Resilience Workshop - NAI
Coastal Climate Risk and Resilience

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Social Coast Forum February 3-6, 2020
Community Health Resource Management (CHARM)
COASTAL CLIMATE RISK
SEA LEVEL RISE – 3 FEET in 50-70 YEARS?
LOW BATTERY HURRICANE IRMA FLOODING
RAIN BOMB AND STORM URBAN FLOODING
As a coastal city with most elevations near sea level, the City of Charleston has long been vulnerable to flooding. Current flooding consists of tidal flooding of some streets during a King Tide or due to storm surge. Tidal flooding in the 1970s averaged 2 times per year, while in the early 2010s it is up to 11 times per year. By 2045, the City is projected to face nearly 180 tidal floods a year.

Rising sea levels represent additional challenges now and in the future. The sea level in Charleston has risen slightly more than one foot in the last 100 years. The estimates of how much more sea level will rise in the next 100 years vary, but there is no doubt the rising trend will continue.

The National Oceanic and Atmospheric Administration (NOAA) estimates a sea level rise of 2 to 7 feet in Charleston over the next 100 years. The current data indicates the expected increase in sea level is more gradual initially, but may accelerate over time. The different projections result from different estimates of ice melting due to warming temperatures.

SOURCES: UCS Analysis; Morales and Alsheimer 2014; NOAA Tides and Currents 2013.
COMMUNITY RESILIENCE
NO ADVERSE IMPACT
Account for Changing Climate/Conditions

10% Increase in Design Storm Sizes
2 Foot Increase in Minimum Road Elevation
2 Foot Increase in Minimum Outfall Elevation
Default Watershed Peaking Factor of 484 (Urban Conditions) with Allowance for Justified Modification
25% Culvert Clogging Factor of Safety
Requirement for Models that Account for Tidal/Backflow Conditions
NEEDED YESTERDAY:

Intergovernmental cooperation and adoption of similar standards for development and redevelopment

Integrated regional planning for new infrastructure, replacements and expansions (roads, drainage, telecommunication, energy, water, sewer)

State and federal enabling laws for local government collaboration and shared grant resources for floodplain management

Relocation programs that cross jurisdictional lines while preserving private investment values
What is the damage from climate change? Are we looking into Pandora’s Box or simply a ‘parade of horribles’?

Can local governments take enough action to prevent damage from climate change, like sea level rise, or is ultimate failure and damage from climate change inevitable?

Resiliency goals as a basis for action are constrained by the money available to implement the goals; is an unfunded plan a failure to act that causes damage?
WHO’S LIABLE FOR MY DAMAGE, WHO PAYS?

Houses condemned, litigation pending over cost of removal on Harbor Island, SC
THE DAMAGE LOCAL GOVERNMENTS FACE

Increased costs for drainage improvements, roadway impacts, traffic management and shelters

Loss of property values and tax revenues

Population and commercial activity declines

Government owned facilities damages and relocation costs

Legal challenges for acting or failing to act:
  - Takings/Inverse Condemnation
  - Flood damages to private property
Several companies have been creating the standards for when they invest in real estate development in climate-challenged areas.

The standards being developed for evaluation of sites for investment are guided by data analytics on climate from several analytic companies.

The private investment market is looking at climate change globally and creating the tools that will be very useful for local governments if they had access to them.

Heitman and Blackrock are two notable examples of global investment firms evaluating sites, with many institutions studying the risk for the real estate investment market.
Analytic companies include Jupiter Intelligence, First Street Foundation (Flood IQ and mapping), Carbon Delta, Geophy, and Verisk Maplecroft.

Some tools are available from government, primary the Digital Coast from NOAA (FEMA maps?)

Insurance companies are not leading in climate change or yet using these analytics because they are all looking backwards to establish actuarial rates.

There is not a 30 year insurance policy for a mortgaged property, significant fluctuations on annual premiums without which the loan is called already affect the market.
Heitman engaged Four Twenty Seven in its initial study published in 2018 with ULI (*Climate Risk and Real Estate Investment Decision-Making*)

The risk-mapping tools created for evaluation of investments includes 30 meter by 30 meter zones (about 100’ by 100’), a significantly smaller scale than most flood mapping.

The scoring under the climate model used looks at risk from cyclones, floods, earthquakes, sea level rise, heat stress and water stress, i.e., climate change risks.

Investment companies are also looking to harden their current assets against the risk of extreme weather events, looking at their portfolios to manage the climate risk going forward and balancing investment risk between market and climate forces.

Engaging with policymakers on a city level resilient strategy and supporting investment by cities in mitigating the risk of all assets in their jurisdiction is a principle used by these investment firms in the evaluation of assets and investments – local action, or inaction, affects investment in the local community.

Data driven decision making is a key element by investment firms and by bond firms.
What data is reliable, what is safe to use by a local government that might withstand a legal challenge if used?

By what criteria can reliable data be chosen and when does it need to be updated?

What is not well presented by these efforts is the evaluation of the cost of doing nothing, except perhaps for the First Street general projections in coastal areas.

Local governments may need to study what impacts they face financially, what is the risk of not addressing climate change?
What Land Will Be Underwater in 20 Years? Figuring It Out Could Be Lucrative
By Brad Plumer
• Feb. 23, 2018

The Battery area of Charleston, S.C., after Hurricane Matthew in October 2016. Companies are seeking better climate forecasts to assess the risks of operating in the area. Credit...Sean Rayford for The New York Times

(introduction to story on Jupiter used by company relocating to Charleston)
Studies are continuing to be developed and funded, in Charleston a three-year $3 million study is underway to look at what physical barriers might be needed to protect against significant storm surge for the entire peninsula.

The Corps of Engineers is also performing a South Atlantic study looking at vulnerability along the southern seaboard (NC – FL).

Local studies for improved drainage facilities, evacuation routes and shelters continue piece-meal to respond to increased flooding.
“Resilience is the capacity of individuals, communities, institutions, businesses and systems within a city to survive, adapt and grow no matter what kinds of chronic stresses and acute shocks they experience.” (Source: 100ResilientCities.org)

“Resilience is the ability to anticipate, prepare for and adapt to changing conditions; and withstand, respond to and recover from disruptions. Principles of resilience are summarized as Prepare, Absorb, Recover and Adapt.) (Source: USACE)

Disaster planning ↔ resilience planning
RESILIENCE AND SUSTAINABILITY

Hurricane Sandy opened eyes and created a growing movement toward resilience, some say survival.

Activity across the US coast gives a lot to draw upon, we confront a common challenge.
Ten Principles for Building Resilience (ULI, 2018)

Understand Vulnerabilities,

Strengthen Job and Housing Opportunities, Promote Equity,

Leverage Community Assets,

Redefine How and Where to Build,

Accurately Price the Cost of Inaction, Build the Business Case,

Design with Natural Systems, Maximize Co-benefits,

Harness Innovation and Technology
Climate Ready Boston
Resilient305 (Miami)
Rising Above (Miami Beach)
Resilient By Design Bay Area Challenge (San Francisco)
Resilient Norfolk
Dutch Dialogues (New Orleans, Norfolk, Charleston)

Communities and developers respond to sea level rise
Clipper Ship development in Boston is a good example, Bay Area Challenge projects highlight several approaches, Hurricane Sandy/NYC challenge ongoing projects with combinations of approaches to living with water
THANK YOU

QUESTIONS? DISCUSSION?
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