

6 Strategies

Connect

Gather

Cool

Absorb

Adapt

Link

COMMON THREADS : RESILIENT PVD

DESIGN AND RESILIENCE TEAM

CITY OF PROVIDENCE

NEMSN/ AIA DART PRESENTATION

FEBRUARY 3, 2016

MAYOR JORGE ELORZA

DIRECTOR OF SUSTAINABILITY : LEAH BAMBERGER

**444 WESTMINSTER STREET
MAIN CONFERENCE ROOM
PROVIDENCE, RI**



SUSTAINPVD



Design & Resiliency Team

A public service program of the American Institute of Architects and the New England Municipal Sustainability Network

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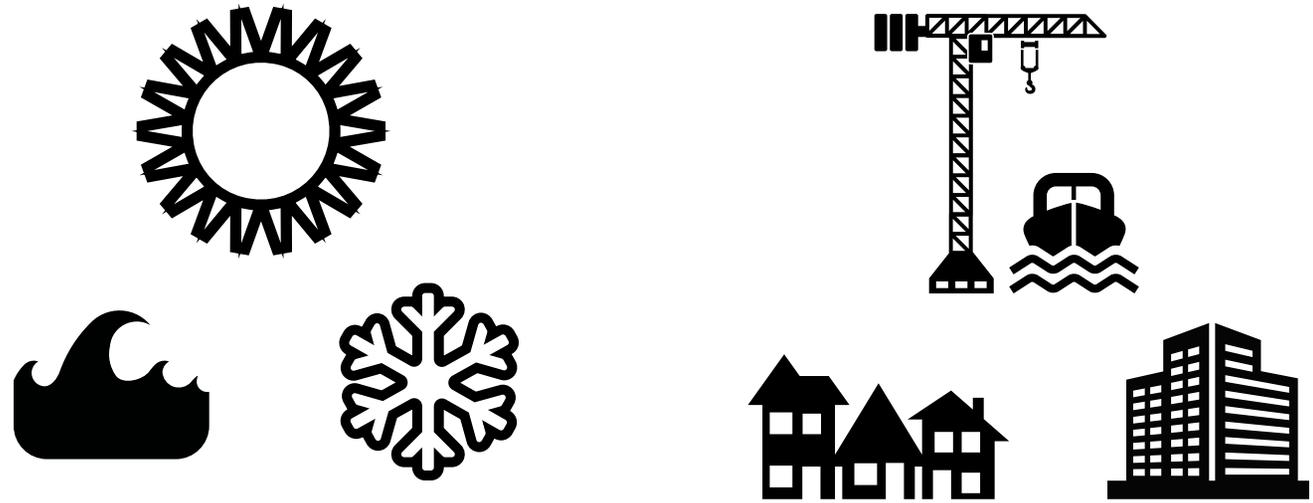
Senior Director of Design Assistance, AIA, Washington DC

Dylan Zingg (report layout)



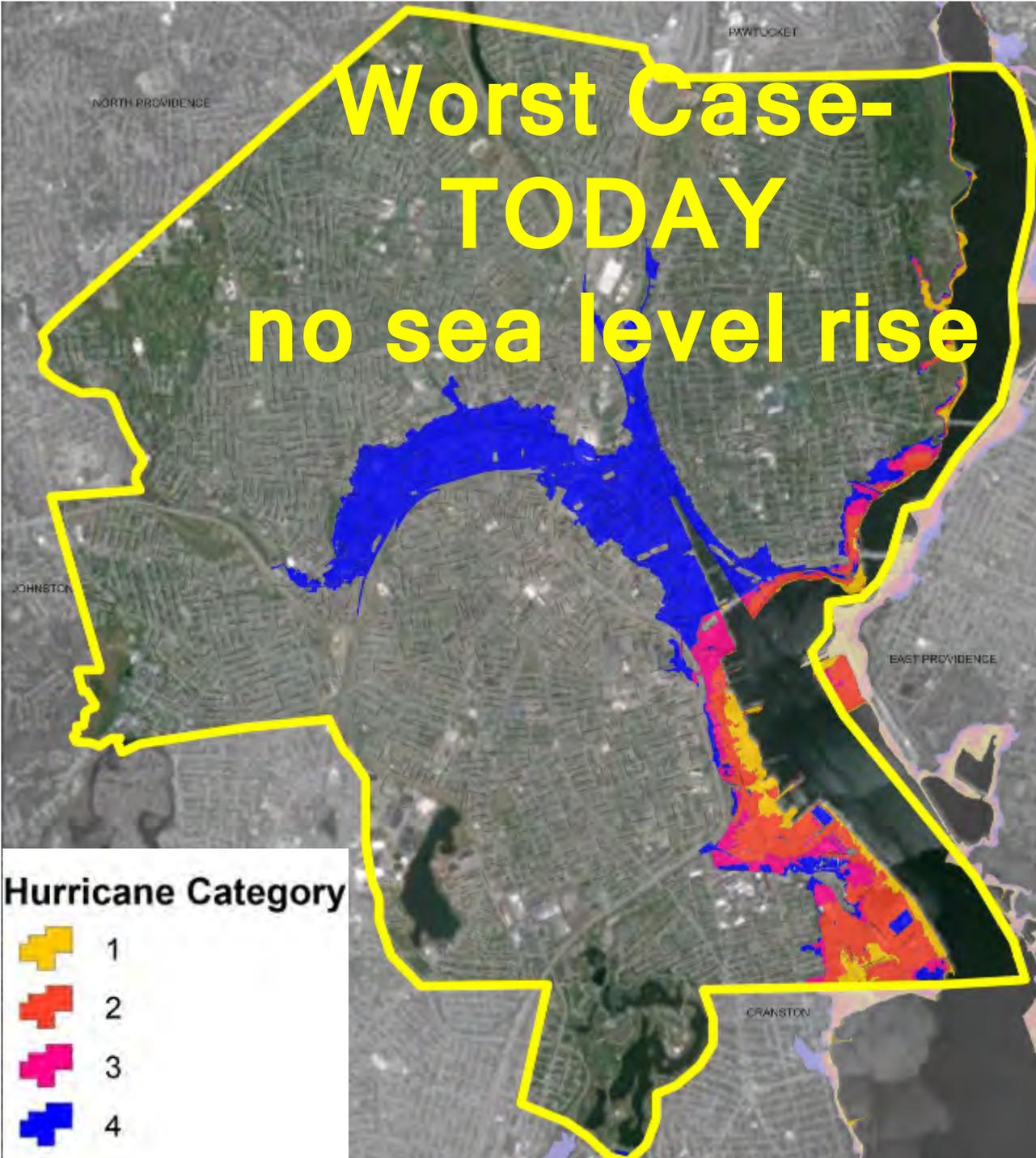
What does climate resilience mean to you? Climate STRESS v. SHOCK

- Adaptation is what you do. *Resilience is what you are.*
- Be ready for sea level rise, hurricanes, storm surge, etc.
- Learn from other cultures and vulnerable populations.
- Focus on both cultural and physical resilience.
- Build community strength from trauma.
- Knowing where we are and where we want to be.
- Understand our systems, designs, and policies.
- Ability to bounce back.
- Use natural systems.
- Proactive instead of reactive.
- Responsive and knowledgeable government.

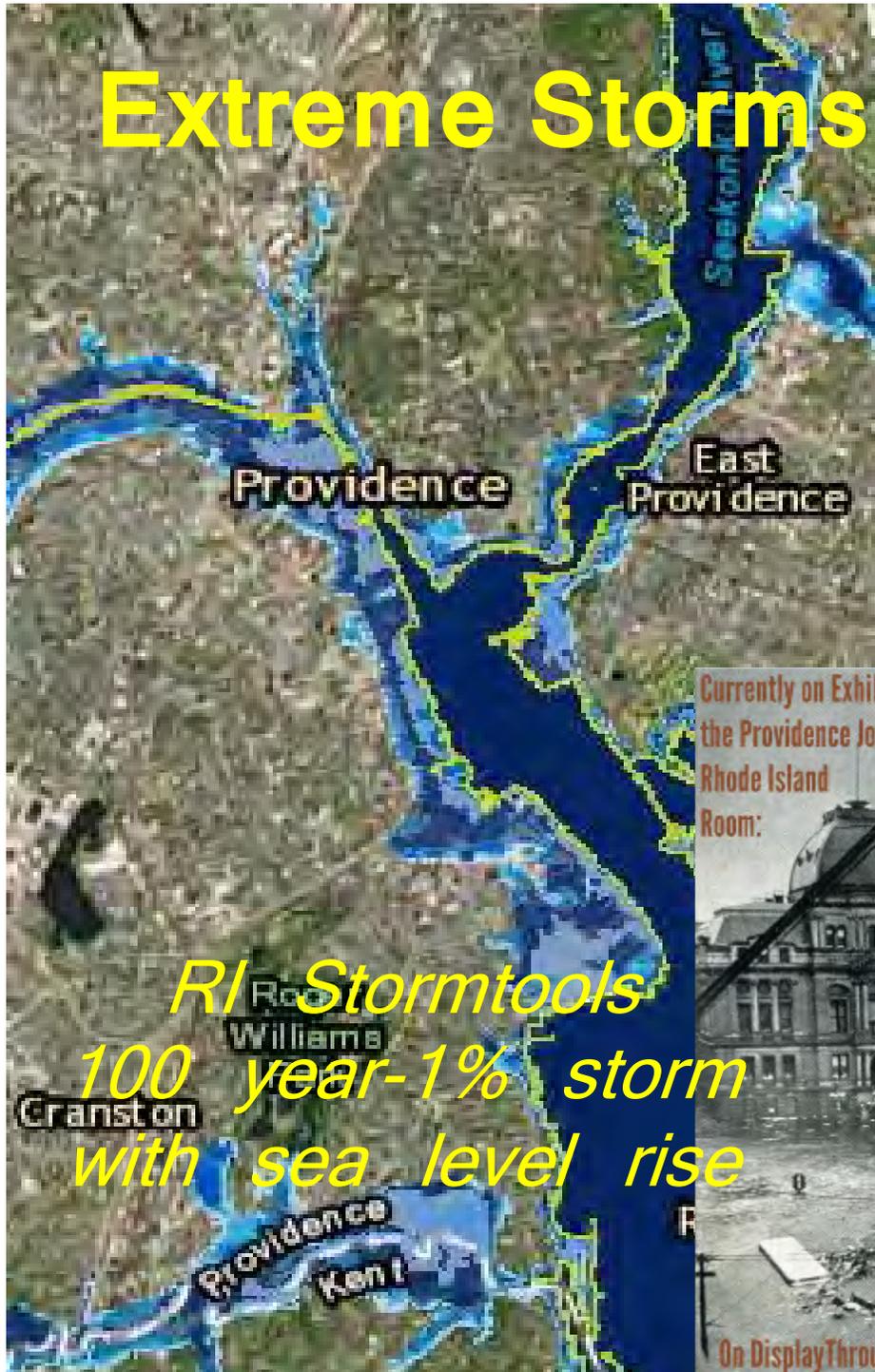


RISK = THREAT X VULNERABILITY

**Worst Case-
TODAY
no sea level rise**



Extreme Storms



Currently on Exhibition in
the Providence Journal
Rhode Island
Room:



