properties that don't qualify for elevation could reduce the robustness of coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements.
South Region (Strathmere to Cape May)																	
5D	All Perimeter Less Seven Miles/Strathmere non-structural	Pass - Elevating structures will reduce damages to buildings, but do not reduce risk to other infrastructure on the mainland. In Cape May City, Wildwood Island and Sea Isle City, the floodwalls will manage risk for both high and low frequency events.	Pass (BCR>1)	Pass: There is risk that the project may not be implementable due to environmental laws. This risk is based in the very high uncertainty whether the high direct impacts of a floodwall would be acceptable to resource agencies. There is also risk due to uncertainty of implementing non-structural measures due to remaining questions about compliance with state and local laws.	Pass: Provides CSRM benefits to both barrier islands and mainland communities. Elevating structures does not reduce risk to other critical infrastructure.	\$2,287,000,000	\$96,000,000	1.9	34%	1	3.3	2	182.4	No reduction in inundation during higher frequency events in Strathmere and 7 Mile Island. Floodwalls and Levees would reduce inundation during higher frequency events in Cape May, the Wildwoods, and Sea Isle City.	There is risk that elevating structures might create a false sense of security during a storm event reducing compliance with evacuation orders. People sheltering in place could increase both their personal risk and the risk to emergency responders.	Exposure of critical infrastructure and evacuation routes is lessened in the Wildwoods, Cape May, and Sea Isle City. Exposure to critical infrastructure is not lessened in Strathmere and 7 Mile Island. Infrastructure and evacuation routes remain vulnerable on the mainland.	Residual risk to infrastructure and properties that don't qualify for elevation in Strathmere and 7 Mile Island could reduce the robustness of those to coastal communities. Additionally, there might be community opposition to selective elevating of structures and the needed real estate easements. Along the floodwalls in Sea Isle City, the Wildwoods, and Cape May, there is potential for reduction in bay side views and access by floodwalls. There will also likely be difficulties in obtaining real estate easements required to construct walls.

A-6) NJBB STUDY AREA MUNICIPALITY INFORMATION

A map with municipalities in the State of New Jersey can be found in Figure 4. Table 8 lists municipalities by study region.

