TRANSFORMING SHORELINES TO SUPPORT A MORE VIBRANT ECOLOGICAL HABITAT IS AN IMPORTANT GOAL OF REBUILD BY DESIGN MEADOWLANDS AND THE STATE OF NEW JERSEY. THIS DOCUMENT DESCRIBES AN APPROACH TO LIVING SHORELINE DESIGN ON THE TIDALLY-INFLUENCED RIVERS AS THEY APPLY TO THE REBUILD BY DESIGN MEADOWLANDS RIVERFRONT PARK CASE STUDY.

LIVING SHORELINES ON TIDAL RIVERS
AN APPROACH TO ENHANCE ECOLOGY + PROVIDE COMMUNITY ACCESS TO THE WATER

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TYPICAL CHALLENGES AND GOALS
- Existing Conditions
- Future Mean High Water
- Mean High Water
- Mean Low Water
- Existing Conditions

TYPICAL DESIGN GOALS
- Public Riverfront Access
- Manage Stormwater
- Improve Ecology
- Stabilize the Shoreline

TYPICAL PLANTING PALETTE
- Tidal wetlands are comprised of multiple ecological zones based on elevation and tidal range. The intertidal marsh is the zone between average high and low tides. Native grass tolerant of brackish water and tidal inundation is planted in the intertidal zone. The high marsh zone is between the intertidal marsh and the maritime shrub zone, and is periodically inundated during higher high tides and storms. The maritime shrub zone has plants that tolerate occasional inundation with brackish water.

TYPICAL SHORELINE CONDITIONS
- The Hackensack is a tidally influenced river with large mudflats extending approximately 200' from the water’s edge and relatively low-intensity wave action. This is an ideal condition for living shorelines. For example, designing the shoreline using biodegradable coir logs, subtle elevation changes and tidal wetland plants at appropriate elevations can cultivate a biodiverse intertidal habitat that is resilient in future rising seas.

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For more information please visit: www.nj.gov/dep/floodresilience/rbd-meadowlands.htm
RIVERFRONT PARK CASE STUDY
NEW ACCESSIBLE WATERFRONT PARK

PROJECT OVERVIEW
A new public park on the Hackensack River, in Little Ferry, NJ, was designed based on community input. The design will create public access on the river, provide community event space, improve biodiversity, provide environmental education, restore the shoreline with tidal marsh and provide an accessible kayak launch and gathering areas. Native upland plants with deep roots filter rain runoff and wetland plants transform the shoreline. The park design itself is inspired by the ebbs and flows of the Hackensack River tidal cycles and the fluid nature of the river itself. Unique features provide education and celebrate the ecological and cultural context. Brick plaques tell of historic crossings of the river and the origin of the brick industry. Interpretive posts show flora and fauna from ecohzones within the park. A concrete paving design maps the Hackensack River watershed and tributaries for a tactile experience of the interconnected waterways.

TRANSFORMING THE SHORELINE
The Riverfront Park location includes a portion of land which was likely tidal marsh until it was in-filled in the late 1960s. The condition of the shoreline is largely in disrepair, and ranges from naturalized revetment, to timber bulkheads and a private boat launch and dock. The design proposes to transform the hardened shoreline through various bio-engineering strategies such as coir logs and vegetated geolifts. With sea level rise anticipated from between 2.4 and 3.5 feet over the next 50 years, the park design accounts for occasional inundation and supports future wetland migration. Tidal wetland and grading design creates shelf-like areas to encourage water levels to stay in certain areas based on the tides. The site elevations and planting are intended to accommodate these changes to provide wetland habitat in 2022 and in the 50+ years following.

ADDITIONAL INFORMATION
This project is one component of the efforts the NJDEP is facilitating to assist communities in building resilience. For more information, check out the following resources:
- PROJECT VIDEO - REBUILD BY DESIGN MEADOWLANDS
  www.youtube.com/watch?v=Q3X5U4CTIxo
- OFFICIAL WEBSITE - REBUILD BY DESIGN MEADOWLANDS
  www.nj.gov/dep/floodresilience/rbd-meadowlands.htm
- CLIMATE AND FLOOD RESILIENCE
  www.nj.gov/dep/cfr/
- STORMWATER INFRASTRUCTURE TOOLKIT
  www.nj.gov/dep/floodresilience/toolkit.html

PARK COMPONENTS

- **2.0 acres** of new accessible parkland
- **0.3 miles** of walking paths
- **0.1 acre** of seating areas
- **75** new trees
- **0.5 acre** of native planting
- **0.5 acre** of tidal wetland planting

AIRPORT APPROPRIATE PLANTS
With Teterboro airport less than 10,000 feet (less than 2 miles) away, plant species were reviewed to ensure FAA and PANYNJ guidelines were met.

RAINFALL ABSORPTION
Dense planting areas offset impervious surfaces and absorb rainfall.

PLANT TRANSPERSION
Plants and trees absorb water from the soil through roots and eventually release to the atmosphere as vapor.

TIDAL FLUCTUATIONS
The river levels rise and fall twice daily with the tides. The shoreline is designed to thrive in this condition.

UPLAND SOIL
SANDY SOIL

NATIVE UPLAND GARDEN
Plants that grow well in sun or partial shade. These plants grow best in well-drained soil.

MULTI-STORY UPLANDS
Multi-layered canopy for plants that grow well in shade or partial shade.

WATER LOVING GARDENS
Plants tolerant of occasional inundation.

MARITIME SHRUBS
Plants tolerant of occasional tidal inundation.

HIGH MARSH
Perennial plants tolerant of periodic tidal inundation by brackish water.

INTERTIDAL MARSH
Marsh grass tolerant of brackish water and tidal inundation.

SUBTIDAL
Numerous crustaceans make their homes in shallow mudflats where few plant species grow.