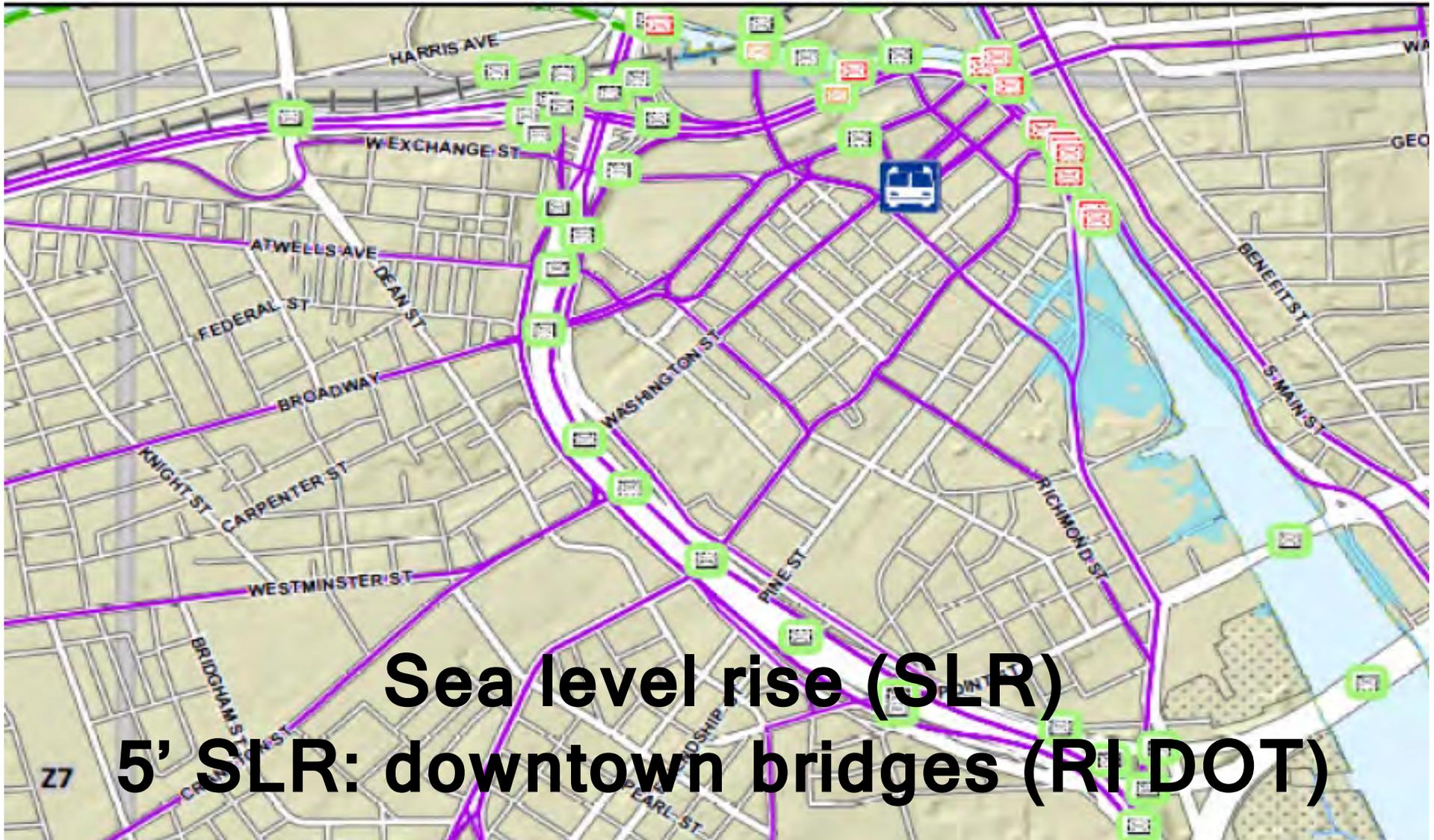
Hurricane Season—The Hurricane of 1938

The hurricane that struck New England in September of 1938 remains the most destructive to ever visit the area. But it was by no means the first hurricane to cause major suffering and loss for New Englanders.

The items on display here include images of the 1938 storm and some of its predecessors, newspaper accounts, materials used in a nonfiction account of the storm and the words of survivors attempting to describe what would be one of the most traumatic days of their lives.

On Display Through August 15th

RI Stormtools
100 year-1% storm
with sea level rise



Sea level rise (SLR) 5' SLR: downtown bridges (RI DOT)

SLR Inundation*	Transportation Infrastructure	Bridges	Reference Features
1 Foot	Roads	Freeboard (FB) Height	Map Atlas Grid
3 Feet	Railroads	FB Concern	Municipal Boundary
5 Feet	Bus Routes	FB Unknown	Streams
Intermodal Hubs	Bike Paths	No FB Concern	RI Ponds & MHHW**
Bus	Ports & Harbors	Accessibility	wetland
		Not Accessible	RI Boundary***
		Accessible	



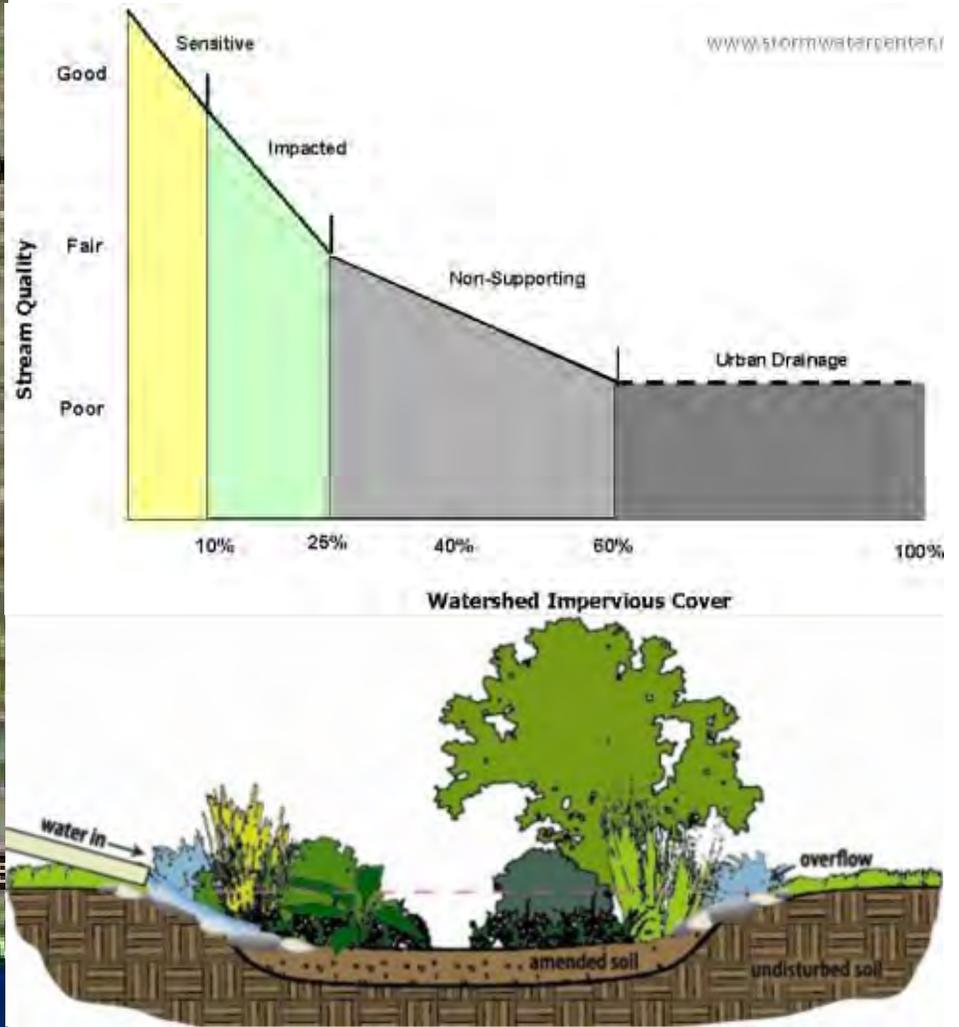




Rhode Island Statewide Planning Program
 Coastal Change Page 04/07/2014
 21Statewide Planning Program/Transportation/Sea Level Rise Paper/Fin/SLR_Map20140407

Map Disclaimer: This map is not the product of a Professional Land Survey. It was created by RI Statewide Planning Program for general reference, informational, planning and guidance use, and is not a legally authoritative source as to location of natural or manmade features. Proper interpretation of this map may require the assistance of appropriate professional services. RI Statewide Planning Program makes no warranty, express or implied, related to the spatial accuracy, reliability, completeness, or currentness of this map.

Local Flooding Water Quality



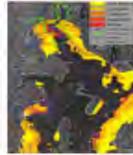


Protect



18.71

Relocate



13.41

Accomodate



8.79

Do Nothing



1.16

Hurricane Resilience For The Port Of Providence (URI)

Ensure post-hurricane business continuity for water front business

4 1-5

Minimize hurricane to damages to infrastructure and waterfront businesses

4 1-5

Minimize hurricane-related environmental damage from port uses

4 1-5

Build public support for hurricane resilience measures & port operations

Minimize hazard insurance rates

Foster port growth

4 1-5

Protect human safety & critical lifelines

5 1-5

Ensure post-hurricane business continuity for water front business

4 1-5

Minimize hurricane to damages to infrastructure and waterfront

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3 1-5

Protect human safety & critical lifelines

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Build public support for hurricane

