South Florida Resilient Redesign
Suburban Community
Western Miami-Dade County
Site Overview

- “This place was once the Everglades, and when it rains, it remembers!”
- Low-lying inland suburban area that is currently experiencing prolonged flooding
- 5 square miles in western Miami-Dade County
- Population of ±73,260 and 27,375 housing units
- Many structures were built prior to flood criteria requirements
Site Overview

- Higher elevations to the east and west increase the likelihood of flooding in the area.
- The area has low land elevations and a high average water table.
  - Vulnerable to flooding
  - Shallow unsaturated zone in which to store additional water
- The area has experienced repetitive losses due to flooding.
- Issues are expected to be compounded by the impacts of sea level rise.
Site Overview

Dolphin Mall
Sweetwater
Miami International Mall
DORAL
SR 836 EXT
Miami International Airport
Mall of the Americas
Florida International University
Tamiami Park (Youth Fair Site)
FIU Eng.
Site Overview
Drainage

- North of Flagler Street, stormwater generally flows to the wet detention areas, then to groundwater by infiltration.
- Southern portion served by a system of swales and french drains connected to a force main and pump station that discharges into the Tamiami Canal.
- The Tamiami Canal conveys stormwater by gravity from west to east along its entire length and discharges to the Miami River.
- SLR is expected to decrease the unsaturated zone storage which directly reduces the capacity of the drainage systems.
Water/Wastewater Infrastructure

- Most areas connected to central water and wastewater service, southeastern portion utilizes individual septic tanks.
- The effectiveness of septic systems may be compromised by rising groundwater levels.
- Wastewater infrastructure experiencing infiltration/inflow from groundwater entering the system.
  - Reduces the available system capacity and increases capital costs and O&M costs.
Design Concepts/Scenarios

• Project Team presented 3 scenarios that represent various levels of intervention.

  ▫ The Engineering Approach
    • Builds on completed/planned engineering projects
    • Increase local pump capacity and capacity of the Tamiami Canal (both east and west) by widening or building walls.

  ▫ The Incremental Approach
    • Based on small steps of intervention towards resilience

  ▫ The Resilient Redesign Scenario
    • Encourages “living-with-the-water” rather than fighting against it
The Engineering Approach

- Based on intensifying the technical management of the water system.
- Builds on projects that have already been implemented or are underway in the area
  - Emergency Detention Basin - complete
  - Tamiami Canal Flood Control Wall
    - Portions complete, remaining portions scheduled for 2015
  - Stormwater pumps currently operated by the County and the City of Sweetwater
The Engineering Approach

During extreme storm events, pump water west and store in abandoned, lined rockmining quarries.

Increase capacity of the Tamiami Canal by widening or building walls.

Increase local pump capacity
The Engineering Approach

• The Project Team concluded:

An approach in which problems are resolved through “engineered fixes” as they arise would lead to increased costs without addressing the underlying problems and would not support the long-term sustainability of the area.
The Incremental Approach

“small interventions – great results”

- Presents an incremental approach that combines public and private interventions, builds on the current built environment and is based on small steps of intervention towards resilience

Lot – Incentive planning

Streets – Green infrastructure

Neighborhood – Blue/green Network
South Florida Resilient Redesign

The Incremental Approach

- Encourage/require property owners to store more stormwater on-site through increased retention and detention areas, rain barrels or rain gardens.
- Use utility line right-of-way to increase water storage capacity.
- Transform roads and parking lots into penetrable areas using porous materials, permeable pavements, bioswales, etc.
- Once central sewer service is extended to the area, abandoned septic tanks can be used to store stormwater.
- Use former golf courses to increase water storage capacity.
The Resilient Redesign Approach

• Presents a bold redevelopment scenario for the Study Area that envisions voluntary land reassembly by the current residents in exchange for an equal or greater share in the development of a more sustainable development pattern.

• It builds on a number of unique strengths of the Study Area that can add value including a possible East-West extension of the mass transit system.

• By elevating the land using traditional cut-and-fill methods, the Resilient Redesign Approach encourages “living-with-the-water” rather than fighting against it with a series of engineering fixes.

• Flood Protection + Quality of life + Healthy ecology + Sustainable urbanism + Vibrant local economy + Climate adaptation (microclimate) = Resilient Redesign
The Resilient Redesign Approach

- Finger canals will be excavated with the fill being used to build up the adjacent land area to reasonably projected levels above the flood plain.
- Increase open space, such as a restorative wetland park, that are designed to work with the natural stormwater flow through the area.
- Provide passive recreation along canal banks.
- Use existing golf courses for increased water storage capacity.
- Floating trailer park concept as a demonstration of an alternative adaptive dwelling typology.
- Builds on a possible East-West extension of the Metrorail to develop a new town center.
Floating Trailer Park Concept

collectively

individually
Finger Canal Concept

Cut and fill

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Implementation

- Recommendations can provide prototypical solutions for areas with similar characteristics and vulnerabilities.
- Adaptation Action Areas (AAA)
  - Resilient redesign recommendations can be implemented through AAAs or similar designation.
  - State law allows local governments to designate vulnerable areas as AAAs and assign policies to address resilience.
  - Miami-Dade County adopted AAA policies into the CDMP last year and is currently determining the feasibility of designating AAAs.
  - Implementation may be different for each vulnerable area depending on unique circumstances and vulnerabilities.
  - Coordination with municipalities and stakeholders
Acknowledgements

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