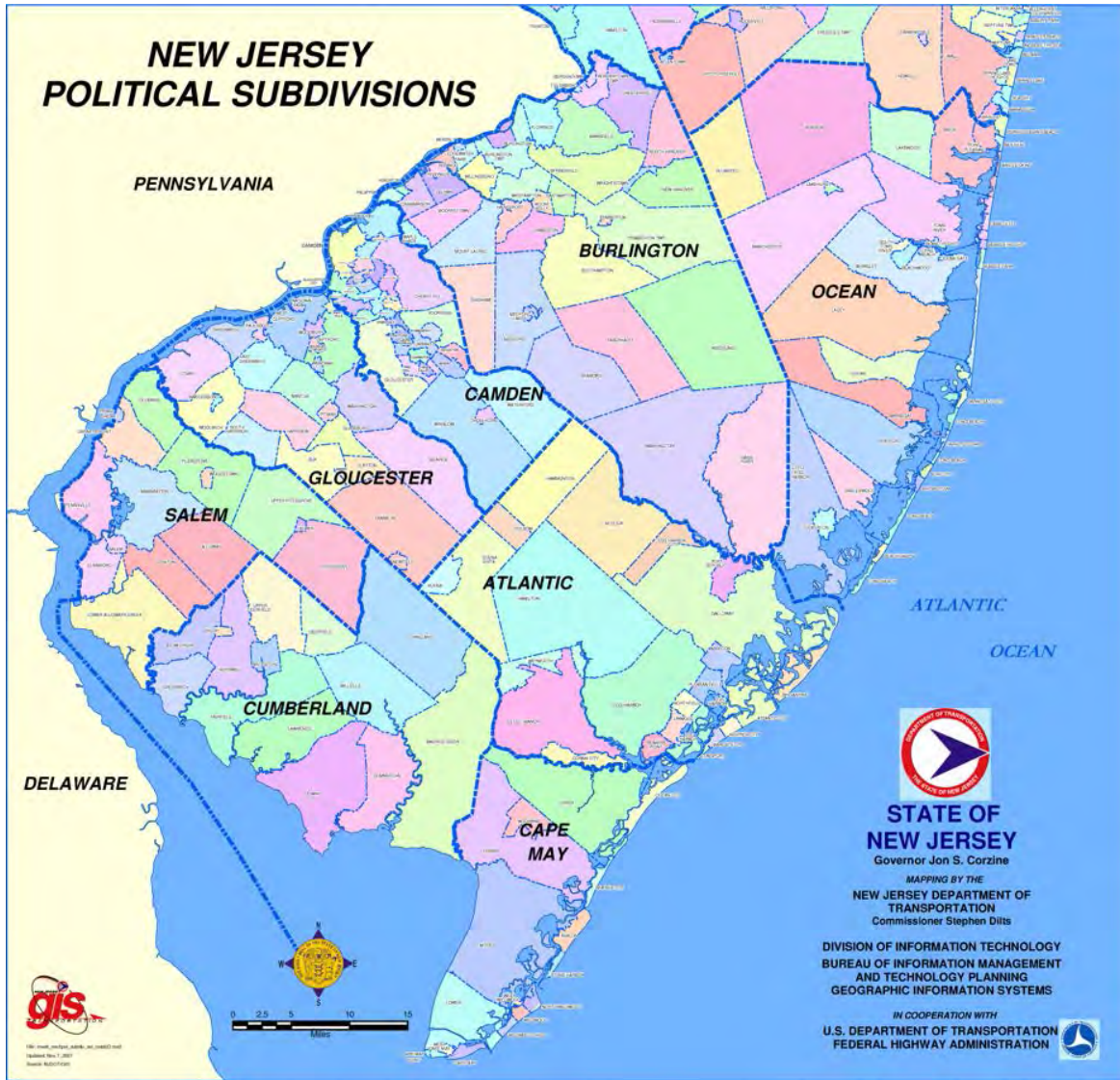


Figure 4: Municipalities in the State of New Jersey

Table 8: NJBB CSRM Feasibility Study Municipalities by Region

Region	NAME	MUN_TYPE	COUNTY
Coastal Lakes	Allenhurst Borough	Borough	MONMOUTH
	Asbury Park	City	MONMOUTH
	Belmar Borough	Borough	MONMOUTH
	Bradley Beach Borough	Borough	MONMOUTH
	Deal Borough	Borough	MONMOUTH
	Interlaken Borough	Borough	MONMOUTH
	Lake Como Borough	Borough	MONMOUTH
	Loch Arbour Village	Village	MONMOUTH
	Long Branch	City	MONMOUTH
	Manasquan Borough	Borough	MONMOUTH
	Neptune City Borough	Borough	MONMOUTH
	Neptune Township	Township	MONMOUTH
	Ocean Township	Township	MONMOUTH
	Sea Girt Borough	Borough	MONMOUTH
	Spring Lake Borough	Borough	MONMOUTH
	Spring Lake Heights Borough	Borough	MONMOUTH
	Wall Township	Township	MONMOUTH
West Long Branch Borough	Borough	MONMOUTH	
Shark River	Avon-by-the-Sea Borough	Borough	MONMOUTH
	Belmar Borough	Borough	MONMOUTH
	Bradley Beach Borough	Borough	MONMOUTH
	Lake Como Borough	Borough	MONMOUTH
	Neptune City Borough	Borough	MONMOUTH
	Neptune Township	Township	MONMOUTH
	Wall Township	Township	MONMOUTH
North	Barnegat Light Borough	Borough	OCEAN
	Barnegat Township	Township	OCEAN
	Bass River Township	Township	BURLINGTON
	Bay Head Borough	Borough	OCEAN
	Beach Haven Borough	Borough	OCEAN
	Beachwood Borough	Borough	OCEAN
	Berkeley Township	Township	OCEAN
	Brick Township	Township	OCEAN
	Brick Township	Township	OCEAN
	Brielle Borough	Borough	MONMOUTH
	Eagleswood Township	Township	OCEAN
	Egg Harbor City	City	ATLANTIC
	Galloway Township	Township	ATLANTIC
	Hammonton	Town	ATLANTIC
Harvey Cedars Borough	Borough	OCEAN	