Minimize hazard insurance rates

Foster port growth

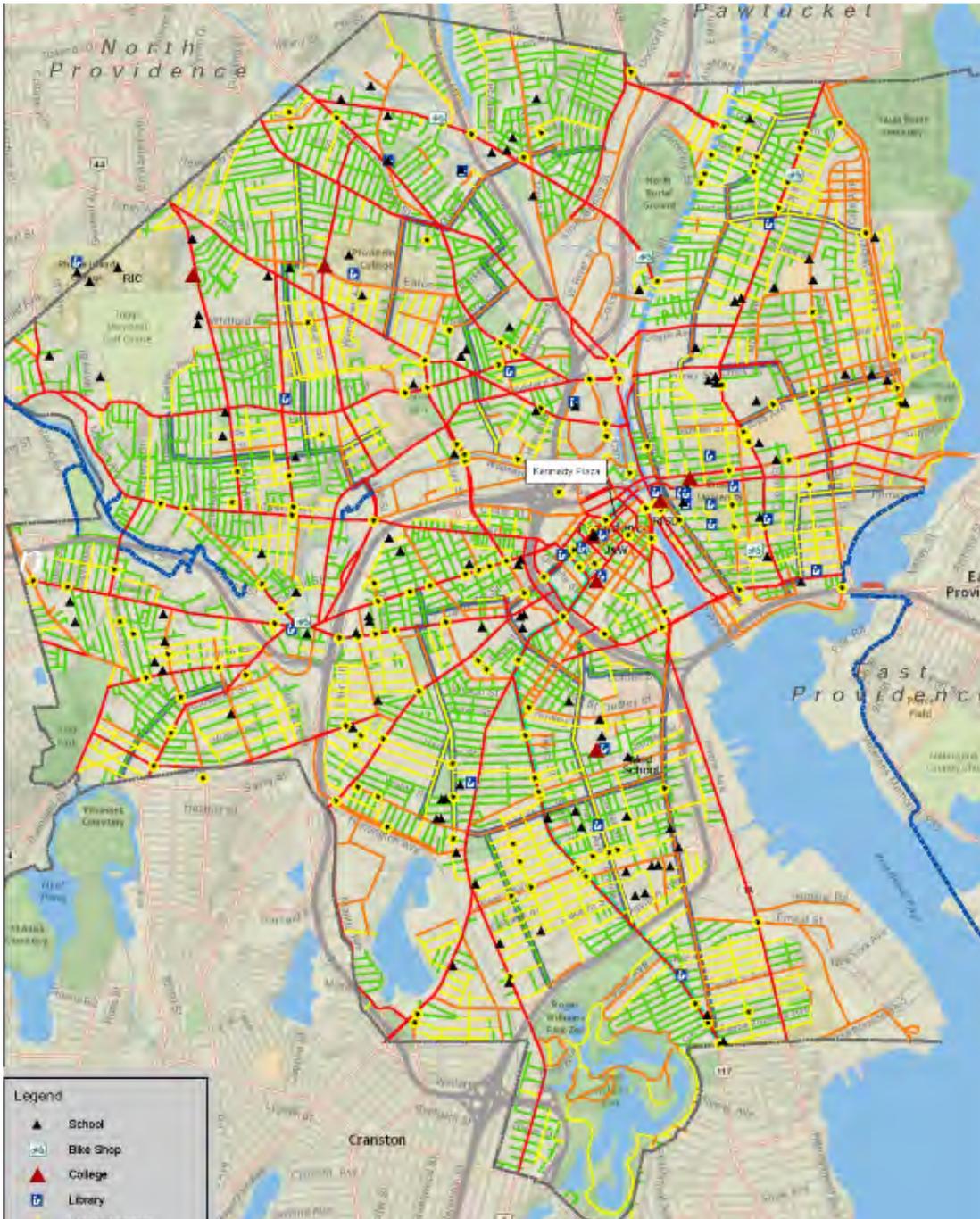
3 1-5

Protect human safety & critical lifelines

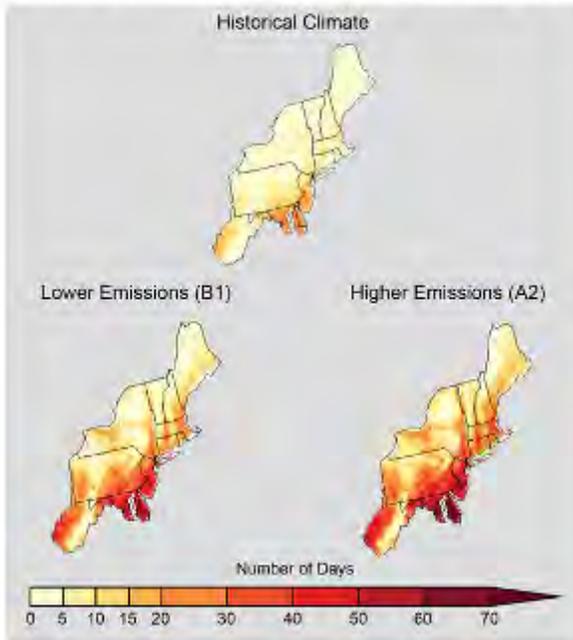
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Build public support for hurricane

Connections e.g. bicycling (Providence/VHB)



Projected Increases in the Number of Days over 90°F

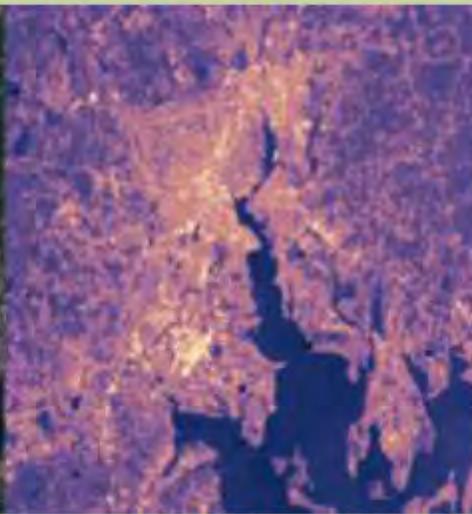


Connecting Green (Providence)

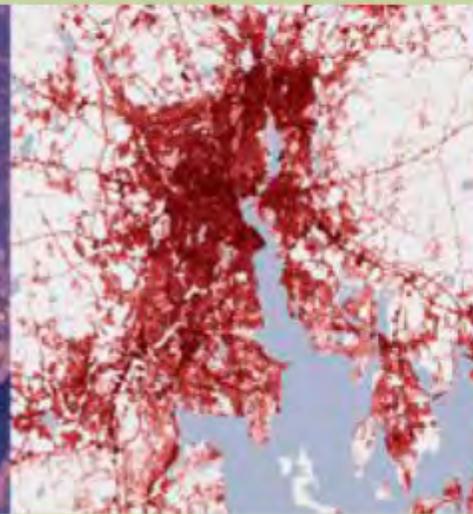
Visible Light



Surface Heat



Developed Land

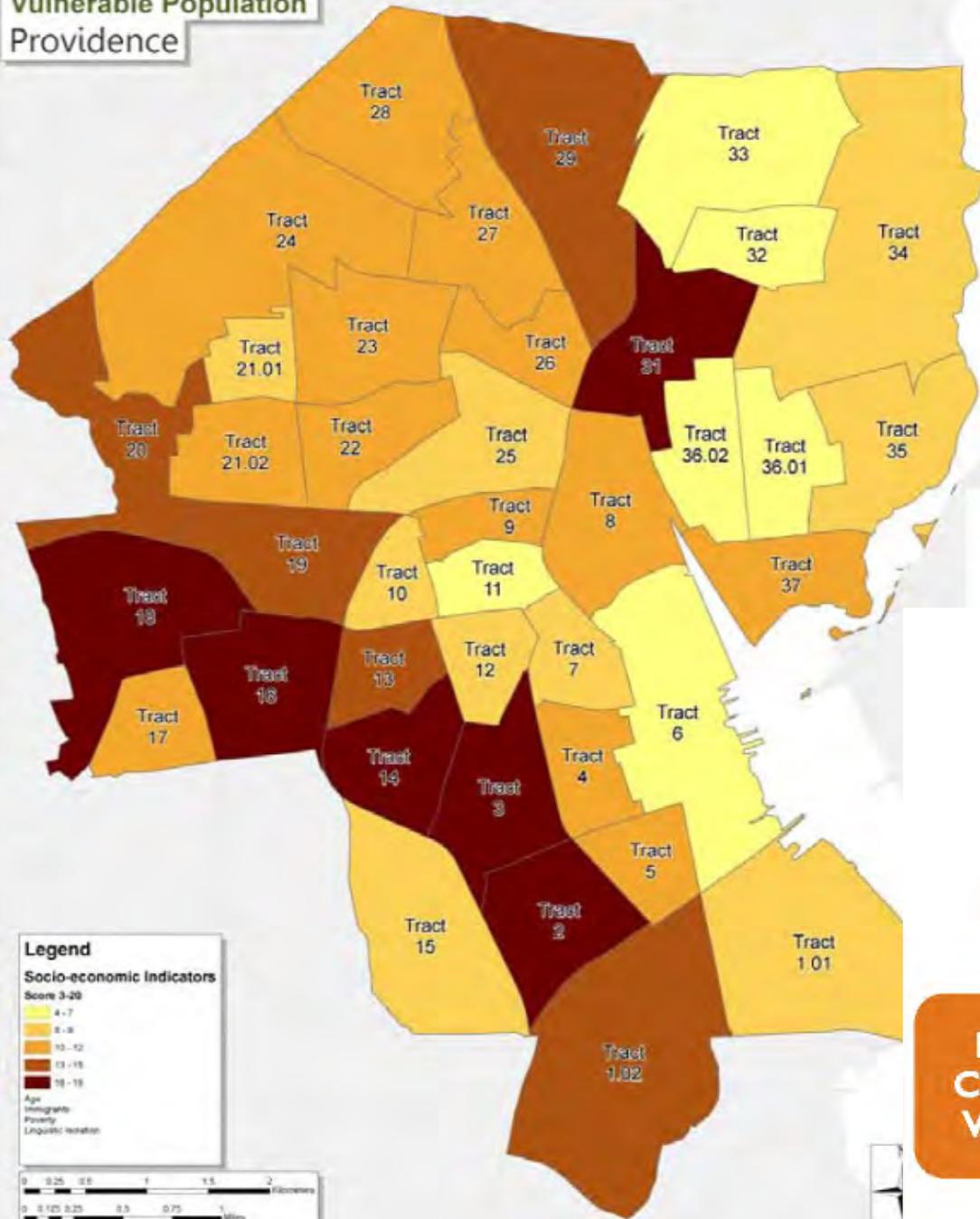


Vegetation Cover



Source: NASA- US EPA, Providence, RI DEM

**Vulnerable Population
Providence**



Well-Being, Health and Climate Change (Providence)

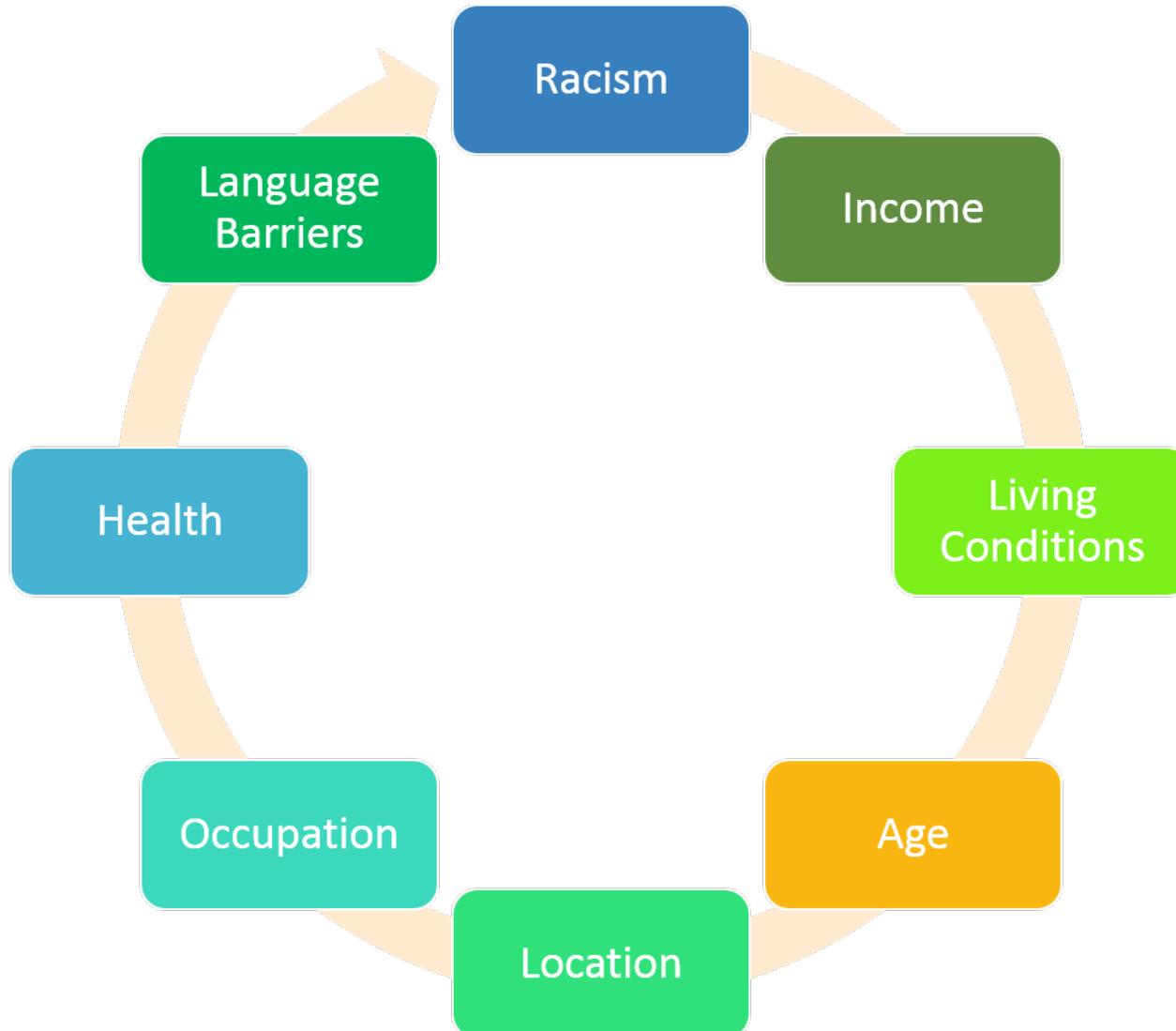


Principles for consideration

- Preparing for events (storms, heat waves) is different than comparing for changes in climate norms (sea level rise/high tides; avg. temperature)
- Buildings and capital project design standards should take into account the climate projections for the full life cycle of the asset
- Envision climate resiliency in 2050 and 2100 and work backwards - incremental approaches will likely not be sufficient, and may prove counter productive
- Don't put all your eggs in one basket - resiliency requires multi-level approaches to protection and preparedness



Major Vulnerability Factors to Climate Change



“The effects of climate change threaten everyone, but they do not threaten all people equally.”

“The climate crisis...inflicts the greatest suffering on those who have contributed the least to the problem - our poorest and most vulnerable communities.”

“The voices of frontline communities, the ones that are *most impacted, usually don't make it to the airwaves.*”

Jacqui Patterson, Director Climate Justice Initiative, NAACP





EQUALITY

Equality is about Sameness

Equality promotes fairness and justice by giving everyone the same thing.

It can only work if everyone starts from the same place.



EQUITY

Equity is about Fairness

Equity gives people access to the same opportunities.

Our differences and/or history can create barriers to participation, so we must first insure equity before we can enjoy equality.



Outreach and Involvement



**ENVIRONMENTAL JUSTICE
LEAGUE OF RHODE ISLAND**

Resilience Planning

Community-centered planning is essential to achieving equitable climate preparedness outcomes.

- Establish a people of color led community **Advisory Committee**.
- Implement a **Race and Social Justice** screen.
- Develop an **Equitable Engagement Checklist**.
- **Fund Community** members and organizations to lead engagement processes.





Neighborhood Resilience



- Create a **Community-Defined** vision of resilience.
- Develop **Neighborhood-Specific** climate vulnerability assessments and resilience plans, include metrics.
- Work at the **Nexus** of Climate Preparedness & Neighborhood Needs.
- Increase **Individual** and **Community** disaster preparedness.
Culturally appropriate emergency preparedness outreach.
Neighborhood emergency hubs.

Neighbors

Empowered and Connected Neighbors are More Resilient

- Support **Neighborhood Events**.
- Enable **Community Defined Projects**.
Foster equitable access to
and benefit from these programs.
- Expand the **Neighborhood Toolkit**.



Youth Involvement



Health & Well-Being

Resilience to Everyday Stresses Helps Prepare us for Big Events

- Improve housing and food security.
- Reduce the burden of pollution on communities of color and lower income communities.
- Advocate to the utility for increased weatherization support for lower income houses.



Green & Healthy
Homes Initiative®



Resilient Economy - For All

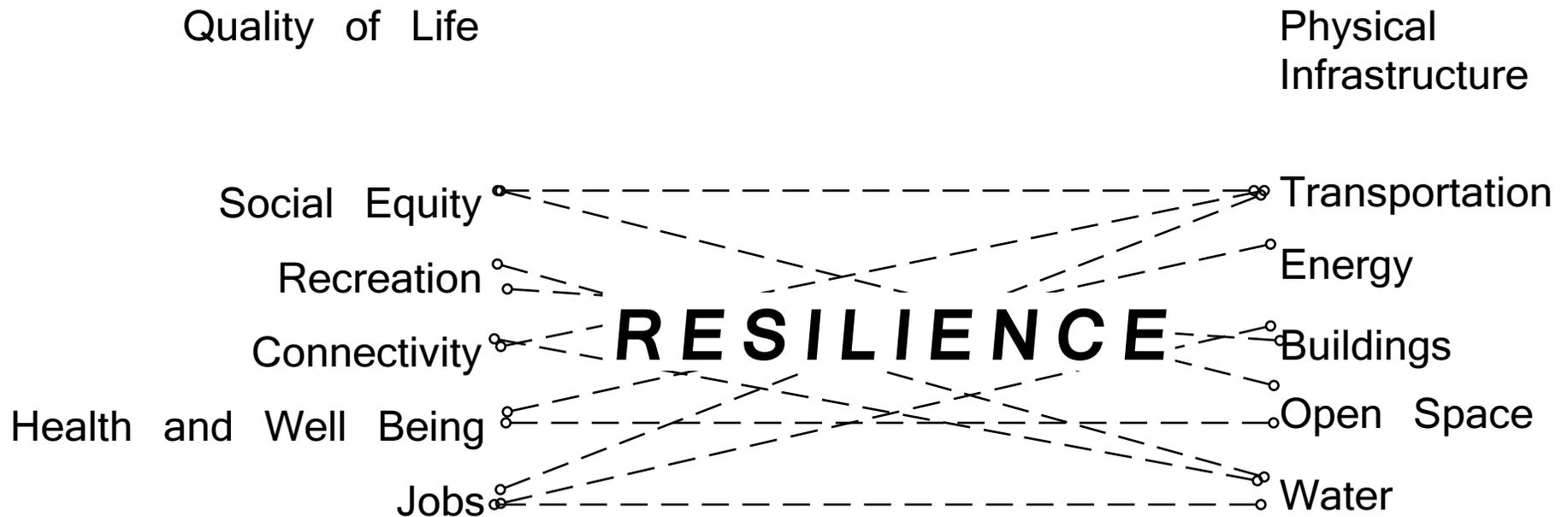
Economically Stable Neighborhoods and Residents are better able to Prepare for and Recover from Extreme Events.

- Support development that brings benefits for all.
- Implement anti-displacement strategies.
- Expand job training & opportunities that advance Climate Resilience.





PROVIDENCE - CONNECTS



FREQUENCY	NOW	2050		2100	
	A	B	C = A + B	D	E = A + D
	Water Level*	Projected Sea Level Rise	Water Level	Projected Sea Level Rise	Water Level
100 Yr Storm Tide	12'	1'	13'	5'	17'
Annually	4'	1'	5'	5'	9'

**100 YEAR STORM BECOMES
AN
ANNUAL EVENT**

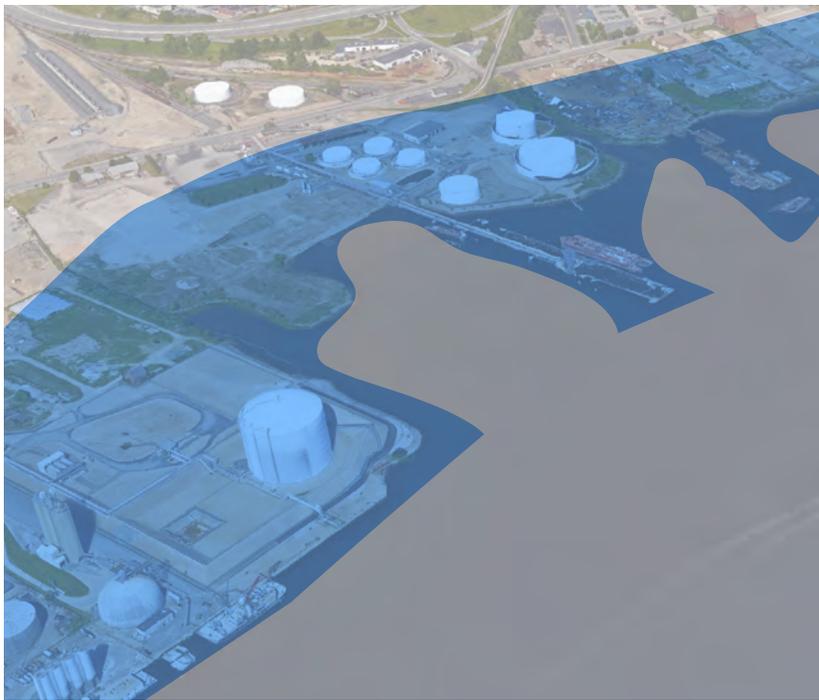
WHAT WE LEARNED



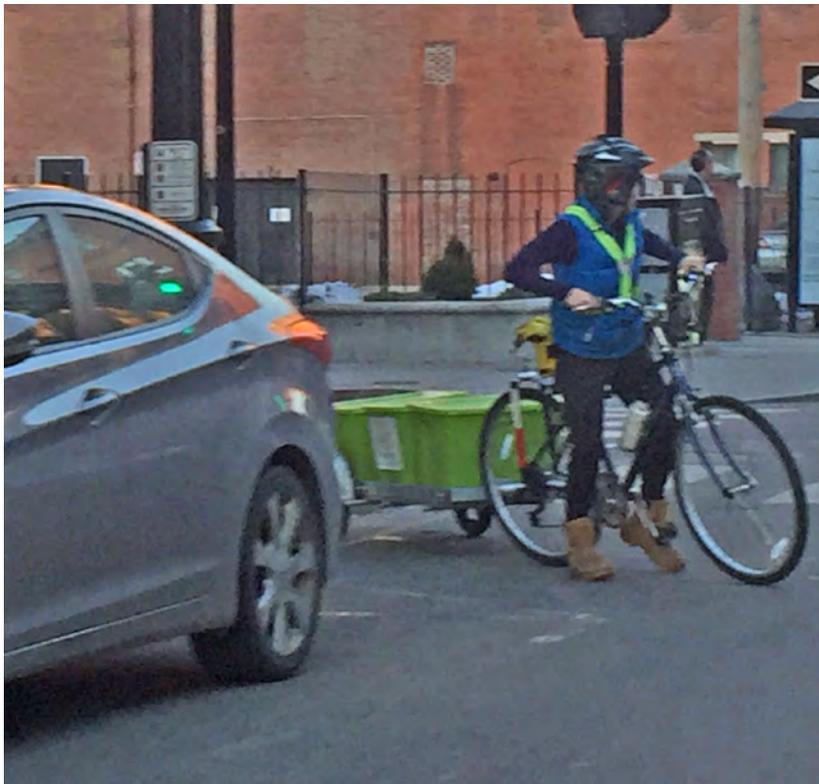


Key Assets





Vulnerabilities



An aerial photograph of Providence, Rhode Island, showing the city's layout, the Providence River, and the surrounding landscape. The image is overlaid with a blue grid pattern. The text "PROVIDENCE IS A MOSAIC" is centered in white, bold, uppercase letters.