	Howell Township	Township	MONMOUTH
	Island Heights Borough	Borough	OCEAN
	Lacey Township	Township	OCEAN
	Lakewood Township	Township	OCEAN
	Lavallette Borough	Borough	OCEAN
	Little Egg Harbor Township	Township	OCEAN
	Long Beach Township	Township	OCEAN
	Manasquan Borough	Borough	MONMOUTH
	Manchester Township	Township	OCEAN
	Mantoloking Borough	Borough	OCEAN
	Mullica Township	Township	ATLANTIC
	Ocean Gate Borough	Borough	OCEAN
	Ocean Township	Township	OCEAN
	Pine Beach Borough	Borough	OCEAN
	Point Pleasant Beach Borough	Borough	OCEAN
	Point Pleasant Borough	Borough	OCEAN
	Point Pleasant Borough	Borough	OCEAN
	Port Republic	City	ATLANTIC
	Sea Girt Borough	Borough	MONMOUTH
	Seaside Heights Borough	Borough	OCEAN
	Seaside Park Borough	Borough	OCEAN
	Shamong Township	Township	BURLINGTON
	Ship Bottom Borough	Borough	OCEAN
	South Toms River Borough	Borough	OCEAN
	Stafford Township	Township	OCEAN
	Surf City Borough	Borough	OCEAN
	Toms River Township	Township	OCEAN
	Tuckerton Borough	Borough	OCEAN
	Wall Township	Township	MONMOUTH
	Washington Township	Township	BURLINGTON
Central	Absecon	City	ATLANTIC
	Atlantic City	City	ATLANTIC
	Brigantine	City	ATLANTIC
	Corbin City	City	ATLANTIC
	Dennis Township	Township	CAPE MAY
	Egg Harbor Township	Township	ATLANTIC
	Estell Manor	City	ATLANTIC
	Galloway Township	Township	ATLANTIC
	Hamilton Township	Township	ATLANTIC
	Linwood	City	ATLANTIC
	Longport Borough	Borough	ATLANTIC
	Margate City	City	ATLANTIC
	Maurice River Township	Township	CUMBERLAND

	Northfield	City	ATLANTIC
	Ocean City	City	CAPE MAY
	Pleasantville	City	ATLANTIC
	Somers Point	City	ATLANTIC
	Upper Township	Township	CAPE MAY
	Ventnor City	City	ATLANTIC
	Weymouth Township	Township	ATLANTIC
	Woodbine Borough	Borough	CAPE MAY
South	Avalon Borough	Borough	CAPE MAY
	Cape May	City	CAPE MAY
	Cape May Point Borough	Borough	CAPE MAY
	Dennis Township	Township	CAPE MAY
	Lower Township	Township	CAPE MAY
	Middle Township	Township	CAPE MAY
	North Wildwood	City	CAPE MAY
	Sea Isle City	City	CAPE MAY
	Stone Harbor Borough	Borough	CAPE MAY
	Upper Township	Township	CAPE MAY
	West Cape May Borough	Borough	CAPE MAY
	West Wildwood Borough	Borough	CAPE MAY
	Wildwood	City	CAPE MAY
	Wildwood Crest Borough	Borough	CAPE MAY
	Woodbine Borough	Borough	CAPE MAY

A-7) REFERENCES

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