PROVIDENCE IS A MOSAIC



BUT IT'S DISCONNECTED

...BUT IT'S DISCONNECTED



Google

...BUT IT'S DISCONNECTED



Google



CONNECTING PROVIDENCE



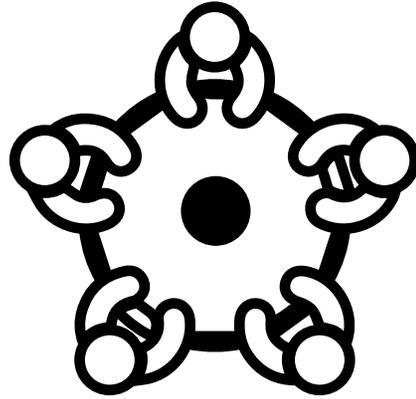


COMMUNITY TOOLKIT
making a “HUB”

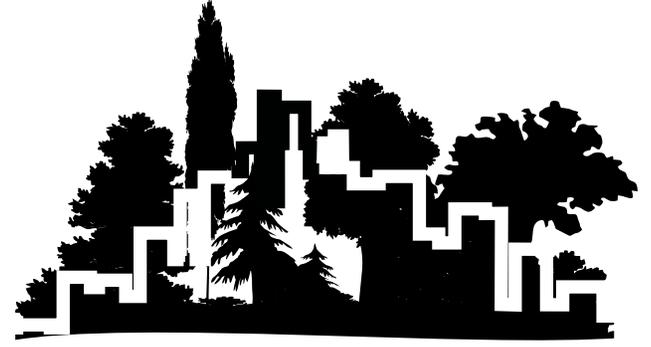




Connect



Gather



Cool

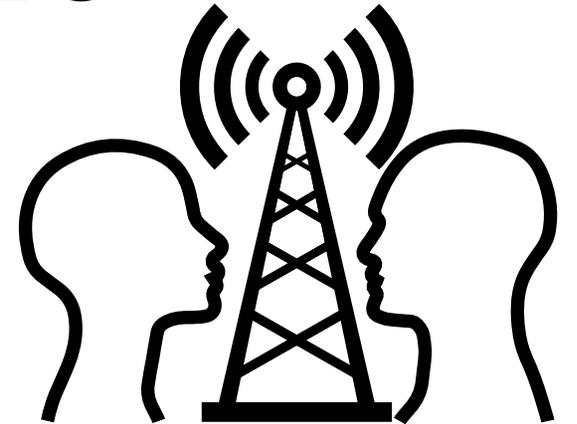
6 STRATEGIES



Absorb



Adapt

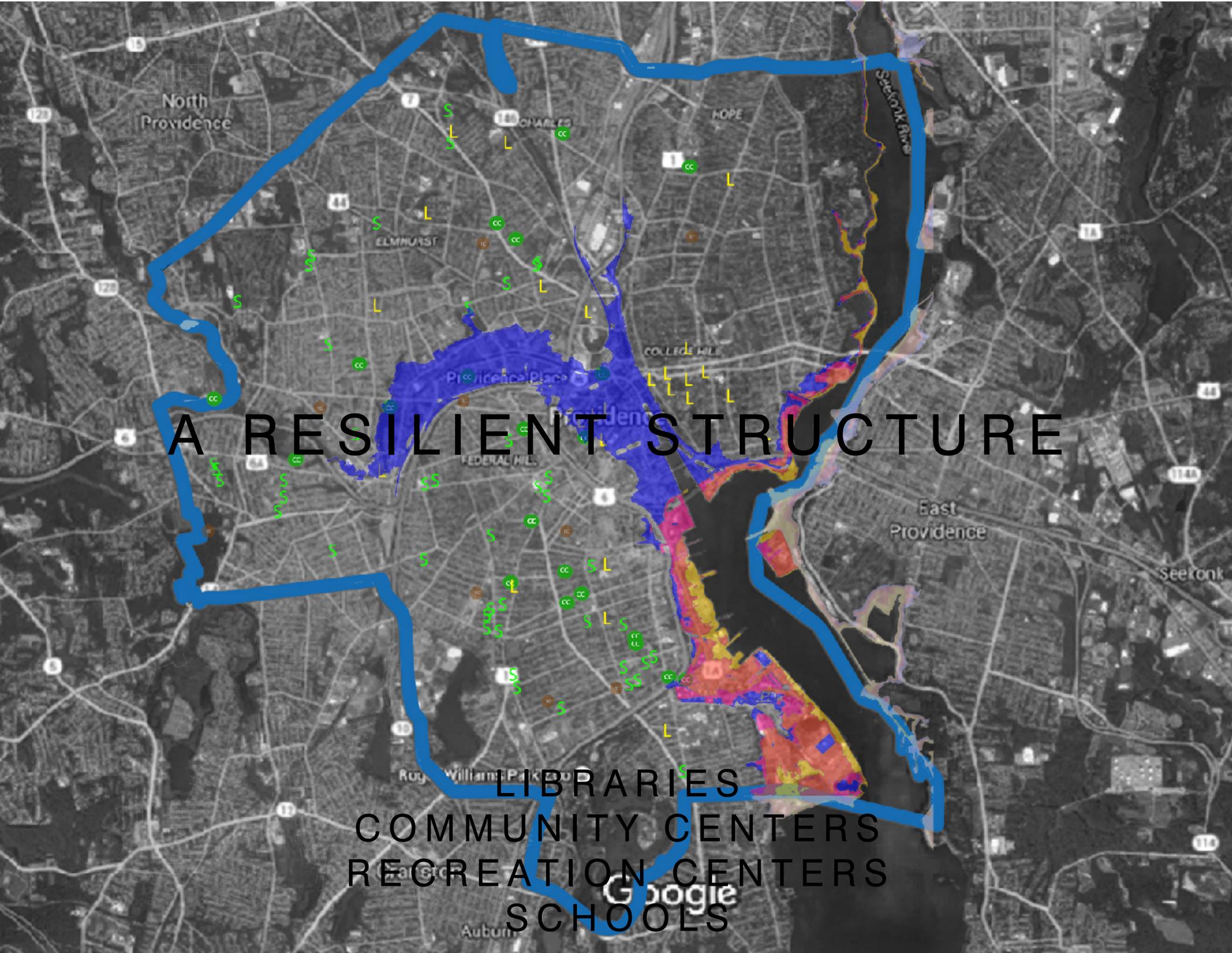


Link/Communicate



A RESILIENT STRUCTURE

- LIBRARIES
- COMMUNITY CENTERS
- RECREATION CENTERS
- SCHOOLS

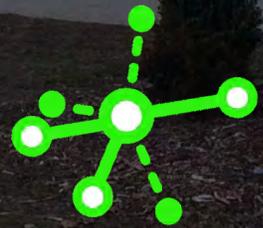
The image is a grayscale aerial map of Providence, Rhode Island, with a blue outline defining a specific geographic area. Within this area, there are several colored zones: a large blue area in the center, a pink area to the east, and a yellow area to the south. Numerous small icons are scattered across the map, including green 'S' icons, brown 'L' icons, green 'CC' icons, and blue 'R' icons. The map also shows major roads, the Seekonk River, and various neighborhood names like North Providence, Elmwood, College Hill, and East Providence. The text 'A RESILIENT STRUCTURE' is overlaid in large black letters across the center of the map.

A RESILIENT STRUCTURE

- LIBRARIES
- COMMUNITY CENTERS
- RECREATION CENTERS
- SCHOOLS



WORTH SAVING



DAVEY LOPES
RECREATION COMPLEX

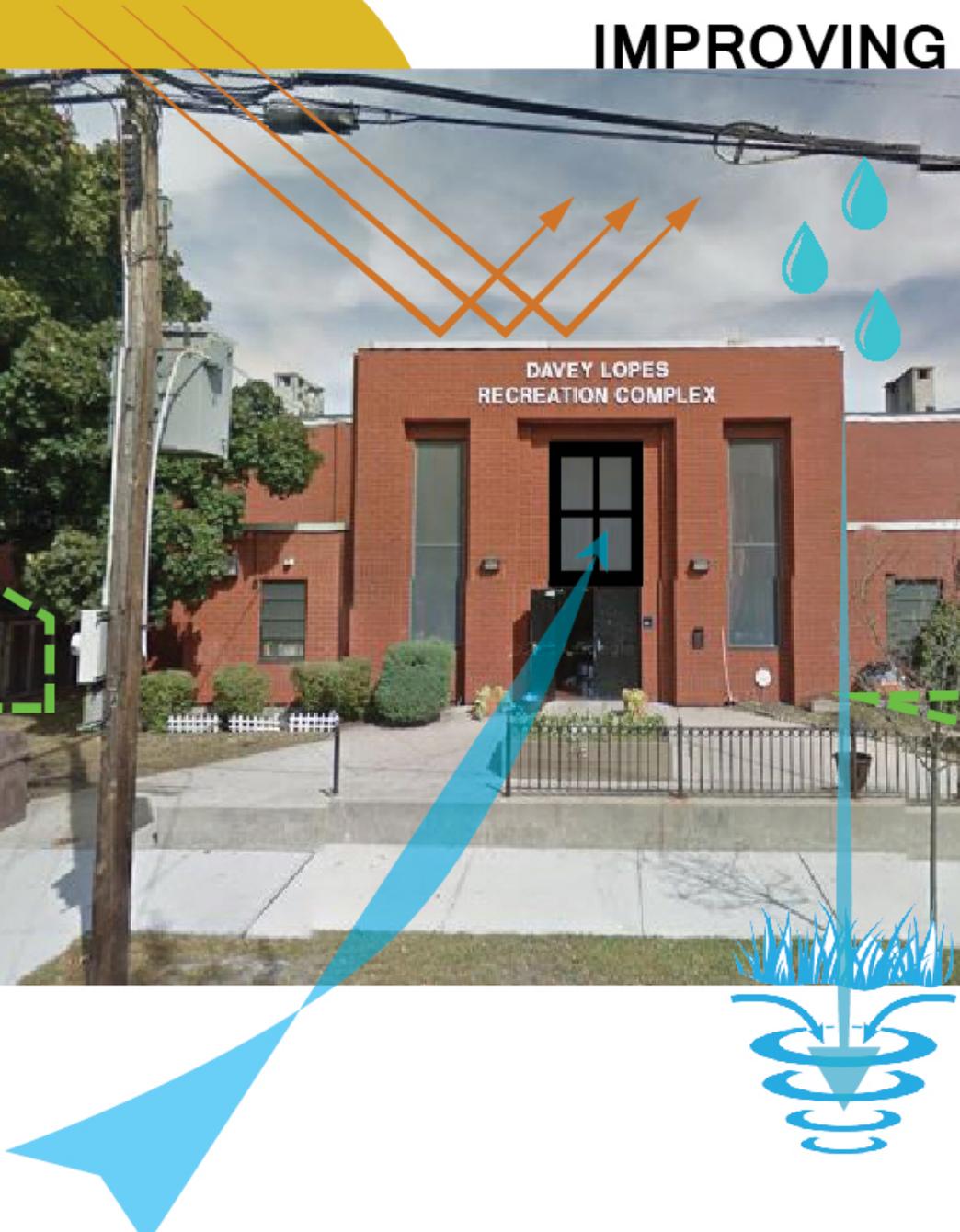


“NOTHING IS KNOCKING THIS DOWN”

- GEORGE LINDSEY



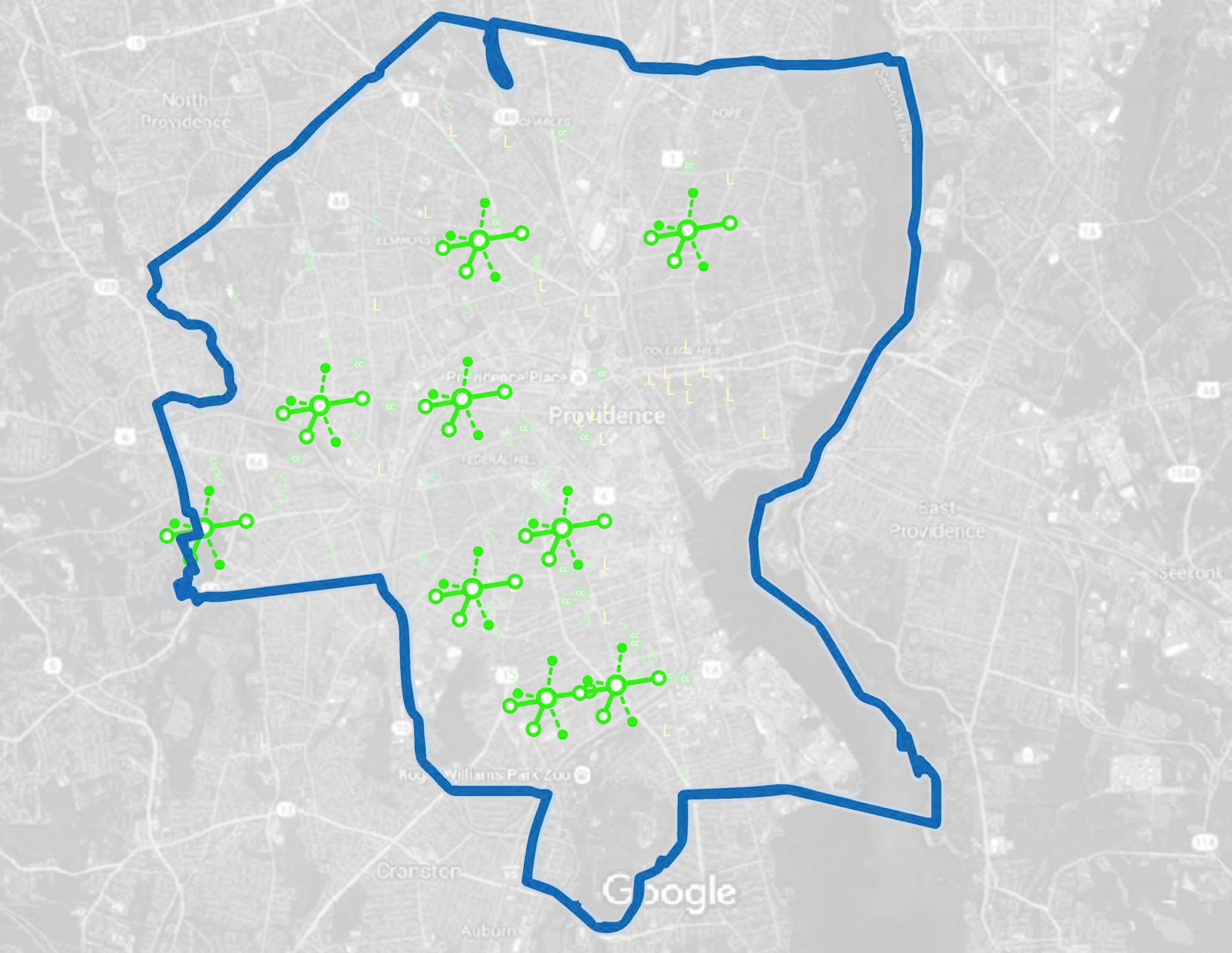
IMPROVING INFRASTRUCTURE





3 days





North Providence

CHARLES CC

HOPE

ELMWOOD

COLLEGE HILL

Providence Place

Providence

FEDERAL HILL

East Providence

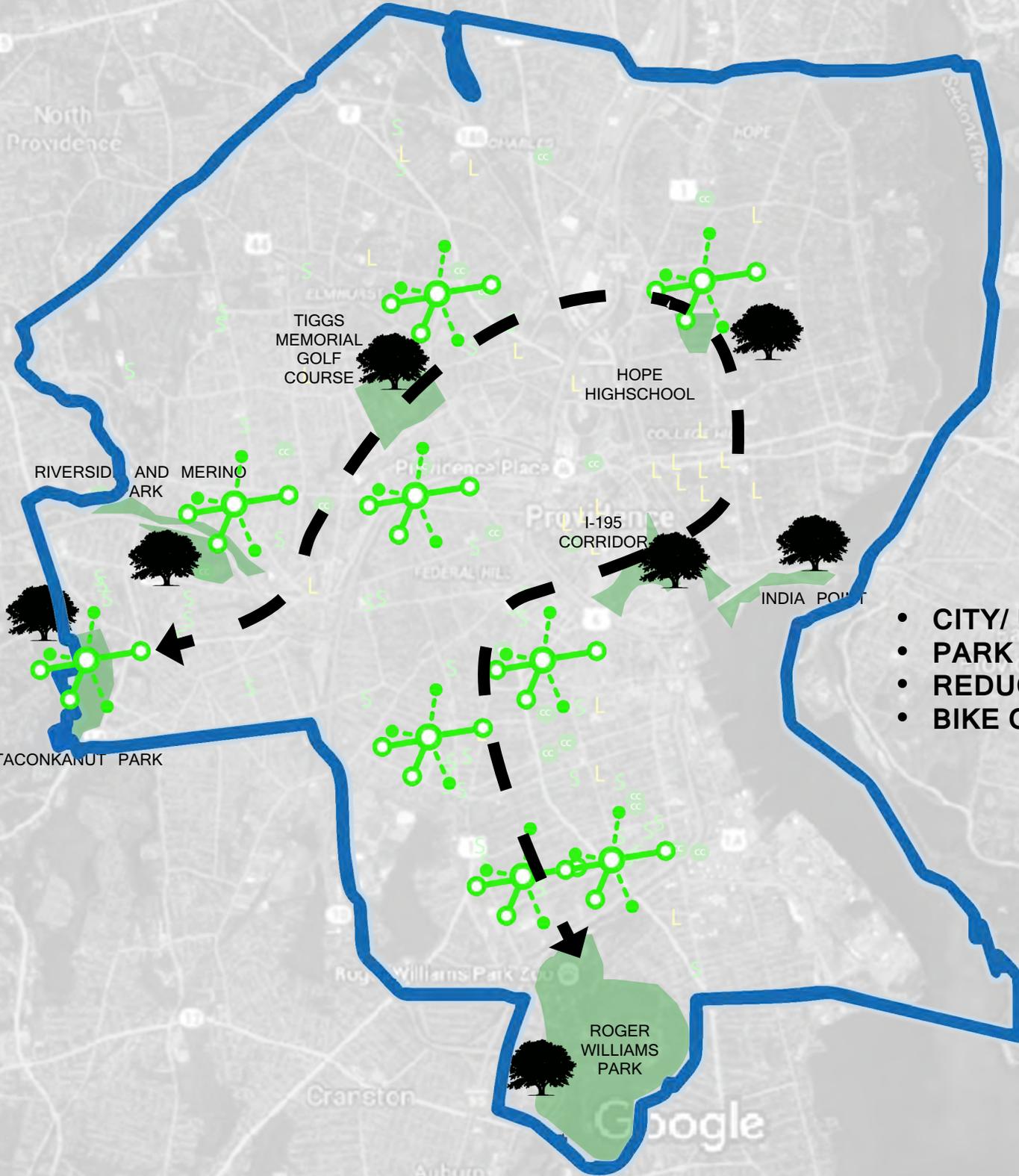
Seekonk

Roy Williams Park Zoo

Cranston

Google

Auburn



North Providence

CHARLES CC

HOPE

TIGGS MEMORIAL GOLF COURSE

HOPE HIGH SCHOOL

RIVERSIDE AND MERINO PARK

I-195 CORRIDOR

INDIA POINT

NEUTACONKANUT PARK

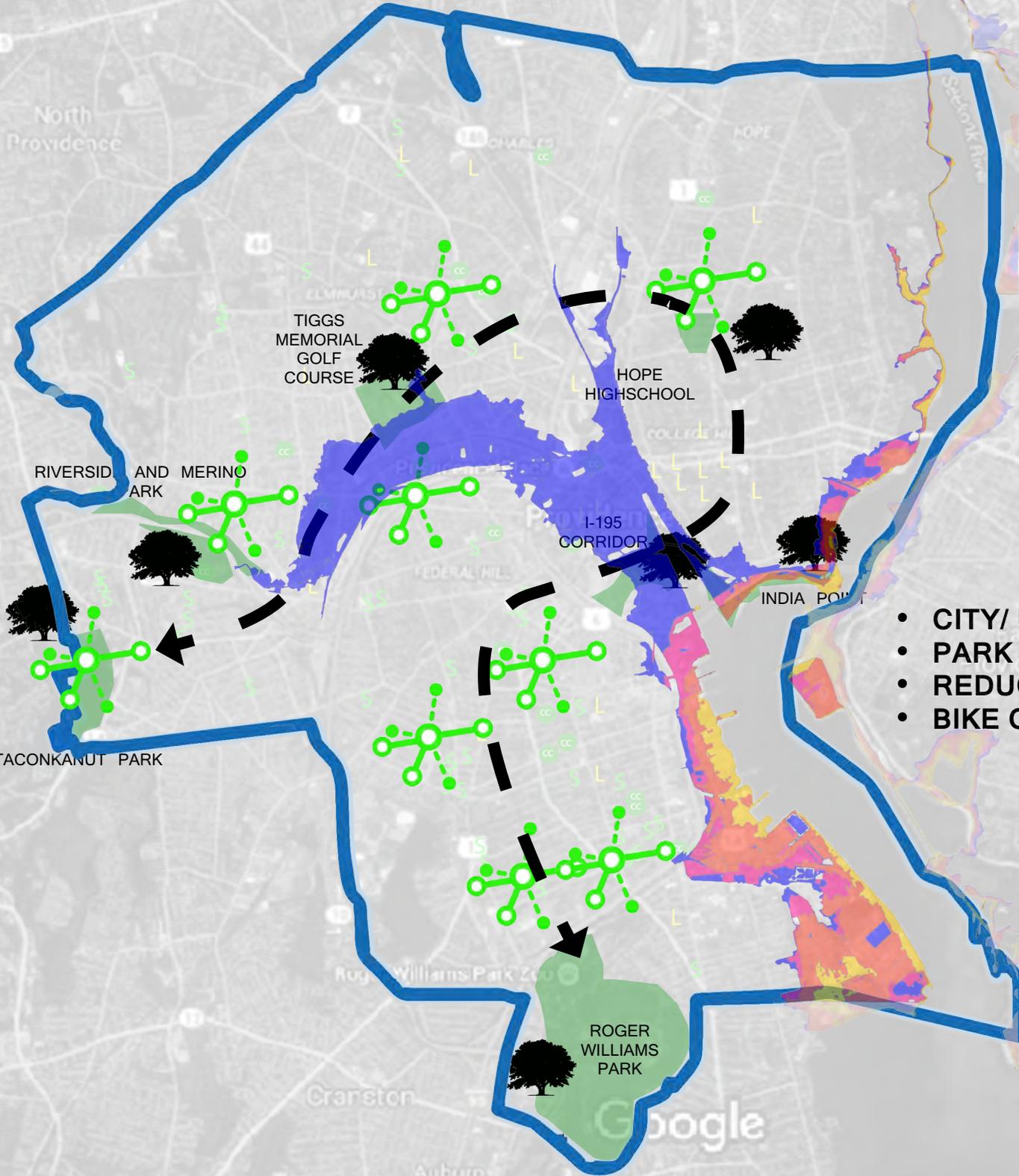
ROGER WILLIAMS PARK

- CITY/ URBAN GREENING
- PARK DEVELOPMENT
- REDUCING HARDSCAPE
- BIKE CONNECTIVITY

Cranston

Auburn

Google



- CITY/ URBAN GREENING
- PARK DEVELOPMENT
- REDUCING HARDSCAPE
- BIKE CONNECTIVITY

North Providence

TIGGS MEMORIAL GOLF COURSE

HOPE HIGH SCHOOL

I-195 CORRIDOR

RIVERSIDE AND MERINO PARK

NEUTACONKANUT PARK

ROGER WILLIAMS PARK

Google

Cranston

Auburn

Seekonk

117

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SCALE



Regional Stormwater
Code
Mass Transit
Port Strategic Hazard Mitigation



Ecodistrict Planning
Multimodal Improvements
Community Hubs
Community Empowerment



Passive Heating/Cooling
Flood Proofing Strategies
Stormwater Disconnection



Climate Resiliency - Long View

- Have a Framework, Plan, & Measure
 - Existing Frameworks
 - Providence Comprehensive Plan
 - Focused & Integrated Vulnerability Assessments
- Using Existing Building and Development Regulations
 - Zoning
 - Building Code
 - Design Standards
- Geographic Focus Areas
 - Resiliency Districts
 - Port of Providence
- Tactical Focus Areas
 - Training the PVD design/engineering community
 - Tactics for Existing Buildings
 - City Government Leading by Example
 - Partnering with Long Term Owners
 - Collaborating Regionally - Sharing Globally
 - Exploring Financing and Incentive Options



Utilize existing frameworks for promoting & assessing progress

- **Climate Risk and Adaptation Framework and Taxonomy (CRAFT) -**
 - Developed for Compact of Mayor's reporting and measuring progress on city climate resiliency
- **Fit Climate Resiliency into the broader context/goal of city resiliency**
 - City Resilience Framework and City Resilience Index
- **Promote and incentivize the Resiliency Pilot Credits for LEED**
- **Promote Insurance Institute for Business & Home Safety's FORTIFIED Home Program**
 - Currently being promoted in RI by CRMC - first state in north Atlantic region



Climate Resiliency as core principal to Providence Comprehensive Plan

- **Sustainable Development Evaluation Tool**
 - expand to include climate resiliency emphasis
 - Use for both public & private developments
- Using **CRAFT** as a measurement tool for Comprehensive Plan implementation



Focused Asset and System Integrated Climate Vulnerability Assessments

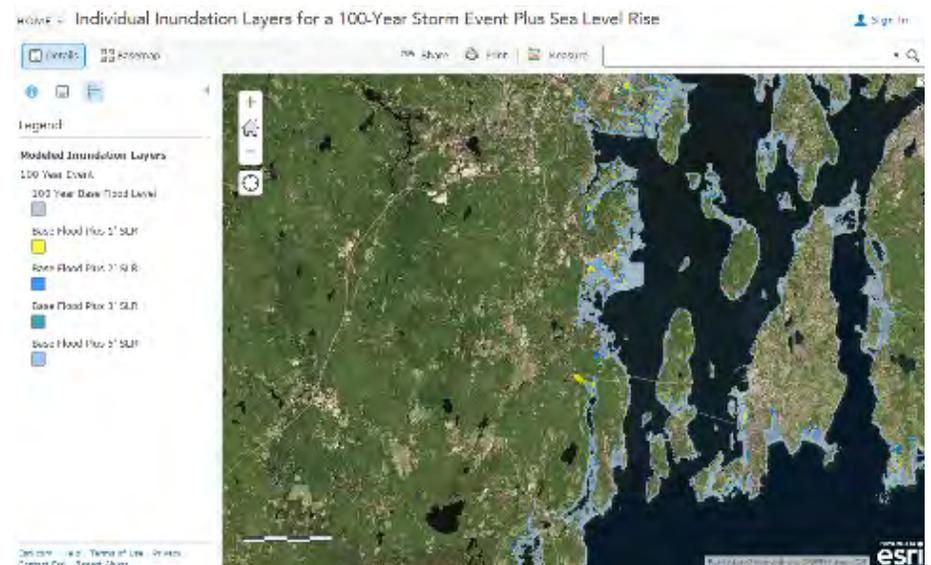
- RI Hospital and health care system
- Transportation
- Stormwater
- Power
- IT & Communications
- Food



- Vulnerability (Sensitivity & Adaptive Capacity) and Risk (Probability & Consequence)
- Equity and Environmental Justice Lens
- Multivariate Risk and Vulnerability Assessment

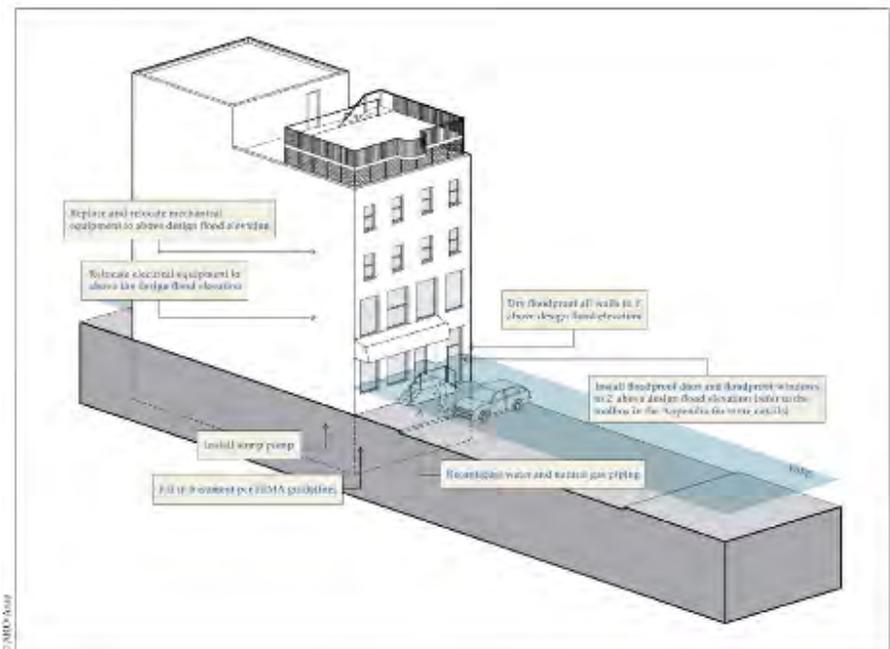
Zoning

- **CRMC**
 - Moving towards requiring climate/sea level scenario analysis as part of future permitting
- **STORMTOOLS**
how to incorporate sea level rise and storm surge models into zoning
 - Using FEMA flood maps is not appropriate in a changing climate
 - How to incentivize density and height as ground floor uses need to evolve to wet uses over time
- **Adapt NYC's 2013 Flood Resilience Zoning Amendment**
- Consider incorporating climate change preparedness into **Zoning Variance** and **City Plan Commission Reviews**



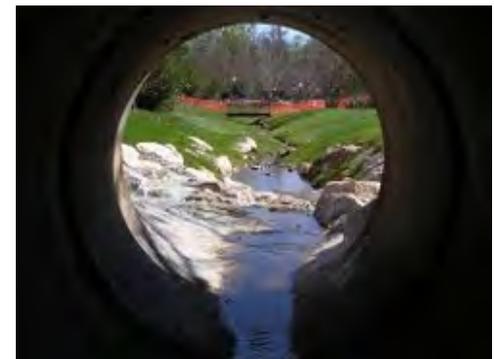
Building Code

- Build on RI's national leadership in code adoption (including IGCC) by **advocating for amendments** focused on Climate Resiliency
 - Consider different standards for new construction and renovations



Infrastructure resiliency design standards

- Based on climate projections and vulnerability assessments completed so far; **Adopt infrastructure design standards that tie to the full expect life on the infrastructure**
 - Standards for new and existing asset renovations can be different
- **At city level, DPW engagement is critical**
 - Peer exchanges with other cities
- **Key for new Stormwater Utility**
 - Fee structure - incentivize on-site percolation; incorporate equity

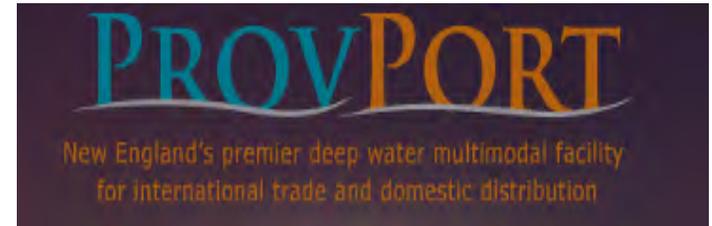


Resiliency Districts

- Providence could designate **Resiliency Districts** focused as innovation/best practice for climate resiliency and adopt distinct standards and incentives for those areas
 - 195 Corridor parcels
 - Olneyville
 - Port of Providence
- **Competitive advantage in marketing**
 - Waterfront Toronto



Port of Providence



- **How does the Port stay functionally viable in 2050? 2100?**
 - What does it look like? How does progress also address neighborhood concerns?
- **What is the right organizational structure for effectively addressing climate challenges?**
 - Need for comprehensive assessments of risk/vulnerability; future design/construction regulations, capital investments, strategy decisions
- **Resiliency requirements in infrastructure and capital planning**
- **ProvPort operating license expires in 2036 - opportunity to think about the right organizational structure going forward**

Port of Providence

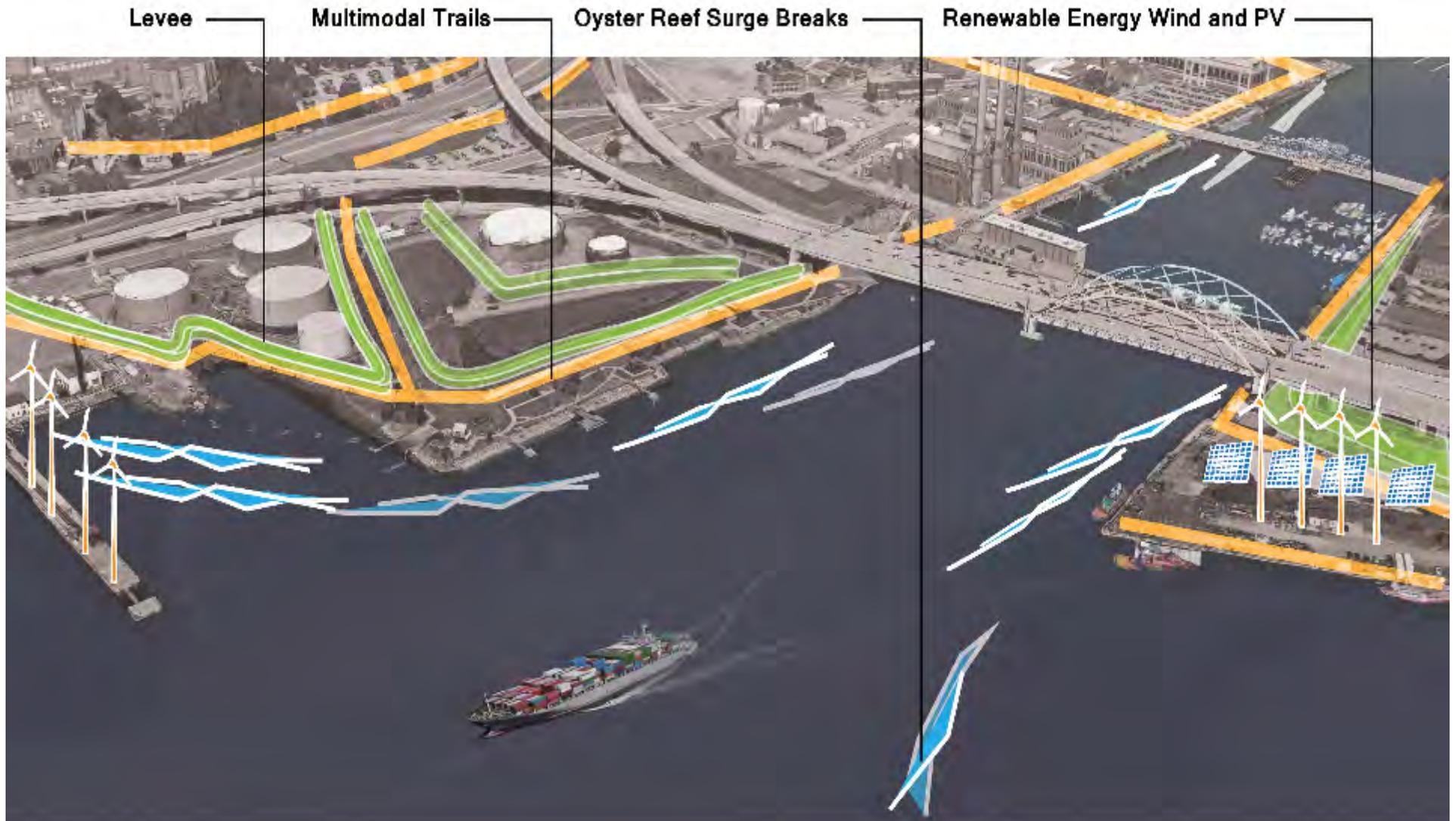


How does Port of Providence become the most climate resilient port on the East Coast?



7ft sea level rise (2100 projection) with 10% storm (10 year storm)

Resilient Port



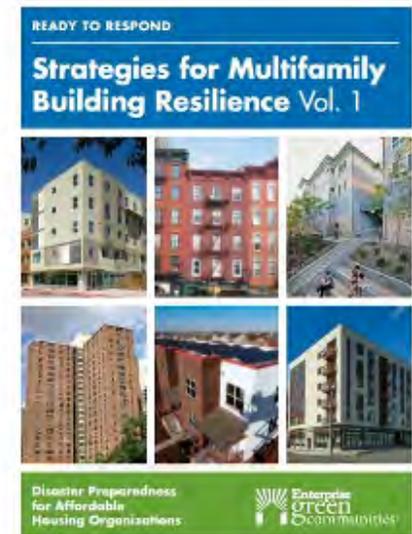
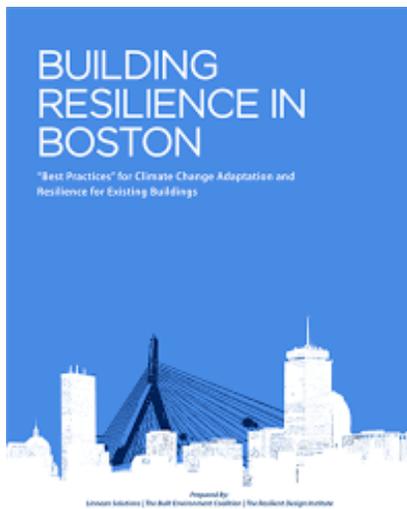
Training the RI Design/ Engineering Community

- An informed Providence design and engineering community is a critical factor to improving building resilience
- Permanent and temporary solutions



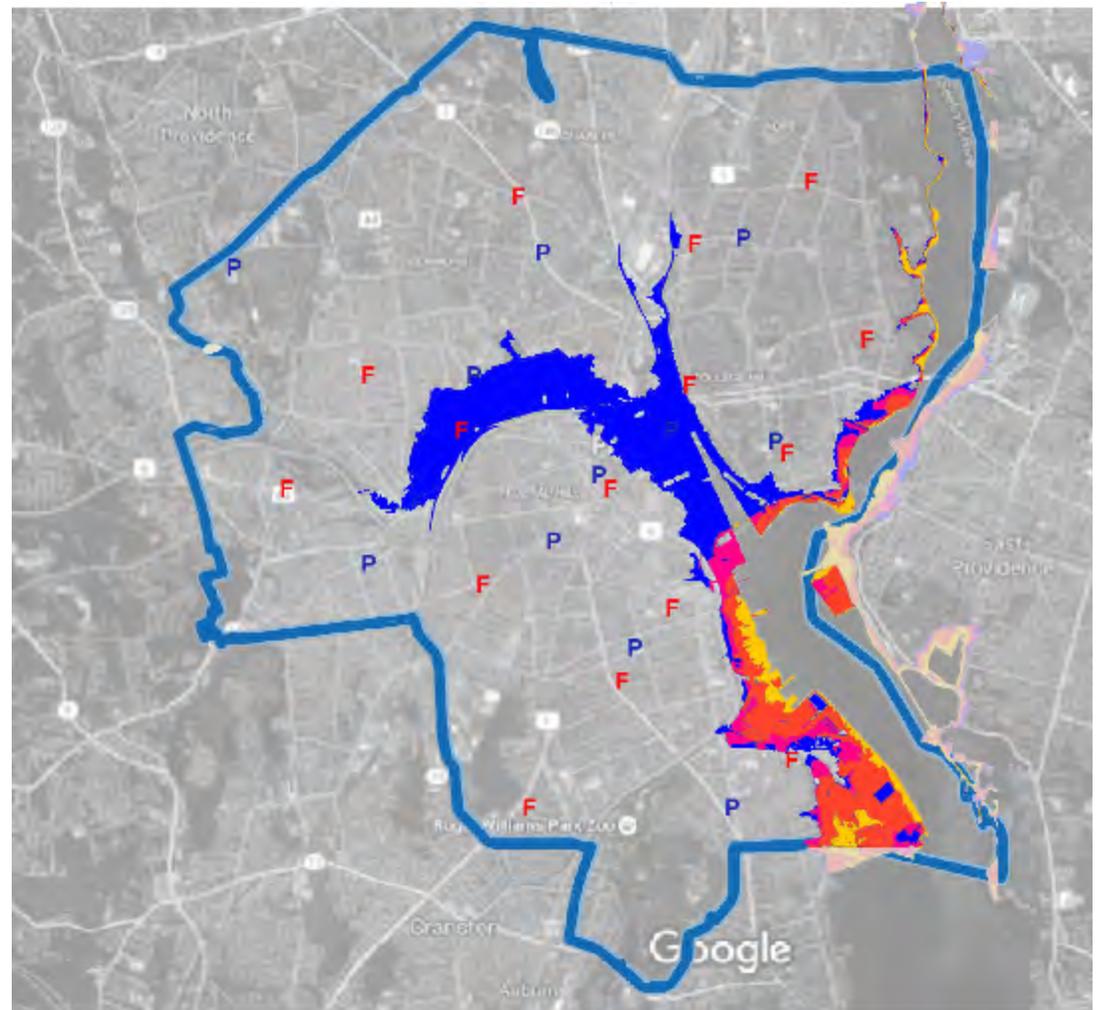
Recommendations for Existing Buildings

- Preparing existing buildings is a larger challenge; especially historic structures
- Providence can build off the work in other cities to identify strategies for its existing buildings



City Can Lead by Example

- Set municipal asset standards that lead by example
 - Identify city government assets and service vulnerabilities
 - Develop and launch strategies for risk reduction



Partner with long-term owners

- Identify and partner with real estate owners that are long term stakeholders and have long term visions
- Medical institutions
- Higher education
- Major real estate owners



PROVIDENCE
COLLEGE



BROWN



Partnering Regionally - Sharing Globally

- Climate change impacts don't respect municipal boundaries - need to coordinate regionally
 - Convene regional mayors, planning authorities, and infrastructure owners to coordinate assessments and strategies for resiliency
- Partner with other cities globally with similar characteristics and facing similar risks



Cities with Similar Hazard Risk Profiles

**Metro Mayors Coalition
Climate Preparedness
Taskforce**



The Coalition launched a Taskforce to address vulnerabilities in the region's shared critical infrastructure.

The Taskforce will:

- help to coordinate a regional and cross-governmental effort;
- ensure coordination and integration of existing and planned mitigation and resiliency work, to optimize the outcomes of both efforts; and
- work fairly, equitably, and inclusively to ensure that vulnerable populations have access to protective measures and adaptive capacity in the face of climate change.



Metro Mayors Coalition Climate Preparedness Summit May 12, 2015

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Exploring financing options

There are a number of available programs and instruments that can be applied to climate resiliency, adaptation, and infrastructure improvements:

- **Start with spending existing funding streams with resiliency in mind**
- District Improvement Financing (DIF) and Business Improvement Districts (BIDs)
- Density Bonuses
- RI Green Infrastructure Bank
- RI Office of Energy Resources
- Army Corps of Engineers
- Natural Hazard Mitigation Plans
- PACE + R
- Green Bonds
- EPA Brownfields funding
- HUD





- **Climate resiliency** as lens for all actions
- **Incremental** and **transformative**
- **Policy and governance structures**
- **Social and racial equity** in resiliency planning
- **Community and physical connectivity**

Special Thanks to:

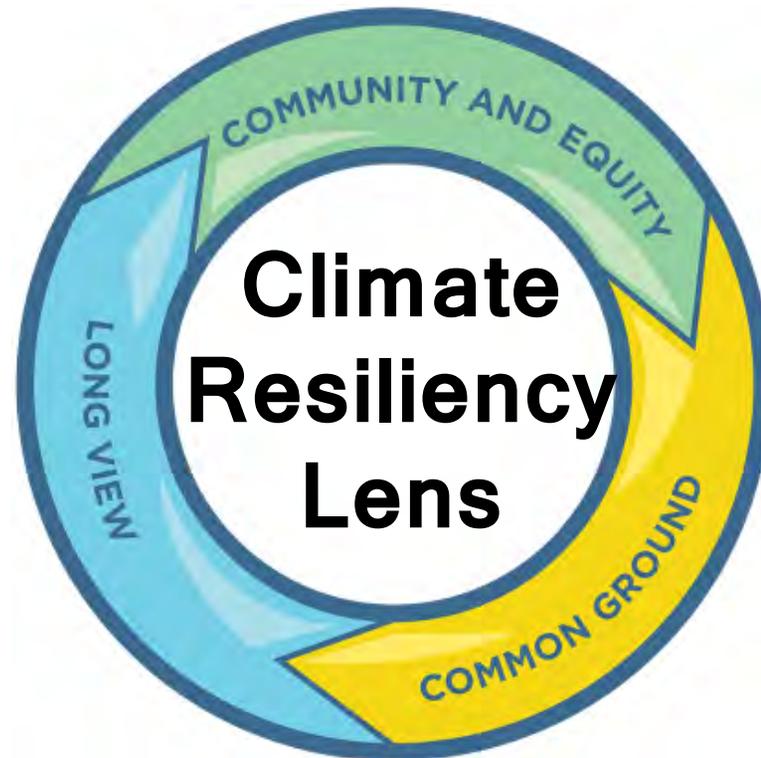
- Over **110 residents** who participated in the DART
- Mayor Jorge Elorza, Senator Whitehouse, EPA Regional Administrator Curt Spalding
- Leah Bamberger, Providence Sustainability Director
- Coordinators and support: Kelly Taylor, Cesar Teo, Ania Szemiot, and Alex Wilson
- Volunteers: Louis Epstein, Eric Kretsch, Lauren Watka, Emily Williams, Emma Gleeman, Katie Denman, Tathya, and Julia Foote
- People's Power & Light for making this a green event

Common Threads: Resilient PVD

Presentation and Final Report

www.DesignResiliency.org

www.aia.org/liv_sdat



www.SustainPVD.org

6 Strategies

Connect

Gather

Cool

Absorb

Adapt

Link

COMMON THREADS : RESILIENT PVD

DESIGN AND RESILIENCE TEAM

CITY OF PROVIDENCE

NEMSN/ AIA DART PRESENTATION

FEBRUARY 3, 2016

MAYOR JORGE ELORZA

DIRECTOR OF SUSTAINABILITY : LEAH BAMBERGER

**444 WESTMINSTER STREET
MAIN CONFERENCE ROOM
PROVIDENCE, RI**



SUSTAINPVD

